

## Ranger Authorization

Date published: 2020-07-28

Date modified: 2023-09-07



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## Using Ranger to Provide Authorization in CDP

Apache Ranger manages access control through a user interface that ensures consistent policy administration across Cloudera Data Platform (CDP) components. Security administrators can define security policies at the database, table, column, and file levels, and can administer permissions for specific LDAP-based groups or individual users. Rules based on dynamic conditions such as time or geolocation can also be added to an existing policy rule. The Ranger authorization model is pluggable and can be easily extended to any data source using a service-based definition.

Once a user has been authenticated, their access rights must be determined. Authorization defines user access rights to resources. For example, a user may be allowed to create a policy and view reports, but not allowed to edit users and groups. You can use Ranger to set up and manage access to Hadoop services.

Ranger enables you to create services for specific resources (HDFS, HBase, Hive, etc.) and add access policies to those services. Ranger security zones enable you to organize service resources into multiple security zones. You can also create tag-based services and add access policies to those services. Using tag-based policies enables you to control access to resources across multiple components without creating separate services and policies in each component. You can also use Ranger TagSync to synchronize the Ranger tag store with an external metadata service such as Apache Atlas.

**Note:**

You can configure authorization using the Ranger UI, REST APIs, or client libraries. For more information about:

- Ranger REST APIs, see <https://ranger.apache.org/apidocs/index.html>.
- Ranger client libraries, see [Using Ranger client libraries](#).

## Ranger plugin overview

Ranger enforces authorization using a plugin model.

Ranger at the core has a centralized web application, which consists of the policy administration. These policies are enforced within the Hadoop ecosystem using lightweight Ranger Java plugins. These plugins run as part of the same process as the namenode (HDFS), HiveServer2(Hive), HiveMetaStore, HBase server (Hbase), Kafka, Solr, NiFi, Raz, RazS3, ADLS, Yarn and Knox server (Knox). Plugins are enabled by default for each of these components except (Solr) and can be disabled individually, using Cloudera Manager.

Ranger plugins exist in the path of the user request. Each plugin decides whether to allow or deny user requests for accessing. Each plugin also collects and stores the access request details as access audit log records.

Ranger plugins enforce the policies defined in the policy database. Ranger Admin users can create a policy for a specific set of resources and assign a specific set of permissions to a specific set of users, groups and roles. Ranger admin users manage policies using the Ranger Admin Web UI.

Ranger policies are independent from native permissions (os permission). Ranger uses native permissions to authorize user access in the case that an applicable Ranger policy does not exist in the policy database.

## Ranger Hive Plugin

Describes how the Ranger Hive plugin enforces authorization.

Ranger Hive Plugin is enabled in HiveServer2 which helps in storage-based authorization and SQL-standard authorization. In storage-based authorization when a new table is created by running CREATE TABLE statement in Beeline, which will submit query to HiveServer2 for processing, and before HiveServer2 is able to run the query, it will check the policy cache file and make sure the user who submits the query has the appropriate permission to perform the task. Once the authorization passes, a query is submitted and a table created.

Upon successful creation of the new table, two things will be triggered by Ranger's Hive plugin:

1. Sends audit event to Solr and/or HDFS
2. Sends Kafka event to topic "ATLAS\_HOOK", to record that a new entity has been created, so effectively Ranger's Hive Plugin is the producer for "ATLAS\_HOOK" topic in Kafka

SQL standard authorization provides grant/revoke functionality at database, table level. When a grant command is executed in beeline it updates/creates a policy for that user and when revoke is executed the user is added in the deny condition of the policy.

## Ranger Hive Plugin Enforcement Example

### Prerequisite

1. Create a database, table, column in hive service and also insert some data into it with hive user.

- create database vehicle;
- create table vehicle.cars(car\_id int, car\_name string, car\_color string, car\_price int);"
- insert into vehicle.cars(car\_id, car\_name, car\_color, car\_price) VALUES (1,'car1','color1',100000), (2,'car2','color2',200000), (3,'car3','color3',300000), (4,'car4','color4',400000);
- select \* from vehicle.cars;

2. Create external user 'externaluser1'

### Access Enforcement steps

1. Let's try to access the vehicle.cars table using 'externaluser1'.

'externaluser1' will be denied access, because 'externaluser1' lacks permission to access the vehicle.cars table.

2. Lets create a policy in ranger-hive for the user:

- Resource : [database=vehicle, table=cars, column=\*]
- allow policy item : [user='externaluser1', permission=select]

3. Let's try to access the vehicle.cars table using 'externaluser1'.

'externaluser1' will be allowed access, because 'externaluser1' now has permission to access the vehicle.cars table.

4. You can check the logs related to these actions, using Ranger Admin Web UI Access Audit tab.

### Masking Enforcement steps

Suppose you don't want to show the car\_price to 'externaluser1' user so we can mask the data of that column for that user.

1. Lets create a masking policy in ranger-hive for the user:

- Resource : [database=vehicle, table=cars, column=car\_price]
- allow policy item : [user='externaluser1', permission=select, Select Masking Option=Partial mask: show last 4]

2. Now let's try to access the vehicle.cars table using 'externaluser1'

'externaluser1' will see the car\_price - only last 4 digits - because 'externaluser1' has masked access to vehicle.cars table.

### Row Enforcement steps

Suppose you don't want to show the only one row to 'externaluser1' user so we can do it using the row filter policy.

1. Lets create a masking policy in ranger-hive for the user:

- Resource : [database=vehicle, table=cars]
- allow policy item : [user='externaluser1', permission=select, Row Level Filter=car\_color = 'color4']

2. Now let's try to access the vehicle.cars table using 'externaluser1'.

'externaluser1' will see only the row whose car\_color is 'color4'.

**Table 1: Hive Commands to Ranger Permission Mapping**

| Permission          | Action  |
|---------------------|---|
| SELECT              | Gives read access to an object.   |
| CREATE              | Hive Create Table statement is used to create table.  |
| UPDATE              | Gives the ability to run update queries on an object (table).   |
| ALTER               | You can rename the table and column of existing Hive tables.<br>You can add a new column to the table.<br>Rename Hive table column.<br>Add or drop table partition.<br>Add Hadoop archive option to Hive table.   |
| DROP                | DROP TABLE command in the hive is used to drop a table inside the hive.   |
| INDEX               | An Index is nothing but a pointer on a particular column of a table. Creating an index means creating a pointer on a particular column of a table.  |
| LOCK                | Is used to lock the table.  |
| Read                | Read data from HDFS using hdfs or other cloud locations.  |
| Write               | Export Data to a location in hdfs or other cloud locations.   |
| ReplAdmin           | ReplAdmin privilege is related to REPL DUMP and REPL LOAD commands.   |
| Service Admin       | Enable hive ranger plugin to isolate various admin operations, in this case "Kill Query". "Service Admin" won't be able to do DATABASE / TABLE / COLUMN operations as this will all be taken care by the existing DATABASE/TABLE/COLUMN level permission model. |
| Temporary UDF Admin | Temporary UDF Admin is needed for creating UDFs.  |
| Refresh             | Refresh is used by only impala.   |
| ALL                 | This is for all the permission mentioned above.   |

## Ranger Kafka Plugin

Describes how the Ranger Kafka plugin enforces authorization.

Ranger Kafka plugin is enabled in master.

### Ranger Kafka Plugin Enforcement Example

Prerequisite

1. Create external user 'externaluser3'

Access Enforcement steps

1. Let's try to create a topic and send some data using 'externaluser3', he will be denied as he doesn't have permission to create it.
2. Lets create a policy in ranger-hive for the user
  - Resource : [Topic=topicstest01]
  - allow policy item : [user='externaluser3', permission=publish, consume, describe, create]
3. Let's try to create a topic and send some data using 'externaluser3', he will be allowed as he gets permission to access it.
4. You can check the logs related to these actions, using Ranger Admin Web UI Access Audit tab.

**Table 2: Kafka Commands to Ranger Permission Mapping**

| Permission                | Action                       |
|---------------------------|------------------------------|
| Resource = topic          |                              |
| Publish, Describe, Create | To produce topic and publish |
| Describe, Create          | To describe topic            |
| Describe                  | sending message to topic     |
| Publish                   | To publish topic             |
| Consume                   | To read data (consume)       |
| Describe                  | To list topic                |
| Configure                 | To alter config of topic     |
| Delete                    | To delete topic              |
| Describe Config           | To describe config of topic  |
| Alter Config              | To alter config              |
|                           |                              |
| Resource = consumergroup  |                              |
| Describe                  | To describe topic            |
| Consume                   | To consume topic             |
|                           |                              |
| Resource = cluster        |                              |
| Create                    | To create topic              |
| Describe                  | To describe topic            |
| Idempotent Write          | To write idempotently        |
|                           |                              |
| Resource = transactionid  |                              |
| Describe, Publish         | To publish and describe      |

## Ranger special entities

Ranger in CDP has specific, internal groups and entities that affect user authorization and access to all services in CDP.

In addition to any users, group, roles and permissions that you define using Ranger, you must understand the following Ranger special entities:

### "public" group

A special, internal group within Ranger that consists of all users, including future users. Membership is implicit and automatic.



**Note:** All users belong to "public" group. Any policies granted to this group provide access to everyone.

The following, default policies give permissions to members of group "public":

- all - database > public > create permission
- default database tables columns > public > create permission
- Information\_schema database tables columns > public > select permission



You can remove “public” from these default policies to further restrict user access, based on your security requirements.

### **{OWNER} special entity**

A special Ranger entity attached to a user based on their actions. For example, when a user "bob" creates a table, "bob" becomes the {OWNER} of that table and would get any permissions provided to {OWNER} on that table across all the policies. The following default policies have permissions for {OWNER}:

- all - database, table, column > {OWNER} > all permissions
- all - database, table > {OWNER} > all permissions
- all - database, udf > {OWNER} > all permissions
- all - database > {OWNER} > all permissions

Although not recommended, you can modify access to special entity {OWNER}, based on your security requirements. Removing the default {OWNER} permissions may require adding additional, specific policies for each object owner, which may increase your policy management operational burden.

## Enabling Ranger HDFS plugin manually on a workload cluster

How to enable an HDFS plugin for Ranger, service-wide, on a workload cluster.

### **About this task**

The Ranger HDFS plug-in helps to centralize HDFS authorization policies. Apache Ranger plugins validate the access of a user against the authorization policies defined in the Apache Ranger policy administration server, and stored in the HDFS service instance, also called a repository. When you enable the Ranger HDFS plugin and an HDFS service user attempts access, Ranger checks whether a policy exists granting or denying the user access. If no policy exists, Ranger defaults to use the native permissions model in HDFS. Access control rules configured through this combination of Ranger HDFS plugin and native file system permissions apply.

To enable users define Ranger authorization policies, using an HDFS service plugin:

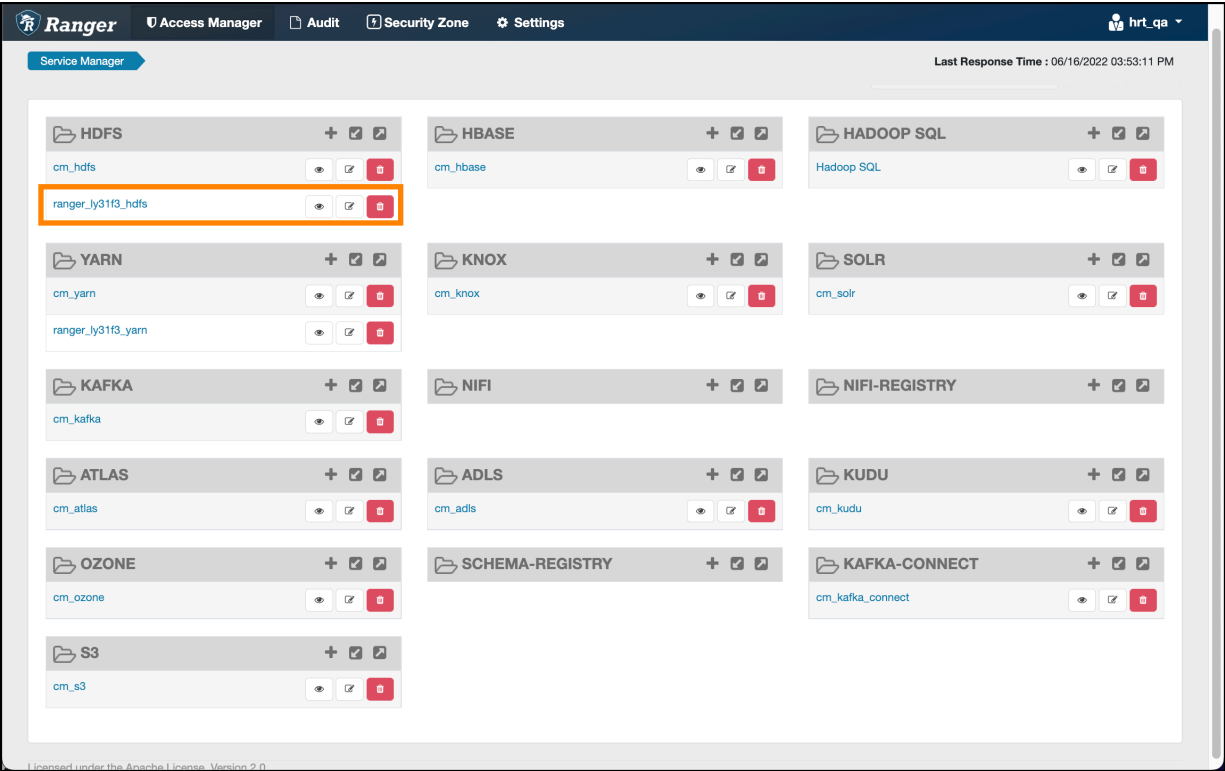
### **Procedure**

1. In a workload cluster, go to Cloudera Manager HDFS Configuration .



7. In Service Manager HDFS , confirm that (DataHub cluster name)\_hdfs appears.

Figure 3: Confirming HDFS plugin added

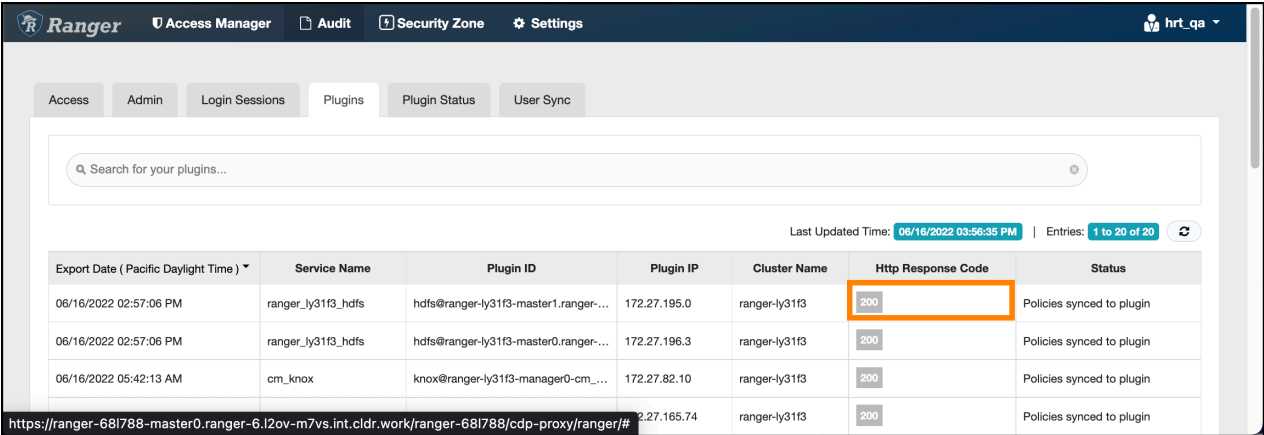


8. Go to Audit Plugins .

Results

Confirm that the Http response code for the Ranger Hdfs plugin enabled on the DataHub Hdfs service displays 200 (successful).

Figure 4: Confirming successful http response



Ranger Policies Overview

Ranger has two types of policies: resource-based and tag-based.

### Resource-based policies

Ranger enables you to configure resource-based services (HDFS, HBase, Hive, etc.) and add access policies to those services.

### Tag-based policies

Ranger enables you to create tag-based services and add access policies to those services.

## Ranger tag-based policies

Ranger enables you to create tag-based services and add access policies to those services.

### Tag-Based Policies Overview

- An important feature of Ranger tag-based authorization is the separation of resource-classification from access-authorization. For example, resources (HDFS file/directory, Hive database/table/column etc.) containing sensitive data such as social security numbers, credit card numbers, or sensitive health care data can be tagged with PII/PCI/PHI – either as the resource enters the Hadoop ecosystem or at a later time. Once a resource is tagged, the authorization for the tag would be automatically enforced, thus eliminating the need to create or update policies for the resource.
- Using tag-based policies also enables you to control access to resources across multiple Hadoop components without creating separate services and policies in each component.
- Tag details are stored in a tag store. Ranger TagSync can be used to synchronize the tag store with an external metadata service such as Apache Atlas.

### Tag Store

Details of tags associated with resources are stored in a tag store. Apache Ranger plugins retrieve the tag details from the tag store for use during policy evaluation. To minimize the performance impact during policy evaluation (in finding tags for resources), Apache Ranger plugins cache the tags and periodically poll the tag store for any changes. When a change is detected, the plugins update the cache. In addition, the plugins store the tag details in a local cache file – just as the policies are stored in a local cache file. On component restart, the plugins will use the tag data from the local cache file if the tag store is not reachable.

Apache Ranger plugins download the tag details from the store managed by Ranger Admin. Ranger Admin persists the tag details in its policy store and provides a REST interface for the plugins to download the tag details.

### Tags

Ranger Tags can have attributes. Tag attribute values can be used in Ranger tag-based policies to influence the authorization decision.

For example, to deny access to a resource after a specific date:

1. Add the EXPIRES\_ON tag to the resource.
2. Add an expiry\_date tag attribute and set its value to the expiry date.
3. Create a Ranger policy for the EXPIRES\_ON tag.
4. Add a condition in this policy to deny access when the date specified in the expiry\_date tag attribute is later than the current date.

Note that the EXPIRES\_ON tag policy is created as the default policy in tag service instances.

### TagSync

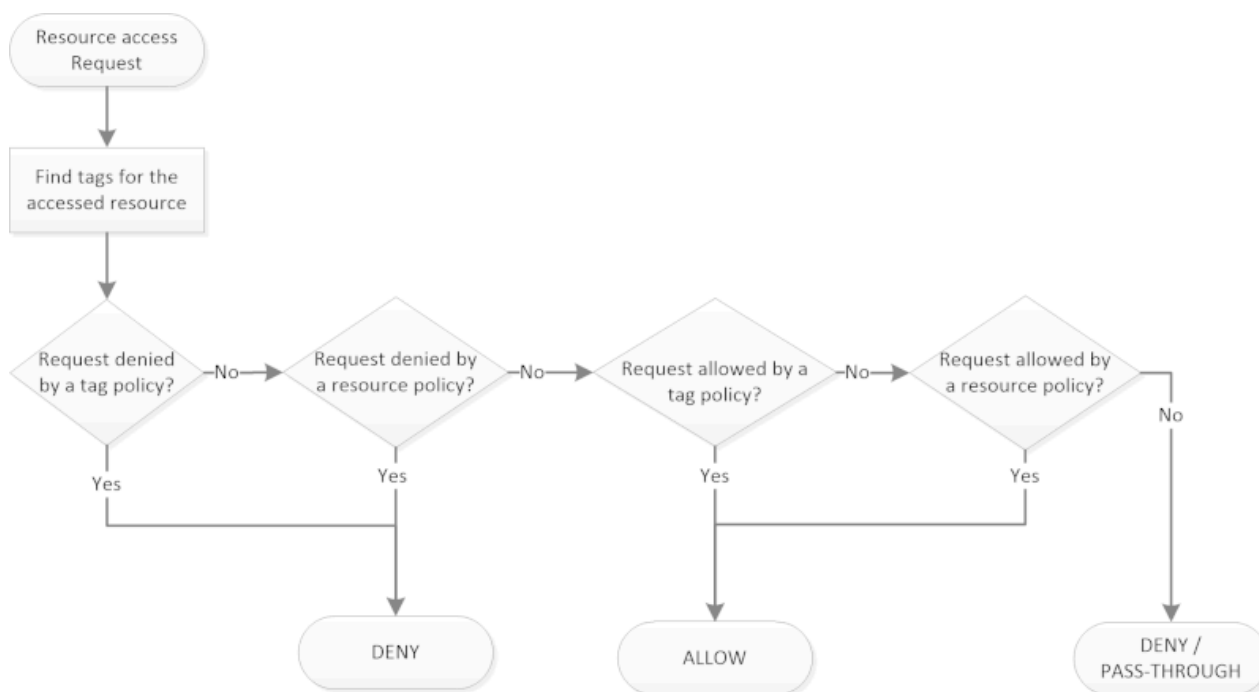
Ranger TagSync is used to synchronize the tag store with an external metadata service such as Apache Atlas. TagSync is a daemon process similar to the Ranger UserSync process.

Ranger TagSync receives tag details from Apache Atlas via change notifications. As tags are added to, updated, or deleted from resources in Apache Atlas, Ranger TagSync receives notifications and updates the tag store.

## Tags and policy evaluation

When authorizing an access request, an Apache Ranger plugin evaluates applicable Ranger policies for the resource being accessed. The following diagram shows the details of the policy evaluation flow. More details on the steps in this workflow are provided in the subsequent sections.

### Apache Ranger Policy Evaluation Flow with Tags



### Apache Ranger Policy Evaluation Flow with Tags

#### Finding Tags

Apache Ranger supports a service to register context enrichers, which are used to update context data to the access request.

The Ranger Tag service, which is part of the tag-based policies feature, adds a context enricher named RangerTagEnricher. This context enricher is responsible for finding tags for the requested resource and adding the tag details to the request context. This context enricher keeps a cache of the available tags; while processing an access request, it finds the tags applicable for the requested resource and adds the tags to the request context. The context enricher keeps the cache updated by periodically polling Ranger Admin for changes.

#### Evaluating Tag-Based Policies

Once the list of tags for the requested resource is found, the Apache Ranger policy engine evaluates the tag-based policies applicable to the tags. If a policy for one of these tag results in a deny, access will be denied. If none of the tags are denied, and if a policy allows for one of the tags, access will be allowed. If there is no result for any tag, or if there are no tags for the resource, the policy engine will evaluate the resource-based policies to make the authorization decision.

## Using Tags in Conditions

Apache Ranger allows the use of custom conditions while evaluating authorization policies. The Apache Ranger policy engine makes various request details – such as user, groups, resource, and context – available to the conditions. Tags in the request context, which are added by the enricher, are available to the conditions and can be used to influence the authorization decision.

The default policy in tag service instances, the EXPIRES\_ON tag, uses such condition to check to see if the request date is later than the value specified in tag attribute expiry\_date. This default policy does not work unless an EXPIRES\_ON tag has been created in Atlas.

## Related Information

[Apache Ranger Wiki> Context Enrichers](#)

## Ranger access conditions

The Apache Ranger access policy model consists of two major components: specification of the resources a policy is applied to, such as HDFS files and directories, Hive databases, tables, and columns, HBase tables, column-families, and columns, and so on; and the specification of access conditions for specific users and groups

## Allow Deny and Exclude Conditions

Apache Ranger supports the following access conditions:

- Allow
- Exclude from Allow
- Deny
- Exclude from Deny

These access conditions enable you to set up fine-grained access control policies.

For example, you can allow access to a "finance" database to all users in the "finance" group, but deny access to all users in the "interns" group. Let's say that one of the members of the "interns" group, "scott", needs to work on an assignment that requires access to the "finance" database. In that case, you can add an Exclude from Deny condition that will allow user "scott" to access the "finance" database. The following image shows how this policy would be set up in Apache Ranger:

**Policy Details :**

Policy ID **15**

Policy Name \*  **enabled**

Hive Database \*  **Include**

table \*  **Include** ← **Resource**

Hive Column \*  **Include**

Description

Audit Logging **YES**

**Allow Conditions :**

| Select Group                         | Select User                              | Permissions  | Delegate Admin                      |                                |
|--------------------------------------|--|--|-------------------------------------|--------------------------------|
| <input type="text" value="finance"/> | <input type="text" value="Select User"/> | <input type="text" value="All"/> <input type="text" value="edit"/> | <input checked="" type="checkbox"/> | <input type="text" value="X"/> |

Exclude from Allow Conditions :

**Deny Conditions :**

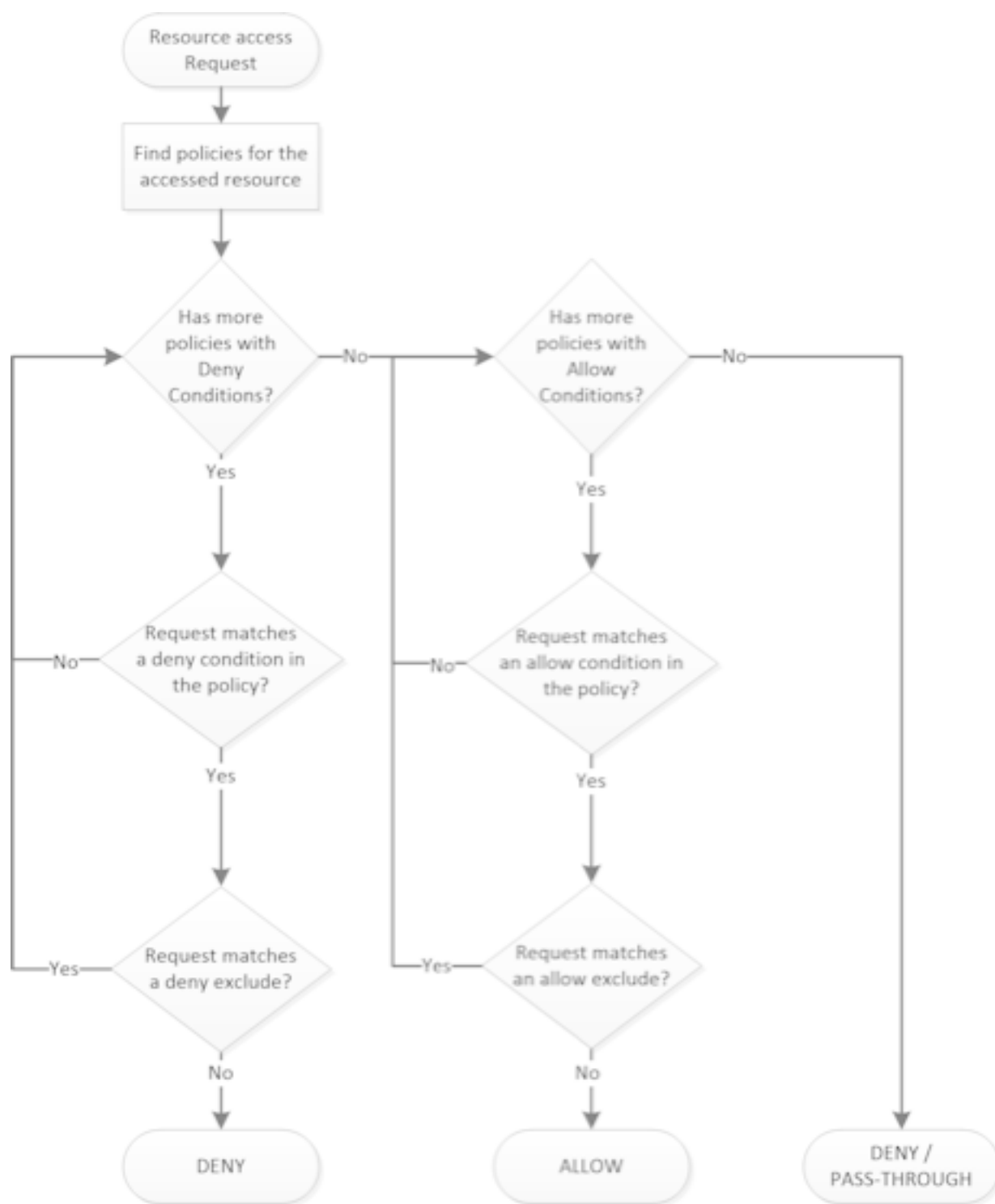
| Select Group                         | Select User                              | Permissions  | Delegate Admin                      |                                |
|--------------------------------------|--|--|-------------------------------------|--------------------------------|
| <input type="text" value="interns"/> | <input type="text" value="Select User"/> | <input type="text" value="All"/> <input type="text" value="edit"/> | <input checked="" type="checkbox"/> | <input type="text" value="X"/> |

Exclude from Deny Conditions :

| Select Group                              | Select User                         | Permissions   | Delegate Admin           |                                |
|---|-------------------------------------|---|--------------------------|--------------------------------|
| <input type="text" value="Select Group"/> | <input type="text" value="X SCOR"/> | <input type="text" value="select"/> <input type="text" value="edit"/> | <input type="checkbox"/> | <input type="text" value="X"/> |

### Policy Evaluation of Access Conditions

Apache Ranger policies are evaluated in a specific order to ensure predictable results (if there is no access policy that allows access, the authorization request will typically be denied). The following diagram shows the policy evaluation work-flow:



Apache Ranger Policy Evaluation Flow



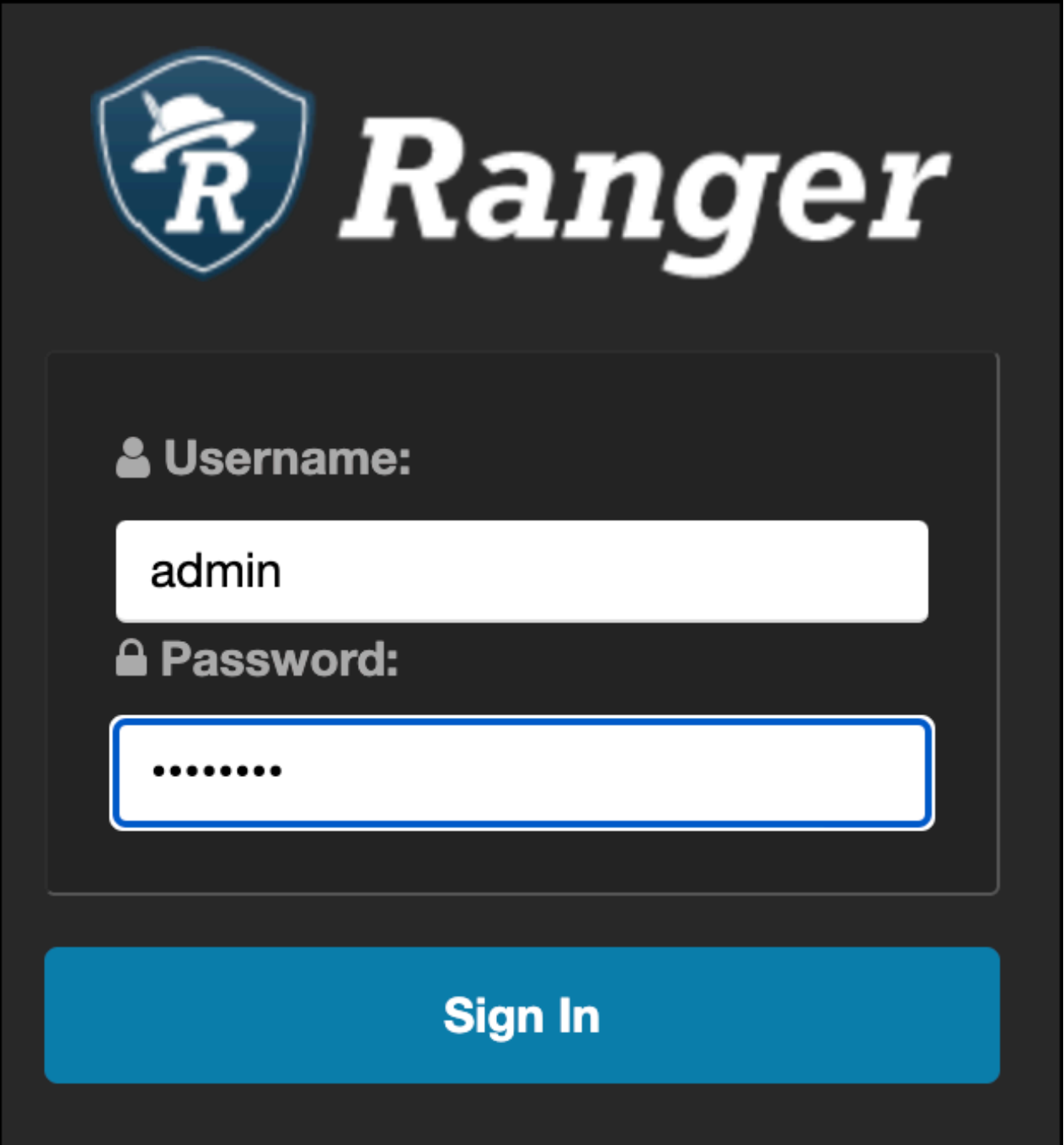
## Using the Ranger Admin Web UI

Log in through the Ranger Admin Web UI as a Ranger administrator user to administer auditing, services for CDP resources, access policies for those services and permissions to the Ranger Admin modules for other Ranger users, groups and roles.


### Accessing the Ranger Admin Web UI


How to access the Ranger Admin Web UI.

To access the Ranger Admin Web UI, go to Cloudera Manager Ranger Ranger Admin Web UI , type your user name and password, and then click Sign In.




The image shows the Ranger Admin Web UI Home Page. At the top, there is a logo consisting of a blue shield with a white 'R' and a white ranger hat, followed by the word 'Ranger' in a large, white, serif font. Below the logo, there is a dark gray rectangular box containing the login fields. The first field is labeled 'Username:' with a person icon, and it contains the text 'admin'. The second field is labeled 'Password:' with a lock icon, and it contains a series of dots. Below these fields is a large blue button with the text 'Sign In' in white.

 **Ranger**

 **Username:**

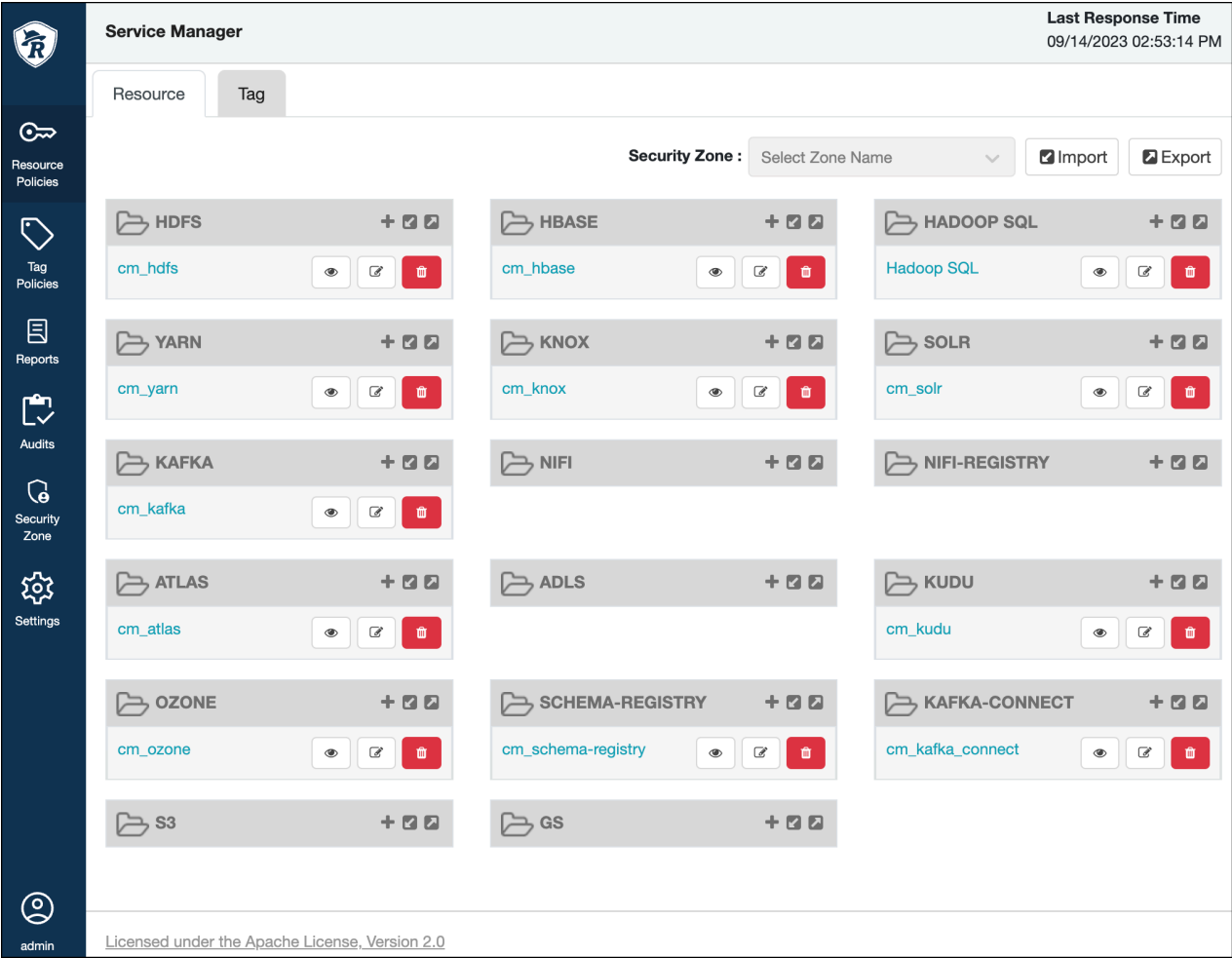
admin

 **Password:**

.....

**Sign In**

Ranger Admin Web UI Home Page



After you log in, your user name is displayed at the lower left of the Ranger Admin Web UI.

Ranger console navigation

Explains the basic Ranger console/GUI.

- The Service Manager for Resource Based Policies page displays when you log in to Ranger Admin Web UI. You can use Service Manager to create services for CDP resources (HDFS, HBase, Hive, etc.) and add access policies to those resources.

**Service Manager** Last Response Time  
09/14/2023 02:53:14 PM

Resource Tag

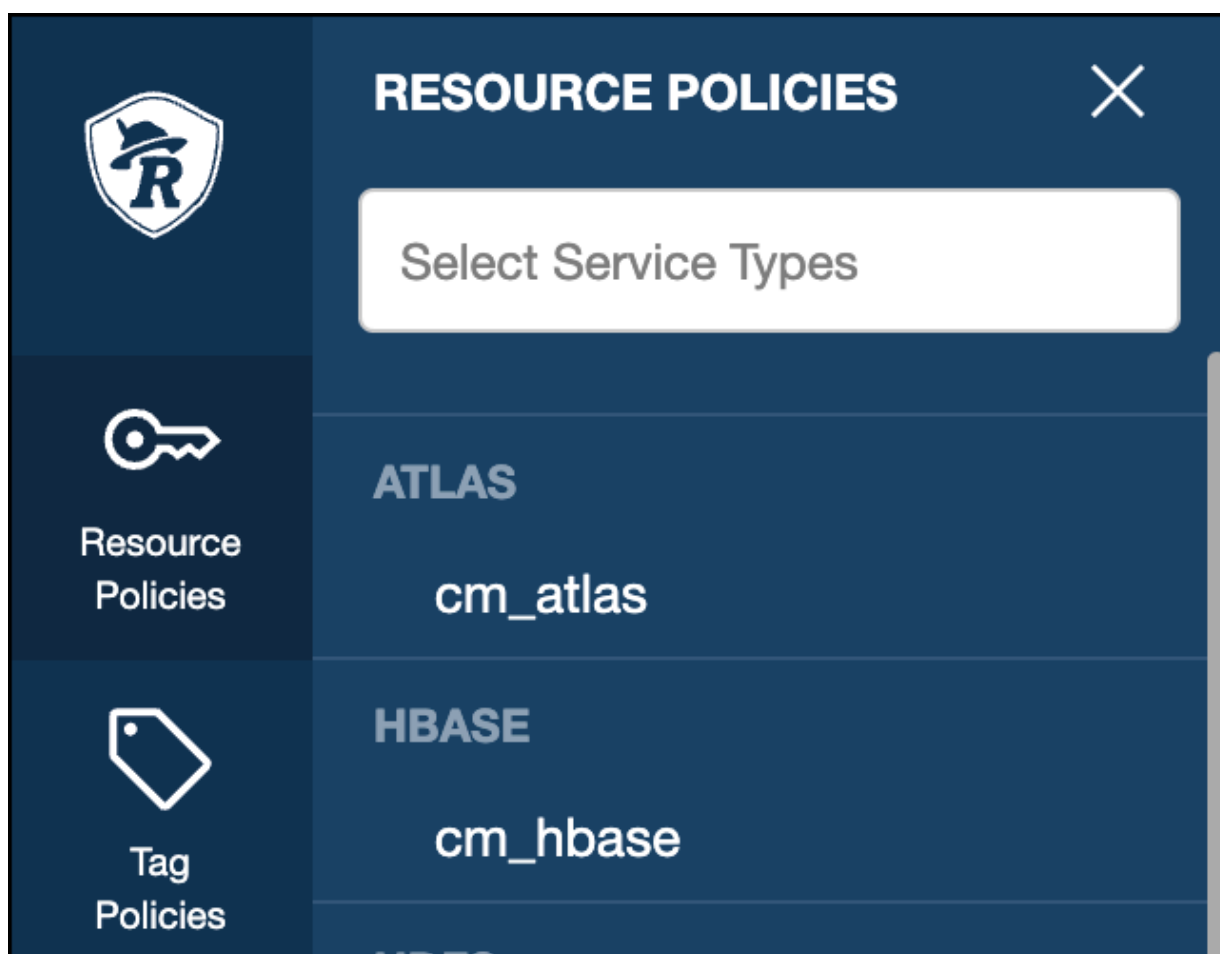
Security Zone : Select Zone Name Import Export

|  |  |  |
|--|--|--|
| <b>HDFS</b> + [icon] [icon]<br>cm_hdfs [eye] [edit] [delete]   | <b>HBASE</b> + [icon] [icon]<br>cm_hbase [eye] [edit] [delete]                     | <b>HADOOP SQL</b> + [icon] [icon]<br>Hadoop SQL [eye] [edit] [delete]          |
| <b>YARN</b> + [icon] [icon]<br>cm_yarn [eye] [edit] [delete]   | <b>KNOX</b> + [icon] [icon]<br>cm_knox [eye] [edit] [delete]                       | <b>SOLR</b> + [icon] [icon]<br>cm_solr [eye] [edit] [delete]                   |
| <b>KAFKA</b> + [icon] [icon]<br>cm_kafka [eye] [edit] [delete] | <b>NIFI</b> + [icon] [icon]  | <b>NIFI-REGISTRY</b> + [icon] [icon]   |
| <b>ATLAS</b> + [icon] [icon]<br>cm_atlas [eye] [edit] [delete] | <b>ADLS</b> + [icon] [icon]  | <b>KUDU</b> + [icon] [icon]<br>cm_kudu [eye] [edit] [delete]                   |
| <b>OZONE</b> + [icon] [icon]<br>cm_ozone [eye] [edit] [delete] | <b>SCHEMA-REGISTRY</b> + [icon] [icon]<br>cm_schema-registry [eye] [edit] [delete] | <b>KAFKA-CONNECT</b> + [icon] [icon]<br>cm_kafka_connect [eye] [edit] [delete] |
| <b>S3</b> + [icon] [icon]                                      | <b>GS</b> + [icon] [icon]  |  |

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Use the left navigation panel to navigate the Ranger Admin Web UI.

To return to the Service Manager home page, click the Ranger icon at the upper left corner of the Ranger Admin Web UI page.



- **Resource Policies** -- Clicking Resource Policies displays a list of resource-based policies. Click a specific policy name to open policy management page for the selected service. You can use the policy page to administer access policies for that service.
- **Tag Policies** -- Clicking Tag Policies displays a list of resource-based policies. Click a specific policy name to open policy management page for the selected tag-based policy. You can use the Tag policy page to administer access policies for tag-based policies.
- **Reports** -- Clicking Reports opens the Reports page. You can use the Reports page to generate user access reports for resource and tag-based policies based on search criteria such as policy name, resource, group, and user name.
- **Audits** -- Click Audits, then select Access, Admin, Login Sessions, Plugins, Plugin Status or User Sync to access the Audit page Access, Admin, Login Sessions, Plugins, Plugin Status, and User Sync tabs. These UIs provide

administrator access to monitor user activity at the resource level, and also to set up conditional auditing based on users, groups, or time.

Audits

Access

Admin

Login Sessions

Plugins

Plugin Status

User Sync

Metrics

Q

START DATE : 09/14/2023

Exclude Service Users: ☐

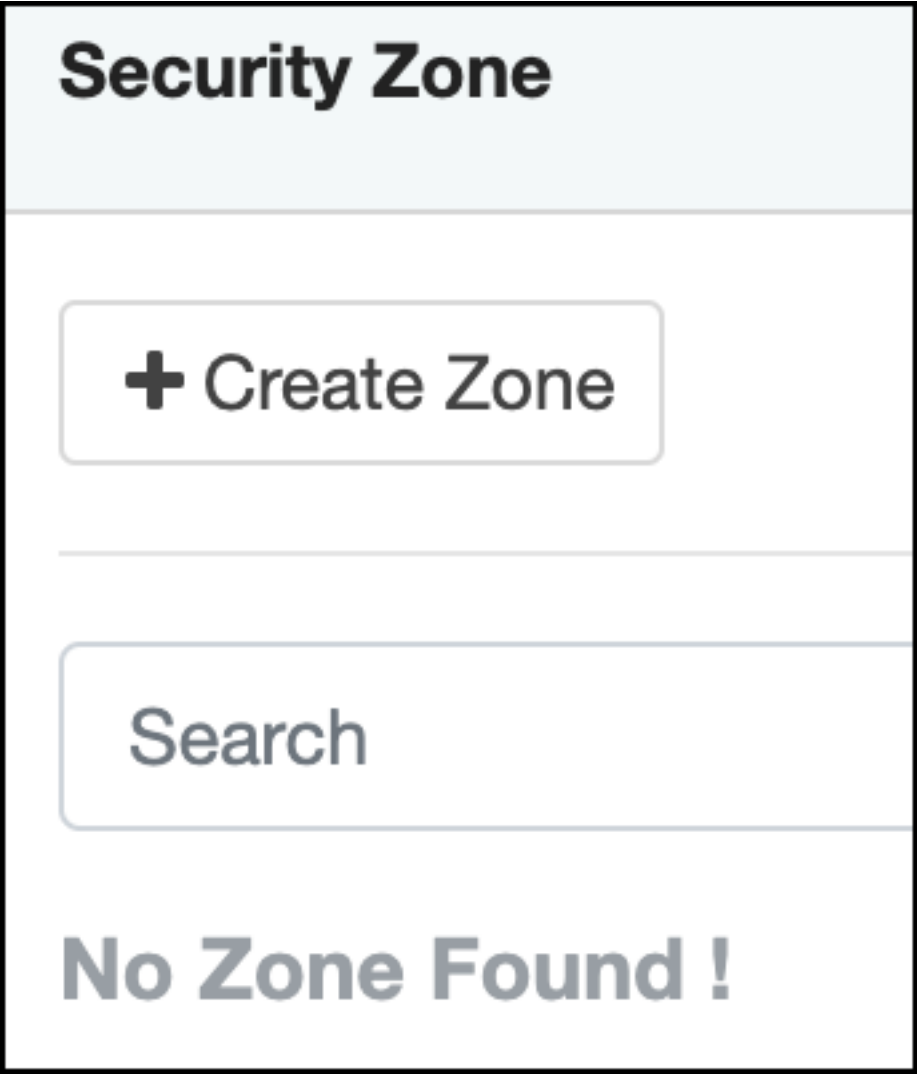
Last Updated Time: 09/14/2023 03:41:23 PM

Entries: 1 to 25 of 2057192

Columns ▾

| Policy ID | Policy Version | Event Time ▾          | Application | User          | Service (Name / Type) | Resource (Name / Type)             | Access Type | Permission | Result  | Access Enforcer |
|-----------|----------------|-----------------------|-------------|---------------|-----------------------|------------------------------------|-------------|------------|---------|-----------------|
| 26        | 1              | 09/14/2023 3:41:09 PM | kafka       | streamsrepmgr | cm_kafka<br>kafka     | srm-meta.internal<br>topic         | describe    | describe   | Allowed | ranger-acl      |
| 20        | 1              | 09/14/2023 3:41:08 PM | ozone       | hue           | cm_ozone<br>ozone     | s3v/cloudera-health-m...<br>bucket | read        | read       | Allowed | ranger-acl      |
| 27        | 1              | 09/14/2023 3:41:07 PM | kafka       | streamsrepmgr | cm_kafka<br>kafka     | secondary-mm2<br>consumergroup     | consume     | consume    | Allowed | ranger-acl      |

- Security Zone -- Lets you organize resource and tag-based services and policies into separate security zones. You can assign one or more administrators for each security zone. Security zone administrators can then create and update policies for their security zone.



- Settings -- Enables you to manage and assign policy permissions to users and groups. Select the appropriate link to the Users, Groups, Roles, and Permissions pages.

**Users/Groups/Roles**

Last Response Time

09/14/2023 03:47:00 PM

Users

Groups

Roles

Q

Search for your users...

✖

Add New User

Set Visibility ▾

✖

| <input type="checkbox"/> | User Name      | Email Address | Role  | User Source | Sync Source | Groups        | Visibility | Sync Details |
|--------------------------|----------------|---------------|-------|-------------|-------------|---------------|------------|--------------|
| <input type="checkbox"/> | admin          | --            | Admin | Internal    | --          | --            | Visible    | --           |
| <input type="checkbox"/> | rangerusersync | --            | Admin | Internal    | --          | --            | Visible    | --           |
| <input type="checkbox"/> | rangertagsync  | --            | Admin | External    | Unix        | rangertagsync | Visible    |              |
| <input type="checkbox"/> | hdfs           | --            | User  | External    | Unix        | hadoop hdfs   | Visible    |              |
| <input type="checkbox"/> | hive           | --            | User  | External    | Unix        | hive          | Visible    |              |

**Permissions**

Last Response Time

09/14/2023 03:51:13 PM

Q

Search for permissions...

✖




| Modules                 | Groups | Users  | Action |
|-------------------------|--------|--|--------|
| Resource Based Policies | --     | admin rangerusersync keyadmin<br>rangertagsync + More..  |        |
| Users/Groups            | --     | admin rangerusersync rangertagsync<br>keyadmin + More..  |        |
| Reports                 | --     | admin rangerusersync keyadmin<br>rangertagsync + More..  |        |
| Audit                   | --     | admin rangerusersync rangertagsync<br>keyadmin + More..  |        |
| Key Manager             | --     | keyadmin   |        |
| Tag Based Policies      | --     | admin rangerusersync rangertagsync<br>rangerrms + More.. |        |
| Security Zone           | --     | admin rangerusersync rangertagsync<br>hdfs + More..      |        |

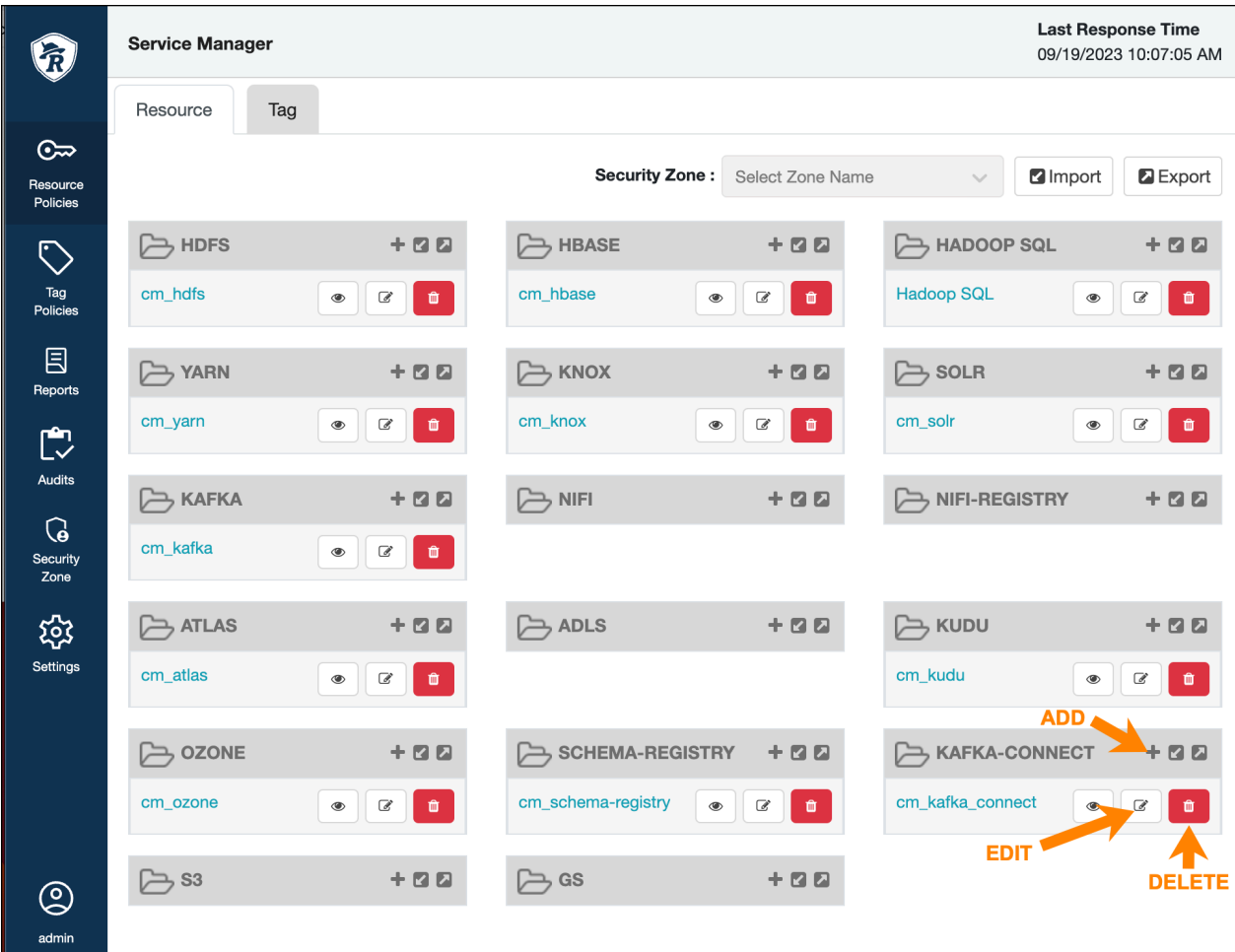
## Resource-based Services and Policies

Ranger enables you to configure resource-based services for Hadoop components (e.g. HBase, Kafka, Storm, etc.) and add access policies to those services.

## Configuring resource-based services

The Service Manager displays the **Resource Policies** Resource page when you log in to the Ranger Admin Web UI. You can also access this page by selecting **Service Manager** **Resource Policies**, or by clicking the Ranger icon at the upper left of the Ranger Admin Web UI. You can use Resource to add, edit or delete services for Hadoop resources (HDFS, HBase, HadoopSQL, etc.) and add access policies for those resources.

- To add a new resource-based service, click Add (  ) in the applicable box on Service Manager. Enter the required configuration settings, then click Add.
- To edit a resource-based service, click Edit (  ) at the right of the service. Edit the service settings, then click Save to save your changes.
- To delete a resource-based service, click Delete (  ) at the right of the service. Deleting a service also deletes all of the policies for that service.



The screenshot displays the **Service Manager** interface. On the left is a navigation sidebar with icons for Resource Policies, Tag Policies, Reports, Audits, Security Zone, Settings, and a user profile (admin). The main area has tabs for **Resource** and **Tag**. At the top right, it shows the **Last Response Time** as 09/19/2023 10:07:05 AM. Below the tabs, there's a **Security Zone** dropdown set to 'Select Zone Name' and buttons for **Import** and **Export**. The services are organized in a grid. Each service card (e.g., HDFS, HBASE, HADOOP SQL) contains a folder icon, the service name, and three action icons: a plus sign for adding, a pencil for editing, and a trash can for deleting. The **KAFKA-CONNECT** service is specifically highlighted with three orange arrows: one labeled 'ADD' pointing to the plus icon, one labeled 'EDIT' pointing to the pencil icon, and one labeled 'DELETE' pointing to the trash icon.


### Configure a resource-based service: Atlas

How to add an Atlas service.



## Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to Atlas.

The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 11:37:14 AM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled
 ☐ Disabled

Select Tag Service

Select Tag Service

Config Properties :

Username \*

admin

Password \*


.....

atlas.rest.address \*

http://localhost:21000

Common Name for Certificate

Add New Configurations

| Name | Value |   |
|------|-------|---|
|      |       |  |

+

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 3: Service Details**

| Field name   | Description  |
|--------------|--|
| Service Name | The name of the service; required when configuring agents. |
| Display Name | The name which will appear on Service Manager.             |
| Description  | A description of the service.                              |

| Field name         | Description  |
|--------------------|--|
| Active Status      | Enabled or Disabled.   |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to Atlas. |

**Table 4: Configuration Properties**

| Field name                  | Description  |
|-----------------------------|--|
| Username                    | The end system username that can be used for connection.   |
| Password                    | The password for the username entered above.   |
| atlas.rest.address          | Atlas host and port: : http://atlas_host_FQDN:21000.   |
| Common Name For Certificate | The name of the certificate.<br><br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations      | Add any other new configuration(s).  |


3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: HBase

How to add an HBase service.

## Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to HBase.  
The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 11:43:15 AM

[Service Manager](#) > Create Service

**Service Details :**

Service Name \*

Display Name

Description

Active Status

☒ Enabled ☐ Disabled

Select Tag Service

Select Tag Service

**Config Properties :**

Username \*

admin

Password \*

.....

hadoop.security.authentication \*

Simple

hbase.master.kerberos.principal

hbase.security.authentication \*

Simple

hbase.zookeeper.property.clientPort \*

2181

hbase.zookeeper.quorum \*

zookeeper.znode.parent \*

/hbase

Common Name for Certificate

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

+

×

**Audit Filter :** ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 5: Service Details**

| Field name         | Description  |
|--------------------|--|
| Service Name       | The name of the service; required when configuring agents.                           |
| Display Name       | The name which will appear on Service Manager.                                       |
| Description        | A description of the service.  |
| Active Status      | Enabled or Disabled.   |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to HBase. |

**Table 6: Configuration Properties**


| Field name                          | Description  |
|-------------------------------------|--|
| Username                            | The end system username that can be used for connection.   |
| Password                            | The password for the username entered above.   |
| hadoop.security.authorization       | The complete connection URL, including port and database name. (Default port: 10000.) For example, on the sandbox, jdbc:hive2://sandbox:10000/.          |
| hbase.master.kerberos.principal     | The Kerberos principal for the HBase Master. (Required only if Kerberos authentication is enabled.)  |
| hbase.security.authentication       | As noted in the hadoop configuration file hbase-site.xml.  |
| hbase.zookeeper.property.clientPort | As noted in the hadoop configuration file hbase-site.xml.  |
| hbase.zookeeper.quorum              | As noted in the hadoop configuration file hbase-site.xml.  |
| zookeeper.znode.parent              | As noted in the hadoop configuration file hbase-site.xml.  |
| Common Name for Certificate         | The name of the certificate.<br><br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations              | Add any other new configuration(s).  |

3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: HDFS

How to add an HDFS service.

**Procedure****1.**

On Service Manager Resource Policies , click Add New Service (  ) next to HDFS.

The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 11:57:44 AM

[Service Manager](#) > Create Service

**Service Details :**

Service Name \*

Display Name

Description

Active Status

☒ Enabled ☐ Disabled

Select Tag Service

Select Tag Service

**Config Properties :**

Username \*

admin

Password \*

.....

Namenode URL \*

Authorization Enabled \*

No

Authentication Type \*

Simple

hadoop.security.auth\_to\_local

dfs.datanode.kerberos.principal

dfs.namenode.kerberos.principal

dfs.secondary.namenode.kerberos.principal

RPC Protection Type

Authentication

Common Name for Certificate

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

+

×

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 7: Service Details**

| Field name         | Description   |
|--------------------|---|
| Service Name       | The name of the service; required when configuring agents.                          |
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to HDFS. |

**Table 8: Configuration Properties**

| Field name                                | Description  |
|---|--|
| Username                                  | The end system username that can be used for connection.   |
| Password                                  | The password for the username entered above.   |
| NameNode URL                              | hdfs://NAMENODE_FQDN:8020<br>The location of the Hadoop HDFS service, as noted in the hadoop configuration file core-site.xml OR (if this is a HA environment) the path for the primary NameNode.<br>This field was formerly named fs.defaultFS. |
| Authorization Enabled                     | Authorization involves restricting access to resources. If enabled, user need authorization credentials.   |
| Authentication Type                       | The type of authorization in use, as noted in the hadoop configuration file core-site.xml; either simple or Kerberos. (Required only if authorization is enabled).<br>This field was formerly named hadoop.security.authorization.               |
| hadoop.security.auth_to_local             | Maps the login credential to a username with Hadoop; use the value noted in the hadoop configuration file, core-site.xml.  |
| dfs.datanode.kerberos.principal           | The principal associated with the datanode where the service resides, as noted in the hadoop configuration file hdfs-site.xml. (Required only if Kerberos authentication is enabled).  |
| dfs.namenode.kerberos.principal           | The principal associated with the NameNode where the service resides, as noted in the hadoop configuration file hdfs-site.xml. (Required only if Kerberos authentication is enabled).  |
| dfs.secondary.namenode.kerberos.principal | The principal associated with the secondary NameNode where the service resides, as noted in the hadoop configuration file hdfs-site.xml. (Required only if Kerberos authentication is enabled).  |
| RPC Protection Type                       | Only authorised user can view, use, and contribute to a dataset. A list of protection values for secured SASL connections. Values: Authentication, Integrity, Privacy  |
| Common Name For Certificate               | The name of the certificate.<br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages.   |
| Add New Configurations                    | Add any other new configuration(s).  |

3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: HadoopSQL

How to add a HadoopSQL service.

### Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to HadoopSQL.

Create Service appears.

**Create Service**

Last Response Time  
09/19/2023 01:56:49 PM

[Service Manager](#) > Create Service

**Service Details :**

Service Name \*

Display Name

Description

Active Status

☒ Enabled
 ☐ Disabled

Select Tag Service

**Config Properties :**

Username \*

Password \*

jdbc.driverClassName \*

jdbc.url \*

Common Name for Certificate

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

+

Test Connection

Add

Cancel



2. On Create Service, enter the following information:

**Table 9: Service Details**

| Field name         | Description   |
|--------------------|---|
| Service Name       | The name of the service; required when configuring agents.                          |
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to Hive. |

**Table 10: Configuration Properties**

| Field name                  | Description  |
|-----------------------------|--|
| Username                    | The end system username that can be used for connection.   |
| Password                    | The password for the username entered above.   |
| jdbc.driver ClassName       | The full classname of the driver used for Hive connections. Default: org.apache.hive.jdbc.HiveDriver   |
| jdbc.url                    | The complete connection URL, including port and database name. (Default port: 10000.) For example, on the sandbox, jdbc:hive2://sandbox:10000/.          |
| Common Name For Certificate | The name of the certificate.<br><br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations      | Add any other new configuration(s).  |


3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: Kafka

How to add a Kafka service.

## Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to Kafka.

The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 02:04:30 PM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled
 ☐ Disabled

Select Tag Service

Select Tag Service

Config Properties :

Username \*

admin

Password \*


.....

Zookeeper Connect String \*

localhost:2181

Ranger Plugin SSL CName

Add New Configurations

| Name | Value |   |
|------|-------|---|
|      |       |  |

+

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 11: Service Details**

| Field name   | Description  |
|--------------|--|
| Service Name | The name of the service; required when configuring agents. |
| Display Name | The name which will appear on Service Manager.             |

| Field name         | Description  |
|--------------------|--|
| Description        | A description of the service.  |
| Active Status      | Enabled or Disabled.   |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to Kafka. |

**Table 12: Configuration Properties**

| Field name               | Description   |
|--------------------------|---|
| Username                 | The end system username that can be used for connection.  |
| Password                 | The password for the username entered above.  |
| ZooKeeper Connect String | Defaults to localhost:2181 (Provide FQDN of zookeeper host : 2181).   |
| Ranger Plugin SSL CName  | Provide common.name.for.certificate which is registered with Ranger (in Wire Encryption environment).<br><br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations   | Add any other new configuration(s).   |


3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: Knox

How to add a Knox service.

## Procedure

1.

On Service Manager Resource Policies , click Add New Service (  ) next to Knox.

The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 02:09:27 PM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled
 ☐ Disabled

Select Tag Service

Select Tag Service

▼

Config Properties :

Username \*

admin

Password \*

.....|

knox.url \*

Common Name for Certificate

Add New Configurations

| Name | Value |   |
|------|-------|---|
|      |       | × |

+

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 13: Service Details**

| Field name   | Description  |
|--------------|--|
| Service Name | The name of the service; required when configuring agents. |
| Display Name | The name which will appear on Service Manager.             |

| Field name         | Description   |
|--------------------|---|
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to Knox. |

**Table 14: Configuration Properties**

| Field name                  | Description  |
|-----------------------------|--|
| Username                    | The end system username that can be used for connection.   |
| Password                    | The password for the username entered above.   |
| knox.url                    | The Gateway URL for Knox.  |
| Common Name For Certificate | The name of the certificate.<br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations      | Add any other new configuration(s).  |


3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: NiFi

How to add a NiFi service.

## Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to NiFi. The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 02:19:51 PM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled ☐ Disabled

Select Tag Service

cm\_tag

Config Properties :

NiFi URL \*

Authentication Type \*

Use Ranger's Default SSL Context \*

Keystore

Keystore Type

Keystore Password

Truststore

Truststore Type

Truststore Password

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2. On Create Service, enter the following information:

**Table 15: Service Details**

| Field name         | Description   |
|--------------------|---|
| Service Name       | The name of the service; required when configuring agents.                          |
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to NiFi. |

**Table 16: Configuration Properties**

| Field name             | Description   |
|------------------------|---|
| NiFi URL               | The complete NiFi host URL.   |
| Authentication Type    | None or SSL.  |
| Keystore               | The keystore to use when Ranger makes an https connection to NiFi. This keystore contains the certificate that represents the Ranger server.  |
| Keystore Type          | The keystore type (JKS or PKCS12).  |
| Keystore Password      | The keystore password.  |
| Truststore             | The truststore to use when Ranger makes an https connection to NiFi. This truststore contains the public key of the certificate authority that signed the NiFi server certificates. |
| Truststore Type        | The truststore type (JKS or PKCS12).  |
| Truststore Password    | The truststore password.  |
| Add New Configurations | Add any other new configuration(s).   |

3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: NiFi Registry

How to add a NiFi Registry service.

## Procedure

1.

On Service Manager Resource Policies, click Add New Service (  ) next to NiFi Registry. The Create Service page appears.

Create Service

Last Response Time  
09/19/2023 02:24:16 PM

[Service Manager](#) > Create Service

**Service Details :**

Service Name \*

Display Name

Description

Active Status  
☒ Enabled ☐ Disabled

Select Tag Service  
Select Tag Service

**Config Properties :**

NiFi Registry URL \*  
http://localhost:18080/nifi-registry-api/policies/resourc ⓘ

Authentication Type \*  
None ▾

Use Ranger's Default SSL Context \*  
No ⓘ ▾

Keystore

Keystore Type  
PKCS12

Keystore Password  
.....


Truststore

Truststore Type

Truststore Password

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

+ 

**Audit Filter :** ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel



2. On Create Service, enter the following information:

**Table 17: Service Details**

| Field name         | Description   |
|--------------------|---|
| Service Name       | The name of the service; required when configuring agents.                          |
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to NiFi. |

**Table 18: Configuration Properties**


| Field name             | Description  |
|------------------------|--|
| NiFi Registry URL      | The complete NiFi Registry URL.  |
| Authentication Type    | None or SSL.   |
| Keystore               | The keystore to use when Ranger makes an https connection to the NiFi Registry. This keystore contains the certificate that represents the Ranger server.  |
| Keystore Type          | The keystore type (JKS or PKCS12).   |
| Keystore Password      | The keystore password.   |
| Truststore             | The truststore to use when Ranger makes an https connection to the NiFi Registry. This truststore contains the public key of the certificate authority that signed the NiFi server certificates. |
| Truststore Type        | The truststore type (JKS or PKCS12).   |
| Truststore Password    | The truststore password.   |
| Add New Configurations | Add any other new configuration(s).  |

3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: Solr

How to add a Solr service.

Procedure

1.
- On Service Manager Resource Policies , click Add New Service (  ) next to Solr.  
The Create Service page appears.

Create Service

Last Response Time09/19/2023 02:31:29 PM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled ☐ Disabled

Select Tag Service

Select Tag Service

Config Properties :

Username \*

admin

Password \*

.....

Solr Zookeeper Quorum

Solr URL \*

Ranger Plugin SSL CName

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

+

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2.
- On Create Service, enter the following information:

Table 19: Service Details

| Field name   | Description  |
|--------------|--|
| Service Name | The name of the service; required when configuring agents. |

| Field name         | Description   |
|--------------------|---|
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to Solr. |

**Table 20: Configuration Properties**


| Field name              | Description   |
|-------------------------|---|
| Username                | The end system username that can be used for connection.  |
| Password                | The password for the username entered above.  |
| Solr URL                | http://Solr_host:8983   |
| Ranger Plugin SSL CName | Provide common.name.for.certificate which is registered with Ranger (in Wire Encryption environment).<br><br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages. |
| Add New Configurations  | Add any other new configuration(s).   |

3. Click Test Connection.
4. Click Add.

## Configure a resource-based service: YARN

How to add a YARN service.

Procedure

1.
- On Service Manager Resource Policies , click Add New Service (  ) next to YARN.  
The Create Service page appears.

Create Service

Last Response Time09/19/2023 02:37:37 PM

[Service Manager](#) > Create Service

Service Details :

Service Name \*

Display Name

Description

Active Status

☒ Enabled ☐ Disabled

Select Tag Service

Select Tag Service

Config Properties :

Username \*

admin

Password \*

.....

YARN REST URL \*

Authentication Type

Simple

Common Name for Certificate

Add New Configurations

| Name | Value |
|------|-------|
|      |       |

Audit Filter : ☐

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

2.
- On Create Service, enter the following information:

Table 21: Service Details

| Field name   | Description  |
|--------------|--|
| Service Name | The name of the service; required when configuring agents. |

| Field name         | Description   |
|--------------------|---|
| Display Name       | The name which will appear on Service Manager.                                      |
| Description        | A description of the service.   |
| Active Status      | Enabled or Disabled.  |
| Select Tag Service | Select a tag-based service to apply the service and its tag-based policies to YARN. |

**Table 22: Configuration Properties**

| Field name                  | Description  |
|-----------------------------|--|
| Username                    | The end system username that can be used for connection.   |
| Password                    | The password for the username entered above.   |
| YARN REST URL               | Http or https://RESOURCEMANAGER_FQDN:8088.   |
| Authentication Type         | The type of authorization in use, as noted in the hadoop configuration file core-site.xml; either simple or Kerberos. (Required only if authorization is enabled).<br>This field was formerly named hadoop.security.authorization. |
| Common Name For Certificate | The name of the certificate.<br>This field is interchangeably named Common Name For Certificate and Ranger Plugin SSL CName in Create Service pages.   |
| Add New Configurations      | Add any other new configuration(s).  |


3. Click Test Connection.
4. Click Add.

## Configuring resource-based policies

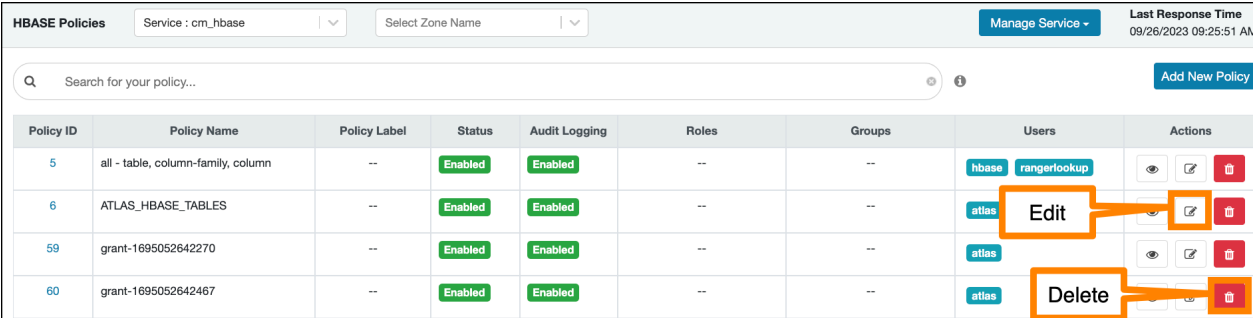
To view the policies associated with a service, click the service name on **Service Manager Resource Policies**. List of Policies displays the list of existing policies for that service, along with a search box.

- To add a new resource-based policy to the service, click Add New Policy.

- 

To edit a resource-based policy, click Edit () for the policy. Edit the policy settings, then click Save to save your changes.

- To delete a resource-based policy, click Delete () for the policy.



### Related Information

[Importing and exporting resource-based policies](#)

## Configure a resource-based policy: Atlas

How to add a new policy to an existing Atlas service.

### Procedure

1. On Service Manager, select an existing Atlas service.

List of Policies displays a list of the policies defined for Atlas service.

2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

The screenshot shows the 'Create Policy' interface. At the top, it says 'Create Policy' and 'Last Response Time 09/26/2023 10:33:47 AM'. Below that is a breadcrumb: 'Service Manager > cm\_atlas Policies > Create Policy'. The main section is 'Policy Details'. It has a 'Policy Type' dropdown set to 'Access'. There's a 'Policy Name\*' text field. To the right are toggle switches for 'Enabled' and 'Normal'. Below that is a 'Policy Label' dropdown. There are two 'Type Category' dropdowns, one of which is open showing options: 'Type Category', 'Entity Type', 'Atlas Service', and 'Relationship Type'. There are also 'Include' toggle switches. At the bottom left is 'Audit Logging\*' with a 'Yes' toggle. Below the 'Policy Details' section is the 'Allow Conditions' section, which has a table with columns: 'Select Roles', 'Select Groups', 'Select Users', 'Permissions', 'Delegate Admin', and a red 'X' button. The 'Permissions' column has a red text 'Add Permissions' and a '+' button. The 'Delegate Admin' column has a checkbox. There is a 'hide' link on the right.

3. Complete the Create Policy page as follows:

**Table 23: Policy Details**

| Field           | Description   |
|-----------------|---|
| Policy Name     | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| type-category   | Select type-category, entity-type, atlas-service, or relationship-type.   |
| Description     | (Optional) Describe the purpose of the policy.  |
| Audit Logging   | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label    | Specify a label for this policy. You can search reports and filter policies based on these labels.  |

| Field               | Description                                  |
|---------------------|--|
| Add Validity Period | Specify a start and end time for the policy. |

**Table 24: Allow Conditions**

| Label          | Description  |
|----------------|--|
| Select Role    | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: Create Type, Update Type, Delete Type, Select/Deselect All.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

**Related Information**

[Wildcards and variables in resource-based policies](#)

**Configure a resource-based policy: HBase**

How to add a new policy to an existing HBase service.

**Procedure**

1. On Service Manager, select an existing HBase service.  
List of Policies displays a list of the policies defined for Hbase service.

## 2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

**Create Policy** Last Response Time  
09/26/2023 10:20:35 AM

Service Manager > cm\_hbase Policies > Create Policy

**Policy Details**

Policy Type: **Access** Add Validity Period

Policy Name\*:  Enabled ☒ Normal ☐

Policy Label:

HBase Table\*:  Include ☒

HBase Column-family\*:  Include ☒

HBase Column\*:  Include ☒

Description:


Audit Logging\*: ☒ Yes

**Allow Conditions:** hide

| Select Roles                           | Select Groups                          | Select Users                           | Permissions   | Delegate Admin           |                                  |
|--|--|--|---|--------------------------|----------------------------------|
| <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | Add Permissions<br><input type="button" value="+"/> | <input type="checkbox"/> | <input type="button" value="X"/> |

## 3. Edit fields on Create Policy, as follows:

**Table 25: Policy Details**

| Label               | Description   |
|---------------------|---|
| Policy Name         | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override     | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.   |
| HBase Table         | <p>Select the appropriate database. Multiple databases can be selected for a particular policy. This field is mandatory.</p> <p> <b>Note:</b> You can define a namespace in the HBase table field. Valid formats for a namespace-specific, HBase policy include:</p> <p>&lt;namespace&gt;:&lt;table&gt; for example, "myNameSpace:table1"</p> <p>Further, note that &lt;namespace&gt;:&lt;tablePrefix&gt;* (default value) does not work, per <a href="https://issues.apache.org/jira/browse/RANGER-1226">https://issues.apache.org/jira/browse/RANGER-1226</a>. All other namespaces except the default one work.</p> |
| HBase Column-family | For the selected table, specify the column families to which the policy applies.  |
| HBase Column        | For the selected table and column families, specify the columns to which the policy applies.  |
| Description         | (Optional) Describe the purpose of the policy.  |



| Label               | Description  |
|---------------------|--|
| Audit Logging       | Specify whether this policy is audited. (De-select to disable auditing).                           |
| Policy Label        | Specify a label for this policy. You can search reports and filter policies based on these labels. |
| Add Validity Period | Specify a start and end time for the policy.   |

**Table 26: Allow Conditions**

| Label          | Description  |
|----------------|--|
| Select Role    | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: Read, Write, Create, Admin, Select/ Deselect All.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### What to do next

Provide User Access to HBase Database Tables from the Command Line:

HBase provides the means to manage user access to HBase database tables directly from the command line. The most commonly-used commands are:

- GRANT

Syntax:

```
grant '<user-or-group>', '<permissions>', '<table>'
```

For example, to create a policy that grants user1 read/write permission on the table usertable, the command would be:

```
grant 'user1', 'RW', 'usertable'
```

The syntax is the same for granting CREATE and ADMIN rights.

- REVOKE

Syntax:

```
revoke '<user-or-group>', '<usertable>'
```

For example, to revoke the read/write access of user1 to the table usertable, the command would be:

```
revoke 'user1', 'usertable'
```



**Note:**

Unlike Hive, HBase has no specific revoke commands for each user privilege.

**Related Information**

[Wildcards and variables in resource-based policies](#)

## Configure a resource-based policy: HDFS

How to add a new policy to an existing HDFS service.

### About this task

Through configuration, Apache Ranger enables both Ranger policies and HDFS permissions to be checked for a user request. When the NameNode receives a user request, the Ranger plugin checks for policies set through the Ranger Service Manager. If there are no policies, the Ranger plugin checks for permissions set in HDFS.

We recommend that permissions be created using **Service Manager Resource Policies**, and to have restrictive permissions at the HDFS level.

### Procedure

1. On **Service Manager Resource Policies**, select an existing HDFS service.

List of Policies displays a list of the policies defined for HDFS service.

## 2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

The screenshot shows the 'Create Policy' interface. At the top, there's a breadcrumb trail: 'Service Manager > cm\_hdfs Policies > Create Policy'. The 'Policy Details' section contains the following elements:

- Policy Type:** A button labeled 'Access'.
- Policy Name\*:** A text input field with the placeholder 'Policy Name'.
- Policy Label:** A dropdown menu with 'Select...' as the placeholder.
- Resource Path\*:** A dropdown menu with 'Select...' as the placeholder.
- Description:** A large text area.
- Audit Logging\*:** A toggle switch set to 'Yes'.
- Enabled/Normal:** Two toggle switches, with 'Enabled' currently selected.
- Recursive:** A toggle switch.
- Add Validity Period:** A button.

Below the 'Policy Details' section is the 'Allow Conditions' section, which includes a table for 'Permissions' and 'Delegate Admin'. A 'Select' dropdown menu is open, showing options: Read, Write, Execute, and Select All. The 'Permissions' table has a '+' button to add permissions. The 'Delegate Admin' table has a checkbox and a '-' button.

## 3. Complete the Create Policy page as follows:

**Table 27: Policy Details**

| Field               | Description   |
|---------------------|---|
| Policy Name         | Enter a unique name for this policy. The name cannot be duplicated anywhere in the system.  |
| normal/override     | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Resource Path       | Define the resource path for the policy folder/file. The default Recursive setting specifies that the resource path is recursive; you can also specify a non-recursive path.  |
| Description         | (Optional) Describe the purpose of the policy.  |
| Audit Logging       | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label        | Specify a label for this policy. You can search reports and filter policies based on these labels.  |
| Add Validity Period | Specify a start and end time for the policy.  |

**Table 28: Allow Conditions**

| Label       | Description   |
|-------------|---|
| Select Role | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy. |

| Label          | Description  |
|----------------|--|
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: Read, Write, Execute, Select/Deselect All.  |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### Related Information

[Wildcards and variables in resource-based policies](#)

## Configure a resource-based policy: HadoopSQL

How to add a new policy to an existing Hive service.

### Procedure

1. On Service Manager Resource Policies , select an existing HadoopSQL service.

List of Policies displays a list of the policies defined for HadoopSQL service.



**Note:** Service\_name remains cm\_hive. Display name is HadoopSQL.

## 2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

## 3. Complete the Create Policy page as follows:

**Table 29: Policy Details**

| Field           | Description   |
|-----------------|---|
| Policy Name     | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory. The policy is enabled by default.  |
| normal/override | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.     |
| Database        | Type in the applicable database name. The autocomplete feature displays available databases based on the entered text.<br><br>Include is selected by default to allow access. Select Exclude to deny access..   |
| table/udf       | Specifies a table-based or UDF-based policy.<br><br>Select table or udf, then type in the applicable table or UDF name. The autocomplete feature displays available tables based on the entered text.<br><br>Include is selected by default to allow access. Select Exclude to deny access. |
| column          | Type in the applicable column name. The autocomplete feature displays available columns based on the entered text.<br><br>Include is selected by default to allow access. Select Exclude to deny access.  |

| Field               | Description  |
|---------------------|--|
| URL                 | Specify the cloud storage path (for example s3a://dev-admin/demo/campaigns.txt) where the end-user permission is needed to read/write the Hive data from/to a cloud storage path.<br><br>Permissions: READ operation on the URL permits the user to perform HiveServer2 operations which use S3 as data source for Hive tables. WRITE operation on the URL permits the user to perform HiveServer2 operations which write data to the specified S3 location. |
| URI                 | Hive INSERT OVERWRITE queries require a Ranger URI policy to allow write operations, even if the user has write privilege granted through HDFS policy.<br><br>Failure to specify this field will result in the following error: Error while compiling statement: FAILED: HiveAccessControlException Permission denied: user [jdoe] does not have [WRITE] privilege on [/tmp/*] (state=42000,code=40000)<br><br>Example value: /tmp/*                         |
| Description         | (Optional) Describe the purpose of the policy.   |
| Hive Service Name   | hiveservice is used only in conjunction with Permissions=Service Admin. Enables a user who has Service Admin permission in Ranger to run the kill query API: kill query <queryID> . Supported value: *. (Required)   |
| Audit Logging       | Specify whether this policy is audited. (De-select to disable auditing).   |
| Policy Label        | Specify a label for this policy. You can search reports and filter policies based on these labels.   |
| Add Validity Period | Specify a start and end time for the policy.   |

**Table 30: Allow Conditions**

| Label        | Description  |
|--------------|--|
| Select Role  | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User  | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions  | Add or edit permissions: Select, Update, Create, Drop, Alter, Index, Lock, All, ReplAdmin, Service Admin, Temp UDF Admin, Refresh, RW Storage, Select/Deselect All.<br><br>Service Admin is used in conjunction with Hive Service Name and the kill query API: kill query <queryID> .  |

| Label          | Description  |
|----------------|--|
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy. |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### What to do next

Provide User Access to Hive Database Tables from the Command Line

Hive provides the means to manage user access to Hive database tables directly from the command line. The most commonly-used commands are:

- GRANT

Syntax:

```
grant <permissions> on table <table> to user <user or group>;
```

For example, to create a policy that grants user1 SELECT permission on the table default-hivesmoke22074, the command would be:

```
grant select on table default.hivesmoke22074 to user user1;
```

The syntax is the same for granting UPDATE, CREATE, DROP, ALTER, INDEX, LOCK, ALL, and ADMIN rights.

- REVOKE

Syntax:

```
revoke <permissions> on table <table> from user <user or group>;
```

For example, to revoke the SELECT rights of user1 to the table default.hivesmoke22074, the command would be:

```
revoke select on table default.hivesmoke22074 from user user1;
```

The syntax is the same for revoking UPDATE, CREATE, DROP, ALTER, INDEX, LOCK, ALL, and ADMIN rights.

### Related Information

[Wildcards and variables in resource-based policies](#)

## Configure a resource-based storage handler policy: HadoopSQL

How to configure a policy that allows authorized users to create data tables using storage-handlers.

### About this task

Ranger includes “storage-type” and “storage-url” resources in HadoopSQL Service that support only the “RW Storage ” permission. Ranger authorizes users to create or alter tables against this resource policy. Users are allowed to create/alter the table in the respective storage if they have the required “RW Storage” permission on the resource representing the storage-type and storage-url .

Procedure

- 1. On Service Manager Resource Policies , select an existing HadoopSQL service.  
List of Policies displays a list of the policies defined for HadoopSQL service.



**Note:** Service\_name remains cm\_hive. Display name is HadoopSQL.

- 2. Select Add New Policy to create a new policy.
  - a) Within Create Policy, select storage-type as shown in the following example:

Create Policy

Last Response Time  
09/26/2023 11:34:47 AM

Service Manager > Hadoop SQL Policies > Create Policy

Policy Details

Policy Type

Access

Policy Name\*

test storage handler policy

Enabled

Normal

Policy Label

Select...

Storage Type

Select...

Hive Database

URL

Hive Service

Global

Storage Type

Include

ge handler policy for HadoopSQL

Add Validity Period

Allow Conditions:

hide

| Select Roles         | Select Groups        | Select Users  | Permissions                      | Delegate Admin                               |
|----------------------|----------------------|---|----------------------------------|--|
| <div>Select...</div> | <div>Select...</div> | <div><div>hive</div><div>beacon</div><div>dpprofiler</div><div>hue</div><div>impala</div><div>admin</div></div> | <div><div>RW Storage</div></div> | <div><div><div></div><div></div></div></div> |

- b) Complete the required\* fields.
    - c) Under Allow Conditions, select users and add the RW Storage permission, as shown in the preceeding example.
    - d) Scroll to the bottom of Create Policy, then click Add.



- To configure an existing policy named all - storage-type, storage-url, click Edit.

The Edit Policy page appears.

**Edit Policy** Last Response Time  
11/29/2023 03:22:15 PM

Service Manager > Hadoop SQL Policies > Edit Policy

Policy ID\* 11

Policy Name\*  Enabled ☒ Normal ☐

Policy Label

Storage Type    Include ☒

Storage URL\*  Include ☒

Description

Audit Logging\* ☒ Yes

**Allow Conditions:** hide ^

| Select Roles                           | Select Groups                          | Select Users  | Permissions                       | Delegate Admin                      |                                     |
|--|--|---|-----------------------------------|-------------------------------------|-------------------------------------|
| <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <div> <div>hive</div> <div>beacon</div> <div>dpprofiler</div> <div>hue</div> <div>admin</div> <div>impala</div> <div>systest</div> </div> | <div>RW Storage</div> <div></div> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

- Complete the Edit Policy page as shown in the preceding example using the follow policy detail descriptions:

**Table 31: Policy Details**

| Field           | Description   |
|-----------------|---|
| Policy Name     | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory. The policy is enabled by default.  |
| normal/override | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Policy Label    | Specify a label for this policy. You can search reports and filter policies based on these labels.  |
| storage-type    | Type in the applicable storage type.<br>* allows authorizes users to create any table in the specified storage type..   |
| storage url     | Type in the applicable storage URL.<br>* allows authorizes users to create any table in the specified storage URL. Select Exclude to deny access.   |
| Description     | (Optional) Describe the purpose of the policy.  |
| Audit Logging   | Specify whether this policy is audited. (De-select to disable auditing).  |

| Field               | Description                                  |
|---------------------|--|
| Add Validity Period | Specify a start and end time for the policy. |

**Table 32: Allow Conditions**

| Label          | Description   |
|----------------|---|
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy. |
| Permissions    | Add or edit permissions: RW Storage, You can assign read and select permissions to rangerlookup user.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |

**Example**

Example StorageHandler Policy Definitions and Use Cases:

**HBase StorageHandler policy:**

Storage Type: hbase

Storage URL: hbase-cluster:port/hbase-table

Storage create table command:

```
CREATE [EXTERNAL] table foo(...)
STORED BY 'org.apache.hadoop.hive.hbase.HBaseStorageHandler'
TBLPROPERTIES ('hbase.table.name' = 'bar');
```

```
e.g:
CREATE TABLE hive_hbase_test_1(key int, value string) STORED BY
'org.apache.hadoop.hive.hbase.HBaseStorageHandler' WITH SERDEPR
PERTIES ("hbase.columns.mapping" = "cf:string", "hbase.table.na
me" = "hbase_test_1");
```

**Iceberg StorageHandler policy:**

Storage type: iceberg

Storage URL: DBname/Table\* , or

Storage URL: DBname/\*

**JDBC StorageHandler policy:**

Storage Type: jdbc:mysql

Storage URL: mysql-host:port/DBname/Table , or

Storage URL: mysql-host:port/DBname/\*

**Note:**

Policy and table definitions must be in sync regarding the port definition, even for default port numbers. For example, if port number 3306 is defined in the policy for mysql and this port number is left out from the URL as default value for the JDBC Driver, you must use the same reference as defined in the policy when creating the external table.

Using an explicit table name allows only to reference that specific table with `hive.sql.table` while using `*` allows not only to reference any tables from the database but also allows you to write a custom query against this database, for example using `hive.sql.query`.

Storage create table command:

```
CREATE [EXTERNAL] TABLE student_jdbc
(
  name string,
  age int,
  gpa double
)
STORED BY 'org.apache.hive.storage.jdbc.JdbcStorageHandler'
TBLPROPERTIES (
  "hive.sql.database.type" = "MYSQL",
  "hive.sql.jdbc.driver" = "com.mysql.jdbc.Driver",
  "hive.sql.jdbc.url" = "jdbc:mysql://localhost/sample",
  "hive.sql.dbcp.username" = "hive",
  "hive.sql.dbcp.password" = "hive",
  "hive.sql.table" = "STUDENT",
  "hive.sql.dbcp.maxActive" = "1"
);
```

**Kafka StorageHandler policy:**

Storage Type: kafka

Storage URL: bootstrap-server:port/kafka-topic

**Phoenix StorageHandler policy:**

Storage Type: phoenix

Storage URL: phoenix-cluster:port/table-name

Storage create table command:

```
CREATE [EXTERNAL] TABLE phoenix_table (
  s1 string,
  i1 int,
  f1 float,
  d1 double
)
STORED BY 'org.apache.phoenix.hive.
PhoenixStorageHandler'
TBLPROPERTIES (
  "phoenix.table.name" = "phoenix_table",
  "phoenix.zookeeper.quorum" = "localhost",
  "phoenix.zookeeper.znode.parent" = "/hbase",
  "phoenix.zookeeper.client.port" = "2181",
  "phoenix.rowkeys" = "s1, i1",
  "phoenix.column.mapping" = "s1:s1, i1:i1, f1:f1, d1:d1",
```

```
"phoenix.table.options" = "SALT_BUCKE
TS=10, DATA_BLOCK_ENCODING='DIFF' "
);
```

## Configure a resource-based policy: Kafka

How to add a new policy to an existing Kafka service.

### Procedure

1. On Service Manager Resource Policies, select an existing Kafka service.

List of Policies displays a list of the policies defined for Kafka service.

2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

The screenshot shows the 'Create Policy' interface. The 'Policy Details' section includes a 'Policy Type' dropdown set to 'Access', a 'Policy Name' text field, a 'Policy Label' dropdown, and a 'Topic' dropdown. There are also toggle switches for 'Enabled' (selected) and 'Normal', and an 'Include' toggle. A 'Policy Conditions' section shows 'No Conditions'. At the bottom, there are sections for 'Select Roles', 'Select Groups', 'Select Users', 'Policy Conditions', 'Permissions', and 'Delegate Admin'.

3. Complete the Create Policy page as follows:

**Table 33: Policy Details**

| Field           | Description   |
|-----------------|---|
| Policy Name     | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Policy Label    | Specify a label for this policy. You can search reports and filter policies based on these labels.  |
| Topic           | Kafka resource type. A topic is a category or feed name to which messages are published.  |

| Field   | Description  |
|---|--|
| Transactional ID                                | Kafka resource type, uniquely identifies producers in a persistent way.  |
| Cluster   | Kafka resource type.   |
| Delegation Token                                | Kafka resource type for authentication.                                  |
| Description                                     | (Optional) Describe the purpose of the policy.                           |
| Audit Logging                                   | Specify whether this policy is audited. (De-select to disable auditing). |
| Add Validity Period                             | Specify a start and end time for the policy.                             |
| Policy Conditions (applied at the policy level) | Click +, then specify an IP address range.                               |

**Table 34: Allow Conditions**

| Label   | Description  |
|---|--|
| Select Role                                   | Specify the roles to which this policy applies.<br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group                                  | Specify the groups to which this policy applies.<br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User                                   | Specify the users to which this policy applies.<br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Policy Conditions (applied at the item level) | Specify an IP address range.   |
| Permissions                                   | Add or edit permissions: Publish, Consume, Configure, Describe, Create, Delete, Describe Configs, Alter Configs, Select/Deselect All.  |
| Delegate Admin                                | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### Related Information

[Wildcards and variables in resource-based policies](#)

## Configure a resource-based policy: Knox

How to add a new policy to an existing Knox service.

## Procedure

1. On Service Manager Resource Policies , select an existing Knox service.

List of Policies displays a list of the policies defined for Knox service.

2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

**Create Policy** Last Response Time  
09/26/2023 02:02:09 PM

[Service Manager](#) > [cm\\_knox Policies](#) > Create Policy

**Policy Details**

Policy Type: **Access** ⊙ Add Validity Period

Policy Name\*:  Enabled ☒ Normal ☐

Policy Label:

Knox Topology \*:  Include ☒

Knox Service \*:  Include ☒

Description:

Audit Logging\*: ☒ Yes ☐ No

**Policy Conditions :** +

No Conditions

**Allow Conditions:** hide

| Select Roles                           | Select Groups                          | Select Users                           | Policy Conditions                                    | Permissions   | Delegate Admin  |
|--|--|--|--|---|---|
| <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <span style="color: red;">Add Conditions</span><br>+ | <span style="color: red;">Add Permissions</span><br>+ | <input type="checkbox"/> <span style="color: red;">✖</span> |

+

3. Complete the Create Policy page as follows:

**Table 35: Policy Details**

| Field               | Description   |
|---------------------|---|
| Policy Name         | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override     | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Knox Topology       | Enter an appropriate Topology Name.   |
| Knox Service        | Enter an appropriate Service Name.  |
| Description         | (Optional) Describe the purpose of the policy.  |
| Audit Logging       | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label        | Specify a label for this policy. You can search reports and filter policies based on these labels.  |
| Add Validity Period | Specify a start and end time for the policy.  |

| Field   | Description                                |
|---|--|
| Policy Conditions (applied at the policy level) | Click +, then specify an IP address range. |

**Table 36: Allow Conditions**

| Label   | Description  |
|---|--|
| Select Role                                   | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group                                  | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User                                   | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Policy Conditions (applied at the item level) | Specify an IP address range.   |
| Permissions                                   | Add or edit permissions: Allow   |
| Delegate Admin                                | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

Since Knox does not provide a command line methodology for assigning privileges or roles to users, the User and Group Permissions portion of the Knox Create Policy form is especially important.

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### Related Information

[Wildcards and variables in resource-based policies](#)

## Configure a resource-based policy: NiFi

How to add a new policy to an existing Atlas service.

### Procedure

1. On **Service Manager Resource Policies**, select an existing NiFi service.

List of Policies displays a list of the policies defined for NiFi service.

- 2. Click Add New Policy.**

Create Policy displays controls for creating details for a new policy.

Create Policy

Last Response Time  
09/26/2023 02:20:53 PM

Service Manager > NIFI Policies > Create Policy

Policy Details

Policy Type

Access

ⓘ Add Validity Period

Policy Name\*

Policy Name ⓘ

Enabled ☒ Normal ☐

Policy Label

Select... | ▾

NIFI Resource Identifier \*

Select... | ▾

Description

Audit Logging\*

Yes ☒

Allow Conditions:

hide ▲

| Select Roles                                   | Select Groups            | Select Users             | Permissions                             | Delegate Admin                      |              |
|--|--------------------------|--------------------------|---|-------------------------------------|--------------|
| <div><div></div><div>Select...   ▾</div></div> | <div>Select...   ▾</div> | <div>Select...   ▾</div> | <div>Add Permissions</div> <div>+</div> | <div><input type="checkbox"/></div> | <div>✕</div> |

+

Save

Cancel

- 3. Complete the Create Policy page as follows:**

### Table 37: Policy Details

| Field                    | Description   |
|--------------------------|---|
| Policy Name              | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override          | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.                                       |
| NiFi Resource Identifier | In a NiFi cluster, all nodes must be granted the ability to view and modify component data in order for user to list or empty queues in processor component outbound connections. With Ranger this can be accomplished by using a wildcard to grant all of the NiFi nodes read and write access to the /data/* NiFi resource. |
| Description              | (Optional) Describe the purpose of the policy.  |
| Audit Logging            | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label             | Specify a label for this policy. You can search reports and filter policies based on these labels.  |



| Field               | Description                                  |
|---------------------|--|
| Add Validity Period | Specify a start and end time for the policy. |

**Table 38: Allow Conditions**

| Label          | Description  |
|----------------|--|
| Select Role    | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: Read, Write, Select/Deselect All.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

## Configure a resource-based policy: NiFi Registry

How to add a new policy to an existing Atlas service.

### Procedure

1. On Service Manager Resource Policies , select an existing NiFi Registry service.  
List of Policies displays a list of the policies defined for NiFi Registry service.

## 2. Click Add New Policy.

Create Policy displays controls for creating details for a new policy.

Create Policy

Last Response Time  
09/26/2023 02:31:17 PM

[Service Manager](#) > [NiFi Registry Policies](#) > Create Policy

Policy Details

Policy Type

Access

Policy Name\*

Policy Name

Enabled

Normal

Policy Label

Select...

NiFi Registry Resource Identifier \*

Select...

Required

Description

Audit Logging\*

Yes

Add Validity Period

Allow Conditions:

hide

| Select Roles | Select Groups | Select Users | Permissions                             | Delegate Admin           |              |
|--------------|---------------|--------------|---|--------------------------|--------------|
| Select...    | Select...     | Select...    | <div>Add Permissions</div> <div>+</div> | <input type="checkbox"/> | <div>×</div> |

+

## 3. Complete the Create Policy page as follows:

Table 39: Policy Details

| Field                             | Description   |
|-----------------------------------|---|
| Policy Name                       | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override                   | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.                                       |
| NiFi Registry Resource Identifier | In a NiFi cluster, all nodes must be granted the ability to view and modify component data in order for user to list or empty queues in processor component outbound connections. With Ranger this can be accomplished by using a wildcard to grant all of the NiFi nodes read and write access to the /data/* NiFi resource. |
| Description                       | (Optional) Describe the purpose of the policy.  |
| Audit Logging                     | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label                      | Specify a label for this policy. You can search reports and filter policies based on these labels.  |

| Field               | Description                                  |
|---------------------|--|
| Add Validity Period | Specify a start and end time for the policy. |

**Table 40: Allow Conditions**

| Label          | Description  |
|----------------|--|
| Select Role    | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: Read, Write, Delete, Select/Deselect All.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

- You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
- You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
- Click Add.

**Related Information**

[SQL Standard Based Hive Authorization](#)

**Configure a resource-based policy: Solr**

How to add a new policy to an existing Solr service.

**Procedure**

- On **Service Manager Resource Policies**, select an existing Solr service.  
List of Policies displays a list of the policies defined for Solr service.

- 2. Click Add New Policy.**

Create Policy displays controls for creating details for a new policy.

Create Policy

Last Response Time  
09/26/2023 02:44:45 PM

Service Manager > cm\_solr Policies > Create Policy

Policy Details

Policy Type

Access

Policy Name\*

Policy Name

Policy Label

Select...

Solr Admin

security

Description

Audit Logging\*

Yes

Enabled

Normal

Include

Add Validity Period

Policy Conditions :

No Conditions

Allow Conditions:

Select Roles

Select Groups

Select Users

Select...

Select...

admin

Query

Update

Select All

Permissions

Delegate Admin

Add Permissions

3. Complete the Create Policy page as follows:

### Table 41: Policy Details

| Field               | Description   |
|---------------------|---|
| Policy Name         | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override     | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Resource Type       | collection - click to select from a list of dynamic values<br>config - click to select from a list of dynamic values<br>schema - click to select from a list of dynamic values<br>admin - click to select COLLECTIONS, CORES, METRICS, SECURITY or AUTOSCALING                          |
| Description         | (Optional) Describe the purpose of the policy.  |
| Audit Logging       | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label        | Specify a label for this policy. You can search reports and filter policies based on these labels.  |
| Add Validity Period | Specify a start and end time for the policy.  |

| Field   | Description                                |
|---|--|
| Policy Conditions (applied at the policy level) | Click +, then specify an IP address range. |

**Table 42: Allow Conditions**

| Label   | Description  |
|---|--|
| Select Role                                   | Specify the roles to which this policy applies.<br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group                                  | Specify the groups to which this policy applies.<br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User                                   | Specify the users to which this policy applies.<br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Policy Conditions (applied at the item level) | Specify an IP address range.   |
| Permissions                                   | Add or edit permissions: Query, Update   |
| Delegate Admin                                | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

**Related Information**

[Wildcards and variables in resource-based policies](#)

**Configure a resource-based policy: YARN**

How to add a new policy to an existing YARN service.

**Procedure**

1. On **Service Manager Resource Policies**, select an existing YARN service.  
List of Policies displays a list of the policies defined for YARN service.

2. Click Add New Policy.  
Create Policy displays controls for creating details for a new policy.

Service Manager

>

cm\_yarn Policies

>

Edit Policy

Last Response Time

11/29/2023 01:20:07 PM

Policy Details

Policy Type

Access

Add Validity Period

Policy ID\*

67

Policy Name\*

yarn queue policy

Enable

Normal

Policy Label

Select...

Queue \*

root.queue1

Recursive

Description

Audit Logging\*

Yes

Allow Conditions:

hide

| Select Roles         | Select Groups  | Select Users     | Permissions  | Delegate Admin |             |
|----------------------|----------------|------------------|--|----------------|-------------|
| <div>Select...</div> | <div>sys</div> | <div>admin</div> | <div>submit-app</div> <div>admin-queue</div> <div></div> | <div></div>    | <div></div> |

- 3. Complete the Create Policy page as follows:**

### Table 43: Policy Details

| Field           | Description   |
|-----------------|---|
| Policy Name     | Enter an appropriate policy name. This name cannot be duplicated across the system. This field is mandatory.  |
| normal/override | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Queue           | The YARN queue to which the policy applies. For example, enter root.xyz for the xyz queue.  |
| Recursive       | The default recursive setting specifies that the policy will also be applied to all sub-queues; you can also specify a non-recursive path.  |
| Description     | (Optional) Describe the purpose of the policy.  |
| Audit Logging   | Specify whether this policy is audited. (De-select to disable auditing).  |
| Policy Label    | Specify a label for this policy. You can search reports and filter policies based on these labels.  |

| Field               | Description                                  |
|---------------------|--|
| Add Validity Period | Specify a start and end time for the policy. |

**Table 44: Allow Conditions**

| Label          | Description  |
|----------------|--|
| Select Role    | Specify the roles to which this policy applies.<br><br>To designate a role as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Select Group   | Specify the groups to which this policy applies.<br><br>To designate a group as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User    | Specify the users to which this policy applies.<br><br>To designate a user as an Administrator, select Delegate Admin. Administrators can edit or delete the policy, and can also create child policies based on the original policy.  |
| Permissions    | Add or edit permissions: submit-app, admin-queue, Select/Deselect All.   |
| Delegate Admin | You can use Delegate Admin to assign administrator privileges to the roles, groups, or users specified in the policy. Administrators can edit or delete the policy, and can also create child policies based on the original policy.   |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add.

### Related Information

[Wildcards and variables in resource-based policies](#)

## Wildcards and variables in resource-based policies

Reference for wildcards and variables in resource-based policies.

### Ranger Authorization Resource Policy Wildcard Characters

Wildcard characters can be included in the resource path, the database name, the table name, or the column name:

- \* indicates zero or more occurrences of characters
- ? indicates a single character

### Ranger Authorization Resource Policy {USER} Variable

The variable {USER} can be used to autofill the accessing user, for example:

In Select User, choose {USER}.

In Resource Path, enter data\_{USER}.

### Ranger Authorization Resource Policy {USER} Variable Recommended Practices and Customizability

Ranger requires that string '{USER}' is used to represent accessing user as the user in the policy-item in a Ranger policy. However, Ranger provides flexible way of customizing the string that is used as shorthand to represent the

accessing user's name in the policy resource specification. By default, Ranger policy resource specification expects characters '{' and '}' as delimiters for string 'USER', however, ranger supports customizable way of specifying delimiter characters, escaping those delimiters, and the string 'USER' itself by prefixing it with another, user-specified string on a per resource-level basis in the service definition of each component supported by Ranger.

For example, if for a certain HDFS installation, if the path names may contain '{' or '}' as valid characters, but not '%' character, then the service-definition for HDFS can be specified as:

```
"resources": [
{
  "itemId": 1,
  "name": "path",
  "type": "path",
  "level": 10,
  "parent": "",
  "mandatory": true,
  "lookupSupported": true,
  "recursiveSupported": true,
  "excludesSupported": false,
  "matcher": "org.apache.ranger.plugin.resourcematcher.RangerPathResourceMatcher",
  "matcherOptions": {"wildcard": true, "ignoreCase": false}, "replaceTokens": true, "tokenDelimiterStart": "%", "tokenDelimiterEnd": "%", "tokenDelimiterPrefix": "rangerToken:"},
  "validationRegex": "",
  "validationMessage": "",
  "uiHint": "",
  "label": "Resource Path",
  "description": "HDFS file or directory path"
}
]
```

Corresponding ranger policy for the use case for HDFS will be written as follow:

```
resource: path=/home/%rangerToken:USER%
user: {USER}
permissions: all, delegateAdmin=true
```

The following customizable matcherOptions are available for this feature:

- **replaceTokens**: true if short-hand for user in resource-spec needs to be replaced at run-time with current-user's name; false if the resource-spec needs to be interpreted as it is. Default value: true.
- **tokenDelimiterStart**: Identifies start character of short-hand for current-user in resource specification. Default value: {.
- **tokenDelimiterEnd**: Identifies end character of short-hand for current-user in resource specification. Default value: }.
- **tokenDelimiterEscape**: Identifies escape character for escaping tokenDelimiterStart or tokenDelimiterEnd values in resource specification. Default value: \.
- **tokenDelimiterPrefix**: Identifies special prefix which together with string 'USER' makes up short-hand for current-user's name in the resource specification. Default value: .

## Adding a policy condition to a resource-based policy

You can add a condition to a resource-based policy, using Ranger Admin Web UI when creating a new, or editing an existing policy.



## About this task

Ranger Admin Web UI supports adding the following policy conditions to a new or existing resource-based policy for Knox, Kafka and Kafka-connect services.

- IP Address Range for example - xx.xxx.xxx, yy.yyy.yy
- Boolean expression for example - Country\_Name="XYZ"

The Policy Conditions dialog prompts for inputs using uhint JSON. For populating "IP-range" for example, we are using JSON like this:

```
{
  "itemId": 1,
  "name": "ip-range",
  "evaluator": "org.apache.ranger.plugin.conditionevaluator.RangerIpMat
cher",
  "evaluatorOptions": {},
  "validationRegex": "",
  "validationMessage": "",
  "uiHint": "{ \"isMultiValue\":true }",
  "label": "IP Address Range",
  "description": "IP Address Range"
}
```

## Procedure

1. In Service Manager Resource Policies cm\_knox\_policies (for example), choose one of the following:

### Add New Policy

to add a new, tag-based policy.

### Policy ID

click a policy ID to edit an existing policy.

2. In either Create Policy or Edit Policy Policy Conditions , click +.

**Edit Policy** Last Response Time  
10/23/2023 03:20:11 PM

Service Manager > cm\_tag Policies > Edit Policy

---

**Policy Details**

Policy Type: **Access** ⓘ Add Validity Period

Policy ID\*: **4**

Policy Name\*: EXPIRES\_ON Enable ☒ Normal ☐

Policy Label: Select... Policy Conditions : No Conditions +

TAG \*: EXPIRES\_ON x v

Description: Policy for data with EXPIRES\_ON tag

Audit Logging\*: **Yes** ☒

3. In Policy Conditions:
  - a) In IP Address Range ?, enter or choose existing ip.address.values .
  - b) In Enter boolean expression, enter an expression that evaluates to true or false.

**Create Policy**

Service Manager > cm\_knox Policies > Create Policy

**Policy Details**

**Policy Condition**

IP Address Range:

enter expression

Enter boolean expression: ⓘ

4. Click Save.

## Preloaded resource-based services and policies

Apache Ranger includes preloaded resource-based services and policies.

- The preloaded resource-based services appear on the Service Manager page for resource-based policies. Service names are prefixed with "cm\_", with the exception of Hadoop SQL, which applies to multiple SQL stack components (Hive, Impala, and Hue).

Service Manager

Last Response Time  
09/20/2023 01:48:10 PM

ResourceTag

Security Zone : 

Select Zone Name

ImportExport

HDFS

cm\_hdfs

YARN

cm\_yarn

KAFKA

cm\_kafka

ATLAS

cm\_atlas

OZONE

cm\_ozone

S3

HBASE

cm\_hbase

KNOX

cm\_knox

NIFI

ADLS

SCHEMA-REGISTRY

cm\_schema-registry

GS

HADOOP SQL

Hadoop SQL

SOLR

cm\_solr

NIFI-REGISTRY

KUDU

cm\_kudu

KAFKA-CONNECT

cm\_kafka\_connect

- To view the policies for each preloaded service, click the service name. To view policy details, click the applicable edit icon or policy ID number.

HBASE Policies

Service : cm\_hbase

Select Zone Name

Manage Service

Last Response Time  
09/20/2023 01:57:55 PM

Q Search for your policy...

Add New Policy

| Policy ID | Policy Name                        | Policy Label | Status  | Audit Logging | Roles | Groups | Users              | Actions                                      |
|-----------|------------------------------------|--------------|---------|---------------|-------|--------|--------------------|--|
| 5         | all - table, column-family, column | --           | Enabled | Enabled       | --    | --     | hbase rangerlookup | <div><div></div><div></div><div></div></div> |
| 6         | ATLAS_HBASE_TABLES                 | --           | Enabled | Enabled       | --    | --     | atlas              | <div><div></div><div></div><div></div></div> |
| 59        | grant-1695052642270                | --           | Enabled | Enabled       | --    | --     | atlas              | <div><div></div><div></div><div></div></div> |
| 60        | grant-1695052642467                | --           | Enabled | Enabled       | --    | --     | atlas              | <div><div></div><div></div><div></div></div> |

Index

- cm\_atlas
- cm\_hbase
- cm\_hdfs
- cm\_kafka
- cm\_knox
- cm\_nifi
- cm\_solr

[cm\\_yarn](#)

[Hadoop SQL](#)

[cm\\_atlas](#)

#### **all - entity-type, entity-classification, entity, entity-business-metadata**

This is a default policy of type "entity" that gives access to all entities and their business metadata attributes for the following users and groups, with the specified permissions:

- admin, dpprofiler, beacon – Update Business Metadata
- rangertagsync, rangerlookup – Read entity
- public group – Read entity

#### **all - entity-type, entity-classification, entity**

This is a default policy of type "entity" that gives access to all entities and their classifications for the following users and groups, with the specified permissions:

- admin, dpprofiler, beacon – Read, Create, Update, Delete entity & Add, Update, Remove classification
- rangertagsync, rangerlookup – Read entity
- public group – Read entity

#### **all - entity-type, entity-classification, entity, entity-label**

This is a default policy of type "entity" that gives access to all entities and classifications and their labels for the following users and groups, with the specified permissions:

- admin, dpprofiler, beacon – Add, Remove label
- rangertagsync, rangerlookup – Read entity
- public group – Read entity

#### **all - relationship-type, end-one-entity-type, end-one-entity-classification, end-one-entity, end-two-entity-type, end-two-entity-classification, end-two-entity**

This is a default policy of type "relationship" that gives access to all to all Entity-Relationships between End1-Entity-Type, End1-Entity-Classification, End1-Entity-ID and End2-Entity-Type, End2-Entity-Classification, End2-Entity-ID for the following users and groups, with the specified permissions:

- admin, dpprofiler, beacon – Add, Update, and Remove relationship
- public group – Add, Update, and Remove relationship

#### **all - atlas-service**

This is a default policy of type "atlas-service" that gives access to all atlas-services [export, import, purge, server] for the following users, with the specified permissions:

- admin, dpprofiler, beacon – Admin Export and Admin Import

#### **all - type-category, type**

This is a default policy of type "type-category" that gives access to all type categories [ENUM, ENTITY, CLASSIFICATION, RELATIOSHIP, STRUCT] and type names for the following users, with the specified permissions:

- admin, dpprofiler, beacon – Create, Update, and Delete type

#### **Allow users to manage favorite searches**

This is a default policy of type "entity-type" that gives access to \_\_AtlasUserProfile and \_\_AtlasUserSavedSearch resources which are internal types for favorite search. This policy provides Read, Create, Update, and Delete Entity permissions to validated users who create a favorite search.

**cm\_hbase****all - table, column-family, column**

Provides access to all HBase tables, column-families, and columns to the following users, with the specified permissions:

- hbase, rangerlookup – Read, Write, Create, Admin

**ATLAS\_HBASE\_TABLES**

Provides access to all HBase column-families and columns in the atlas\_janus and ATLAS\_ENTITY\_AUDIT\_EVENTS HBase tables, to the following user, with the specified permissions:

- atlas – Read, Write, Create, Admin

**cm\_hdfs****all - path**

Provides access to all HDFS resource paths to the following users, with the specified permissions:

- hdfs, rangerlookup – Read, Write, Execute

**kms-audit-path**

Provides access to the /ranger/audit/kms resource path to the following user, with the specified permissions:

- keyadmin – Read, Write, Execute

**cm\_kafka****all - topic**

Provides access to all topics to the following users, with the specified permissions:

- kafka, rangerlookup, streamsmgmgr, streamsrepmgr – Publish, Consume, Configure, Describe, Create, Delete, Describe Configs, Alter Configs

**all - cluster**

Provides access to all clusters to the following users, with the specified permissions:

- kafka, rangerlookup, streamsmgmgr, streamsrepmgr – Configure, Describe, Create, Kafka Admin, Idempotent Write, Describe Configs, Alter Configs

**all - transactionalid**

Provides transactionalid access to the following users, with the specified permissions:

- kafka, rangerlookup, streamsmgmgr, streamsrepmgr – Publish, Describe

**all - delegationtoken**

Provides delegationtoken access to the following users, with the specified permissions:

- kafka, rangerlookup, streamsmgmgr, streamsrepmgr – Describe

**ATLAS\_HOOK**

Provides ATLAS\_HOOK topic access to the following users, with the specified permissions:

- hbase, hive, impala, mlgov – Publish
- atlas – Create, Configure, and Consume

**ATLAS\_ENTITIES**

Provides ATLAS\_ENTITIES topic access to the following users, with the specified permissions:

- atlas – Create, Configure, and Publish
- rangertagsync – Consume

### **ATLAS\_SPARK\_HOOK**

Provides ATLAS\_SPARK\_HOOK topic access to the following user, with the specified permissions:

- atlas – Create, Configure, and Consume

Also provides ATLAS\_SPARK\_HOOK topic access to the following group, with the specified permissions:

- public – Publish

### **cm\_knox**

#### **all - topology, service**

Provides access to all Knox topologies and services to the following users, with the specified permissions:

- admin, rangerlookup – Allow

### **cm\_nifi**

#### **all - nifi-resource**

Provides access to all NiFi resource identifiers to the following user, with the specified permissions:

- rangerlookup – Read, Write

### **cm\_solr**

#### **all - collection**

Provides access to all Solr collections to the following users, with the specified permissions:

- solr, rangerlookup, ranger, atlas – Query, Update, Others, Solr Admin

### **RANGER\_AUDITS\_COLLECTION**

Provides access to the RANGER\_AUDITS\_COLLECTION Solr collection to the following users, with the specified permissions:

- atlas, hbase, hdfs, hive, impala, kafka, knox, nifi, ranger, storm, yarn – Query, Update, Others
- ranger – Query, Update, Others, Solr Admin

### **cm\_yarn**

#### **all - queue**

Provides access to all YARN queues to the following users, with the specified permissions:

- yarn, rangerlookup – submit-app, admin-queue

### **Hadoop SQL**

#### **all - global**

Provides global access to the following users, with the specified permission:

- hive, beacon, dpprofiler, hue, admin, impala, rangerlookup – Temporary UDF Admin



**Note:** The Ranger web UI may show additional permissions for the all-global policy, but the only valid permission is Temporary UDF Admin.

#### **all - database, table, column**

Provides access to all databases, tables, and columns to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh
- {OWNER} – All

#### **all - database, table**

Provides access to all databases and tables to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh
- {OWNER} – All

#### **all - storage-type, storage-url**

Ranger introduces new resources “storage-type” and “storage-url” in HadoopSQL Service and supports only one permission “RW Storage”. When a user creates / alters a table, they will be authorized against this resource policy. Users granted “RW Storage” permission on the resource representing the storage-type + storage-url, can create/alter the table in the respective storage. Provides access to all databases to the following users, with the RW Storage permission only:

- hive, rangerlookup, impala, beacon, dpprofiler, hue, admin



**Note:** {OWNER} macro should NOT be configured for StorageHandler policies.

#### **all - database**

Provides access to all databases to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh
- {OWNER} – All

Also provides access to all databases to the following group, with the specified permissions:

- public – Create

#### **all - hiveservice**

Provides hiveservice access to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh

#### **all - database, udf**

Provides database and udf access to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh
- {OWNER} – All

#### **all - url**

Provides url access to the following users, with the specified permissions:

- hive, rangerlookup, impala – Select, Update, Create, Drop, Alter, Index, Lock, All, Read, Write, ReplAdmin, Service Admin, Temporary UDF Admin, Refresh

**default database tables columns**

Provides access to all tables and columns in the default database to the following user, with the specified permissions:

- impala – Create

Also provides access to all tables and columns in the default database to the following group, with the specified permissions:

- public – Create

**information\_schema database tables columns**

Provides access to all tables and columns in the information\_schema database to the following user, with the specified permissions:

- impala – Select

Also provides access to all tables and columns in the information\_schema database to the following group, with the specified permissions:

- public – Select

## Importing and exporting resource-based policies

You can export and import policies from the Ranger Admin UI for cluster resiliency (backups), during recovery operations, or when moving policies from test clusters to production clusters. You can export/import a specific subset of policies (such as those that pertain to specific resources or user/groups) or clone the entire repository (or multiple repositories) via Ranger Admin UI.

### Interfaces

You can import and export policies from [Ranger Admin Web UI Service Manager Resource](#) :



Service Manager

Last Response Time  
09/21/2023 09:02:46 AM

Resource

Tag

Security Zone :

Select Zone Name

Import

Export

HDFS

cm\_hdfs

+

HBASE

cm\_hbase

+

HADOOP SQL

Hadoop SQL

+

YARN

cm\_yarn

+

KNOX

cm\_knox

+

SOLR

cm\_solr

+

KAFKA

cm\_kafka

+

NIFI

+

NIFI-REGISTRY

+

ATLAS

cm\_atlas

+

ADLS

+

KUDU

cm\_kudu

+

OZONE

cm\_ozone

+

SCHEMA-REGISTRY

cm\_schema-registry

+

KAFKA-CONNECT

cm\_kafka\_connect

+

S3

+

GS

+

You can also export policies from Ranger Admin Web UI Service Manager Reports :

**Reports**

Last Response Time  
09/21/2023 09:08:09 AM

Search Criteria

Policy Name

Policy Type

Access

Component

Resource

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

Search

Excel file

Export

CSV file

JSON file

Zone Name

HDFS

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|
| 1         | all - path     | --           | path: /*                | Access      | Enabled | --        |
| 2         | kms-audit-path | --           | path: /ranger/audit/... | Access      | Enabled | --        |

HBASE

| Policy ID | Policy Name            | Policy Label | Resources                                 | Policy Type | Status  | Zone Name |
|-----------|------------------------|--------------|---|-------------|---------|-----------|
| 5         | all - table, column... | --           | column-family: *<br>column: *<br>table: * | Access      | Enabled | --        |

Table 45: Export Policy Options

|                         | Service Manager Page | Reports Page         |
|-------------------------|----------------------|----------------------|
| Formats                 | JSON                 | JSON<br>Excel<br>CSV |
| Filtering Supported     | No                   | Yes                  |
| Specific Service Export | Yes                  | Via filtering        |

### Filtering

When exporting from the Reports page, you can apply filters before saving the file.

### Export Formats

You can export policies in the following formats:

- Excel
- JSON

- CSV

Note: CSV format is not supported for importing policies.

When you export policies from the Service Manager page, the policies are automatically downloaded in JSON format. If you wish to export in Excel or CSV format, export the policies from the Reports page dropdown menu.

#### Required User Roles

The Ranger admin user can import and export only Resource & Tag based policies. The credentials for this user are set in Ranger Configs > Advanced ranger-env in the fields labeled admin\_username (default: admin/admin).

The Ranger KMS keyadmin user can import and export only KMS policies. The default credentials for this user are keyadmin/keyadmin.

#### Limitations

To successfully import policies, use the following database versions:

- MariaDB: 10.1.16+
- MySQL: 5.6.x+
- Oracle: 11gR2+
- PostgreSQL: 8.4+
- MS SQL: 2008 R2+

Partial import is not supported.

#### Related Information

[Importing and exporting tag-based policies](#)

### Import resource-based policies for a specific service

How to import resource-based policies for a specific service (HBase, YARN, etc.).

#### Procedure

1. On the Service Manager page, click the Import icon for the service:



The Import Policy page appears.


**2. Select the file to import.**

You can only import policies in JSON format.


Security Zone : Select


## Import Policy

Select File :

Select file 

Override Policy : ☐

*Ranger\_Policies\_20190717\_190622.json* 


 All services gets listed on service destination when Zone destination is blank.  
When zone is selected at destination, then only services associated with that zone will be listed.

**Specify Zone Mapping :**

Source

Destination



To

No zone selected 


**Specify Service Mapping :**


Source

Destination

cm\_hdfs  

To

Select service name 



Cancel

Import

84

3. (Optional) Configure the import operation:

- The Override Policy option deletes all policies of the destination repositories.
- Zone Mapping – when no destination is selected, all services are imported. When a destination is selected, only the services associated with that security zone are imported.
- Service Mapping maps the downloaded file repository, i.e. source repository to destination repository. You can use the red x symbols to remove services from the import. Scroll down to view all service mappings.

**Import Policy**

**Specify Zone Mapping :**

Source: [ ] To Destination: [No zone selected]

**Specify Service Mapping :**

| Source   | To | Destination |
|----------|----|-------------|
| cm_hdfs  | To | cm_hdfs     |
| cm_hbase | To | cm_hbase    |
| cm_yarn  | To | cm_yarn     |
| cm_hive  | To | cm_hive     |
| cm_knox  | To | cm_knox     |
| cm_storm | To | cm_storm    |

Cancel Import

4. Click Import.

A confirmation message appears after the file is imported.

**Related Information**

[Import resource-based policies for all services](#)

**Import resource-based policies for all services**

How to import policies for all services.

## Procedure

1. On Service Manager Resource , click Import.


The screenshot displays the 'Service Manager' interface. At the top right, it shows the 'Last Response Time' as '09/21/2023 09:02:46 AM'. Below the header, there are tabs for 'Resource' and 'Tag'. A 'Security Zone' dropdown menu is set to 'Select Zone Name'. To the right of the dropdown are two buttons: 'Import' (which is highlighted with an orange box) and 'Export'. The main area contains a grid of service cards. Each card has a folder icon, a service name, and three action icons (plus, eye, and trash). The services listed are: HDFS (cm\_hdfs), HBASE (cm\_hbase), HADOOP SQL (Hadoop SQL), YARN (cm\_yarn), KNOX (cm\_knox), SOLR (cm\_solr), KAFKA (cm\_kafka), NIFI, NIFI-REGISTRY, ATLAS (cm\_atlas), ADLS, KUDU (cm\_kudu), OZONE (cm\_ozone), SCHEMA-REGISTRY (cm\_schema-registry), KAFKA-CONNECT (cm\_kafka\_connect), S3, and GS.

The Import Policy page appears.


Security Zone : Select


## Import Policy

Select File :

Select file 

Override Policy : ☐

*Ranger\_Policies\_20190717\_190622.json* 


 All services gets listed on service destination when Zone destination is blank.  
When zone is selected at destination, then only services associated with that zone will be listed.

Specify Zone Mapping :

Source

Destination



To

No zone selected 




Specify Service Mapping :

Source

Destination

cm\_hdfs  

To

cm\_hdfs   

Cancel

Import

2. Select the file to import.

You can only import policies in JSON format.

87

3. (Optional) Configure the import operation:

- The Override Policy option deletes all policies of the destination repositories.
- Zone Mapping – when no destination is selected, all services are imported. When a destination is selected, only the services associated with that security zone are imported.
- Service Mapping maps the downloaded file repository, i.e. source repository to destination repository. You can use the red x symbols to remove services from the import. Scroll down to view all service mappings.

**Import Policy**

**Specify Zone Mapping :**

Source: [ ] To Destination: [No zone selected]

**Specify Service Mapping :**

| Source   | To | Destination |   |
|----------|----|-------------|---|
| cm_hdfs  | To | cm_hdfs     | X |
| cm_hbase | To | cm_hbase    | X |
| cm_yarn  | To | cm_yarn     | X |
| cm_hive  | To | cm_hive     | X |
| cm_knox  | To | cm_knox     | X |
| cm_storm | To | cm_storm    | X |

Cancel Import

4. Click Import.

A confirmation message appears after the file is imported.

**Related Information**

[Import resource-based policies for a specific service](#)

**Export resource-based policies for a specific service**

How to export the policies for a specific service (HBase, YARN, etc).

**About this task**

If you would like to export in Excel or CSV format, export the policies from the Reports page dropdown menu.



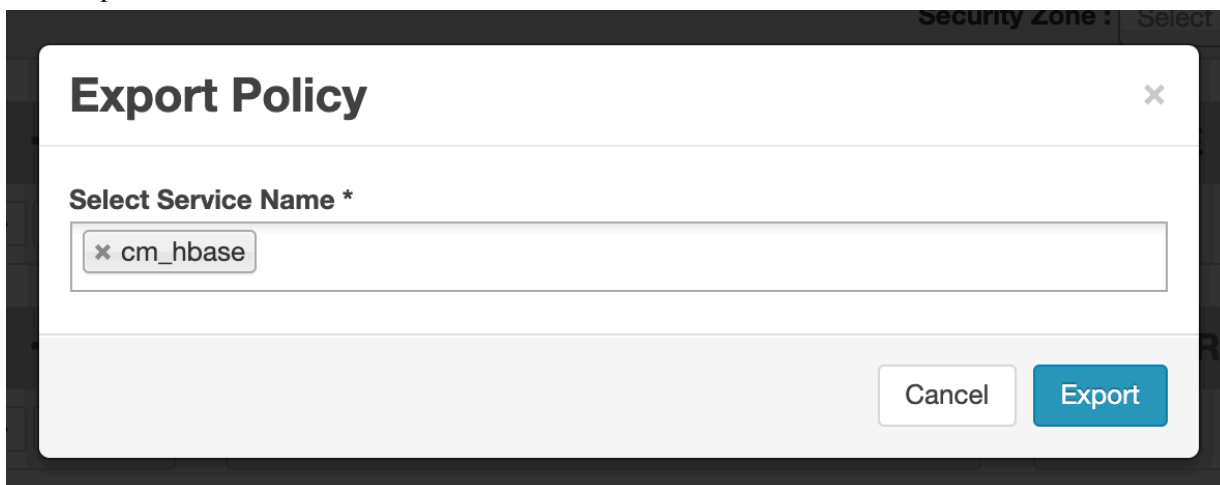
**Procedure**

1. On Service Manager Resource , click the Export icon for the service:



The Export Policy page appears.

2. Click Export.



The file downloads in your browser as a JSON file.

**Related Information**

[Export all resource-based policies for all services](#)

**Export all resource-based policies for all services**

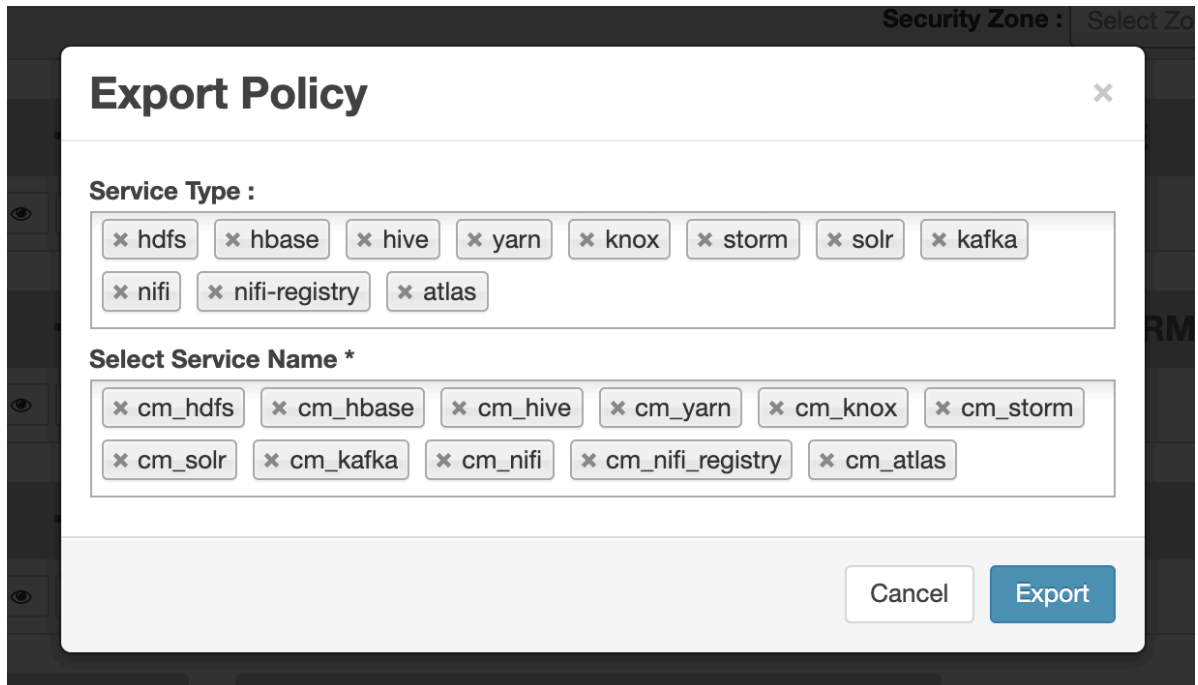
How to export the policies for all services.

**About this task**

If you would like to export in Excel or CSV format, export the policies from the Reports page drop-down menu.

**Procedure**

- From Service Manager Resource :
  - a) Click Export.  
The Export Policy page appears.
  - b) Remove components or specific services, then click Export.

The image shows a screenshot of the 'Export Policy' dialog box in the Cloudera Service Manager. The dialog has a title bar with a close button (X). Below the title, there are two sections: 'Service Type :' and 'Select Service Name \*'. The 'Service Type :' section contains a grid of buttons with 'x' icons, representing various services: hdfs, hbase, hive, yarn, Knox, storm, solr, kafka, nifi, nifi-registry, and atlas. The 'Select Service Name \*' section contains a similar grid of buttons with 'x' icons, representing the corresponding component names: cm\_hdfs, cm\_hbase, cm\_hive, cm\_yarn, cm\_knox, cm\_storm, cm\_solr, cm\_kafka, cm\_nifi, cm\_nifi\_registry, and cm\_atlas. At the bottom right of the dialog, there are two buttons: 'Cancel' and 'Export'.

The file downloads in your browser as a JSON file.

- From Service Manager Reports :
  - Apply filters before exporting the file.
  - Open the Export drop-down menu:

**Reports**
Last Response Time  
09/21/2023 09:08:09 AM

Search Criteria

Policy Name

Policy Type

Access

Component

Resource

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

Q Search

Excel file

CSV file

JSON file

Export

HDFS

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|
| 1         | all - path     | --           | path: /*                | Access      | Enabled | --        |
| 2         | kms-audit-path | --           | path: /ranger/audit/... | Access      | Enabled | --        |

HBASE

| Policy ID | Policy Name            | Policy Label | Resources                                 | Policy Type | Status  | Zone Name |
|-----------|------------------------|--------------|---|-------------|---------|-----------|
| 5         | all - table, column... | --           | column-family: *<br>column: *<br>table: * | Access      | Enabled | --        |

- Select the file format.  
The file downloads in your browser.

### Related Information

[Export resource-based policies for a specific service](#)

## Row-level filtering and column masking in Hive

You can use Apache Ranger row-level filters to set access policies for rows in Hive tables. You can also use Ranger column masking to set policies that mask data in Hive columns, for example to show only the first or last four characters of column data.

### Row-level filtering in Hive with Ranger policies

Row-level filtering helps simplify Hive queries. By moving the access restriction logic down into the Hive layer, Hive applies the access restrictions every time data access is attempted. This helps simplify authoring of the Hive query, and provides seamless behind-the-scenes enforcement of row-level segmentation without having to add this logic to the predicate of the query.

## About this task

Row-level filtering also improves the reliability and robustness of Hadoop. By providing row-level security to Hive tables and reducing the security surface area, Hive data access can be restricted to specific rows based on user characteristics (such as group membership) and the runtime context in which this request is issued.

Typical use cases where row-level filtering can be beneficial include:

- A hospital can create a security policy that allows doctors to view data rows only for their own patients, and that allows insurance claims administrators to view only specific rows for their specific site.
- A bank can create a policy to restrict access to rows of financial data based on the employee's business division, locale, or based on the employee's role (for example: only employees in the finance department are allowed to see customer invoices, payments, and accrual data; only European HR employees can see European employee data).
- A multi-tenant application can create logical separation of each tenant's data so that each tenant can see only their own data rows.

You can use Apache Ranger row-level filters to set access policies for rows in Hive tables. Row-level filter policies are similar to other Ranger access policies. You can set filters for specific users, groups, and conditions.

The following conditions apply when using row-level filters:

- The filter expression must be a valid WHERE clause for the table or view.
- Each table or view should have its own row-level filter policy.
- Wildcard matching is not supported on database or table names.
- Filters are evaluated in the order listed in the policy.
- An audit log entry is generated each time a row-level filter is applied to a table or view.

## Procedure

1. On Service Manager Resource , select an existing Hadoop SQL service.
2. Select Row Level Filter , then click Add New Policy.

3. On the Create Policy page, add the following information for the row-level filter:

**Table 46: Policy Details**

| Field                       | Description   |
|-----------------------------|---|
| Policy Name<br>(required)   | Enter an appropriate policy name. This name cannot be duplicated across the system. The policy is enabled by default.   |
| normal/override             | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Hive Database<br>(required) | Type in the applicable database name. The auto-complete feature displays available databases based on the entered text.   |

| Field                    | Description   |
|--------------------------|---|
| Hive Table<br>(required) | Type in the applicable table name. The auto-complete feature displays available tables based on the entered text. |
| Audit Logging            | Audit Logging is set to Yes by default. Select No to turn off audit logging.                                      |
| Description              | Enter an optional description for the policy.   |
| Add Validity Period      | Specify a start and end time for the policy.  |

**Table 47: Row Filter Conditions**

| Label        | Description   |
|--------------|---|
| Select Role  | Specify the roles to which this policy applies.   |
| Select Group | Specify the groups to which this policy applies.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User  | Specify one or more users to which this policy applies.   |
| Access Types | Currently select is the only available access type. This will be used in conjunction with the WHERE clause specified in the Row Level Filter field.             |

| Label          | Description   |
|----------------|---|
| Add Row Filter | <ul style="list-style-type: none"> <li>To create a row filter for the specified users, groups, and roles, Click Add Row Filter, then type a valid WHERE clause in the Enter filter expression box.</li> <li>To allow Select access for the specified users and groups without row-level restrictions, do not add a row filter (leave the setting as "Add Row Filter").</li> <li>Filters are evaluated in the order listed in the policy. The filter at the top of the Row Filter Conditions list is applied first, then the second, then the third, and so on.</li> </ul> |

Create Policy

Last Response Time  
09/21/2023 02:28:09 PM

Service Manager > Hadoop SQL Policies > Create Policy

**i** Please ensure that users/groups listed in this policy have access to the table via an **Access Policy**. This policy does not implicitly grant access to the table. ✕

Policy Details

Policy Type

Row Level Filter

○ Add Validity Period

Policy Name\*

Policy Name i

Enabl

Norma

Policy Label

Select... ▼

Hive Database \*

Select... ▼

Hive Table \*

Select... ▼

Description

Audit Logging\*

Yes ●

Row Filter Conditions:

hide ▲

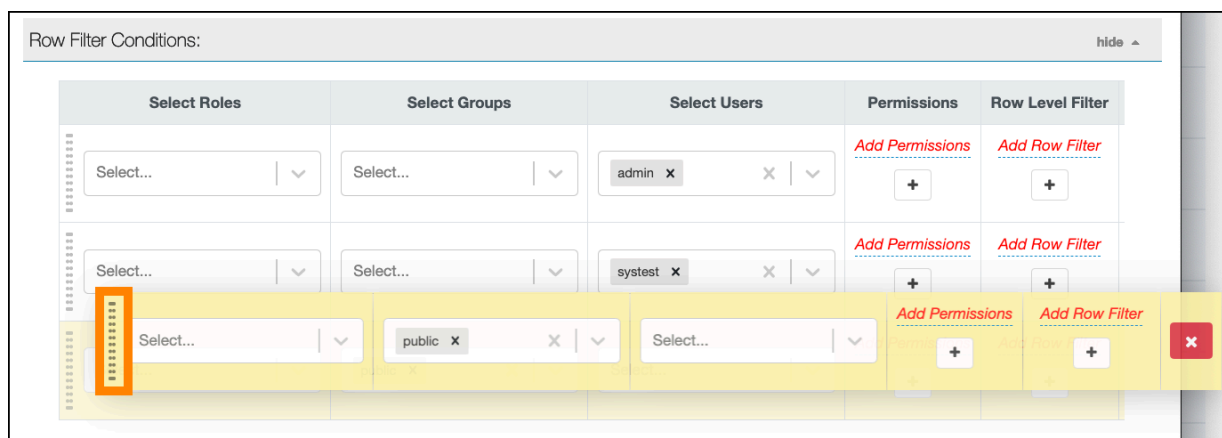
| Select Roles             | Select Groups                                       | Select                   | Enter  | Row Level Filter                                    |
|--------------------------|---|--------------------------|--|---|
| Select... <span>▼</span> | Select... <span>▼</span>                            | admin <span>✕</span>     | enter expression   | <div>Add Row Filter</div> <div><span>+</span></div> |
| Select... <span>▼</span> | Select... <span>▼</span>                            | sysrest <span>✕</span>   | <div>✓ <span>✕</span></div> <div><span>✕</span> <span>▼</span></div> | <div>Add Row Filter</div> <div><span>+</span></div> |
| Select... <span>▼</span> | public <span>✕</span> <span>✕</span> <span>▼</span> | Select... <span>▼</span> | <div>Add Permissions</div> <div><span>+</span></div>                 | <div>Add Row Filter</div> <div><span>+</span></div> |

+

Save

Cancel

- To move a condition in the Row Filter Conditions list (and therefore change the order in which the list is evaluated), click the dotted rows icon at the left of the condition row, then drag the condition to a new position in the list.



- Click Add in Create Policy to add the new row-level filter policy.

## Dynamic resource-based column masking in Hive with Ranger policies

You can use Apache Ranger dynamic resource-based column masking capabilities to protect sensitive data in Hive in near real-time. You can set policies that mask or anonymize sensitive data columns (such as PII, PCI, and PHI) dynamically from Hive query output. For example, you can mask sensitive data within a column to show only the first or last four characters.

### About this task

Dynamic column masking policies are similar to other Ranger access policies for Hive. You can set filters for specific users, groups, and conditions. With dynamic column-level masking, sensitive information never leaves Hive, and no changes are required at the consuming application or the Hive layer. There is also no need to produce additional protected duplicate versions of datasets.

The following conditions apply when using Ranger column masking policies to mask data returned in Hive query results:

- A variety of masking types are available, such as show last 4 characters, show first 4 characters, Hash, Nullify, and date masks (show only year).
- You can specify a masking type for specific users, groups, and conditions.
- Wildcard matching is not supported.
- Each column should have its own masking policy.
- Masks are evaluated in the order listed in the policy.
- An audit log entry is generated each time a masking policy is applied to a column.

### Procedure

- On **Service Manager Resource**, select an existing Hadoop SQL service.

2. Select Masking , then click Add New Policy.

The screenshot shows the 'HIVE Policies' management page. At the top, there are filters for 'Service : Hadoop SQL' and 'Select Zone Name', along with a 'Manage Service' button and a 'Last Response Time' of '09/21/2023 03:19:47 PM'. Below these are three tabs: 'Access', 'Masking' (which is highlighted with an orange box), and 'Row Level Filter'. A search bar with the placeholder 'Search for your policy...' is located below the tabs. To the right of the search bar is an 'Add New Policy' button, also highlighted with an orange box. Below the search bar is a table with columns: Policy ID, Policy Name, Policy Label, Status, Audit Logging, Roles, and Groups. The table is currently empty, and a message 'No data to show!!' is displayed at the bottom right of the table area.

3. On Create Policy, add the following information for the column-masking filter:

**Table 48: Policy Details**

| Field                       | Description   |
|-----------------------------|---|
| Policy Name<br>(required)   | Enter an appropriate policy name. This name cannot be duplicated across the system. The policy is enabled by default.   |
| normal/override             | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies. |
| Hive Database<br>(required) | Type in the applicable database name. The auto-complete feature displays available databases based on the entered text.   |
| Hive Table<br>(required)    | Type in the applicable table name. The auto-complete feature displays available tables based on the entered text.   |
| Hive Column<br>(required)   | Type in the applicable column name. The auto-complete feature displays available columns based on the entered text.   |
| Audit Logging               | Audit Logging is set to Yes by default. Select No to turn off audit logging.  |
| Description                 | Enter an optional description for the policy.   |
| Add Validity Period         | Specify a start and end time for the policy.  |

**Table 49: Mask Conditions**

| Label        | Description   |
|--------------|---|
| Select Role  | Specify the roles to which this policy applies.   |
| Select Group | Specify the groups to which this policy applies.<br><br>The public group contains all users, so granting access to the public group grants access to all users. |
| Select User  | Specify one or more users to which this policy applies.   |
| Access Types | Currently select is the only available access type.   |



| Label               | Description   |
|---------------------|---|
| Select Masking Type | <p>To create a row filter for the specified users, groups, and roles, click Select Masking Option, then select a masking type:</p> <ul style="list-style-type: none"><li>• Redact – mask all alphabetic characters with "x" and all numeric characters with "n".</li><li>• Partial mask: show last 4 – Show only the last four characters.</li><li>• Partial mask: show first 4 – Show only the first four characters.</li><li>• Hash – Replace all characters with a hash of entire cell value.</li><li>• Nullify – Replace all characters with a NULL value.</li><li>• Unmasked (retain original value) – No masking is applied.</li><li>• Date: show only year – Show only the year portion of a date string and default the month and day to 01/01</li><li>• Custom – Specify a custom masked value or expression. Custom masking can use any valid Hive UDF (Hive that returns the same data type as the data type in the column being masked).</li></ul> <p>Masking conditions are evaluated in the order listed in the policy. The condition at the top of the Masking Conditions list is applied first, then the second, then the third, and so on.</p> |

Create Policy

Last Response Time  
09/21/2023 03:34:47 PM

Service Manager > Hadoop SQL Policies > Create Policy

Please ensure that users/groups listed in this policy have access to the column via an Access Policy. This policy does not implicitly grant access to the column.

Policy Details

Policy TypeMasking

Add Validity Period

Policy Name\*Policy Name

EnableNormal

Policy LabelSelect...

Hive Database \*Select...

Hive Table \*Select...

Hive Column \*Select...

Description

Audit Logging\*Yes

Mask Conditions:

Select RolesSelect...

Select GroupsSelect...

Select Masking Options

hive

+

SaveCancel

Enter

Redact

Partial mask: show last 4

Partial mask: show first 4

Hash

Nullify

Unmasked (retain original value)

Date: show only year

Custom

✓✗

- To move a condition in the Mask Conditions list (and therefore change the order in which the list is evaluated), click the dotted rows icon at the left of the condition row, then drag the condition to a new position in the list.


- On Create Policy, click Add to add the new column masking filter policy.

## Dynamic tag-based column masking in Hive with Ranger policies

Where Ranger resource-based masking policy for Hive anonymizes data from a Hive column identified by the database, table, and column, Ranger tag-based masking policy anonymizes Hive column data based on tags and tag attribute values associated with Hive column (usually specified as metadata classification in Atlas).

### About this task

The following conditions apply when using Ranger column masking policies to mask data returned in Hive query results:

- A variety of masking types are available, such as show last 4 characters, show first 4 characters, Hash, Nullify, and date masks (show only year).
-  **Note:** Ranger depends on Hive/Impala's hashing functions for hash masking.
  - Impala uses sha512 in FIPS mode, sha256 in non-FIPS mode.
  - Hive uses sha256. Plans to update to sha512 in FIPS mode.
- You can specify a masking type for specific users, groups, and conditions.
- Wildcard matching is not supported.
- If there are multiple tag masking policies applied to the same Hive column, the masking policy with the lexicographically smallest policy-name is chosen for enforcement, E.G., policy "a" is enforced before policy "aa".
- Masks are evaluated in the order listed in the policy.
- An audit log entry is generated each time a masking policy is applied to a column.

### Procedure

- On Service Manager Tag, select a tag-based service.
- On TAG Policies, select Masking, then click Add New Policy.

3. In Create Policy, add the following information for the column-masking filter:

**Table 50: Policy Details**

| Field   | Description  |
|---|--|
| Policy Type<br>(required)                       | Set to Masking by default.   |
| Policy Name<br>(required)                       | Enter an appropriate policy name. This name cannot be duplicated across the system. The policy is enabled by default.  |
| normal/override                                 | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.  |
| TAG<br>(required)                               | Enter the applicable tag name, for example MASK.   |
| Audit Logging                                   | Audit Logging is set to Yes by default. Select No to turn off audit logging.   |
| Description                                     | Enter an optional description for the policy.  |
| Add Validity Period                             | Specify a start and end time for the policy.   |
| Policy Conditions (applied at the policy level) | <p>Click + to add policy conditions. Currently "Accessed after expiry_date? (yes/no)" is the only available policy condition.</p> <p>"Accessed after expiry_date (yes/no)?: To set this condition, type yes in the text box, then click check mark to add the condition.</p> <p>Enter boolean expression: Available for allow or deny conditions on tag-based policies. For examples and details, see "Using Tag Attributes and Values in Ranger Tag-Based Policy Conditions".</p> <p>Click Save to save the policy condition.</p> |

**Table 51: Mask Conditions**

| Label   | Description   |
|---|---|
| Select Role                                   | Specify the roles to which this policy applies.   |
| Select Group                                  | <p>Specify the groups to which this policy applies.</p> <p>The public group contains all users, so granting access to the public group grants access to all users.</p>  |
| Select User                                   | Specify one or more users to which this policy applies.   |
| Policy Conditions (applied at the item level) | <p>Click Add Conditions to add policy conditions. Currently "Accessed after expiry_date? (yes/no)" is the only available policy condition.</p> <p>"Accessed after expiry_date (yes/no)?: To set this condition, type yes in the text box, then click check mark to add the condition.</p> <p>Enter boolean expression: Available for allow or deny conditions on tag-based policies. For examples and details, see "Using Tag Attributes and Values in Ranger Tag-Based Policy Conditions".</p> |
| Permissions - Access Types                    | Currently select is the only available access type for the hive component.  |

| Label                 | Description  |
|-----------------------|--|
| Select Masking Option | <p>To create a row filter for the specified users, groups, and roles, click Select Masking Option, then select a masking type:</p> <ul style="list-style-type: none"> <li>Redact – mask all alphabetic characters with "x" and all numeric characters with "n".</li> <li>Partial mask: show last 4 – Show only the last four characters.</li> <li>Partial mask: show first 4 – Show only the first four characters.</li> <li>Hash – Replace all characters with a hash of entire cell value.</li> <li>Nullify – Replace all characters with a NULL value.</li> <li>Unmasked (retain original value) – No masking is applied.</li> <li>Date: show only year – Show only the year portion of a date string and default the month and day to 01/01</li> <li>Custom – Specify a custom masked value or expression. Custom masking can use any valid Hive UDF (Hive that returns the same data type as the data type in the column being masked).</li> </ul> <p>Masking conditions are evaluated in the order listed in the policy. The condition at the top of the Masking Conditions list is applied first, then the second, then the third, and so on.</p> |

**Create Policy** Last Response Time  
09/21/2023 04:10:36 PM

Service Manager > cm\_tag Policies > Create Policy

Please ensure that users/groups listed in this policy have access to the tag via an **Access Policy**. This policy does not implicitly grant access to the tag.

**Policy Details**

Policy Type: **Masking** Add Validity Period

Policy Name\*:  Enabled Normal

Policy Label:

TAG \*:

Description:

Audit Logging\*: Yes

**Mask Conditions:**

Select Roles:  Select Groups:  Select Users:

**Select Masking Option**

Select Masking Option

Enter

- ☐ Redact
- ☐ Partial mask: show last 4
- ☐ Partial mask: show first 4
- ☐ Hash
- ☐ Nullify
- ☐ Unmasked (retain original value)
- ☐ Date: show only year
- ☐ Custom

Save Cancel

- Click + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
- Click Add to add the new policy.

### Related Information

[Using tag attributes and values in Ranger tag-based policy conditions](#)

# Tag-based Services and Policies

Ranger enables you to create tag-based services and add access policies to those services.

## Adding a tag-based service

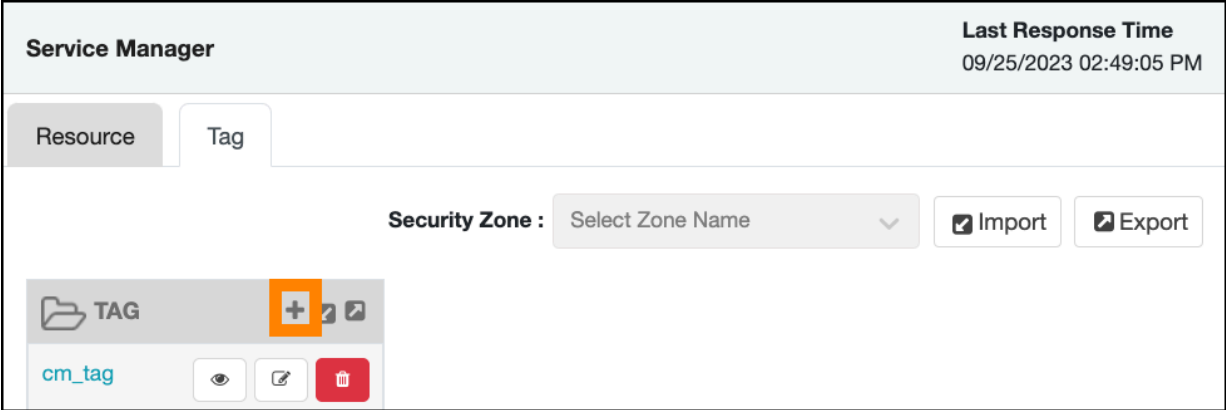
How to add a tag-based service to Ranger.

### About this task

You can use `Ranger Admin Web UI Service Manager Tag Policies` to create tag-based services and add tag-based access policies that can be applied to CDP resources. Using tag-based policies enables you to control access to resources across multiple components without creating separate services and policies in each component. You can also use `Ranger TagSync` to synchronize the Ranger tag store with an external metadata service such as Apache Atlas.

### Procedure

- 1. Select `Ranger Admin Web UI Service Manager Tag Policies` , then click +.



- On Create Service, type in a service name and an optional description. The service is enabled by default, but you can disable it by selecting Disabled. To add the service, click Add.

**Create Service**

Last Response Time  
09/25/2023 02:56:06 PM

[Service Manager](#) > Create Service

**Service Details :**

Service Name \*

tag\_service1

Display Name

Description

Active Status

☒ Enabled
 ☐ Disabled

**Config Properties :**

Add New Configurations

| Name        | Value       |              |
|-------------|-------------|--------------|
| <div></div> | <div></div> | <div>×</div> |

+

**Audit Filter**

Select "Audit Filter" to save/add audit filter !!

Test Connection

Add

Cancel

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- The new tag service appears in Service Manager.

**Service Manager**

Last Response Time  
09/25/2023 03:02:03 PM

Resource

Tag

Security Zone :

Select Zone Name

☒ Import

☒ Export

TAG

+

cm\_tag

tag\_service1

## Adding tag-based policies

Tag-based policies enable you to control access to resources across multiple Hadoop components without creating separate services and policies in each component. You can also use Ranger TagSync to synchronize the Ranger tag store with an external metadata service such as Apache Atlas.

### Procedure

1. Select Service Manager Tag Policies , then select a tag-based service.
2. List of Policies displays existing Access policies by default. Click Add New Policy.

**TAG Policies** Service : cm\_tag Select Zone Name Manage Service Last Response Time 09/27/2023 09:59:17 AM

Access Masking

Search for your policy...

Add New Policy

| Policy ID | Policy Name | Policy Label | Status  | Audit Logging | Roles | Groups | Users | Actions          |
|-----------|-------------|--------------|---------|---------------|-------|--------|-------|------------------|
| 4         | EXPIRES_ON  | --           | Enabled | Enabled       | --    | public | --    | View Edit Delete |

Create Policy displays controls for creating details for a new policy.

**Create Policy** Last Response Time 09/27/2023 10:06:28 AM

Service Manager > cm\_tag Policies > Create Policy

**Policy Details**

Policy Type **Access** Add Validity Period

Policy Name\* Policy Name Enabled Normal

Policy Label Select...

TAG \* Select...

Description

Audit Logging\* Yes

**Allow Conditions:** hide

| Select Roles | Select Groups | Select Users | Policy Conditions | Permissions     |   |
|--------------|---------------|--------------|-------------------|-----------------|---|
| Select...    | Select...     | Select...    | Add Conditions    | Add Permissions | X |

+ Exclude from Allow Conditions:

| Select Roles | Select Groups | Select Users | Policy Conditions | Permissions     |   |
|--------------|---------------|--------------|-------------------|-----------------|---|
| Select...    | Select...     | Select...    | Add Conditions    | Add Permissions | X |

+ Deny All Other Accesses: False

**Deny Conditions:** hide

| Select Roles | Select Groups | Select Users | Policy Conditions | Permissions     |   |
|--------------|---------------|--------------|-------------------|-----------------|---|
| Select...    | Select...     | Select...    | Add Conditions    | Add Permissions | X |

+



## 3. Complete the Create Policy page as follows:

**Table 52: Policy Details**

| Field   | Description  |
|---|--|
| Policy Type                                     | Set to Access by default.  |
| Policy Name                                     | Enter a unique policy name. This name cannot be duplicated across the system. This field is mandatory.   |
| normal/override                                 | Enables you to specify an override policy. When override is selected, the access permissions in the policy override the access permissions in existing policies. This feature can be used with Add Validity Period to create temporary access policies that override existing policies.  |
| TAG   | Enter the applicable tag name.   |
| Description                                     | (Optional) Describe the purpose of the policy.   |
| Audit Logging                                   | Specify whether this policy is audited. (De-select to disable auditing).   |
| Policy Label                                    | Specify a label for this policy. You can search reports and filter policies based on these labels.   |
| Add Validity Period                             | Specify a start and end time for the policy.   |
| Policy Conditions (applied at the policy level) | <p>Click the + icon to add policy conditions. Currently "Accessed after expiry_date? (yes/no)" is the only available policy condition.</p> <p>"Accessed after expiry_date (yes/no)?: To set this condition, type yes in the text box, then click the check mark button to add the condition.</p> <p>Enter boolean expression: Available for allow or deny conditions on tag-based policies. For examples and details, see "Using Tag Attributes and Values in Ranger Tag-Based Policy Conditions".</p> <p>Click Save to save the policy condition.</p> |

**Table 53: Allow, Exclude from Allow, Deny, and Exclude from Deny Conditions**

| Label   | Description  |
|---|--|
| Select Role                                   | Specify the roles to which this policy applies.  |
| Select Group                                  | <p>Specify the group to which this policy applies. To designate the group as an Administrator for the chosen resource, specify Admin permissions. (Administrators can create child policies based on existing policies).</p> <p>The public group contains all users, so setting a condition for the public group applies to all users.</p>   |
| Select User                                   | Specify a particular user to which this policy applies (outside of an already-specified group) OR designate a particular user as Admin for this policy. (Administrators can create child policies based on existing policies).   |
| Policy Conditions (applied at the item level) | <p>Click Add Conditions to add policy conditions. Currently "Accessed after expiry_date? (yes/no)" is the only available policy condition.</p> <p>"Accessed after expiry_date (yes/no)?: To set this condition, type yes in the text box, then click the check mark button to add the condition.</p> <p>Enter boolean expression: Available for allow or deny conditions on tag-based policies. For examples and details, see "Using Tag Attributes and Values in Ranger Tag-Based Policy Conditions".</p> |

| Label                 | Description   |
|-----------------------|---|
| Component Permissions | Click Add Permissions to add or edit component conditions. To add component permissions, enter the component name in the text box, then use the check boxes to specify component permissions. Click the check mark button to add the chosen component conditions to the policy. |

4. You can use + to add additional conditions. Conditions are evaluated in the order listed in the policy. The condition at the top of the list is applied first, then the second, then the third, and so on.
5. You can use Deny All Other Accesses to deny access to all other users, groups, and roles other than those specified in the allow conditions for the policy.
6. Click Add to add the new policy.

### Related Information

[Using tag attributes and values in Ranger tag-based policy conditions](#)

## Using tag attributes and values in Ranger tag-based policy conditions

Enter boolean expression allows Ranger to use tag attributes and values when configuring tag-based policy Allow or Deny conditions. It allows admins to provide boolean expression(s) using tag attributes.

The policy condition is introduced in the tag service definition:

```
{
  "itemId":2,
  "name":"expression",
  "evaluator": "org.apache.ranger.plugin.conditionevaluator.RangerScriptConditionEvaluator",
  "evaluatorOptions" : {"engineName":"JavaScript", "ui.isMultiline":"true"},
  "label":"Enter boolean expression",
  "description": "Boolean expression"
}
```

The following variables can be referenced in the boolean expression:

- ctx: Context handler containing APIs to access metadata information from the request.
- tag: Information about the current tag.
- tagAttr: Map containing all the current tag attributes and corresponding values.

The following APIs available from the request:

- getUser(): Returns a string.
- getUserGroups(): Returns a set of strings containing groups.
- getClientIPAddress(): Returns a string containing client IP address.
- getAction(): Returns a string containing information about the action being requested.

For two scenarios:

- User “sam” needs to be denied a policy based on the IP address of the machine from where the resources are accessed.

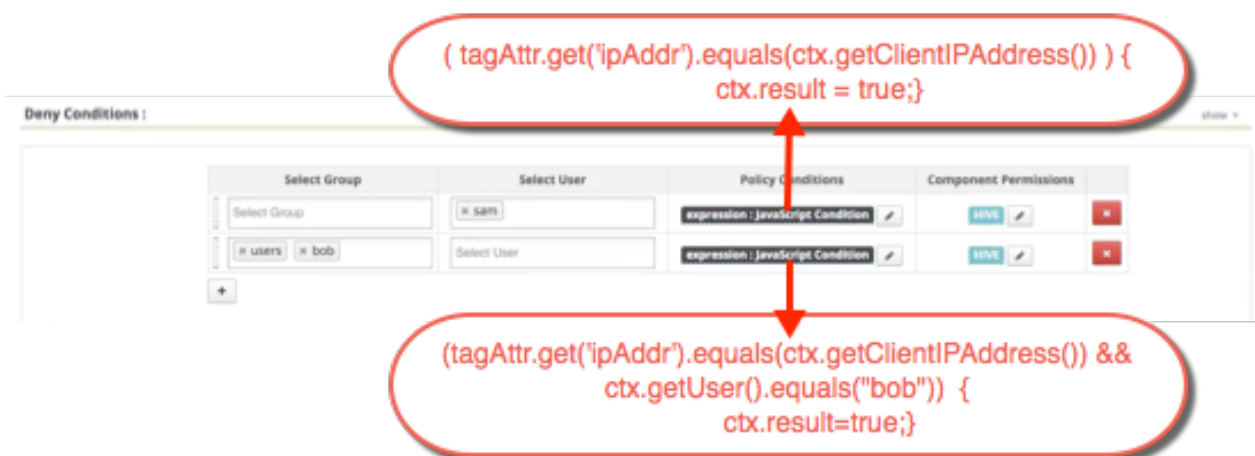
Set the deny condition for user sam with the following boolean expression:

```
if ( tagAttr.get('ipAddr').equals(ctx.getClientIPAddress()) ) {
  ctx.result = true;
}
```

- Deny one particular user, “bob” from a group, “users”, only when this user is accessing resources from a particular IP defined as an tag attribute in Atlas.

Set the deny condition for group users with the following boolean expression:

```
if (tagAttr.get('ipAddr').equals(ctx.getClientIPAddress()) && ctx.getUser().equals("bob")) {
    ctx.result=true;
}
```



## Adding a policy condition to a tag-based policy

You can add a condition to a tag-based policy, using Ranger Admin Web UI when creating a new, or editing an existing policy.

### About this task

Ranger Admin Web UI supports adding one of the following policy conditions to a new or existing tag-based policy:

- Accessed after expiry\_date ? for example - Yes/No
- Boolean expression for example - Country\_Name="XYZ"

The Policy Conditions dialog prompts for inputs using uhint JSON. For populating "Accessed after expiry\_date? (yes/no)" for example, we are using JSON like this:

```
{
  "itemId": 1,
  "name": "accessed-after-expiry",
  "evaluator": "org.apache.ranger.plugin.conditionevaluator.RangerScriptTemplateConditionEvaluator",
  "evaluatorOptions": {
    "scriptTemplate": "ctx.isAccessedAfter('expiry_date');"
  },
  "uiHint": "{ \"singleValue\":true }",
  "label": "Accessed after expiry_date (yes/no)?",
  "description": "Accessed after expiry_date? (yes/no)"
}
```

## Procedure

1. In Service Manager Tag Policies `cm_tag_policies` , choose one of the following:

### Add New Policy

to add a new, tag-based policy.

### Policy ID

click a policy ID to edit an existing policy.

2. In either Create Policy or Edit Policy Policy Conditions , click +.

**Edit Policy** Last Response Time  
10/23/2023 03:20:11 PM

Service Manager > cm\_tag Policies > Edit Policy

**Policy Details**

Policy Type: **Access** Add Validity Period

Policy ID\*: **4**

Policy Name\*:  Enable ☒ Normal ☐

Policy Label:

TAG \*:

Description:

Audit Logging\*: ☒ Yes

**Policy Conditions :** +

No Conditions

3. In Policy Conditions:
  - a) In Accessed after expiry date ?, select Yes or No.
  - b) In Enter boolean expression, enter an expression that evaluates to true or false.  
Country\_Name="XYZ"
4. Click Save.

## Adding a tag-based PII policy

Example of how to add a PII tag-based policy. In this example we create a tag-based policy for objects tagged "PII" in Atlas. Access to objects tagged "PII" is allowed for members of the "audit" group. All other users (the "public" group) are denied access.

## Procedure

1. Select Service Manager Tag Policies , then select a tag-based service.

2. List of Policies displays existing Access policies by default. Click Add New Policy.

The screenshot shows the 'TAG Policies' interface. At the top, there's a header with 'Service : cm\_tag' and 'Select Zone Name'. A 'Manage Service' button is on the right. Below the header, there's a tab for 'Access' and 'Masking'. A search bar is present with the text 'Search for your policy...'. An 'Add New Policy' button is on the right. The main table has columns: Policy ID, Policy Name, Policy Label, Status, Audit Logging, Roles, Groups, Users, and Actions. One policy is listed with ID 4, Name EXPIRES\_ON, Label --, Status Enabled, Audit Logging Enabled, Roles --, Groups public, and Users --. The Actions column has icons for view, edit, and delete.

Create Policy displays controls for creating details for a new policy.

The screenshot shows the 'Create Policy' page. The header includes 'Service Manager > cm\_tag Policies > Create Policy' and 'Last Response Time 09/27/2023 10:06:28 AM'. The 'Policy Details' section has a 'Policy Type' dropdown set to 'Access'. There are toggle buttons for 'Enabled' and 'Normal'. A 'Policy Conditions' section shows 'No Conditions'. Below this, there's a table for 'Allow Conditions' with columns: Select Roles, Select Groups, Select Users, Policy Conditions, Permissions, and a delete button. The 'Deny All Other Accesses' toggle is set to 'False'. There's also a 'Deny Conditions' section with a similar table structure.

3. Complete the Create Policy page as follows:

**Table 54: Policy Details**

| Field         | Description               |
|---------------|---------------------------|
| Policy Type   | Set to Access by default. |
| Policy Name   | PII                       |
| TAG           | PII                       |
| Audit Logging | YES                       |

| Field       | Description                                    |
|-------------|--|
| Description | Restrict access to resources with the PII tag. |

**Table 55: Allow Conditions**

| Label                 | Description                      |
|-----------------------|----------------------------------|
| Select Group          | audit                            |
| Select User           | <none>                           |
| Policy Conditions     | <none>                           |
| Component Permissions | hive<br>(select all permissions) |

**Table 56: Deny Conditions**

| Label                 | Description                      |
|-----------------------|----------------------------------|
| Select Group          | public                           |
| Select User           | <none>                           |
| Policy Conditions     | <none>                           |
| Component Permissions | hive<br>(select all permissions) |

**Table 57: Exclude from Deny Conditions**

| Label             | Description |
|-------------------|-------------|
| Select Group      | audit       |
| Select User       | <none>      |
| Policy Conditions | <none>      |

| Label                 | Description                      |
|-----------------------|----------------------------------|
| Component Permissions | hive<br>(select all permissions) |

**Create Policy** Last Response Time  
09/27/2023 10:06:28 AM

Service Manager > cm\_tag Policies > Create Policy

**Policy Details**

Policy Type: **Access** Add Validity Period

Policy Name\*: PII Enabled ☒ Normal ☐

Policy Label: Select... Policy Conditions: No Conditions

TAG \*: PII +

Description: Restrict access to resources with the PII tag

Audit Logging\*: ☒ Yes

**Allow Conditions:** hide

| Select Roles | Select Groups | Select Users | Policy Conditions   | Permissions |   |
|--------------|---------------|--------------|---------------------|-------------|---|
| Select...    | audit x       | Select...    | Add Conditions<br>+ | HIVE        | x |

**Exclude from Allow Conditions:**

| Select Roles | Select Groups | Select Users | Policy Conditions   | Permissions     |   |
|--------------|---------------|--------------|---------------------|-----------------|---|
| Select...    | Select...     | Select...    | Add Conditions<br>+ | Add Permissions | x |

Deny All Other Accesses: ☐ False

**Deny Conditions:** hide

| Select Roles | Select Groups | Select Users | Policy Conditions   | Permissions |   |
|--------------|---------------|--------------|---------------------|-------------|---|
| Select...    | public x      | Select...    | Add Conditions<br>+ | HIVE        | x |

**Exclude from Deny Conditions:**

| Select Roles | Select Groups | Select Users | Policy Conditions   | Permissions |   |
|--------------|---------------|--------------|---------------------|-------------|---|
| Select...    | audit x       | Select...    | Add Conditions<br>+ | HIVE        | x |

In this example we used Allow Conditions to grant access to the "audit" group, and then used Deny Conditions to deny access to the "public" group. Because the "public" group includes all users, we then used Exclude from Deny Conditions to exclude the "audit" group, in effect reinstating the "audit" group's original Allow access condition.

- Click Add to add the new policy.

## Default EXPIRES\_ON tag policy

An EXPIRES\_ON tag-based policy is created automatically when a tag service instance created. This default policy denies access to objects tagged with EXPIRES\_ON after the expiry date specified in the Atlas tag attribute. You can use the following steps to review the default EXPIRES\_ON policy.

## Procedure

1. Select **Service Manager Tag Policies** , then select a tag-based service.
2. On **List of Policies**, click **Edit** for the default EXIRES\_ON policy.

TAG Policies

Service : cm\_tag

Select Zone Name

Manage Service

Last Response Time  
09/27/2023 10:36:57 AM

Access

Masking

Q Search for your policy...

Add New Policy

| Policy ID | Policy Name | Policy Label | Status  | Audit Logging | Roles | Groups | Users | Actions |
|-----------|-------------|--------------|---------|---------------|-------|--------|-------|---------|
| 4         | EXPIRES_ON  | --           | Enabled | Enabled       | --    | public | --    |         |

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The Edit Policy page appears:

Policy Type

Access

Policy ID\*

4

Policy Name\*

EXPIRES\_ON

Enabled

Normal

Policy Label

Select...

TAG \*

EXPIRES\_ON

Description

Policy for data with EXPIRES\_ON tag

Audit Logging\*

Yes

⊙ Add Validity Period

Policy Conditions :

No Conditions

Allow Conditions:

hide

Select Roles

Select Groups

Select Users

Policy Conditions

Permissions

Select...

Select...

Select...

Add Conditions

Add Permissions

+

⚠ Exclude from Allow Conditions:

Select Roles

Select Groups

Select Users

Policy Conditions

Permissions

Select...

Select...

Select...

Add Conditions

Add Permissions

+

Deny All Other Accesses: \*

False

Deny Conditions:

hide

Select Roles

Select Groups

Select Users

Policy Conditions

Permissions

Select...

public

rangerlookup

Accessed after expiry\_data (yes/no)? : yes

ADLS

KUDU

SG

GS

HDFS

HEBASE

HIVE

YARN

KNOX

KMS

SOLR

KAFKA

NIFI

NIFI-REGISTRY

ATLAS

OZONE

SCHEMA-REGISTRY

KAFKA-CONNECT

+

3. We can see that the default EXPIRES\_ON policy denies access to all users, and for all components, after the expiry date specified in the Atlas tag attribute.

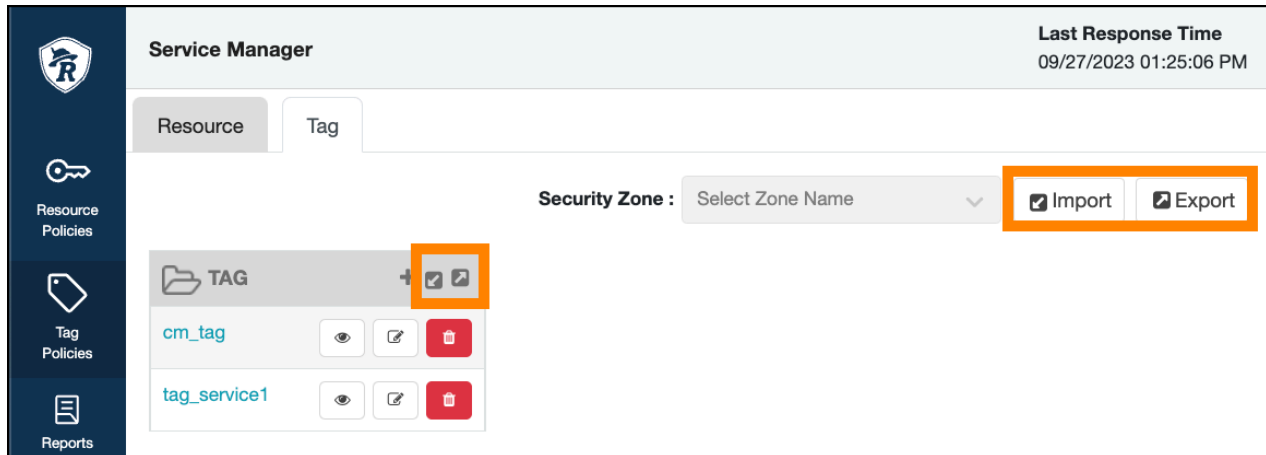


## Importing and exporting tag-based policies

You can export and import policies from the Ranger Admin UI for cluster resiliency (backups), during recovery operations, or when moving policies from test clusters to production clusters. You can import or export a specific subset of policies (such as those that pertain to specific resources or user/groups) or clone the entire repository (or multiple repositories) via the Ranger Admin UI.

### Interfaces

You can import and export policies from Service Manager Tag Policies Tag :



You can also export policies from Reports:

**Reports**

**Last Response Time**  
09/21/2023 09:08:09 AM

**Search Criteria**

Policy Name

Policy Type 

Access ▾

Component 

▾

Resource

Policy Label 

▾

Zone Name 

Select Zone Name ▾

Search By 

Group ▾

Select...

Excel file  
CSV file  
JSON file

Export

**HDFS**

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|
| 1         | all - path     | --           | path: /*                | Access      | Enabled | --        |
| 2         | kms-audit-path | --           | path: /ranger/audit/... | Access      | Enabled | --        |

**HBASE**

| Policy ID | Policy Name            | Policy Label | Resources                                 | Policy Type | Status  | Zone Name |
|-----------|------------------------|--------------|---|-------------|---------|-----------|
| 5         | all - table, column... | --           | column-family: *<br>column: *<br>table: * | Access      | Enabled | --        |

**Table 58: Export Policy Options**

|                         | Service Manager Page | Reports Page         |
|-------------------------|----------------------|----------------------|
| Formats                 | JSON                 | JSON<br>Excel<br>CSV |
| Filtering Supported     | No                   | Yes                  |
| Specific Service Export | Yes                  | Via filtering        |

### Filtering

When exporting from the Reports page, you can apply filters before saving the file.

### Export Formats

You can export policies in the following formats:

- Excel
- JSON

- CSV

**Note:**

CSV format is not supported for importing policies.

When you export policies from the Service Manager page, the policies are automatically downloaded in JSON format. If you wish to export in Excel or CSV format, export the policies from the Reports page dropdown menu.

**Required User Roles**

The Ranger admin user can import and export only Resource & Tag based policies. The credentials for this user are set in Ranger Configs Advanced ranger-env in the fields labeled admin\_username (default: admin/admin).

The Ranger KMS keyadmin user can import and export only KMS policies. The default credentials for this user are keyadmin/keyadmin.

**Limitations**

To successfully import policies, use the following database versions:

- MariaDB: 10.1.16+
- MySQL: 5.6.x+
- Oracle: 11gR2+
- PostgreSQL: 8.4+
- MS SQL: 2008 R2+

**Note:**

Partial policy import is not supported.

**Related Information**

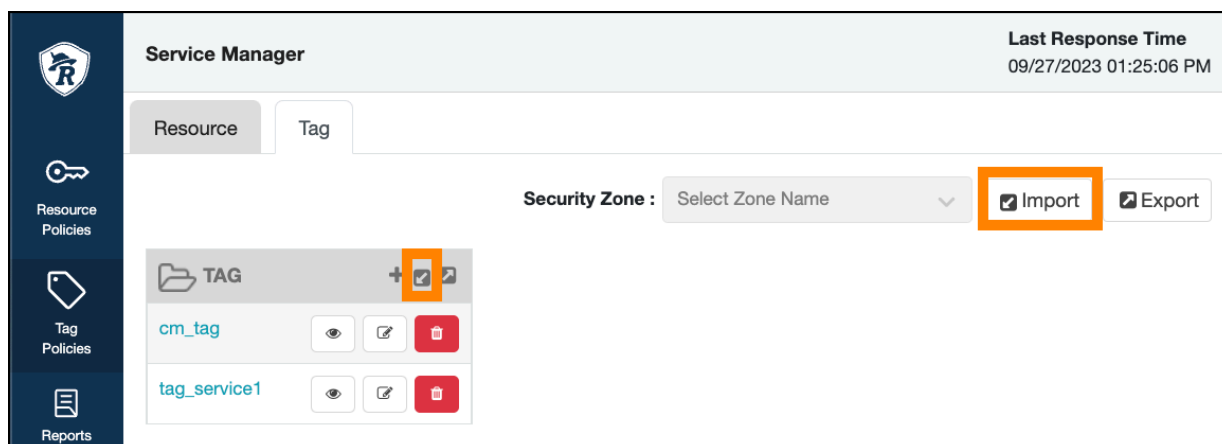
[Importing and exporting resource-based policies](#)

**Import tag-based policies**

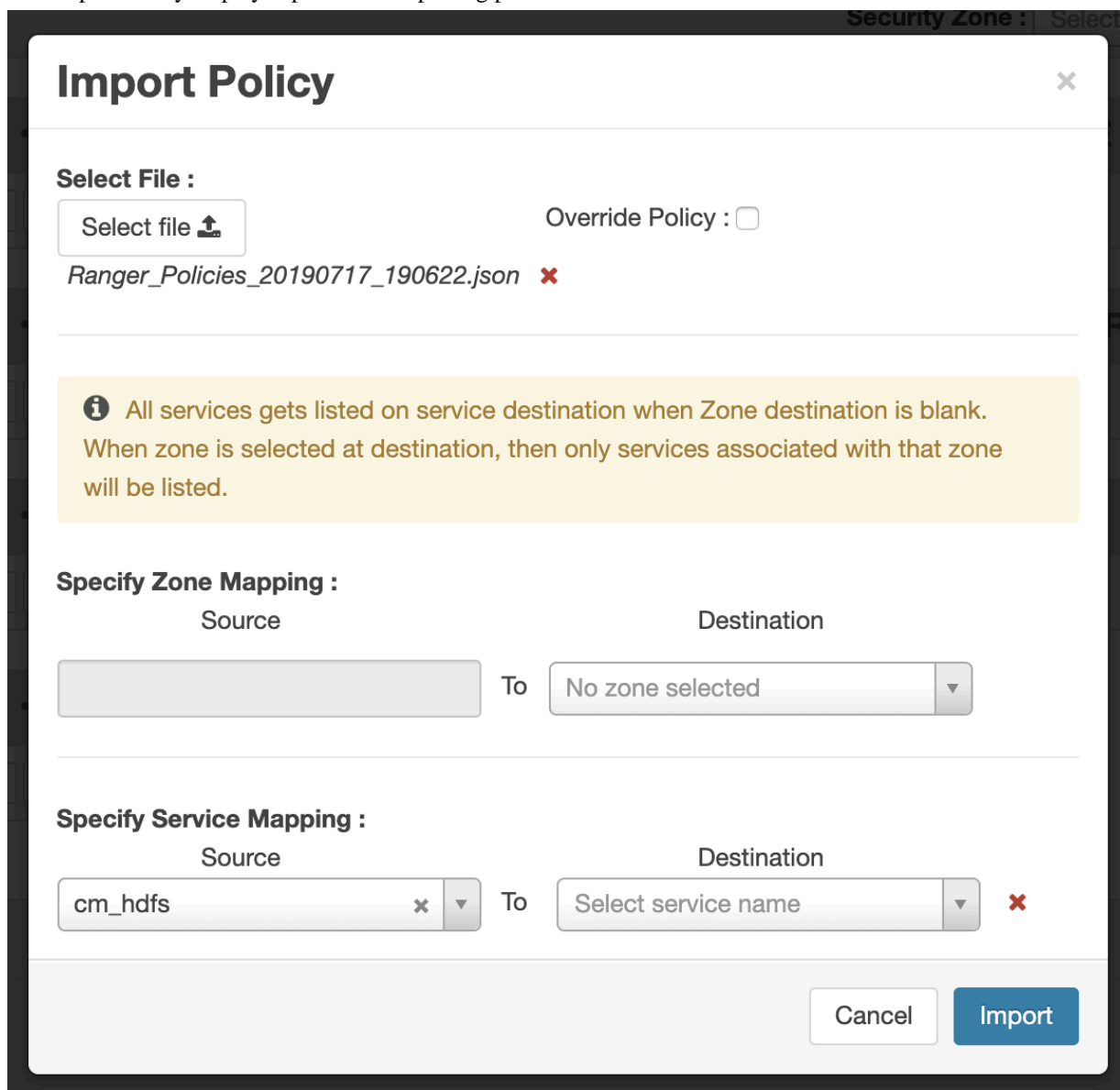
How to import tag-based policies.

## Procedure

1. On Service Manager Tag Policies Tag , click one of the Import icons:



The Import Policy displays options for importing policies.



## 2. Select the file to import.

You can only import policies in JSON format.

## 3. (Optional) Configure the import operation:

- The Override Policy option deletes all policies of the destination repositories.
- Zone Mapping – when no destination is selected, all services are imported. When a destination is selected, only the services associated with that security zone are imported.
- Service Mapping maps the downloaded file repository, i.e. source repository to destination repository. You can use the red x symbols to remove services from the import. Scroll down to view all service mappings.

**Import Policy**

**Specify Zone Mapping :**

Source Destination

To No zone selected

**Specify Service Mapping :**

Source Destination

|          |    |          |   |
|----------|----|----------|---|
| cm_hdfs  | To | cm_hdfs  | x |
| cm_hbase | To | cm_hbase | x |
| cm_yarn  | To | cm_yarn  | x |
| cm_hive  | To | cm_hive  | x |
| cm_knox  | To | cm_knox  | x |
| cm_storm | To | cm_storm | x |

Cancel Import

## 4. Click Import.

A confirmation message appears after the file is imported.

**Related Information**

[Export tag-based policies](#)

**Export tag-based policies**

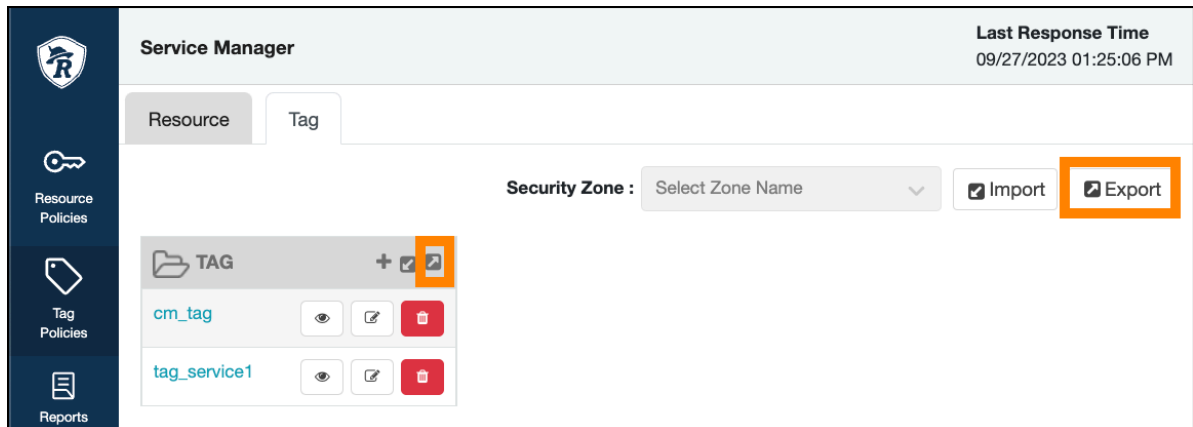
How to export all tag-based policies.

### About this task

You can only export policies in JSON format from the Tag-based policies page. If you would like to export in Excel or CSV format, export the policies from the Reports page drop-down menu.

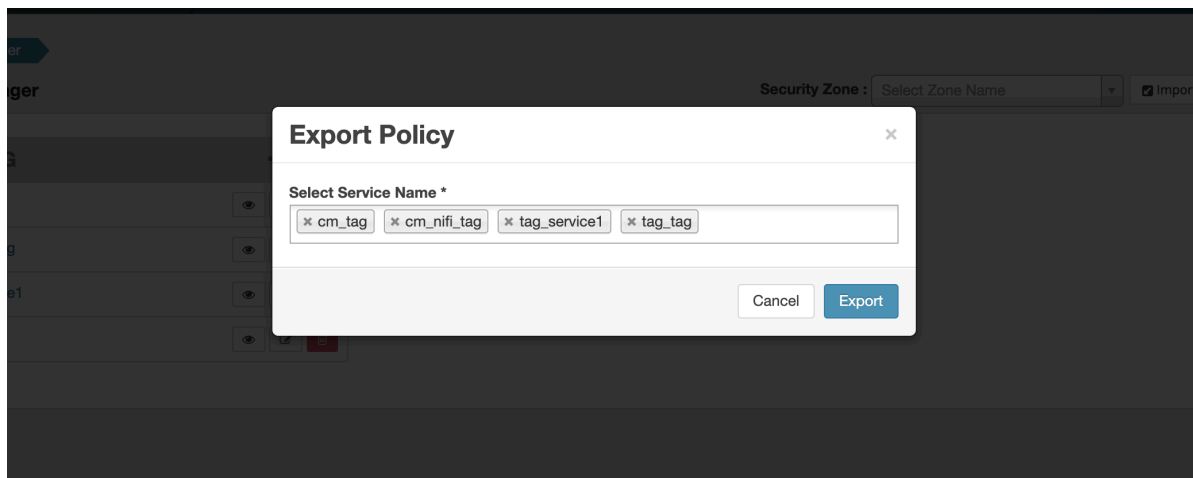
### Procedure

- On Service Manager Tag Policies Tag, click one of the Export icons:
  - Click the Export button or icon:



Export Policy displays options for exporting policies.

- Remove components or specific services, then click Export.



- The file downloads in your browser as a JSON file.

- From Reports:
  - Filter Component to tag and click Search.
  - (Optional) Apply filters before exporting the file.
  - Open the Export drop-down menu:

The screenshot shows the 'Reports' section of the Cloudera interface. At the top right, it says 'Last Response Time 09/27/2023 01:56:48 PM'. Below this is a 'Search Criteria' section with several filters: 'Policy Name' (text input), 'Policy Type' (dropdown menu set to 'Access'), 'Component' (dropdown menu set to 'tag'), 'Resource' (text input), 'Policy Label' (dropdown menu), 'Zone Name' (dropdown menu set to 'Select Zone Name'), and 'Search By' (dropdown menu set to 'Group'). A 'Search' button is at the bottom of this section. Below the search criteria is a table titled 'TAG' with columns: Policy ID, Policy Name, Policy Label, Resources, Policy Type, Status, Zone, and Conditions. The table contains two rows of data. To the right of the table is an 'Export' button with a dropdown menu showing options for 'Excel file', 'CSV file', and 'JSON file'.

| Policy ID | Policy Name | Policy Label | Resources       | Policy Type | Status  | Zone | Conditions |
|-----------|-------------|--------------|-----------------|-------------|---------|------|------------|
| 4         | EXPIRES_ON  | --           | tag: EXPIRES_ON | Access      | Enabled | --   | +          |
| 67        | EXPIRES_ON  | --           | tag: EXPIRES_ON | Access      | Enabled | --   | +          |

- Select the file format.  
The file downloads in your browser.

## Create a time-bound policy

Ranger policy validity periods enable you to configure a policy to be effective for a specified time range. You can add a validity period to both resource-based and tag-based policies.

### About this task

Time-bound policy use-case examples:

- To restrict access to sensitive financial information until the earnings release date.
- To block a certain user for a specific time period (e.g., a compromised user account being investigated needs to be put on "hold" from accessing resources in Hadoop services).
- To block a certain group for a specific time (e.g., excluding temporary employees from writing on resources during the holiday season).

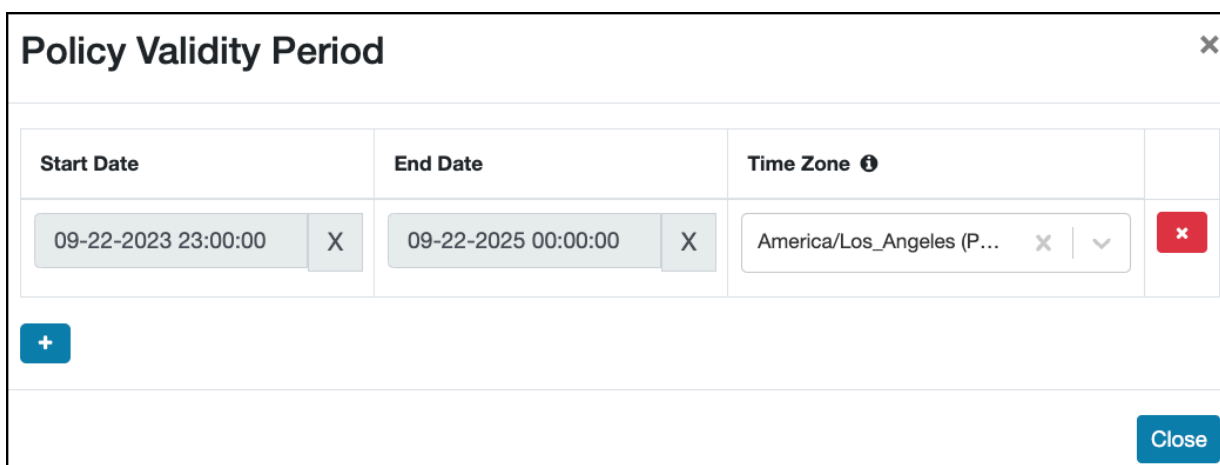


**Note:** The following procedure shows how to create a time-bound resource-based policy. The procedure is essentially the same for a tag-based resource policy.

### Procedure

- On **Service Manager Resource Policies**, select a service.
- On **<Service\_name> Policies**, click **Add New Policy**.
- Complete the fields on **Create Policy**.
- Click **Add Validity Period**.

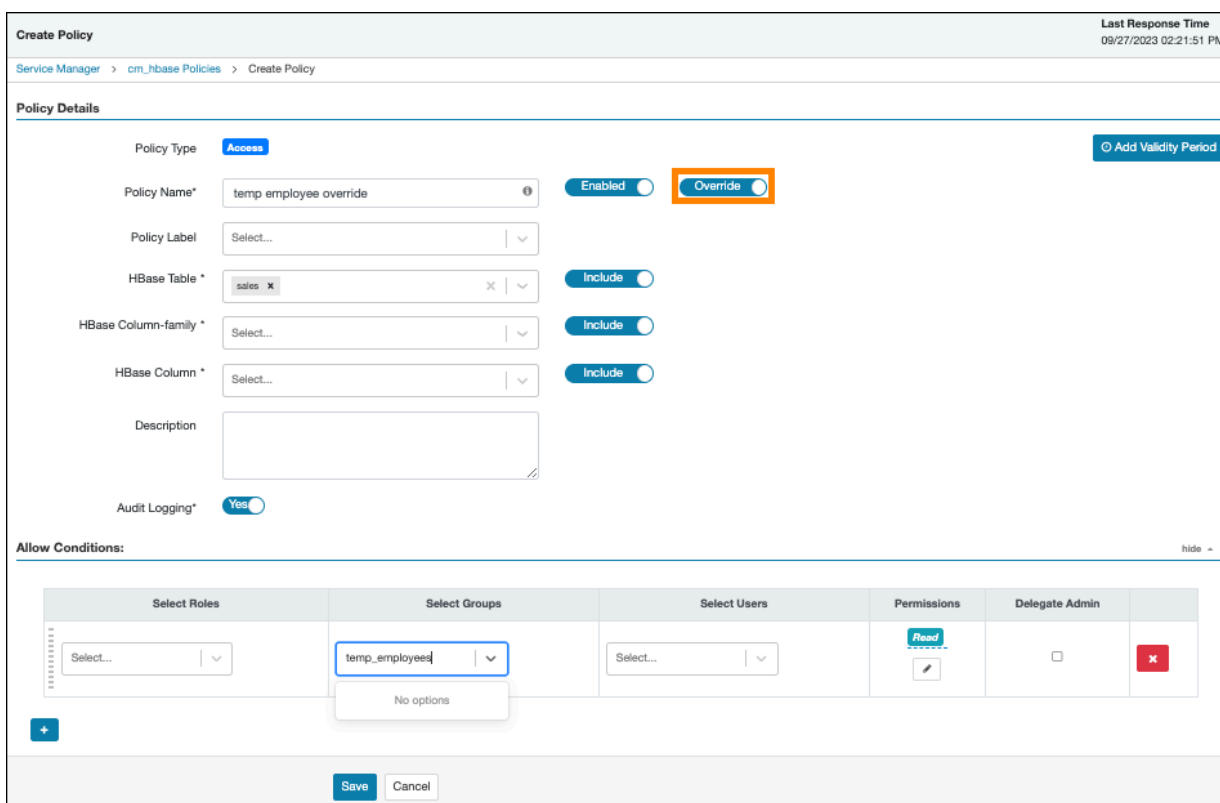
5. On Policy Validity Period, specify a start time, end time, and time zone. To add additional validity periods, click +. Click Save to save the specified validity periods.



The dialog box titled "Policy Validity Period" contains a table with three columns: Start Date, End Date, and Time Zone. The Start Date is set to 09-22-2023 23:00:00, the End Date is 09-22-2025 00:00:00, and the Time Zone is America/Los\_Angeles (P...). There are delete (X) and add (+) buttons for each row. A blue + button is at the bottom left, and a blue Close button is at the bottom right.

| Start Date            | End Date              | Time Zone ⓘ                     |
|-----------------------|-----------------------|---------------------------------|
| 09-22-2023 23:00:00 X | 09-22-2025 00:00:00 X | America/Los_Angeles (P... X   v |

6. If you would like the policy to override all other policies during its validity period, select override.



The "Create Policy" form shows the "Policy Details" section. The Policy Type is "Access". The Policy Name is "temp employee override". The "Override" radio button is selected and highlighted with an orange box. Other fields include Policy Label, HBase Table (sales), HBase Column-family, HBase Column, Description, and Audit Logging (Yes). The "Allow Conditions" section shows a table with columns: Select Roles, Select Groups (temp\_employee), Select Users, Permissions (Read), Delegate Admin, and a delete button (X). There are +, Save, and Cancel buttons at the bottom.

Policy Details

Policy Type: Access

Policy Name\*: temp employee override

Policy Label: Select...

HBase Table\*: sales

HBase Column-family\*: Select...

HBase Column\*: Select...

Description:

Audit Logging\*: Yes

Override (selected)

Allow Conditions:

| Select Roles | Select Groups | Select Users | Permissions | Delegate Admin           |
|--------------|---------------|--------------|-------------|--------------------------|
| Select...    | temp_employee | Select...    | Read        | <input type="checkbox"/> |

7. Click Add.

## Create a Hive authorizer URL policy

You can create a Hive Authorizer URL policy in Ranger that maintains Read and Write permissions for a location or folder.



## About this task

Hive supports several commands that include URLs which refer to a current or future data location. Such locations must authorize end user access to that location. Currently, you can create a Ranger HDFS policy that grants "All" permissions for a location, recursively. If no such policy exists, HDFS authorization "falls back" to the current ACL that defines access to a location or folder. By default the value of the parameter is "hdfs:,file:". If you remove "hdfs:", access requests will be authorized against the HIVE URL policy and won't check for hdfs plugin or Hadoop ACL. This solution requires maintaining many policies or ACLs at the storage level. You can create a Hive Authorizer URL policy in Ranger that maintains Read and Write permissions for a location or folder.

To create a Hive Authorizer policy:

## Procedure

1. In Cloudera Manager HIVE-1 Configuration Search . type ranger-hive.
2. In Hive Service Advanced Configuration Snippet (Safety Valve) for ranger-hive-security.xml, click +.
  - a) Under HIVE-1, in Name, type: ranger.plugin.hive.urlauth.filesystem.schemes.
  - b) In Value, type: file:
  - c) Click Save Changes.
3. In Cloudera Manager Hive\_On\_Tez-1 Configuration Search . type ranger-hive.
4. In Hive Service Advanced Configuration Snippet (Safety Valve) for ranger-hive-security.xml, click +.
  - a) Under HIVE\_ON\_TEZ-1, in Name, type: ranger.plugin.hive.urlauth.filesystem.schemes.
  - b) In Value, type: file:
  - c) Click Save Changes.
5. In HIVE-1 Actions , click Restart.
6. In HIVE\_ON\_TEZ-1 Actions , click Restart.

By default the value of the parameter is "hdfs:,file:". If you remove "hdfs:", access requests will be authorized against the HIVE URL policy and won't check for hdfs plugin or Hadoop ACL.
7. In Ranger Resource Policies Hadoop SQL , click Add New Policy.
8. In Policy Details, select URL, then type the URL represents the location or folder to which you want Ranger to authorize access: hdfs://<hostname>.root.hwx.site:8020/demo/data.

9. In Allow Conditions, select user(s), then choose Read and Write permissions, as shown in the following example:

**Figure 5: Creating a Hive Authorizer URL Policy**

**Create Policy** Last Response Time  
09/27/2023 02:42:16 PM

Service Manager > Hadoop SQL Policies > Create Policy

**Policy Details**

Policy Type: **Access** Add Validity Period

Policy Name\*:  Enabled ☒ Normal ☐

Policy Label:

URL:  Recursive ☒

Description:

Audit Logging\*: ☒ Yes

**Allow Conditions:** hide

| Select Roles                           | Select Groups                          | Select Users                      | Permissions  | Delegate Admin           |                                     |
|--|--|-----------------------------------|--|--------------------------|-------------------------------------|
| <input type="text" value="Select..."/> | <input type="text" value="Select..."/> | <input type="text" value="hive"/> | <input checked="" type="checkbox"/> Read <input checked="" type="checkbox"/> Write | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

+

This policy allows the user to READ / WRITE into the location defined by the URL.

```
CREATE EXTERNAL TABLE IF NOT EXISTS STUDENT (student_ID INT, FirstName STRING, LastName
STRING, year STRING, Major STRING) COMMENT 'Student Names' ROW FORMAT DELIMITED FIELDS
TERMINATED BY ',' STORED AS TEXTFILE LOCATION '/demo/data';
```

This will create a table reading data from the location /demo/data provided user will have the necessary READ permission to the location along with CREATE permission for table STUDENT

If the storage system is S3A or ADFS, then URL policy would be maintained for the scheme. For example, s3a://<folder>, abfs://<folder>.

Hive supports URL policies for the following commands that have URLs defined for the respective location:

#### **CREATE TABLE**

external table location

#### **ALTER TABLE LOCATION**

new location

#### **ALTER PARTITION LOCATION**

new partition location

#### **ALTER TABLE ADD PARTITION**

for partition location

#### **LOAD**

input location

For additional information about creating Hive commands with URL, see <https://cwiki.apache.org/confluence/display/RANGER/Hive+Commands+to+Ranger+Permission+Mapping>.

## Showing Role|Grant definitions from Ranger HiveAuthorizer

You can use beeline to show the roles granted to users, groups, and roles.

### About this task

You can create roles in Ranger or in Hive. You create roles in HIVE using ROLE commands, such as CREATE ROLE, GRANT / REVOKE ROLE. You can create roles in Ranger, using the Ranger Admin Web UI, if you have Admin permissions. See related links for more information about creating roles. The Hive2 command line interface Beeline returns role grant definitions for a specific principal, such as a user, group or role.

### Before you begin

Roles must be defined before using beeline to show role|grant definitions.

### Procedure

1. Run beeline, (the hive2 command line interface) on the Ranger host.

```
beeline -u jdbc:hive2://<ranger_host_name>
```

2. Enter valid syntax to return the role definitions for a specific principal.

#### Syntax

```
SHOW ROLE GRANT (USER|GROUP|ROLE) principal_name;
```

where

principal\_name is USER | GROUP | ROLE name

### Results

Beeline outputs query results, as shown in following examples:

### Example

SHOW ROLE GRANT USER HDFS -> show roles for user "hdfs"

```
0: jdbc:hive2://rm-ranger-3.rm-ranger.root.hw> show role grant user hdfs;
INFO : Compiling command(queryId=hive_20211109235258_b9211cfe-0e78-47d7-8a2a-1b611ddcd18): show role grant user hdfs
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:[FieldSchema(name:role, type:string, comment:from deserializer), FieldSchema(name:grant_option,
_time, type:bigint, comment:from deserializer), FieldSchema(name:grantor, type:string, comment:from deserializer)], properties:null)
INFO : Completed compiling command(queryId=hive_20211109235258_b9211cfe-0e78-47d7-8a2a-1b611ddcd18); Time taken: 0.02 seconds
INFO : Executing command(queryId=hive_20211109235258_b9211cfe-0e78-47d7-8a2a-1b611ddcd18): show role grant user hdfs
INFO : Starting task [Stage-0:DDL] in serial mode
INFO : Completed executing command(queryId=hive_20211109235258_b9211cfe-0e78-47d7-8a2a-1b611ddcd18); Time taken: 0.008 seconds
INFO : OK

+-----+-----+-----+-----+
| role | grant_option | grant_time | grantor |
+-----+-----+-----+-----+
| ITManager | false | 1636501912000 | |
+-----+-----+-----+-----+
```

### Example

SHOW ROLE GRANT ROLE -> show roles for role "ITManagers"

```

0: jdbc:hive2://rm-ranger-3.rm-ranger.root.hw> show role grant role ITManager;
INFO : Compiling command(queryId=hive_20211109235607_2d543c50-7c7b-4d54-bed0-159f67c24079): show role grant role ITManager
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:[FieldSchema(name:role, type:string, comment:from deserializer), FieldSchema(name:grant_option,
_time, type:bigint, comment:from deserializer), FieldSchema(name:grantor, type:string, comment:from deserializer)], properties:null)
INFO : Completed compiling command(queryId=hive_20211109235607_2d543c50-7c7b-4d54-bed0-159f67c24079); Time taken: 0.177 seconds
INFO : Executing command(queryId=hive_20211109235607_2d543c50-7c7b-4d54-bed0-159f67c24079): show role grant role ITManager
INFO : Starting task [Stage-0:DDL] in serial mode
INFO : Completed executing command(queryId=hive_20211109235607_2d543c50-7c7b-4d54-bed0-159f67c24079); Time taken: 0.007 seconds
INFO : OK
+-----+-----+-----+-----+
| role | grant_option | grant_time | grantor |
+-----+-----+-----+-----+
| Managers | false | 1636502074000 | |
| TeamLeads | false | 1636502122000 | |
+-----+-----+-----+-----+

```

### Related Information

[Apache documentation on Role operations](#)

[Adding a role through Hive](#)

[Adding a role through Ranger](#)

## Ranger Security Zones

Ranger security zones let you organize service resources into multiple security zones.

Security Zones allow carving/bucketing of resources in a service into multiple zones for better administration of security policies. Defining Security Zones can enable multiple administrators to setup security policies for a service – based on the zones to which they have been granted administration rights.

## Security Zones Administration

A Security Zone enables a Ranger administrator to separate resource policies into different administrative zones.

### What is a Security Zone?

Security Zones help simplify security policy administration, and allow a limited amount of policies to be checked when doing authorization against certain resources. Only policies under a particular zone that contains the requested resource are loaded and checked by Ranger.

For example, let us consider two security zones: finance and sales:

- Security zone finance includes all content in a Hive database named finance.
- Security zone sales includes all content in a sales database.
- Policies defined in a security zone apply only to resources of that zone.
- A zone can be extended to include resources from multiple services such as HDFS, Hive, HBase, Kafka, etc. Extending a zone across multiple services allows zone administrators to set up policies for resources owned by their organization across multiple services.

For example:

```

Zone: finance
  service: prod_hdfs; path=/finance/*, /taxes/*
  service: prod_hive; database=finance
  service: prod_kafka; topic=FIN_*
  service: test_hadoop; path=/finance/*, /taxes/*
Zone: sales
  service: prod_hadoop; path=/sales/*
  service: prod_hive; database=sales
  service: prod_kafka; topic=SALES_*

```

- As shown above, resources can be specified using wildcards (FIN\_\*, SALES\_\*).
- Sets of users and groups are designated as administrators in each security zone.
- Users are allowed to set up policies only in security zones in which they are administrators.
- A resource cannot map to more than one security zone. Ranger does not allow creating security zones that specify resources that match resources in another zone. For example, an attempt to update the finance zone in the above example with the HDFS path /sales/finance/\* is not permitted, because this conflicts with the HDFS path /sales/\* specified in the sales zone.
- A set of users and groups can be designated as administrators of a security zone. Administrators can create, update, and delete security policies for the resources in that security zone.
- A set of users and groups can be authorized to view audit logs for that security zone's resources. Other users are not allowed to view access-audit logs for that security zone's resources.
- The security zone name appears in the zonename column of the access-audit log.

### Security Zone Administration

- Security zones can only be created, updated, or deleted by a user with the ROLE\_SYS\_ADMIN role in Ranger.
- Users can view, retrieve, and update policies only in security zones in which they have administrator privileges.
- Users can view/retrieve and cannot update zone policies for which they have zone auditor permission.

### How are Security Zones Used in Authorization?

When a Ranger authorization plugin authorizes a resource access request, it first determines the zone in which the accessed resource resides. If the resource matches a security zone, only the policies of that security zone are used to authorize the access. If resource does not match any security zone, the policies in the default (unnamed) security zone are used to authorize the access.

#### Tag-based Policies in Security Zones

In a given service, each security zone can be configured to use tag-based policies from a specific security zone in a tag-service. This enables different tag-based authorization policies to be used, based on the security zone of the resource.

#### Audit Logs

Audit logs generated by Ranger include the name of the security zone in which the accessed resource resides. Only users who have been assigned as an Admin or Auditor for the security zone are allowed to view the audit logs.

## Security Zones Example Use Cases

Four example use cases for administering security zones.

### Based on the following example:

```
Zone: finance
    service: prod_hdfs; path=/finance/*, /taxes/*
    service: prod_hive; database=finance
    service: prod_kafka; topic=FIN_*
    service: test_hadoop; path=/finance/*, /taxes/*
Zone: sales
    service: prod_hadoop; path=/sales/*
    service: prod_hive; database=sales
    service: prod_kafka; topic=SALES_*
```

### Use case 1 : Access HDFS path using zone policy

For example, let us access hdfs path using unixuser1 user from finance zone.

#### Finance zone resource:

Ranger Service : prod\_hdfs

Resource : /finance/\*

**Finance zone policy:**

Resource Path : /finance/\*

User : unixuser1

Permission : read, write, execute

Now, when unixuser1 user tries to create dir in /finance dir, Ranger checks for zone with resource /finance and policy for that user in that zone and then allows access for that user. Also, access-audit logs for that operation appear in the Ranger Admin Web UI, Access Audit tab.

### Use case 2 : Hive access policy and tag masking policy

For example, we want to manage access policies and masking policy for taxation-related information in multiple finance databases for an organization.

**Zone Resource :**

Zone Tag service: cm\_tag

Ranger Service : prod\_hive

Resource :

Database : finance

**Zone policy resource**

Tag policy

resource:TDS

Hive policy

Resource :

Database : finance

Now, the Admin and security zone admin can create access policies and masking policies for all the resources associated with tag TDS and as and when new tables on Hive / Hbase are created for saving any taxation related data. They can associate a TDS tag with a related Hive / Hbase column. This will enable zone admin to create policies for masking the confidential data of its organization.

### Use case 3 : Knox topologies

For example, suppose we want to manage access to a service. We can manage access to a service using topology.

**Zone Resource :**

Ranger Service : prod\_knox

Resource:

Knox Topology:cdp-proxy-api

Knox Service:WEBHDFS

**Zone deny policy Resource:**

Knox Topology:cdp-proxy-api

Knox Service:WEBHDFS

Without a security zone, access to webhdfs is allowed since the default policy has a 'public' group in it.

### Use case 4 : Import and export of zone policy

We can import and export zone policies from stage to prod.

Suppose we want to have the same policy in production that exists on stage. We can export the zone policy from the stage where the exported json has a zone name as a parameter in the json. While importing, we can map the zone name of stage to prod and then import the policies.

## Adding a Ranger security zone

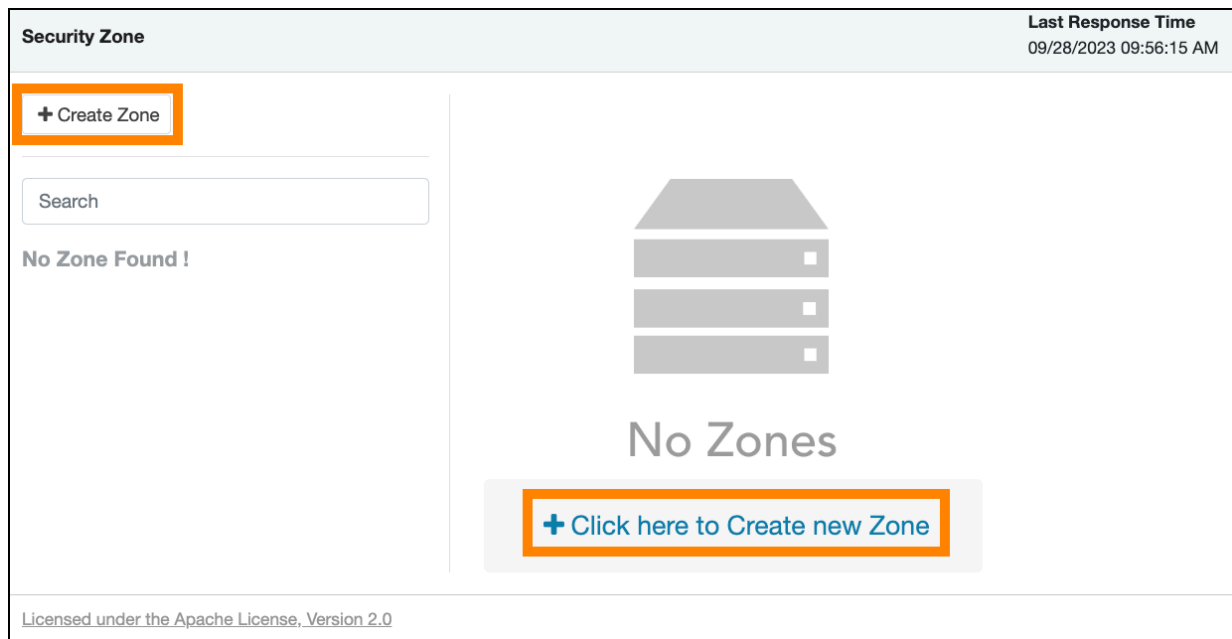
Ranger administrator users can create a Security Zone using the Ranger Admin Web UI.

### Procedure

1. In Ranger Admin Web UI Service Manager , click Security Zone.

Security Zone displays existing security zones. If no zone exists, two options for creating a new zone display.

2. On Security Zone, click + Create (new) Zone.



Create Zonedisplays options for creating a new security zone.



Create Zone

Last Response Time  
09/28/2023 11:25:39 AM

[Security Zone](#) > Create Zone

Zone Details:

Zone Name \*

security-zone-1

Zone Description

Zone Administration:

Admin Users

Audrey x

Admin Usergroups

Select Group

Auditor Users

Audrey x

Auditor Usergroups

auditors x

Services:

Select Tag Services

cm\_tag x

Select Resource Services \*

cm\_hive x

| Service Name | Service Type | Resource |
|--------------|--------------|----------|
| cm_hive      | hive         | +        |

Save

Cancel

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3. On Create Zone, enter the following information:

Table 59: Zone Details

| Field            | Description              |
|------------------|--------------------------|
| Zone Name        | The security zone name.  |
| Zone Description | An optional description. |

Table 60: Zone Administration

| Field            | Description                                  |
|------------------|--|
| Admin Users      | The Admin users for the security zone.       |
| Admin Usergroups | The Admin user groups for the security zone. |
| Auditor Users    | The Auditor users for the security zone.     |

| Field              | Description                                    |
|--------------------|--|
| Auditor Usergroups | The Auditor user groups for the security zone. |

**Table 61: Services**

| Label                    | Description   |
|--------------------------|---|
| Select Tag Services      | Select tag-based services for the security zone.      |
| Select Resource Services | Select resource-based services for the security zone. |

4. Selected services are listed in Services. To add resources for each selected service, click + in the Resource column for the applicable service.

**Create Zone**

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[Security Zone](#) > Create Zone

**Zone Details:**

Zone Name \*

security-zone-1

Zone Description

**Zone Administration:**

Admin Users

Audrey x

Admin Usergroups

Select Group

Auditor Users

Audrey x

Auditor Usergroups

auditors x

**Services:**

Select Tag Services

cm\_tag x

Select Resource Services \*

cm\_hive x

| Service Name | Service Type | Resource |
|--------------|--------------|----------|
| cm_hive      | hive         | +        |

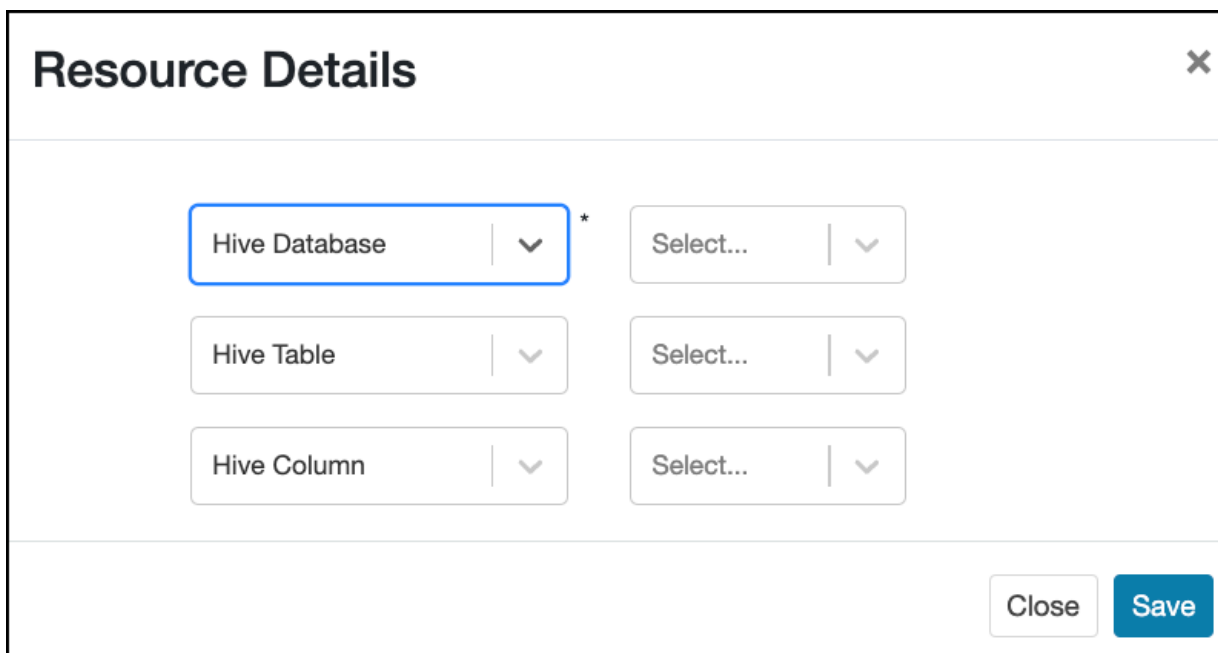
Add Resource

Save

Cancel

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5. Use Resource Details to specify resources for the service, then click Save.

A dialog box titled "Resource Details" with a close button (X) in the top right corner. The dialog contains three rows of dropdown menus. The first row has "Hive Database" selected in the first dropdown, followed by an asterisk, and "Select..." in the second dropdown. The second row has "Hive Table" in the first dropdown and "Select..." in the second. The third row has "Hive Column" in the first dropdown and "Select..." in the second. At the bottom right, there are two buttons: "Close" and "Save".

| Resource Details |           |
|------------------|-----------|
| Hive Database    | Select... |
| Hive Table       | Select... |
| Hive Column      | Select... |

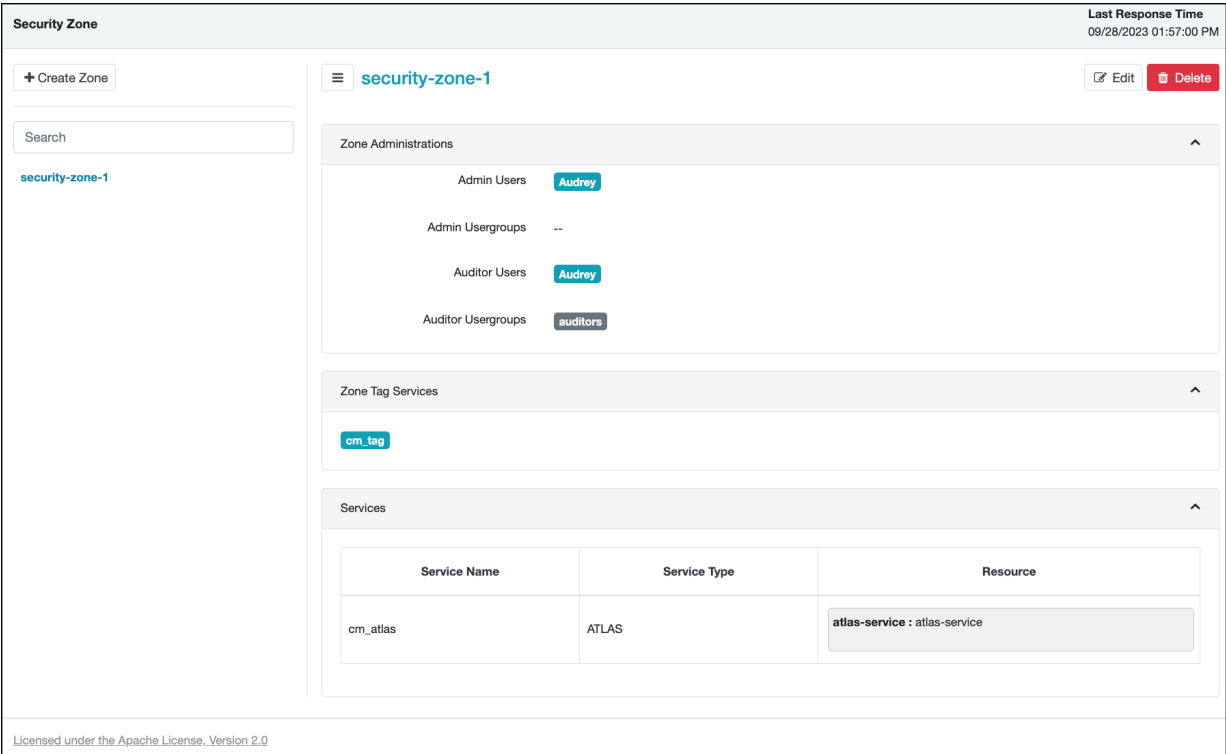
Selected resources appear as Resources for each Service in Create Zone.



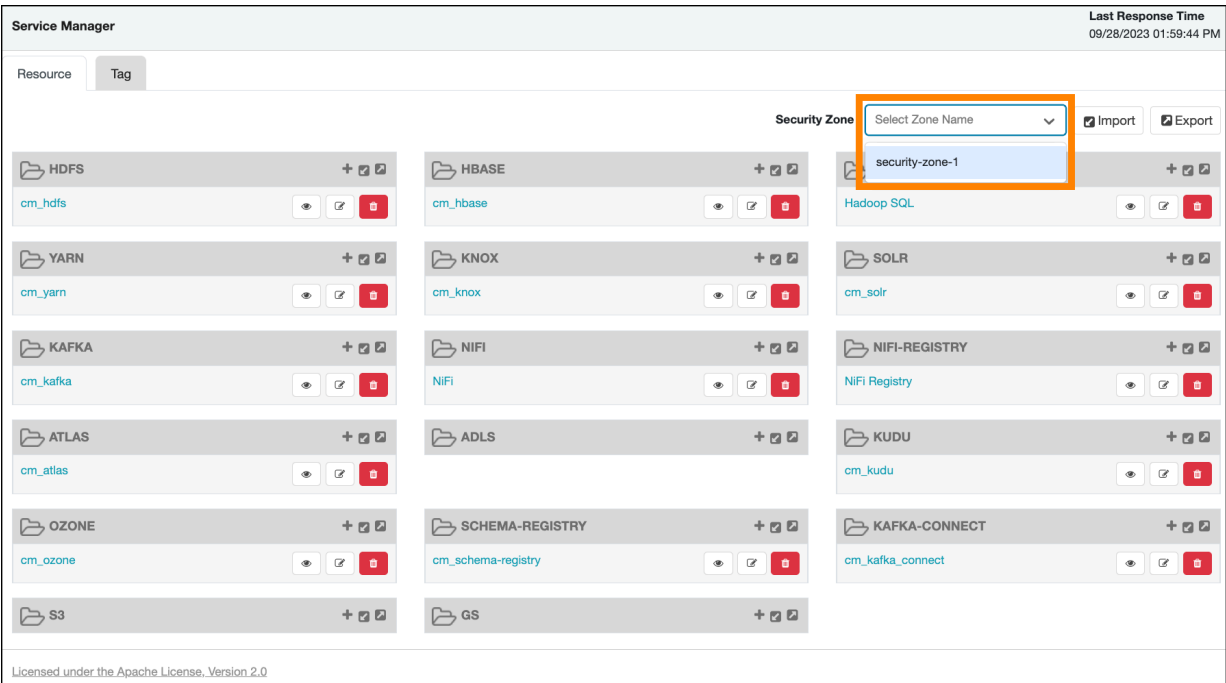
**Note:** The solr plugin supports fine-grained authorization similar to legacy Sentry privileges. A part of this support introduces the following new solr resources: collection, config, schema and admin. To perform any operation on a collection, a user also requires admin-level permission. To create a security zone for with the solr service that includes a collection resource, you must also add an admin resource. Currently, if you use one solr service to create a security zone that has a collection resource (and therefore includes an admin resource) you cannot create another solr security zone using another collection. (currently, only one admin resource can be used per solr security zone). This limitation exists for security zones in cr-7.1.8.

6. Click Save at the bottom of Create Zone to save the new security zone.

7. The new security zone is listed on the Security Zone page.



8. To edit a security zone, click the security zone name in the Security Zones list, then click Edit.
9. After security zones have been created, you can use the Security Zone selection box on the Service Manager page to display the services assigned to the selected security zone. A Zone Name column appears in the table on Audit Access , and also in Service Manager Reports .



## Administering Ranger Reports

You can use **Service Manager Reports** to help manage policies more efficiently as the number of policies increases. Reports lists all resource-based and tag-based policies.

Reports

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10/02/2023 09:15:04 AM

Search Criteria

Policy Name

Enter Policy Name

Policy Type

Access

Component

Resource

Enter Resource Name

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

Search

Export

HDFS

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name | Policy Conditions |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|-------------------|
| 1         | all - path     | --           | path: /                 | Access      | Enabled | --        | +                 |
| 2         | kms-audit-path | --           | path: /ranger/audit/kms | Access      | Enabled | --        | +                 |
| 3         | hbase-archive  | --           | path: /hbase/archive    | Access      | Enabled | --        | +                 |

## View Ranger reports

How to view reports for Ranger policies.

To view reports for one or more policies, select **Service Manager Reports**.

- To view Allow Condition details for each policy, click + in the Allow Conditions column. You can use the same method to view details for other policy conditions (Allow Exclude, Deny Conditions, etc.).
- To edit a policy from the Reports page, click the Policy ID.

**Reports**

Last Response Time  
10/02/2023 09:15:04 AM

**Search Criteria**

Policy Name

Policy Type

Access

Component

Resource

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

**HDFS**

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name | Policy Conditions |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|-------------------|
| 1         | all - path     | --           | path: /                 | Access      | Enabled | --        | +                 |
| 2         | kms-audit-path | --           | path: /ranger/audit/kms | Access      | Enabled | --        | +                 |
| 3         | hbase-archive  | --           | path: /hbase/archive    | Access      | Enabled | --        | +                 |

## Search Ranger reports

Reference information for searching Ranger reports on one or more policies.

You can search based on:

- Policy Name – The policy name.
- Policy Type – The policy type (Access, Masking, or Row Level Filter).
- Policy Label – The policy label.
- Component – The policy resource or tag component.
- Resource – The resource path used when creating the policy.
- Zone Name – The security zone name.
- Group, Username – The group or user name assigned to the policy.

Reports

Last Response Time  
10/02/2023 09:15:04 AM

Search Criteria

Policy Name

Enter Policy Name

Policy Type

Access

Component

Resource

Enter Resource Name

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

Search

Export

HDFS

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name | Policy Conditions |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|-------------------|
| 1         | all - path     | --           | path: /                 | Access      | Enabled | --        | +                 |
| 2         | kms-audit-path | --           | path: /ranger/audit/kms | Access      | Enabled | --        | +                 |
| 3         | hbase-archive  | --           | path: /hbase/archive    | Access      | Enabled | --        | +                 |

Export Ranger reports

Reference information for exporting Ranger reports on one or more policies.

You can export a list of reports in three file formats:

- CSV file
- Excel file
- JSON

Reports

Last Response Time  
10/02/2023 09:15:04 AM

Search Criteria

Policy Name

Enter Policy Name

Policy Type

Access

Component

Resource

Enter Resource Name

Policy Label

Zone Name

Select Zone Name

Search By

Group

Select...

Search

Export

Excel file

CSV file

JSON file

HDFS

| Policy ID | Policy Name    | Policy Label | Resources               | Policy Type | Status  | Zone Name | Policy Conditions |
|-----------|----------------|--------------|-------------------------|-------------|---------|-----------|-------------------|
| 1         | all - path     | --           | path: /                 | Access      | Enabled | --        | +                 |
| 2         | kms-audit-path | --           | path: /ranger/audit/kms | Access      | Enabled | --        | +                 |
| 3         | hbase-archive  | --           | path: /hbase/archive    | Access      | Enabled | --        | +                 |

Related Information

[Export tag-based policies](#)

[Export resource-based policies for a specific service](#)

[Export all resource-based policies for all services](#)

## Using Ranger client libraries

Ranger now supports clients written in java and python which enable applications to access Ranger REST APIs programmatically. Using client library code simplifies access using java or python, compared with making direct HTTP requests to Ranger REST APIs.

### Summary

Ranger client libraries:

- Provide idiomatic, hand-written code in Java and Python, making Ranger REST APIs simple and intuitive to use.
- Handle all low-level details of communication with the server including complexities involved in JSON parsing.
- Support installing the python client using the familiar package management tool pip.

**Table 62: Ranger Client Installation Repo and Library Reference Links**

| Language | Installation                             | Library Reference                        |
|----------|--|--|
| java     | <a href="#">github source repository</a> | <a href="#">java library reference</a>   |
| python   | <a href="#">github source repository</a> | <a href="#">python library reference</a> |

### Authentication

The Apache Ranger release 2.2 client supports two authentication types:

- Basic authentication (username/password)
- Kerberos authentication

Java client prompts for the authentication mode to be used at runtime. For Kerberos-based authentications, a principal and keytab file path is required.

### SSL

Java and Python clients support SSL/TLS-enabled ranger. To connect to HTTPS ranger using java client, provide the path to the SSL configuration file, as shown in this example:

```
$ ./run-sample-client.sh -n <ranger_admin_url>
SSL Configuration File: /path/to/config.xml
```

Sample SSL configuration file which requires values to be populated:

```
<configuration>
  <property>
    <name>xasecure.policymgr.clientssl.truststore</name>
    <value></value>
  </property>
  <property>
    <name>xasecure.policymgr.clientssl.truststore.credential.file</name>
    <value></value>
  </property>
  <property>
    <name>xasecure.policymgr.clientssl.truststore.type</name>
    <value></value>
  </property>
</configuration>
```



### Environment variables

The Java client requires that you initialize the following environment variables:

```
$ export JAVA_HOME=/usr/java/<jdk_version>/bin
$ export PATH=$PATH:$JAVA_HOME
$ export HADOOP_CREDSTORE_PASSWORD=<hadoop_credstore_password>
```

## Using session cookies to validate Ranger policies

Apache Ranger REST Client uses cookie sessions to download policies, tags and roles from Ranger Admin.

In earlier versions, each Ranger plugin used a kerberos login to request a ticket granting ticket (TGT) from the KDC/AD server in order to download policies, tags and roles. This caused high traffic levels when multiple Ranger plugins requested downloads.

Ranger Admin now supports cookie-based sessions. The flag used to enable cookie sessions, `ranger.plugin.<service-name>.policy.rest.client.cookie.enabled`, where `<service-name>` is the name of the service for which a Ranger plugin is enabled, such as `hive`, `solr`, or `kafka`, is set to "enabled" by default.

To check whether the cookie session is used, open the Ranger Admin `access.log` in the `/var/log/ranger/admin` folder. Any policy, tag, or role download call to Ranger Admin displays either a 200 or 304 value as response status. A 401 value for response status indicates the call to the KDC server for a TGT for authentication at service start or when the session cookie expires.

## Configure optimized rename and recursive delete operations in Ranger Ozone plugin

You can enable performance optimized authorization approach for rename and recursive delete operations in the Ranger Ozone plugin.

### About this task

Ozone introduced support for FSO (`FILE_SYSTEM_OPTIMIZED`) Bucket layout. FSO Bucket layout is a Hierarchical FileSystem namespace view with directories and files. Similar to HDFS, with FSO bucket layout, Ozone has an efficient directory rename and delete operations. Ranger supports not only authorization for rename and recursive delete operations, but also provides an option to enable performance optimized solution when these operations are performed on directory containing large set of subpaths (directories/files) within it.

Property name - `ranger.plugin.ozone.optimized.subaccesspath.enabled`

Default is set to false.

To enable authorization for rename and recursive delete operations in the Ranger Ozone plugin:

### Procedure

1. In Cloudera Manager Ozone Ozone Manager Configuration Search, type `ranger-ozone-security.xml`.
2. In Ozone Service Advanced Configuration Snippet (Safety Valve) for `ranger-ozone-security.xml`, click +.
  - a) Under Ozone, in Name, type: `ranger.plugin.ozone.optimized.subaccesspath.enabled`.
  - b) In Value, type: `true`.
  - c) Click Save Changes.
3. In Ozone Actions, click Restart.

**Results**

Ranger not only authorizes rename and recursive delete operations, but also provides an option to enable performance optimized solution when these operations are performed on a directory containing a large set of subpaths (directories/files) within it.