

# Cloudera Observability Cluster Optimization

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

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## Understanding your environment

This section describes how to plan, budget, and forecast costs, identify, troubleshoot, and optimize existing and potential problems, create alerts and enable reports, purge your data, and manage your users with roles and your data with Workload Views.



**Note:** To display the most current diagnostic metrics and health statistics collected by Telemetry Publisher in the Cloudera Observability on premises web UI, you must upgrade to the latest version of Cloudera Manager and restart Telemetry Publisher.

## Supported browsers

Cloudera validates and tests against the latest version and supports recent versions of the following browsers:

- Google Chrome
- Mozilla Firefox



**Note:**

- Mozilla Firefox is not supported by Cloudera Data Engineering.
- Certain accessibility features in Cloudera Data Flow do not work in Mozilla Firefox.
- Safari
- Microsoft Edge

## Managing your workloads and users

Learn the Cloudera Observability on premises administration features that enable you to define workload views for analyzing specific items of interest, purge your data, and assign resource access roles for managing and restricting user access.

## Classifying workloads for analysis with Workload Views

The Workload View feature enables you to analyze workloads with much finer granularity. For example, you can analyze how queries that access a particular database or that use a specific resource pool are performing against your SLAs. Or you can examine how all the queries that are sent by a specific user are performing on your cluster.

### Automatically generate workload views

If you have not defined workload views you have an option to generate default views by selecting a set of criteria.

#### About this task

Describes how to generate the Cloudera Observability on premises default views.

#### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.

c) Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.

d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.

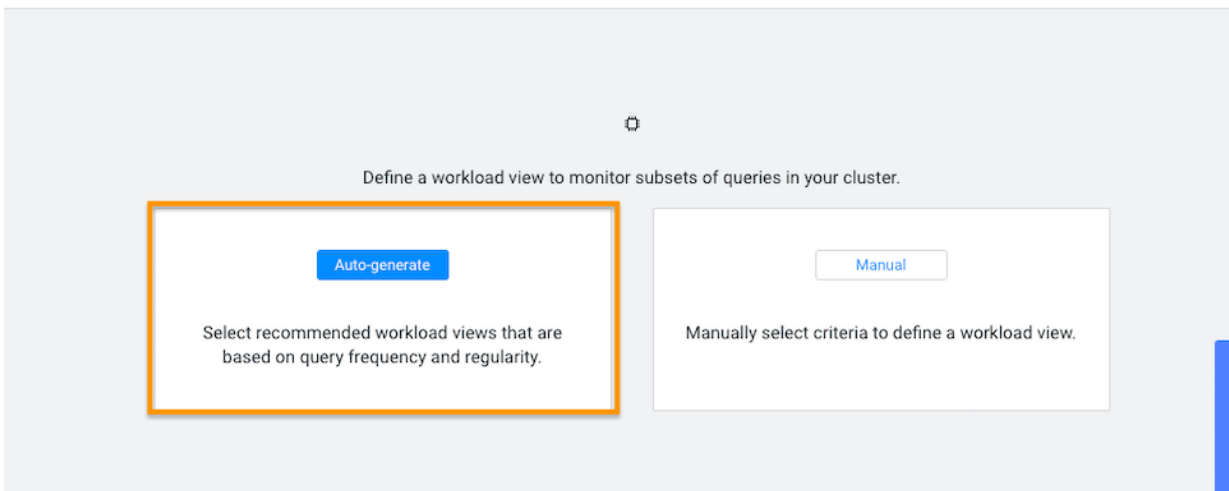
2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.



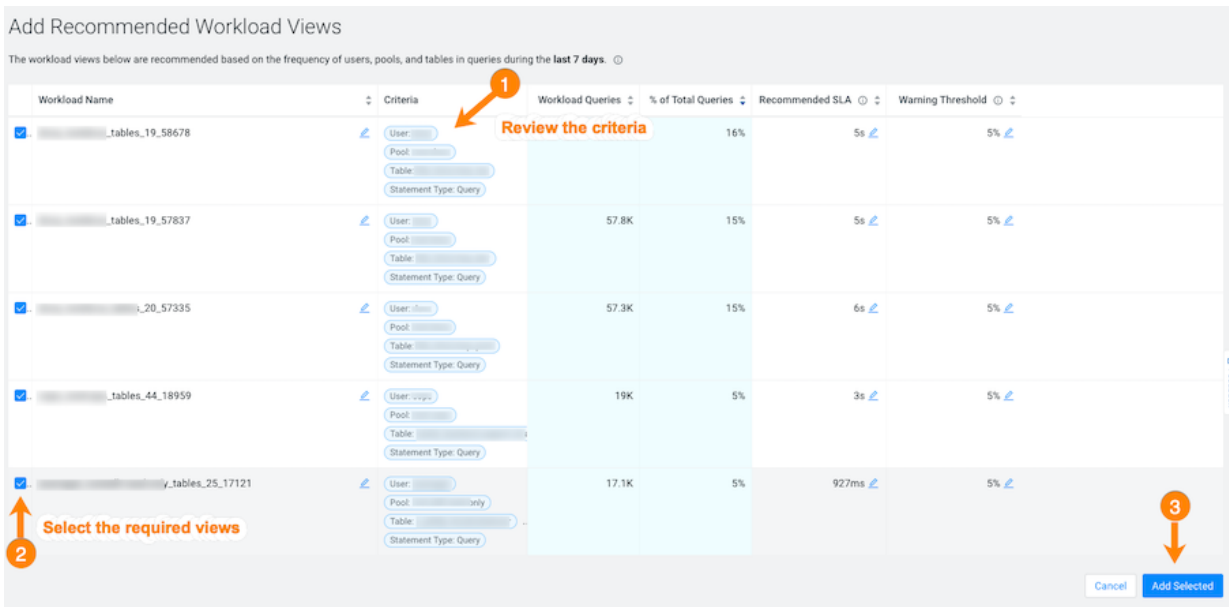
**Tip:** The page's title is displayed in the browser tab.

3. Select the Workloads tab.

4. In the Workloads page, click Auto-generate:



5. From the Criteria column, examine the criteria that is used for each workload view, select the required workload view or views, and then click Add Selected:



The workload views you selected are saved and displayed on the Workloads page.

6. To verify your workload views, on the Workloads page, locate the workload view you added. When verified, click the workload to view its details:

Display more details by clicking on your Workload's name

Status	Cloud Friendly	Workload	Engine	Criteria	SLA	Warning Thresh...	Missed SLA %
✓	●	workload_1	Impala	Pool: ANY OF	2s	90%	76%
●	●	TB-Table	Impala	Table: ANY OF Statement Type: Query	10s	10%	81%
●	●	_Impala	Impala	User: dcxa	1ms	1%	70%
●	-	ETL	Impala	DDL Type: ANY OF ALTER_TABLE, CREATE_TABLE, CREATE_TABLE_AS Statement Type: ANY OF DDL, DML, Load	10s	1%	37%
✓	-	NW2	Impala	Database:	30s	95%	33%
●	-	user_ query	Impala	User: tserver Statement Type: Query	1m	2%	19%

7. To view more information about the workload, open its Summary page by clicking the name of the workload view in the Workload column, which displays the view's details as chart widgets that you can use to further analyze the results.
8. To create a new view do the following:
- Verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.



**Tip:** The page's title is displayed in the browser tab.

- Select the Workloads tab.
- From the Define New menu in the Workloads page, select one of the following:
  - To create a new manual view, select Manual Definition, in the Criteria Definition widget define a set of criteria for the view, and then click Save.
  - To automatically generate a new view, select Auto-generate Definition.

The Workloads page reopens and your workload view appears in the Workload column.

9. Workload Views cannot be edited directly. If you require changes to an existing Workload View do the following:
- In the Workloads page, locate the Workload View that requires changes.
  - From its Action list, select Clone.
  - In the Criteria Definition widget make the changes you require, and then click Save.
- The Workloads page reopens and your workload view appears in the Workload column.
- Locate the Workload View that required changes and from its Action list, select Delete and then in the Confirm message, confirm its deletion by clicking OK.

## Defining workload views manually

Steps for manually defining your workload views.

### About this task

This task describes how to manually define your Workload Views.

### Procedure

- Verify that you are logged in to the Cloudera Observability web UI.
  - In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.

- d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.

2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.

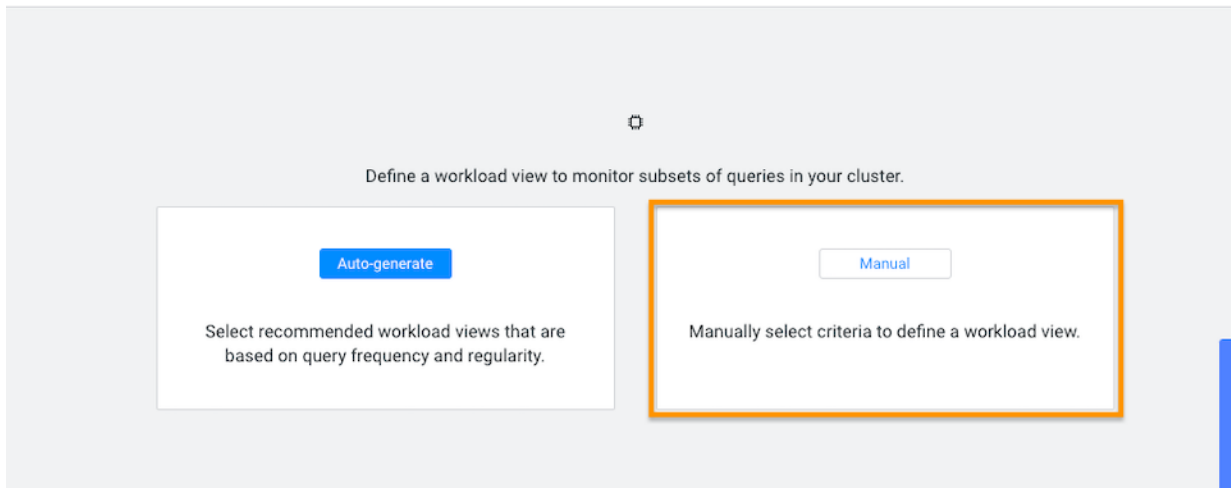


**Tip:** The page's title is displayed in the browser tab.

3. Select the Workloads tab.
4. In the Workloads page, click Manual:



**Attention:** For the AI Workbench environment, defining workload views through the Auto-generate method is not supported.



The Criteria Definition widget opens, where you define a set of criteria that enables you to analyze a specific set of queries.

For example, as shown in the image below, you can list the total amount of failed queries, as a percentage, from a specific engine that are subject to a two second SLA.

Where, as defined by the criteria condition, Cloudera Observability on premises monitors all query jobs from the Impala engine. When the total query execution time exceeds 2 seconds, as defined by the SLA condition, for 90 percent of these queries, as defined by the Warning Threshold, the workload is flagged with a failed state:

\* Name

\* Engine

\* Criteria  ANY

\* SLA   
Example: 1h 2m 3s 5ms

\* Warning Threshold  % queries missed SLA  
Sets the percentage of queries missing the SLA that is to be reached before the workload is flagged with a failed status.

[Preview](#)

Cluster default date range is in the past, metrics reflect the status of the period.

01/24/2021 - 07/23/2021

Total Jobs	Missed SLA %
30063	76%



**Attention:** The engine is not associated with the Cloudera AI Workbench environment. Therefore, the Engine field is omitted when configuring workload views for the Cloudera AI Workbench environment.

- To display a summary of the queries matching your criteria, click Preview. The date range, the number of queries that match the criteria, and the number of queries that missed the SLA condition are displayed.
- Click Save.

The Workloads page opens and your workload view appears in the Workload column.

Display more details by clicking on your Workload's name

Status	Cloud Friendly	Workload	Engine	Criteria	SLA	Warning Thresh...	Missed SLA %
✓	●	<a href="#">workload_1</a>	Impala	Pool: ANY OF	2s	90%	76%
●	●	<a href="#">TB-Table...</a>	Impala	Table: ANY OF Statement Type: Query	10s	10%	81%
●	●	<a href="#">_Impala</a>	Impala	User: dcxa	1ms	1%	70%
●	-	<a href="#">ETL</a>	Impala	DDL Type: ANY OF ALTER_TABLE, CREATE_TABLE, CREATE_TABLE_AS Statement Type: ANY OF DDL, DML, Load	10s	1%	37%
✓	-	<a href="#">NW2</a>	Impala	Database:	30s	95%	33%
●	-	<a href="#">user_... query</a>	Impala	User: tserver Statement Type: Query	1m	2%	19%



**Tip:** To locate your new workload view from a long list, sort the Workload column alphabetically in either the ascending or descending order by clicking the Workload column's up and down arrows.

- To view more information about the workloads using the view's formula, open its Summary page by clicking the name of the workload view in the Workload column, which displays the view's details as chart widgets that you can use to further analyze the results.
- To create a new view do the following:
  - Verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.



**Tip:** The page's title is displayed in the browser tab.

- b) Select the Workloads tab.
- c) From the Define New menu in the Workloads page, select one of the following:
  - To create a new manual view, select Manual Definition, in the Criteria Definition widget define a set of criteria for the view, and then click Save.
  - To automatically generate a new view, select Auto-generate Definition.

The Workloads page reopens and your workload view appears in the Workload column.

9. Workload Views cannot be edited directly. If you require changes to an existing Workload View do the following:
  - a) In the Workloads page, Locate the Workload View that requires changes.
  - b) From its Action list, select Clone.
  - c) In the Criteria Definition widget make the changes you require, and then click Save.

The Workloads page reopens and your workload view appears in the Workload column.

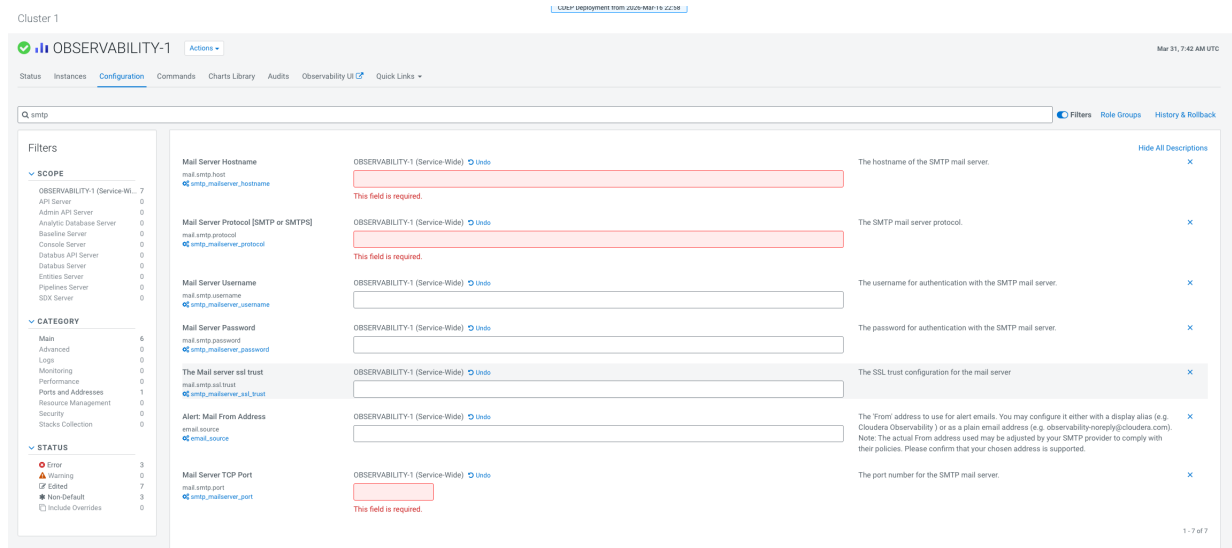
- d) Locate the Workload View that required changes and from its Action list, select Delete and then in the Confirm message, confirm its deletion by clicking OK.

## Configuring workload alert email notifications

To receive workload alerts, you must configure the SMTP settings in Cloudera Observability on premises.

### Procedure

1. Log in to Cloudera Manager UI
2. Navigate to Clusters
3. Click Observability
4. Click Configuration



5. In the search box, search for each parameter name mentioned in the below table and provide a valid input for the parameter.

Review the description column to understand the parameter.

Parameter name	Description
smtp_mailserver_hostname	The hostname of the SMTP mail server.
smtp_mailserver_protocol	The SMTP mail server protocol.

Parameter name	Description
smtp_mailserver_username	The username for authentication with the SMTP mail server.
smtp_mailserver_password	The password for authentication with the SMTP mail server.
smtp_mailserver_ssl_trust	The SSL trust configuration for the mail server. This value is usually the same as the Mail Server Hostname.
email_source	The 'From' address for alert emails. This is usually the same as the username.
smtp_mailserver_port	The port number for the SMTP mail server. Cloudera recommends using port 587.

### Results

You will start receiving the workload alerts.

## Triggering email alerts for your workload views

You can trigger daily email alerts for your Workload Views, based on your defined service-level agreement (SLA) performance threshold and/or your workload job or query failures. When a Workload View's SLA reaches or exceeds the defined threshold, or the workload jobs or queries reach or exceed the failure percentage, an email alert is triggered for you to take action upon its receipt.

### About this task

Steps on how to enable email alerts for your Workload Views.



**Note:** The Cloudera Observability on premises Premium license tier is required for the Workload View Alert feature. If you do not have Cloudera Observability on premises Premium the Workload View's alert enablement and menu items are hidden. For more information about the Cloudera Observability on premises Premium license tier and to request a demo, click the Related Information link below.

### Procedure

- Verify that you are logged in to the Cloudera Observability web UI.
  - In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.
  - From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.
- Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.

To display the Cluster Summary page for a Data Hub, Virtual Cluster, and Virtual Warehouse environment type, do one of the following:

  - From the Environment panel, expand the service's category and depending on the service, locate and select the Data Hub's cluster, Virtual Cluster, or Virtual Warehouse that is required for analysis.

- In the Data Services table, drill-down through the service links to locate and select the Data Hub's cluster, Virtual Cluster, or Virtual Warehouse that is required for analysis.



**Tip:** The page's title is displayed in the browser tab.

3. Select the Workloads tab.
4. Do one of the following:

- a. If no other Workload Views exist, in the Workloads page, click Manual.
- b. If other Workload Views exist, from the Define New list, select Manual Definition.

The Criteria Definition widget opens, where you define the criteria for the Workload View that will alert you when the SLA or specific workload jobs or queries reach or exceed the defined threshold or failure percentage.

5. In the Name field, enter a unique name that is easily identifiable.



**Note:** The name must be alphanumeric, must start with an alphabetical character, and must not contain spaces. Underscores and minus characters are accepted.

6. From the Engine list, select the engine in which the job or query is run. For example, Impala.



**Note:** All jobs or queries that are run on the selected engine are monitored by Cloudera Observability on premises.



**Attention:** The engine is not associated with the Cloudera AI Workbench environment. Therefore, the Engine field is omitted when configuring workload views for the Cloudera AI Workbench environment.

7. Specify the Criteria condition by doing the following:

- a. From the Criteria list, select a criteria filter item from the available options. The displayed filter options vary based on the selected engine. For information on the filter options displayed in the Criteria field, see *About the Cloudera Observability on premises Workloads page*.

You can set multiple conditions for the selected filter item. For example,

- If you selected User, you can include ANY or NONE of the available users in the Select user list.
- If you selected Pool, you can include ANY or NONE of the available pools in the Select pool list.
- If you selected Query Start Time, you can include IN RANGE or NOT IN RANGE of your selected time period.



**Tip:** You can define multiple Criteria filters by clicking the plus sign.

8. In the SLA field, enter the threshold unit for the completion of a job or query, using the following abbreviations as the time units:

- h = hours
- m = minutes
- s = seconds
- ms = milliseconds

The time units must be in chronological order, where hours come before minutes, minutes come before seconds, and seconds come before milliseconds, and cannot have a space between the threshold number value and the time unit. For example, 2h 20m 3s. The threshold time value can also be entered as a whole time unit, where instead of entering 1h 10m you can enter 70m.

9. In the Warning Threshold field, enter a percentage value that when exceeded by either the number of jobs or queries failing the SLA value or failing execution completion, triggers a Warning status and if applicable triggers an email alert notification.



**Note:** Rounding rules are applied to the Warning Threshold value.

10. For users with the Cloudera Observability on premises Premium license tier, you can enable the email alert notification when the threshold or the number of failed jobs or queries is exceeded.
- On the Workloads page, select the Workload View and from its Actions list, select Manage Email Alerts.
  - On the **Manage Email Alerts** window, in the Alert Email field, enter the email address to which alert notification must be enabled, and press Enter or click the plus icon.

The specified email address is displayed in the Current Alert Emails list. You can enter multiple email addresses. When enabled, a maximum of one email for each calendar day is sent to the specified email address notifying them of the exceeded threshold.



**Note:** In the Current Alert Emails list, the toggle is on by default for all specified addresses. You can toggle the current alert email notification to enable or disable it as needed.

- Click Save to enable email alerts.
11. To display a summary of the jobs or queries matching your criteria, click Preview. The date range, the number of jobs or queries that match the criteria, and the number of jobs or queries that missed the SLA condition or failed completion are displayed.
12. Click Save.

The Workloads page opens and your workload view appears in the Workload column.



**Tip:** To locate your new workload view from a long list, sort the Workload column alphabetically in either the ascending or descending order by clicking the Workload column's up and down arrows.

13. To view more information about the workloads using the view's formula, open its Summary page by clicking the name of the Workload View in the Workload column, which displays the view's details as chart widgets that you can use to further analyze the results.
14. To delete an existing Workload View, do the following:
- In the Workloads page, locate and select the Workload View that requires deletion.
  - From the Actions list, select Delete.
  - In the confirmation message, click OK to confirm. The view is permanently removed.
15. To create a new view do the following:
- Verify that the **Cluster Summary** page is displayed for the environment's cluster required as a workload view.



**Tip:** The page's title is displayed in the browser tab.

- Select the Workloads tab.
- From the Define New menu in the Workloads page, select one of the following:
  - To create a new manual view, select Manual Definition, in the Criteria Definition widget define a set of criteria for the view, and then click Save.
  - To automatically generate a new view, select Auto-generate Definition.

The Workloads page reopens and your workload view appears in the Workload column.

16. Workload Views cannot be edited directly. If you require changes to an existing Workload View do the following:
- In the Workloads page, Locate the Workload View that requires changes.
  - From its Action list, select Clone.
  - In the Criteria Definition widget make the changes you require, and then click Save.
 

The Workloads page reopens and your workload view appears in the Workload column.
  - Locate the Workload View that required changes and from its Action list, select Delete and then in the Confirm message, confirm its deletion by clicking OK.

## About the Cloudera Observability on premises Workloads page

Describes the fields in the Cloudera Observability on premises Workloads page.

The Workloads page displays the defined settings and state of your workload views.

It contains the following entry fields:

- Status, which displays the current state of the action, as follows:
  - Green, denotes that all the jobs/queries in a Workload View are UNDER the specified threshold for both Missed SLA and Failure Rate.
  - Red, denotes that the percentage of jobs/queries in a Workload View have met or exceeded the specified threshold for EITHER the Missed SLA or the Failure rate.
- Workload, which displays the name of the Workload View. When clicked the Workload View's Summary page opens.
- Engine, which displays, from the Workload View's definition settings, the selected engine in which the jobs or queries are run.



**Attention:** The engine is not associated with the Cloudera AI Workbench environment. Therefore, the Engine field is omitted when configuring workload views for the Cloudera AI Workbench environment.

- Criteria, which displays the alert's Criteria filters. These are attributes with static values that remain the same during the execution of a job or query. The displayed filter options vary based on the selected engine. The following table lists the engine name and a list of filter options displayed in the Criteria field:

Engine name	Filter options
Impala	<ul style="list-style-type: none"> <li>• Database</li> <li>• Table</li> <li>• Pool</li> <li>• Statement Type</li> <li>• DDL Type</li> <li>• User</li> <li>• Query Start Time</li> </ul>
Spark, Hive, Oozie, and MapReduce	<ul style="list-style-type: none"> <li>• Pool</li> <li>• User</li> <li>• Query Start Time</li> </ul>
For information on these filter options, see <i>Filter Attributes</i> in Cloudera Manager documentation.	

The filter options vary for the AI Workbench environment. The following filter options are displayed if you have selected the AI Workbench environment:

- Type: Define AI Workbench workloads using the APPLICATION, JOB, MODEL, and SESSION categories.
- Project: Name of the project
- Team: Name of the team where users work together on more than one project.
- User: User who can view Cloudera AI Workbenches provisioned within a given Cloudera environment.

For information on these filter options, see Cloudera AI documentation.

- SLA, which displays the service level agreement performance measurement, set as the completion duration threshold of a job or query, using the following abbreviations as the time units:
  - h = hours
  - m = minutes
  - s = seconds
  - ms = milliseconds



**Note:** Depending on what was entered for the SLA duration threshold, the time unit value may be displayed as a whole time unit, where 70m is displayed for 1h 10m.

- Warning Threshold, which displays the warning threshold value, which is set as a percentage of jobs or queries that either miss the SLA condition or fail completion.
- Missed SLA %, which displays the percentage of jobs or queries that missed the SLA threshold.
- Failure %, which displays the percentage of jobs or queries that failed completion.

- Total Jobs/Queries, which displays the total number of jobs or queries executed, regardless of completion (including those not in a terminal state), during the selected time period that is displayed in the Date Range field in the filter row.
- Action, which when selected lists the Workload View's available actions:
  - Rename
  - Clone
  - Delete
  - Manage Access
  - Manage Email Alerts

## Cloudera Data Services on premises integration

Cloudera Observability on premises 3.7.1 introduces support for integrating Cloudera Data Services on premises with Cloudera Observability on premises. With this release, you can now monitor Cloudera Data Services on premises workloads directly within your on premises environment.

The supported version for integrating Cloudera Observability on premises 3.7.1 with Cloudera Data Services on premises is 1.5.5 SP2 and higher.



**Note:** For Cloudera Data Services on premises 1.5.5 SP2, you must manually disable a feature flag to enable integration with Cloudera Observability on premises.

## Updating the DataBus producer configuration

The steps in this section help you to manually disable a flag that allows you to integrate Cloudera Data Services on premises 1.5.5 SP2 with Cloudera Observability on premises.

### Procedure

1. Identify your Cloudera Data Services on premises namespace.
2. Edit the **ConfigMap** by adding the namespace `kubectl edit configmap databus-producer-conf-databus-producer -n [***NAMESPACE***]`
  - a) To identify your Cloudera Data Engineering service namespace, find the cluster ID in the Cloudera Data Engineering UI and use the format `dex-base-<cluster_id>`.  
For example, if your Service ID is `cluster-sbm2m4j9`, `cluster_id` is `sbm2m4j9`, run `export NAMESPACE=dex-base-sbm2m4j9`
  - b) To identify your Cloudera Data Warehouse Database Catalog namespace, find the catalog ID in the Cloudera Data Warehouse UI and use the format `warehouse-<catalog_id>`.  
For example, if your ID is `1769067981-6gk5`, run `export NAMESPACE=warehouse-1769067981-6gk5`
3. In the `databus-producer.xml` file in Cloudera Data Warehouse and `dbus-client.xml` in Cloudera Data Engineering, add the following property inside the `[***Configuration***]` element:

```
<property>
<name>observability.dbus.hostname.validation.enabled</name>
<value>>false</value>
</property>
```

4. Save changes.
5. Restart the pod.
6. Run the `kubectl rollout restart deployment` command: `<deployment-name> -n $NAMESPACE`
7. Check rollout status for `kubectl` by running the command `<deployment-name> -n $NAMESPACE`

## Hierarchical authorization

Hierarchical authorization in Cloudera Observability enables access control policy inheritance across all clusters associated with the Base cluster. Because policies inherit from the Base cluster to environments like Cloudera Data Engineering and Cloudera Data Warehouse, you do not need to set up access control policies on every individual data services cluster.

With Cloudera Data Services on premises 1.5.5 SP2 integration, Cloudera Observability now supports Cloudera Data Engineering and Cloudera Data Warehouse clusters. You can view these clusters in the environment hierarchy, which uses a tree structure to show the relationship between Base cluster and Data Services cluster.

The hierarchical authorization parameter simplifies access management. When you enable this parameter in Cloudera Manager, access policies assigned at a parent level are automatically inherited by all child environments. If you disable this parameter, you must explicitly create separate access policies for every child cluster in the hierarchy.

### Policy inheritance

When you enable the Hierarchical authorization parameter, child environments inherit the authorization policies assigned to a parent environment. When creating a policy, select the highest-level environment where access begins.

If the Hierarchical authorization parameter is disabled, policies are not inherited. You must create access control policies for each environment or cluster that the user needs to access.

## Use cases

When hierarchical authorization is enabled, child environments inherit roles assigned to a parent environment.

### Cloudera Base on premises (root environment):

Supported child environments inherit roles assigned at the parent (root) environment level, including:

- Cloudera Data Warehouse Database Catalogs
- Cloudera Data Warehouse Virtual Warehouses
- Cloudera Data Engineering services
- Cloudera Data Engineering Virtual Clusters

### Services:

- Cloudera Data Warehouse Database Catalog : The Cloudera Data Warehouse Virtual Warehouses associated with a Database Catalog inherit the roles assigned to that catalog.
- Cloudera Data Engineering service: The Cloudera Data Engineering Virtual Clusters associated with a Cloudera Data Engineering Service inherit the roles assigned to that service.

### Assign the policy at the level where access begins:

- Cloudera Base on premises: Use this level to grant access across Cloudera Data Warehouse and Cloudera Data Engineering child environments.
- Database Catalog: Use this level to grant access only to its associated Cloudera Data Warehouse Virtual Warehouses.
- Cloudera Data Engineering service: Use this level to grant access only to its associated Cloudera Data Engineering Virtual Clusters.

## Enabling hierarchical authorization

You can enable or disable the hierarchical authorization parameter in Cloudera Manager to simplify access management.

### About this task

Enabling this parameter allows you to assign policies to access parent level clusters and its child clusters. If you disable this feature, you must create separate access policies for parent and child clusters. This parameter is enabled by default.

### Before you begin

You must enable the Role Based Access enabled parameter before enabling the Hierarchical Authorization Enabled parameter.

### Procedure

1. Log in to Cloudera Manager
2. Click Cloudera Observability
3. Click Configuration
4. In the search box, search for the Role Based Access enabled parameter
5. Select the Role Based Access enabled check box.
6. Click Save Changes.
7. In the search box, search for the Hierarchical Authorization Enabled parameter
8. Select the Hierarchical Authorization Enabled check box.



**Note:** You must create separate access policies for parent and child clusters if you clear the Hierarchical Authorization Enabled checkbox.

9. Click Save Changes
10. Click Actions
11. Click Restart

### Results

This will allow you to access both parent level and child level environments.

## Assigning access roles in Cloudera Observability on premises

Cloudera Observability on premises supports cluster privilege role types that define who is entitled to access jobs and queries that are created by the user, who is entitled to create and administer cost centers and view cluster costs, and who is entitled to access and administer jobs and queries within either a specific cluster or across all clusters within the Cloudera Observability on premises environment.

Limiting the trust boundary for jobs, queries, cluster costs, and administrative management at the cluster level, enables more control over the security and access management of your Cloudera Observability on premises environment.

### Understanding the Cloudera Observability on premises access roles

Describes the Cloudera Observability on premises access roles.



**Important:** Customers are responsible for managing and reviewing access credentials for their Cloudera Observability on premises accounts and activities. All user privileges and access rights should periodically be reviewed and monitored, including who should access Cloudera Observability on premises, its services, and components. For example, access rights should be reviewed when a user moves to another business unit.

Cloudera Observability on premises supports cluster privilege roles that define Cloudera Observability on premises users as a:

- System Admin

- Cluster Admin
- Cluster User

The following tables describe these cluster privilege roles, also known as access roles:

### System Admin access role

An authentic Cloudera Observability on premises user who is assigned the System Admin access role has full access rights and system administrator privileges across all clusters within the Cloudera Observability on premises environment. Where they can view, edit, and create cost centers, view, edit, and create auto actions, and view all the jobs and queries in all the Workload clusters. These users have the least restrictive access permissions.

**Table 1: System Admin**

Resource	Actions
Access Management page	View and manage all the Cloudera Observability on premises cluster policies and user access from the Access Management page
Cluster	<ul style="list-style-type: none"> <li>• View all the workload clusters on the Clusters page</li> <li>• Rename a workload cluster</li> <li>• Delete a workload cluster</li> </ul>
Workloads	<ul style="list-style-type: none"> <li>• Create workloads</li> <li>• View all the workloads in a cluster</li> <li>• Update all the workloads in a cluster</li> <li>• Delete all the workloads in a cluster</li> </ul>
Queries	View all the queries in all the clusters of the Cloudera Observability on premises environment
Jobs	View all the jobs in all the clusters of the Cloudera Observability on premises environment
Chargeback	<ul style="list-style-type: none"> <li>• Create cost centers</li> <li>• Update cost centers</li> <li>• List cost centers</li> <li>• Delete cost centers</li> <li>• View all the Chargeback related dashboards</li> </ul>
Auto Actions	<ul style="list-style-type: none"> <li>• Create auto actions</li> <li>• View auto actions</li> <li>• Update auto actions</li> <li>• Disable auto actions</li> <li>• Delete auto actions</li> <li>• Enable an auto action email</li> </ul>

### Cluster Admin access role

An authentic Cloudera Observability on premises user who is assigned the Cluster Admin access role has full access rights and cluster administrator privileges across an assigned cluster within the Cloudera Observability on premises environment. Where they can view all the jobs and queries in the assigned Workload cluster.

**Table 2: Cluster Admin**

Resource	Actions
Cluster	<ul style="list-style-type: none"> <li>• View the assigned Workload cluster on the Clusters page</li> <li>• Rename the Workload cluster</li> <li>• Delete the Workload cluster</li> </ul>

Resource	Actions
Workloads	<ul style="list-style-type: none"> <li>• Create workloads</li> <li>• View all workloads in the assigned cluster</li> <li>• Update all workloads in the assigned cluster</li> <li>• Delete all workloads in the assigned cluster</li> </ul>
Queries	View all the queries in the assigned cluster
Jobs	View all the jobs in the assigned cluster

### Cluster User access role

An authentic Cloudera Observability on premises user who is assigned the Cluster User access role has limited access rights across an assigned cluster within the Cloudera Observability on premises environment. Where they can view only those jobs and queries they created and executed in the assigned Workload cluster.

**Table 3: Cluster User**

Resource	Actions
Cluster	View their assigned cluster on the Clusters page.
Workloads	View their assigned workloads on the Workloads page
Queries	View their queries in the assigned cluster
Jobs	View their jobs in the assigned cluster

The Cluster User access role type has the most restricted access permissions, where the user may only view their own jobs and queries.

This access role further restricts the Cluster User to one cluster per policy. For users who are responsible for jobs and queries in more than one cluster they must also be assigned access rights to those clusters. You can either add them to the Cluster Policy for that cluster or include the pool that contains those workloads in the Cluster Policy in which they are assigned.

Also, for users who require access to jobs and queries executed by other users, you can create a Custom Policy as part of the Cluster Policy. This policy includes the user names of the users who execute those jobs and queries and/or the pool names in which they are executed.

For example, though user A and user B have been granted the same Cluster User role type their access to jobs and queries is different. This is due to the conditions of the Cluster Policy in which they are assigned. Where:

- The cluster policy that defines user A's Cluster User role type does not permit the user to view workloads within a pool or view other user workloads. In this case, user A is restricted to only view their own jobs and queries within their policy's assigned cluster.
- The cluster policy that defines user B's Cluster User role type contains a Custom Policy that permits the user to view workloads within a pool and view other user workloads. In this case, user B can view the jobs and queries executed by other users and the jobs and queries executed in the pool.

### Understanding a Cloudera Observability on premises cluster policy

Describes the Cloudera Observability on premises Cluster Policy criteria that is used to assign Cloudera Observability on premises access roles to your users.

Access to your Workload jobs and queries is determined by a Cloudera Observability on premises Cluster Policy, which comprises two or more of the following conditions:

- One or more LDAP Group identifier account names.
- Group names with spaces are not supported. Role-based access fails for groups with spaces in their names.
- One or more user names. By default, Cloudera Observability on premises authenticates user access by checking that the user is a member of an LDAP group.

- A Cloudera Observability on premises access role type. The access role is assigned to the users that you provide in the Users field and/or the users who are part of the groups you provide in the Groups field and is defined by the conditions in the Cluster Policy.
- (Cluster User and Cluster Admin only) The cluster associated with the access role.
- (Cluster User only) A custom policy whose criteria is defined from the provided user names and/or the provided pools. A custom policy enables the user or users defined in the Cluster Policy to view the jobs and queries executed by other users and/or the jobs and queries executed in a pool.

Cloudera Observability on premises Cluster Policies are created, managed, and maintained from the Access Management page. Only users who have been granted the System Admin access role type can view and manage your Cloudera Observability on premises cluster policies.



**Note:** At this time, to access the Access Management page a manual edit in the URL is required. This is a temporary workaround for this known issue.

## Configuring a default systems administrator for Cloudera Observability on premises

Pre-tasks that are required before you can start enabling role based access in Cloudera Observability on premises.

### About this task

Describes how to enable role based access in Cloudera Observability on premises and configure a Cloudera Observability on premises default systems administrator.

Before you can assign access roles in Cloudera Observability on premises you must first enable role based access and configure a default systems administrator. Both tasks are completed in Cloudera Manager. Once configured, the default administrator (also known as a superuser) can log into the Cloudera Observability on premises UI and assign the System Admin access policy role to one or more users.

### Procedure

1. In a supported web browser on the Cloudera Observability on premises on-premises cluster, log in to Cloudera Manager.
2. In Cloudera Manager, select Clusters, OBSERVABILITY, and then click the Configuration tab.
3. In the Configuration page, search for the Role Based Access enabled property and then select its OBSERVABILITY (Service-Wide) check box.
4. According to your requirements, do one of the following:
  - a. In the OBSERVABILITY (Service Wide) field of the OBSERVABILITY Default Super Users property, enter either the user name or the account name of a system administrator who is to be granted access to perform administration tasks in Cloudera Observability on premises. By default, admin.



**Tip:** If the OBSERVABILITY (Service Wide) field is not displayed, click the plus sign circle icon.

- b. In the OBSERVABILITY (Service Wide) field of the OBSERVABILITY Default Super Groups property, enter the group account name of your LDAP admin group. For example, admin\_grp.

The following image shows the configuration properties:

5. Click Save Changes.
6. Navigate to the top of the Cloudera Observability on premises service page and from the Actions menu, restart the Cloudera Observability on premises service, by selecting Restart.

## Assigning Cloudera Observability on premises access roles

Role based access to your Workload jobs and queries requires a Cloudera Observability on premises Cluster Policy that defines the conditions for the role based access type and assigns it to your users. You can have multiple Cluster Policies that define the access criteria for all of your workloads.

The Hierarchical Authorization Enabled parameter is enabled by default and you can create policies that allow you to access the parent and child clusters together. However, if you want to create separate policies for parent and child clusters, you must disable the Hierarchical Authorization Enabled parameter. For more information, see the [Hierarchical authorization](#) documentation.

### System Admin access role

Steps for assigning a System Admin access role to your Cloudera Observability on premises users.

#### About this task

Describes how to assign a Cloudera Observability on premises Role Based Access (RBAC) role for a system administrator. This access role has full access rights and system administrator privileges across all clusters within the Cloudera Observability on premises environment and can create your Cloudera Observability on premises Cluster Policies that define your access roles.



**Note:** Generally, only a user assigned the System Admin access role can create a Cloudera Observability on premises Cluster Policy. But until the first System Admin access role is assigned, a Cluster Policy can only be created by a default systems administrator, also known as a default super user.

#### Before you begin

This task assumes that you have:

- Enabled role based access in Cloudera Manager. For more information, click the Related Information link below.
- Created a default systems administrator, also known as a default super user, in Cloudera Manager.

## Procedure

1. In a supported web browser log in to Cloudera Observability on premises as the user with default systems administrator privileges.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability on premises URL and press Enter.
  - b) When the Cloudera Observability on premises Log in page opens, enter your Cloudera Observability on premises user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability on premises landing page opens.

2. Verify that you have enabled role based access in Cloudera Manager. For more information, click the Related Information link below.
3. From the Cloudera Observability on premises main navigation side-bar, select Access Management.



**Note:** To display the Access Management link on the Cloudera Observability on premises main navigation side-bar the role base access property must be enabled in Cloudera Manager. For more information on how to display the Access Management link for creating role based access, click the Related Information link below.

4. In the Access Management page, click New Cluster Policy.

The Create Cluster Policy page opens.

5. Do one or more of the following:

- a. In the Groups field, enter the name of the LDAP administration group account whose users will be assigned this cluster policy's access role.
- b. In the Users field, enter the user name or user names who will be assigned this cluster policy's access role.

6. From the Assign Roles list, select System Admin.

7. Click Create.



**Note:** Cloudera Observability on premises will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy. To manually update this for immediate effect, see the [Caching policy](#) documentation.

## Results

The Successfully created access policy message appears when the Cluster Policy is created and the policy is displayed in the Access Management's home page.

## Related Information

[Configuring a default systems administrator for Cloudera Observability on premises](#)

## Cluster Admin access role

Steps for assigning a Cluster Admin access role to your Cloudera Observability on premises users.

## About this task

Describes how to assign a Cloudera Observability on premises Role Based Access (RBAC) role for a cluster administrator.



**Note:** Only a user assigned the System Admin access role can create a Cloudera Observability on premises Cluster Policy.

## Procedure

1. In a supported web browser log in to Cloudera Observability on premises as a user that has been granted the System Admin access role.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability on premises URL and press Enter.

- b) When the Cloudera Observability on premises Log in page opens, enter your Cloudera Observability on premises user name and password access credentials.
- c) Click Log in.

The Cloudera Observability on premises landing page opens.

2. Verify that you have enabled role based access in Cloudera Manager. For more information, click the Related Information link below.
3. From the Cloudera Observability on premises main navigation side-bar, select Access Management.



**Note:** To display the Access Management link on the Cloudera Observability on premises main navigation side-bar the role base access property must be enabled in Cloudera Manager. For more information on how to display the Access Management link for creating role based access, click the Related Information link below.

4. In the Access Management page, click New Cluster Policy.

The Create Cluster Policy page opens.

5. Do one or more of the following:
  - a. In the Groups field, enter the name of the LDAP group account whose users will be assigned this cluster policy's access role.
  - b. In the Users field, enter the user name or user names who will be assigned this cluster policy's access role.
6. From the Assign Roles list, select Cluster Admin.
7. From the Cluster list, select the name of the cluster that will be assigned to this policy's access role.
8. Click Create.



**Note:** Cloudera Observability on premises will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy. To manually update this for immediate effect, see the [Caching policy](#) documentation.

## Results

The Successfully created access policy message appears when the Cluster Policy is created and the policy is displayed in the Access Management's home page.

## Related Information

[Configuring a default systems administrator for Cloudera Observability on premises](#)

## Cluster User access role

Steps for assigning a Cluster User access role to your Cloudera Observability on premises users.

## About this task

Describes how to assign a Cloudera Observability on premises Role Based Access (RBAC) role for a cluster user.



**Note:** Only a user assigned the System Admin access role can create a Cloudera Observability on premises Cluster Policy.

## Procedure

1. In a supported web browser log in to Cloudera Observability on premises as a user that has been granted the System Admin access role.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability on premises URL and press Enter.
  - b) When the Cloudera Observability on premises Log in page opens, enter your Cloudera Observability on premises user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability on premises landing page opens.
2. Verify that you have enabled role based access in Cloudera Manager. For more information, click the Related Information link below.

- From the Cloudera Observability on premises main navigation side-bar, select Access Management.



**Note:** To display the Access Management link on the Cloudera Observability on premises main navigation side-bar the role base access property must be enabled in Cloudera Manager. For more information on how to display the Access Management link for creating role based access, click the Related Information link below.

- In the Access Management page, click New Cluster Policy.  
The Create Cluster Policy page opens.
- Do one or more of the following:
  - In the Groups field, enter the name of the LDAP group account whose users will be assigned this cluster policy's access role.
  - In the Users field, enter the user name or user names who will be assigned this cluster policy's access role.
- From the Assign Roles list, select Cluster User.
- From the Cluster list, select the name of the cluster that will be assigned to this policy's access role.
- Enable the user or users defined in this cluster policy to view executed workloads from other users or executed workloads from a pool by doing the following:
  - In the Users field, enter the user name or user names whose jobs and queries can be viewed by the user or users defined in this cluster policy.
  - In the Pools field, enter the pool name or pool names whose jobs and queries can be viewed by the user or users defined in this cluster policy.
- Click Create.



**Note:** Cloudera Observability on premises will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy. To manually update this for immediate effect, see the [Caching policy](#) documentation.

### Results

The Successfully created access policy message appears when the Cluster Policy is created and the policy is displayed in the Access Management's home page.

### Related Information

[Configuring a default systems administrator for Cloudera Observability on premises](#)

### Caching policy

Whenever you create or update a policy, the policy is cached on the server side and refreshed every one hour by default allowing the policy to come to effect. However, if you want to cache the policy immediately, you must restart Cloudera Observability on Cloudera Manager UI.

### Procedure

- Log in to Cloudera Manager
- Click Cloudera Observability
- Click Actions
- Click Restart

### Results

The policies are cached on the server side allowing the policy to come into effect immediately.

## Managing Your Cloudera Observability on premises access roles

Describes how to manage your Cloudera Observability on premises cluster policies and access roles.

Information about your Cloudera Observability on premises Cluster Policies are displayed on the Access Management page, which are viewed and managed by the user with the System Admin access role.

Each row displays a Cluster Policy and its conditions, where:

- The Status column displays the state of the policy, as either Enabled or Disabled.
- The Clusters column displays the name of the cluster assigned to the Cloudera Observability on premises access role.
- The Role column displays the Cloudera Observability on premises access role type.
- The Groups column displays the LDAP group users who are assigned the Cluster Policy's access role.
- The Users column displays the user names who are assigned the Cluster Policy's access role.
- The Custom Policy column displays the user and pool filter conditions.
- The Last Updated column displays the date when the policy was last updated.
- The Actions column's vertical ellipses, when selected, lists the management tasks that can be performed.

The following management tasks are performed from the Access Management home page by a user with the System Admin access role, which is accessed by selecting Access Management from the Cloudera Observability on premises Navigation side-bar.

### Updating a cluster policy

In the Access Management page, click the cluster policy's vertical ellipsis in the Actions column, and select Edit. In the Cluster Policy, make your changes and then click Update.

### Deleting a cluster policy

In the Access Management page, click the cluster policy's vertical ellipsis in the Actions column, and select Delete. In the confirmation message, click OK to confirm the action. The policy is permanently removed.



**Tip:** Cloudera recommends disabling rather than deleting a Cluster Policy.

### Disabling a cluster policy

In the Access Management page, click the cluster policy's vertical ellipsis in the Actions column, and select Disable. In the confirmation message, click OK to confirm the action. The Status column displays the state of the policy as Disabled.

## Purging HDFS data

Reduce bottlenecks between Telemetry Publisher and Cloudera Observability on premises, free up storage space, and increase job and query runtime efficiency by removing obsolete HDFS data that exceeds the maximum retention limit.



**Note:** Cloudera recommends performing regular purge events for HDFS files that are no longer required.

### Understanding the purge date used by the purge event

Describes the Cloudera Observability on premises purge event's criteria that is based on the file's data group and the data group's retention limit and how the purge date is calculated.

The purge event's criteria is based on the maximum data retention policy, described in days, for the following HDFS data groups:

- Temporary data, when the retention period exceeds 8 days
- Staging data, when the retention period exceeds 31 days
- Detailed data, when the retention period exceeds 181 days
- Summarized data, when the retention period exceeds 731 days

The purge date is calculated by subtracting the retention days, specified by the maximum data retention period policy, from the current date and comparing the resultant date with the data’s timestamp date. If the data’s timestamp date is less than or equal to the resultant date the data is removed.

The data’s timestamp date is determined by where the data resides:

- If the data resides in the cloudera-dbus root directory, the timestamp date is extracted from the subdirectory name. For example, if the directory name is /cloudera-dbus/HiveAudit/2021030623. The timestamp date extracted by the purge event is 2021/03/06, using the YYYY/MM/DD date format.



**Important:** The purge event deletes files from the cloudera-dbus directory as follows:

- If the date is successfully extracted and is less than or equal to the resultant date, all the files in the directory are removed and are counted as one file by the maximum deletion limit.
- If the date is successfully extracted, is less than or equal to the resultant date, and a file or files are set in the blobstore.purger.paths.to.keep parameter, all the files except the file or files set in the blobstore.purger.paths.to.keep parameter are removed and each file that is removed is counted by the maximum deletion limit.
- If the data resides in a cloudera-sigma-olap-impala, cloudera-sigma-partial-pse, cloudera-sigma-pse-extended, or cloudera-sigma-sdx-payloads root directory, the timestamp date is extracted from the file’s last modified time.

Obsolete data can be purged from the following HDFS root directories:



- cloudera-dbus
- cloudera-sigma-olap-impala
- cloudera-sigma-partial-pse
- cloudera-sigma-pse-extended
- cloudera-sigma-sdx-payloads

### Cloudera Observability on premises purge event parameters

Lists the Cloudera Observability on premises purge event parameter settings that enable you to set the event’s execution time, frequency, and maximum purge duration. You can also exclude files and directories from being purged with the blobstore.purger.paths.to.keep parameter setting.

**Table 4: Purge event parameters**

Parameter	Description	Example
blobstore.purger.frequency	<p>The purge event’s recurring schedule, based on one of the following values:</p> <ul style="list-style-type: none"> <li>• None: Disables the purge process.</li> <li>• Daily: Files are automatically deleted the next day at 1 am.</li> <li>• Weekly: Files are automatically deleted every Saturday at 1 am. This is the default setting.</li> <li>• Monthly: Files are automatically deleted on the last Saturday of the month at 1 am, and then every 28 days thereafter. The monthly parameter uses a 28-day calendar format.</li> </ul>	blobstore.purger.frequency=weekly

Parameter	Description	Example
blobstore.purger.start.time	<p>The purge event's start time, based on the 24-hour time format. Where, 01:00 and 0:00 are valid time values, and 24:00, 1:0, and 01:0 are not valid time values</p> <p>By default, Cloudera Observability on premises schedules the purge process when it will cause the least amount of disruption to users.</p> <p> <b>Note:</b> Cloudera recommends scheduling a time during non-peak working hours or job execution hours.</p>	blobstore.purger.start.time=01:00
blobstore.purger.paths.to.keep	<p>Lists the files and directories that are to be excluded from the purge event.</p> <p>Where each file and/or directory is separated by a comma and where:</p> <ul style="list-style-type: none"> <li>• a file value must use its full path, directory name, and file name.</li> <li>• a directory value must use its full path and directory name.</li> </ul>	<pre>blobstore.purger.paths.to.keep= /cloudera-dbus/ImpalaQueryProfile/2021030217/7d2bcefa-8819-4fa1-be0c-4529ee4eb98f, /cloudera-dbus/HiveAudit, /cloudera-sigma-olap-impala/02f54999-b9a4-4dca-8237-d1b047755efb, /cloudera-sigma-sdx-payloads/2bc85719-7a3e-4438-96a4-8fc0f77ff</pre>
blobstore.purger.delete.request.limit	<p>The maximum deletion limit.</p> <p>By default, the maximum number of files that can be deleted by the purge process is 500,000. This ensures that a purge cycle is not overloaded, does not introduce bugs, or takes up too much time.</p> <p>When the deletion limit is met, the purge process:</p> <ul style="list-style-type: none"> <li>• Stops processing for a daily scheduled value.</li> <li>• Stops processing and restarts the next day for all other scheduled values.</li> </ul> <p> <b>Note:</b> The purge event's maximum deletion limit calculates all the files in a dbus directory as one file. When you exclude a file or files that reside in the dbus directory from the purge process, the purge event's maximum deletion limit condition calculates all the files in the directory minus those files you have excluded.</p>	blobstore.purger.delete.request.limit=500000

## Configuring the Cloudera Observability on premises purge event

Steps for scheduling and configuring a purge event.

### About this task

Describes how to schedule and configure the Cloudera Observability on premises purge event.

## Procedure

1. In a supported web browser, log in to Cloudera Manager as a user with full system administrator privileges.
2. From the Navigation panel, select Clusters and then OBSERVABILITY.
3. In the Status Summary panel of the OBSERVABILITY page, select Admin API Server.
4. Click the Configuration tab.
5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the observability-conf/sigmaadminapi.properites option.
6. In the text field enter your purge event's parameter settings, using the *PURGE EVENT PARAMETERS* table.

Parameters with example values:

```
blobstore.purger.delete.request.limit=9990000
blobstore.purger.start.time=0:00
```



**Note:** You can also exclude files and directories from being purged with the `blobstore.purger.paths.to.keep` parameter setting.

Parameter with comma-separated example values:

```
blobstore.purger.paths.to.keep=/cloudera-dbus/ImpalaQueryProfile/2021030217/7d2bcefa-8819-4fa1-be0c-4529ee4eb98f,/cloudera-dbus/HiveAudit,/cloudera-sigma-olap-impala/02f54999-b9a4-4dca-8237-d1b04775efb,/cloudera-sigma-sdx-payloads/2bc85719-7a3e-4438-96a4-8fc0f77ff79e
```

7. Click Save Changes, which sets and schedules the purge process.
8. From the Actions menu, select Restart this Admin API Server.
9. In the Restart this Admin API Server message, confirm your changes by clicking Restart this Admin API Server.
10. When the Restart API Server step window displays Completed, click Close.

## Manually executing a Cloudera Observability on premises purge event

You can manually run your purge event immediately with a one-time operation, rather than scheduling a purge event.

### About this task

Describes how to manually run a Cloudera Observability on premises purge event.

A one-time purge event is based on the maximum data retention policy using the Cloudera Observability on premises purge event's parameter values, without the frequency value.

## Procedure

1. In a supported web browser, log in to Cloudera Manager as a user with full system administrator privileges.
2. From the Navigation panel, select Clusters and then OBSERVABILITY.
3. In the Status Summary panel of the OBSERVABILITY page, select Admin API Server.
4. Click the Configuration tab.
5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the observability-conf/sigmaadminapi.properites option.
6. In the text field enter your purge event's parameter settings, using the *PURGE EVENT PARAMETERS* table.

Parameters with example values:

```
blobstore.purger.delete.request.limit=9990000
blobstore.purger.start.time=0:00
```



**Note:** You can also exclude files and directories from being purged with the `blobstore.purger.paths.to.keep` parameter setting.

Parameter with comma-separated example values:

```
blobstore.purger.paths.to.keep=/cloudera-dbus/ImpalaQueryProfile/2021030217/7d2bcefa-8819-4fa1-be0c-4529ee4eb98f,/cloudera-dbus/HiveAudit,/cloudera-sigma-olap-impala/02f54999-b9a4-4dca-8237-d1b047755efb,/cloudera-sigma-sdx-payloads/2bc85719-7a3e-4438-96a4-8fc0f77ff79e
```

7. Click Save Changes.
8. From the Actions menu, select Restart this Admin API Server.
9. In the Restart this Admin API Server message, confirm your changes by clicking Restart this Admin API Server.
10. When the Restart API Server step window displays Completed, click Close.
11. When a manual purge event run is required, do the following:
  - a) Log in to Cloudera Manager.
  - b) From the Navigation panel, select Clusters and then OBSERVABILITY.
  - c) From the Actions menu, select Purge HDFS Bucket Data.
  - d) In the Purge HDFS Bucket Data confirmation message, confirm the purge event by clicking Purge HDFS Bucket Data.
  - e) When the Purge HDFS Bucket Data window displays Completed, click Close.

## Managing your Cloudera Observability on premises purge event

Steps for updating, stopping, and troubleshooting your Cloudera Observability on premises Purge event.

The following management tasks can be performed:

### Updating your Cloudera Observability on premises purge event

To update your purge event:

1. In a supported web browser, log in to Cloudera Manager as a user with full system administrator privileges.
2. From the Navigation panel, select Clusters and then OBSERVABILITY.
3. From the Status Summary panel, select Admin API Server.
4. Click the Configuration tab.
5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the `observability-conf/sigmaadminapi.properites` option field.
6. In the text field, change the required values.
7. Click Save Changes.
8. From the Actions menu, select Restart this Admin API Server.
9. In the Restart this Admin API Server message, confirm your changes by clicking Restart this Admin API Server.
10. When the Restart API Server step window displays Completed, click Close.

### Stopping the Cloudera Observability on premises purge event

You can stop a recurring purge event or stop a scheduled purge event whilst still running.

- To stop a recurring purge event:
  1. In a supported web browser, log in to Cloudera Manager as a user with full system administrator privileges.
  2. From the Navigation panel, select Clusters and then OBSERVABILITY.
  3. From the Status Summary panel, select Admin API Server.
  4. Click the Configuration tab.
  5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the `observability-conf/sigmaadminapi.properites` option field.

6. In the text field, replace the `blobstore.purger.frequency` value with `none`.
  7. Click **Save Changes**.
  8. From the **Actions** menu, select **Restart this Admin API Server**.
  9. In the **Restart this Admin API Server** message, confirm your changes by clicking **Restart this Admin API Server**.
  10. When the **Restart API Server** step window displays **Completed**, click **Close**.
- To stop a scheduled purge event whilst still running:
    1. In a supported web browser, log in to Cloudera Manager as a user with full system administrator privileges.
    2. From the **Navigation** panel, select **Clusters** and then **OBSERVABILITY**.
    3. From the **Status Summary** panel, select **Admin API Server**.
    4. From the **Actions** menu, select **Stop this Admin API Server**.
    5. Still in the **Admin API Server** page, click the **Configuration** tab.
    6. Search for the **Admin API Server Advanced Configuration Snippet (Safety Valve)** for the `observability-conf/sigmaadminapi.properites` option field.
    7. Replace the `blobstore.purger.frequency` value with `none`.
    8. Click **Save Changes**.
    9. From the **Actions** menu, select **Restart this Admin API Server**.
    10. In the **Restart this Admin API Server** message, confirm your changes by clicking **Restart this Admin API Server**.
    11. When the **Restart API Server** step window displays **Completed**, click **Close**.

### Troubleshooting

The Cloudera Observability on premises purge event does not delete directories and files that do not have the full observability owner and file permissions. Files and directories may revert back to the `hdfs` owner when a restore is created from a snapshot. In this case and before creating an automatic or manual purge event you must verify the owner and file permissions of the required files to be purged.

To reset your HDFS files and directories as the observability owner with full administrative permissions do the following:

1. In a terminal go to the `/etc` directory and open the `hdfs` password file by entering:
 

```
vim passwd
```
2. Search for the `kafka` parameter.
3. Replace `/sbin/nologin` with `/bin/hash`.
4. Save the file.
5. Grant full observability access permissions to the `hdfs` password file by using the `chown` command.

### Tracking your purge event from log entries

You can determine if the purge event was successful or identify potential problems from the Cloudera Manager Admin API Server log files.

The Admin API Server log file entries also list the names of the files and directories that were deleted and provide details about how many files and directories were deleted, the sum total size of the files and directories that were deleted, and the time they were deleted.

## Working with alerts, costs, and reports

Certain Cloudera Observability on premises features enable you to define cost centers for planning, budgeting, and justifying resources and create alert actions that monitor your workloads and trigger a corrective action when applicable.

## Understanding Cloudera Observability Financial Governance feature

The Cloudera Observability Financial Governance feature collects CPU, GPU, memory, data read, data written, and resource usage data from your environment, allocates those charges to your custom cost centers, and visually displays the results. It provides in-depth visibility into the resource usage of your workloads and services, as well as the costs of your environment's infrastructure, which can be used for planning, budgeting, and forecasting.

The Cloudera Observability Financial Governance feature allows you to track costs at the environment level and cost center level as created by the administrators, providing a view of infrastructure costs. You can compare the Provisioned and Utilized costs for a cluster, which includes CPU, GPU, Memory, Data Read, Data Write and the average costs, allowing you to resize the cluster based on the previous usage using the Date Range and Granularity drop-downs.

The Cloudera Observability Financial Governance feature allows you to track costs at the environment level and cost center across various organizations and departments. You can create a cost center for your organization, department, region, or any other by defining the costs using the chargeback criteria.

The Financial Governance feature collects data on CPU, GPU, memory, data read, data written, and resource usage from your environment, allocates these charges to custom cost centers, and visually presents the results. This feature provides detailed insights into resource usage of your workloads and services, supporting effective planning, budgeting, and forecasting.

For instance, you can create three cost centers based on regions - Asia-Pacific, America, and European Union and define the costs using the chargeback criteria. Based on the provisioned budget for these three regions, you can track the utilized budget for these regions, say for six months. This provides an understanding of the budgeting and forecasting based on the historical data and helps you to effectively plan for the next year.



**Important: For Internal Chargeback Only:** The costs displayed in Financial Governance are calculated based on resource usage multiplied by the unit costs you define in the chargeback criteria. These figures are for internal cost attribution (chargeback or showback) and analysis only. They do not pull data from Cloudera's consumption or billing systems and will not match your official Cloudera invoice.

### About the Cloudera Observability Cost Centers feature

This feature measures and records the resource usage of your workloads and allocates them to the users who consume them. For resources that are shared, such as multi-tenant clusters that are shared between different organizations and departments, it also enables you to measure and record those shared costs and charge those users based on their actual consumption. This feature helps you plan and forecast budgets, ensuring costs align with business requirements. The cost center reports can be used to raise cost awareness and set limits to control your overall costs.

### About cost centers and their criteria

This feature calculates cost based on the following criteria:

- Users or Pool usage, for instance, YARN pools for YARN-based offerings, enables you to separate user and resource pool costs.
- CPU, GPU, and Memory unit costs are based on actual CPU, GPU, and memory usage using your internal pricing or cost model.
- Data read and written unit costs are charged per gigabyte (GB) for the data read and written by your application.

Using the Cost Centers criteria that you have set, charges for CPU, GPU, memory, data read, and data written consumption are calculated and assigned by Cloudera Observability to a cost center that is created by you. Cost centers separate costs across users or pools and track their workload resource consumption costs. They can be divided and/or grouped into members associated with an organization or group to help you assign the charges to a user's department.

When you create a Cloudera Observability Cost Center, detailed summary reports of the costs and resource usage for the environment are generated. After a job has run, the tracked resource costs that are associated with the cost center's environment, service, or cluster are visually displayed. You can drill down for more detailed reports, such as viewing

the costs incurred by a specific user or pool or viewing the top 500 users or pools whose jobs created the highest costs or the top 500 jobs or queries that created the highest costs.

Over time, as more jobs and queries are run, you can view and compare historical trends by selecting specific periods from the Date Range and Granularity lists. By default, data is retained for six months.

The Cloudera Observability Cost Centers feature uses usage-based metrics for CPU and GPU utilization and memory consumption that have an aggregation.

The cost centers costs are calculated based on a cost per resource unit, where:

- The CPU and GPU costs are expressed as the amount of time a job process uses the CPU and GPU within an hour.
- The Memory costs are expressed as an allocation cost per gigabyte.

### Considerations and limitations

The following describes considerations and limitations you must know when using the Cloudera Observability Cost Centers feature:

- Cost centers aggregate the charges, where a cost center can be for one individual user, multiple users, or pools. To avoid cost duplication, users and pools must only be assigned one cost center.
- When viewing the cost center reports, the costs are adjusted to a user's local timezone. Therefore, total costs, such as daily charges, may differ across time zones.



**Note:** The time-range list converts universal time to the user's local timezone.



**Note:** Only users with the System Admin access role type can define the Chargeback settings, list, create, update, or delete cost centers, and view all the Chargeback related dashboards. For more information about the Cloudera Observability access roles, click the Related Information link below.

### Assumptions and prerequisites

The Cloudera Observability Cost Centers feature assumes the following:

- Your organization has an internal pricing or cost model.
- You have created Cloudera Observability users or resource pools and assigned them to your workloads.

### Related Information

[Assigning access roles in Cloudera Observability on premises](#)

## Configuring the Cloudera Observability cost center criteria


This feature defines cost centers based on certain criteria. Configure your Cloudera Observability Cost Center settings by designating your cost center resource usage across users and pools and defining the unit resource consumption costs.

### About this task

The Cloudera Observability Cost Center calculates user and pool costs based on CPU, GPU, memory, data read and written consumption. You decide the CPU, GPU, and Memory unit rates using your internal pricing or cost model.



**Note:**

-  **Important: For Internal Chargeback Only:** The costs displayed in Financial Governance are calculated based on resource usage multiplied by the unit costs you define in the chargeback criteria. These figures are for internal cost attribution (chargeback or showback) and analysis only. They do not pull data from Cloudera's consumption or billing systems and will not match your official Cloudera invoice.
- Only users with the System Admin access role type can define the Chargeback settings, list, create, update, or delete cost centers, and view all the chargeback related dashboards.

## Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Cloudera Observability main navigation panel, select Financial Governance Chargeback Settings . The **Cost Center Criteria** page opens.
  - a. From the Select your Chargeback criteria section, select the required user or pool usage criterion option for your cost centers.
 

The Users option defines your cost centers based on users.

The Pools option defines your cost centers based on your resource pools.
  - b. From the Unit cost section, do the following:
    1. From the Form Factor list, select the form factor to define the cost. This defined unit cost is used to calculate the chargeback cost. By default, Default is selected. You can select from the following form factors in addition to the Default option:
      - Classic Cluster
      - Data Engineering Service (CDE)
      - Data Hub (CDH)
      - Data Warehouse Service (CDW)
      - Cloudera AI (CML)
      - Private Cloud Base (PvC Base)
    2. In the CPU (\$/CPU core hours) field, enter the amount for each CPU core hour.
    3. In the Memory (\$/GB hours) field, enter the amount for each gigabyte hour.
    4. In the Data Read \$/GB field, enter the cost per gigabyte (GB) for the data read by your application, measured in dollars.
    5. In the Data Written \$/GB field, enter the cost per gigabyte (GB) for the data written by your application, measured in dollars.
    6. In the GPU (\$/GPU core hours) field, enter the amount for each GPU core hour.



**Note:** By default, the decimal currency symbol uses the \$ dollar sign.

- c. Click Update.

Now that you have configured your Chargeback criteria settings, you can start creating cost centers.

## Creating a Cloudera Observability cost center

This topic describes the steps for creating a Cloudera Observability cost center. Cost centers separate costs across user or pool usage and track their workload resource consumption costs. They can be divided and/or grouped into members associated with a specific organization or group to help you assign actual consumption charges to a user's department.

### About this task

Describes how to create a Cloudera Observability cost center.



**Important:** To avoid cost duplication, resources must only be assigned one cost center.



**Note:** Only users with the System Admin access role type can define the Chargeback settings, list, create, update, or delete cost centers, and view all the chargeback related dashboards.

## Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Cloudera Observability Main navigation panel, select Financial Governance Cost Centers .
3. To create a new cost center, do the following:

- a. Click Create Cost Center.

The **Create Cost Center** page opens.

- b. In the Name field, enter a unique name for your cost center.
- c. In the Description field, provide a description for the cost center.
- d. From the Environment Selection section, click inside its text field to display a hierarchical list of your environments and their clusters.

1. From the hierarchical list, locate the cluster in which your jobs or queries run and select its check box.

The cluster and its parent service are also highlighted, and the cluster's name is populated in the Environment Selection text field.



**Note:** For multiple clusters within an environment or an environment's service, such as a Data Warehouse, you must select the check box for each of the clusters you require.

- e. Continue to locate and add more clusters and their environments.
- f. Depending on the chargeback usage criterion option you selected when you configured your Chargeback settings, do one of the following:
  - If you selected Pools, click inside the Add Pools field and then select either one or multiple resource pools, or select All (denoted as a star \*), which highlights all the resource pools associated with the selected cluster.

The Add Pools field is populated with the selected pools.

- If you selected Users, click inside the Add Users field and then select either one or multiple users, or select All (denoted as a star \*), which highlights all the users associated with the selected cluster.

The Add Users field is populated with the selected users.



**Note:** Only those pools or users that are associated with the environment's cluster that you previously selected in the Environment Selection field are listed.

- g. Click Create.

The Cloudera **Chargeback** page opens displaying a Success message, which denotes that the cost center was successfully created, and your new cost center is listed under the Cost Centers column.



**Note:** Until data is available from a job run, within the clusters you selected, the costs and resource usage will not display. Zero cost and resource usage values for the cost center denote that no charges have been incurred. If this continues after a job has run, check that the correct time-period is displayed.

Now that you have created a cost center you can now view the costs and resource usage associated with your cost center.

4. To edit an existing cost center, do the following:

- a. In the **Cost Centers** page, locate and select the cost center that requires changes.
  - b. From the Actions list, select Edit.  
The **Cost Center** details page opens.
  - c. Make your changes.
  - d. Click Update.
5. To delete an existing cost center, do the following:
- a. In the **Cost Centers** page, locate and select the cost center that requires deletion.
  - b. From the Actions list, select Delete.  
A confirmation message appears confirming the deletion.
  - c. Click OK.

The cost center is deleted and removed from the environment's cost center list and all the user and pool costs associated with the cost center are moved into the Uncategorized section.

## Assigning uncategorized resources to a cost center

Unassigned resource costs are included in the total cost of all your cost centers. They represent user and pool costs that have not been assigned to a cost center. Learn how to move unassigned resource costs into an existing or a new Cloudera Observability cost center.

### About this task

Steps on how to locate and move unassigned resource costs into an existing or a new Cloudera Observability cost center.

### Before you begin

- Assign resources to only one cost center to avoid cost duplication.
- Ensure that you have the System Admin access role permissions to define the Chargeback settings, list, create, update, or delete cost centers, and view all the chargeback-related dashboards.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.  
The Cloudera Observability landing page opens.
2. From the Cloudera Observability Main navigation panel, select **Financial Governance Cost Centers** .  
The **Chargeback** page opens.
3. Scroll down and select **Uncategorized**.  
The **Uncategorized** page opens.
4. Select the environment that must be assigned to a cost center.
5. Depending on the chargeback usage criterion option you selected when you configured your Chargeback settings, from the Pools or Users page, select the check boxes of the uncategorized resources you require for your cost center.



**Note:** Users and Pools may contain multiple instances of the same name, for example an *ADMIN* user. In this case, select the name that is associated with the environment you require for your cost center.

6. Click **Assign a Cost Center**.  
The **Assign Cost Center** dialog box opens.

7. Do one of the following:

- To add the unassigned resource costs in a new cost center, do the following:
  - a. Click Create a new Cost Center...

The **Create a Cost Center** page opens displaying the Cost Center details settings.

- b. In the Name field, enter a unique name for the cost center.
- c. In the Description field, enter a description for the cost center.
- d. Click Create.

The Cloudera **Chargeback** page opens displaying a Success message, which denotes that the cost center was successfully created. Your new cost center is listed under the Cost Centers column and the **Uncategorized** page no longer displays the unassigned resource costs.

- To add the unassigned resource costs in an existing cost center, do the following:
  - a. From the Select Cost Center list, select the existing cost center that you require.
  - b. Click Assign to Cost Center.

The Cloudera Chargeback page opens displaying a Success message, which denotes that the unassigned costs were moved into the selected cost center, and the **Uncategorized** page no longer displays the unassigned resource costs.

8. Repeat steps 4 through 6 until all your uncategorized resources are placed in your Cloudera Observability cost centers.

## Displaying your costs associated with a cost center

When a Cloudera Observability cost center is created, detailed summary reports of the costs and resource usage for the environment are also generated, which enable you to analyze the costs and the cost breakdown associated with the cost center. You can view the current and historical costs and the resource usage associated with your cost centers.

### About this task

Steps on how to view the detailed summary reports associated with a cost center.

The reports visually display the tracked resource consumption and usage costs associated with the cost center for a specific time-period that you select from the time-range list.

Within each report you can to drill down further:

- To view by users, resource pools, jobs, queries, projects, teams, and application types with the highest costs. Note that projects and teams are only available in the Cloudera AI environment, and resource pools are not applicable for Cloudera AI.
- To view the health of a job or query of interest. To optimize costs by using the Cloudera Observability prescriptive guidance and recommendations that enable you to improve performance and resource usage.
- Enabling the Show Resource Usage checkbox allows you to track resource usage, including CPU, GPU, memory, and data read/write. For example, CPU and GPU usage can be viewed in core-hours.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Cloudera Observability Main navigation panel, select Financial Governance Cost Centers .

The Cloudera Observability **Cost Centers** page opens, which displays:

- The provisioned cost, and the provisioned cost of CPU, memory, and GPU cost for all of your environments. Data read and written values for all of your cost centers.  
Provisioned cost = Provisioned CPU + Provisioned Memory + Provisioned GPU + Data read + Data write  
Data read and written values for all of your cost centers.
  - Lists your existing cost centers that use the current criteria settings and displays the provisioned costs, CPU, GPU, and Memory usage and data read and written values associated with each cost center.
  - The provisioned cost, CPU, GPU, and memory usage, and data read and written values for users and pools that are not yet assigned to a cost center in the uncategorized section.
3. To display a cost center's detailed report that includes costs for each chosen environment, do the following:
    - a. From the Date Range and Granularity list, select a time-period that meets your requirements.
    - b. From the Cost Centers page, click inside the cost center row that requires analysis.  
The cost center's report page opens, which displays the following:
      - The provisioned costs, CPU, GPU, Memory usage, and Data Read and Data Written cost per GB for the cost center.
      - Lists the environments that are associated with the cost center and displays their provisioned costs, CPU, GPU, and Memory usage, and data read and written cost.
    - c. To view more details about an environment, click on the environment name.
  4. To display the users, pools, jobs, queries, projects, teams, and application types that created the highest costs on a specific cluster of interest, do the following:
    - a. Click inside the cluster row that requires more analysis.  
The cluster report overview page opens, which displays the following:
      - The top 500 users whose jobs created the highest costs.
      - The top 500 pools whose jobs created the highest costs.
      - The top 500 jobs or queries that created the highest costs.
    - b. To gain more insights on the health of a job or query, click the name of the job or query listed in the Top 500 Jobs panel that requires more investigation.  
The job or query's summary page opens.
    - c. Select the Health Checks and Execution Details tabs for more insights, and if available, read the optimization recommendations.
    - d. Enabling the Show Resource Usage checkbox allows you to track resource usage, including CPU, GPU, memory, and data read/write. For example, CPU and GPU usage can be viewed in core-hours.
  5. To view a full list of users, including their job costs, CPU, GPU, and Memory usage, select the Users tab.  
The **Users** report opens, which displays the following:
    - The name of the user.
    - The total cost that the user incurred.
    - The number of jobs that the user ran.
    - The CPU, GPU, and Memory usage.
    - The cost per GB for the data read and written by your application.
    - The total job costs that the Cloudera Observability engines incurred: AI Jobs, Impala, Hive, Spark, MapReduce, and Oozie.
  6. To view a full list of pools, including their job costs, CPU, GPU, and Memory usage, select the Pools tab.  
The **Pools** report opens, which displays the following:
    - The name of the pool.
    - The environment that the pool is associated with.
    - The total cost that the pool incurred.
    - The number of jobs that the pool ran.

- The CPU, GPU, and Memory usage.
  - The cost per GB for the data read and written by your application.
  - The total job costs that the Cloudera Observability incurred: AI Jobs, Impala, Hive, Spark, MapReduce, and Oozie.
7. To view the list of Jobs & Queries, their CPU, GPU, and Memory usage, select the Jobs tab.

The **Top 500 Jobs** report opens, which displays the following:

- The name of the job or query.
  - The total cost that the job or query incurred.
  - The CPU, GPU, and Memory cost and resource usage.
  - The cost per GB and resource usage for the data read and written by your job or query.
  - The total job costs that the Cloudera Observability engines incurred: AI Jobs, Impala, Hive, Spark, MapReduce, and Oozie.
8. To view the list of Projects, their CPU, GPU, and Memory usage, select the Projects tab.

The **Projects** report opens, which displays the following:

- The name of the Project.
  - The number of jobs for that project.
  - The total cost that the project incurred.
  - The CPU, GPU, and Memory usage.
  - The cost per GB for the data read and written by your application.
9. To view the list of Teams, their CPU, GPU, and Memory usage, select the Teams tab.

The **Teams** report opens, which displays the following:

- The name of the Team.
  - The number of jobs for that team.
  - The total cost that the project incurred.
  - The CPU, GPU, and Memory usage.
  - The cost per GB for the data read and written by your application.
10. To view the list of Application types, their CPU, GPU, and Memory usage, select the Application Types tab.

The Application Types open, displaying the Top Application Types, which include the engines Impala, Hive, Spark, MapReduce, and Oozie. However, if the environment is Cloudera AI, the Top Application Types will display Application, Session, Job, and Model.

- The name of the Application Type.
- The number of jobs for the application type.
- The total cost that the user incurred.
- The CPU, GPU, and Memory cost and resource usage.
- The cost per GB and resource usage for the data read and written by your application.
- The total job costs that the Application Type incurred.

### Related Information

[Specifying a time range](#)

## Downloading your chargeback costs

You can save the CPU, GPU, memory, and resource usage costs displayed in the **Chargeback** or **Uncategorized** pages of the Cloudera Observability UI as a spreadsheet report on your system, which can be used at a later time for further analysis using other tools or for printing and sharing with others. Learn how to download reports for both assigned and unassigned resource costs in Cloudera Observability.

### About this task

Steps on how to locate and download a report for assigned and unassigned resource costs.



**Note:** The downloaded file contains raw data and as such may not display exactly as the format in the Cloudera Observability UI.

## Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Cloudera Observability Main navigation panel, select Financial Governance Cost Centers . The **Cost Centers** page opens.

3. To download a report of your assigned chargeback costs, do the following:

- a) From the Date Range and Granularity list, select a time-period that meets your requirements.
- b) Click Download Report.

A **Download Report** message appears stating that the report is generating.



**Important:** Navigating to another page or browser tab during the generation process will automatically stop the generation and download process.

When completed, your assigned chargeback costs for the time-period selected are downloaded as a Microsoft Excel file to your Downloads folder.

4. To download a report of your unassigned chargeback costs, do the following:

- a) From the Date Range and Granularity list, select a time-period that meets your requirements.
- b) Scroll down and select Uncategorized.

The **Uncategorized** page opens.

- c) Click Download Report.

A **Download Report** message appears stating that the report is generating.



**Important:** Navigating to another page or browser tab during the generation process will automatically stop the generation and download process.

When completed, your unassigned chargeback costs for the time-period selected are downloaded as a Microsoft Excel file to your Downloads folder.



### Note:

- You can download a report at the environment level as well. From the Cloudera Observability Main navigation panel, select Financial Governance Environments Download Report .
- You can download a report on users, pools, jobs, queries, projects, teams, and application types that is downloaded in the CSV format. From the Cloudera Observability Main navigation panel, select Financial Governance Cost Centers Environments Download Report select users/pools/jobs/queries/projects/teams/application types depending upon the environment Export CSV . You can download a maximum of one million records.

## Budgeting

The Financial Governance Budgeting feature provides organizations with granular control over their spending by allowing them to allocate and manage budgets for expenses associated with workloads and infrastructure.

Budgeting works on the existing financial governance capability, which already tracks and records workload costs by attributing them to the corresponding users and allows the creation of cost centers based on criteria like individual

users or resource pools. This feature helps you to enable budget creation, monitor financial control, track spending against the budget set, and implement an alerting system.

You can create budgets for specific cost centers or environments for a defined duration, incorporating a warning threshold. If the scope is Cost Centers, the amount spent is calculated based on jobs run within those cost centers, (for example, Spark, Hive, and Impala). If the scope is Environments, the spent amount is calculated using infrastructure cost data. You can monitor the spending, remaining budget days, and budget utilization percentages.

Alerting is a key function. A scheduled job validates budget thresholds, sending an alert notification to the configured email address if actual costs exceed the specified warning threshold.

Alerting is a key function. A scheduled job validates budget thresholds, sending an alert notification to the configured email address if actual costs exceed the specified warning threshold.



**Note:** A budget will trigger a maximum of one alert per day, and alerts are not generated if your premium entitlement is not active.

Currently, Slack notifications are not available for on premises deployments.

#### Supported versions:

- Cloudera Private Cloud Base (7.3.1.200 and higher) clusters running Cloudera Manager 7.13.1.200 and higher.



#### Note:

- Budgeting data and environment listing:
  - Budgeting data is displayed only for supported environments.
  - Unsupported environments are listed in the budgeting page. However, budgeting data is not displayed for unsupported environments.
  - Inactive environments are not listed in the budgeting page, and budgeting data is not displayed.
- The retention period for data is currently six months.

### Budget Scope definition

The flexibility to define the scope of the budget is based on two options: **Cost Centers** or **Environments**. This scoping determines how the consumption is tracked and calculated against the allocated budget amount. For both options, you can select the same cost centers or environments across multiple budgets, allowing for flexible management and reporting.

#### Cost Centers

- If you select Cost Centers, you can choose one or more available cost centers.
- For cost centers, the amount spent is calculated based on jobs that run within those cost centers.
- You can select the same cost centers across multiple budgets.


#### Environments

- If you select Environments, you can choose one or more available environments.
- Environment spending is determined by the infrastructure cost data linked to those environments.
- You can select the same environments across multiple budgets.

### Budget report details

The budget report displays a list of all budgets with description:

Budget report	Description
Budget Name	The identifier assigned during creation.
Type	Categorized as either Environment or Cost Center.

Budget resport	Description
Scope	List of supported and unsupported environments or cost centers.  <b>Note:</b> Inactive environments are not listed in the budgeting page, and budgeting data is not displayed.
Frequency	The recurring interval. For example, Daily, Weekly, Monthly, or Quarterly.
Duration	The active period for which the budget applies.
Duration Remaining	The number of days remaining until the budget's duration concludes.
Allocated	The predefined spending limit for a specific interval.
Spent	The actual amount spent within that interval.
Spent Percentage	Line chart visually representing utilization as a percentage. <b>Blue</b> indicates utilization below the warning threshold, <b>Orange</b> is above the warning threshold, and <b>Red</b> denotes an overshoot.
Actions	Edit, Clone, and Delete are the available actions.
Search	You can search using textual fields using the budget name and scope.

### Role-Based Access Control (RBAC) and administration

The ObservabilityAccountAdmin role is required to create, edit, or view budgets, consistent with other financial governance features. The Cloudera Observability on premises support administrator has read-only access to the budget feature, preventing them from performing actions like creating, cloning, deleting, or editing budgets.

### Budget dependencies and constraints

- If a cost center is currently in use within a budget, attempting to delete that cost center will trigger a validation error to prevent its deletion.
- For Quarterly budgets, you can only select the current and next quarters.
- The default Warning Threshold is set at 80%.
- The system skips validation if a budget's duration has concluded or it's no longer active.
- Alerts are not generated if the premium entitlement is no longer active.

## Creating a budget


You can create a budget to track spending against specific cost centers or environments, set durations, and configure alert notifications when thresholds are exceeded.

### Procedure

1. Log in to the Cloudera Observability web UI.
2. From the Cloudera Observability Main navigation panel, select Financial Governance Budgeting .
3. Click Create Budget.  
The **Create Budget** page opens.
4. In the Budget Name field, enter a unique name for your budget.
5. Under Select Scope, select either Cost Centers or Environments.
6. From the Cost Centers or Environments section, click inside its text field to display a hierarchical list of your Cost Centers or Environments. Select one or more.
7. In the Budget Amount field, enter the value represented in \$.
8. Set the budget duration using the Frequency drop-down.

**Budget Frequency options:** When creating a budget, you must set a recurring interval for the budget period.

Frequency	Budget Period Definition
Daily	From UTC midnight to midnight of the current day.

Frequency	Budget Period Definition
Weekly	From Monday to Sunday of that week.
Monthly	Starts on the first day of the month and ends on the last day. Consumption is calculated from the beginning of the month, even if the budget is created mid-month.
Quarterly	Q1: January–March; Q2: April–June; Q3: July–September; Q4: October–December.  <b>Note:</b> You can only select the current and next quarters.

9. Select the date range.

10. Set the warning threshold by setting the Cost Exceeds in %.

This value is based on the Budget amount set in step 5. Accordingly, the automatically Calculated Amount is displayed.

11. From the Notification section, you can either select Email or Slack:

12. In the Emails field, enter one or more email addresses that you use to log into Cloudera Observability.



**Important:** You must ensure that the domain of any email address you use in the Emails field for an Auto Action is included in the Notifications Allowed Domains list. Only Account Administrators can update the Allowed Domains list, available under the Notifications section of Cloudera Management Console. For more information, see *Creating and managing distribution lists*.

13. In the Slack Channel IDs field, enter the Slack channel ID.



**Important:** The Slack Channel ID field is enabled only when Slack is integrated on the Notifications tab. For more information, see the *Setting up Slack for resource notifications* [Technical Preview] documentation.

14. In the Subject field, enter a subject for the email that distinguishes the email from another email for a different Auto Action.

## Triggering action alerts across jobs and queries

You can trigger action alerts, that are defined by you, across your workload applications, jobs, and queries whilst they are running with the Cloudera Observability on premises Auto Actions feature. When a workload application, job, or query matches the action's defined threshold value, the auto action event is triggered. For example, you may have a scenario where too much memory is being allocated to specific jobs and you would like to take an action before a problem occurs, such as avoiding memory exhaustion. In this case, you can create an auto action that triggers a notification alert when a job is identified as having an over-allocation of memory. You can then either manually take steps to alleviate the problem or include the Kill action option that stops the job in question.



**Important:** Before you can use the Auto Actions feature you must set the required auto actions configuration properties in Telemetry Publisher. For information on how to enable the Telemetry Publisher Auto Actions property settings, click the Related Information link below.



**Note:** At this time the Auto Actions feature is only available for Classic Cluster and Cloudera Base on premises using Cloudera Manager version 7.6.2, or above, environments. Users using Cloudera Data Hub clusters require Cloudera Runtime version 7.2.18 running Cloudera Manager version 7.12.0, or above.

### Considerations and Limitations

The following describes consideration decisions and limitations when using Auto Actions:

- Terminating a workload application, job, or query could impact other workloads. Especially when another workload is dependent on the results of the terminated workload application, job, or query. Before triggering a Kill type action, Cloudera recommends using the Notification only action alert until you have verified that no issues will arise.

- By default, the Cloudera Observability on premises UI limits the amount of displayed audit events to 500 and sorts them in ascending order (newest time stamp first). To display older audit events, change the date range duration and/or the time range duration from the time-range list on the Auto Actions Events page.
- Too Fast To Collect: The minimum polling interval is one minute. If you have jobs or queries that overlap or start before the minimum polling interval is completed there may not be enough time for Cloudera Observability on premises to evaluate your auto action's definition.

For example, if Cloudera Observability on premises starts polling at 1:00:00 PM and polling finishes by 1:00:10 PM (10 seconds) and then a job starts at 1:00:12 PM and finishes before 1:01:00 PM, there is not enough of a time lapse for Cloudera Observability on premises to evaluate and trigger your action alert.

- Too Fast to Kill: Under normal conditions the evaluation and invocation phases of an auto action is within the span of one minute. If you have jobs or queries whose run time is less than one minute, Cloudera Observability on premises may complete the evaluation phase but not have time to complete the invocation phase, such as terminating the job. Depending on the context of your auto action, this may or may not be an issue. But if, for example, you have a workload cluster that is dedicated for specific jobs and a rogue job is run before the action is triggered, then this could be an issue.

### Related Information

[Enabling the Auto Actions feature in Telemetry Publisher](#)

## Creating an Auto Action event

You can create an Auto Action definition in Cloudera Observability on premises that triggers an action when an application, job, or query exceeds its defined thresholds. This allows you to automatically manage workload issues, such as stopping a job that's running too long and potentially delaying others. For example, if a job is exceeding its defined runtime, you can configure an Auto Action to: Notify you through a communication channel (such as email or Slack) or optionally, stop the application, job, or query automatically. The optionality of the Stop action allows you to decide whether you want to manually manage the issue or let the Auto Action resolve it for you automatically.

### About this task

Describes how to create a Cloudera Observability on premises Auto Action definition.



#### Note:

- These instructions assume that you have set the required Auto Action configuration properties in Telemetry Publisher. For information about the properties and how to enable the Telemetry Publisher Auto Actions property settings, click the Related Information links below.
- The Auto Actions feature is currently available only for Classic Cluster and Cloudera Base on premises environments using Cloudera Manager version 7.6.2 or higher.

### Procedure

1. Log in to the Cloudera Observability web UI
2. Click on the environment to create an Auto Action. You can filter by environment type from the All Environments option.



**Note:** Currently, the following environments are supported: Classic Clusters and Private Cloud Base.

3. Click Analytics Auto Actions Create Auto Action
4. In the Auto Action Name field, enter a unique name that is easily identifiable.
5. Select an option from the Scope drop-down.

For example, if you want your action to only evaluate Spark related applications, select Spark Application.

The following options are currently available for Classic Clusters and Private Cloud Base: Tez Session, Impala Query, MapReduce Job, Spark Application, and YARN Application.

6. Define the conditions for the Auto Action:
  - a. Specify a Specify Criteria Logic

1. AND (default): All criteria conditions must be met.
2. OR: Any one of the criteria conditions must be met.



**Note:** The current UI supports grouping all criteria under one operator. It does not yet support mixed nested logic (for example, (A AND B) OR C) within the same section.

**b. Specify a Criteria:**

1. From the Criteria list, select a criteria item. For more information, see the [Criteria selection information](#) documentation.
2. From the Operator list, select the required operator.




**Important:** Cloudera Observability on premises does not validate regular expressions when using the matches regex operator for string criteria types, such as User, Pool, or Query Name. Neither does it display help for poor syntax. Cloudera recommends validating your code and syntax before entering your regular expression in the Value field.

3. In the Value field, enter the value for this filter.



**Tip:** You can define multiple AND filters for the Criteria by clicking the plus sign.

**Criteria**

Criteria  Operator  - 



**Note:** An Auto Action does not require the Criteria filter if a Trigger condition is defined:

- When included, only those applications, jobs, or queries that are run on the selected scope and meet the specified criteria are tested by the Trigger.
- When not included, all applications, jobs, or queries that are run on the selected scope are tested by the Trigger.

**c. Specify a Trigger Logic**

1. OR (default): Any one of the trigger conditions must be met.
2. AND: All trigger conditions must be met.

**d. Specify a Trigger:**

1. From the Metric list, select a metric item. For more information, see [Trigger selection information](#) documentation.



**Note:** When using an Auto Action with a Tez session, know that all triggers are evaluated based on the Tez session, and not on the individual Hive queries running within the session. For example, if you set a trigger for **Duration > 60min** to identify long-running Hive queries, the duration is measured against the Tez session, which spans a longer time. In this scenario, if a Tez session exceeds 60 minutes and includes a Hive query that has been running for only 4 minutes, the trigger will terminate the Tez session after it surpasses the 60-minute threshold. Consequently, the 4-minute Hive query will also be terminated if it has not completed.

2. From the Operator list, select the required operator.



**Note:** The in-between operator is inclusive.

3. In the Value field, enter the value for this trigger condition.



**Tip:** You can define multiple OR conditions for the trigger by clicking the plus sign.

## Triggers

Metric ▼ Operator ▼ - ⊕



**Note:** An Auto Action does not require the Trigger filter if a Criteria condition is defined:

- When included, workloads that are run on the selected workload component service and meet the specified criteria are tested by the Trigger.
- When not included, only those workloads that are run on the selected workload component service and meet the criteria conditions are evaluated.

7. From the Select Action options, choose the action to perform when the condition is met. The available actions are Notification only and Kill. Choosing Kill automatically includes the Notification only action.



**Warning:** Killing an application, job, or query can impact other processes, especially if a process depends on its results. Before triggering a Kill action, Cloudera recommends using the Notification-only action to ensure no issues will arise from killing the application, job, or query.

8. From the Notification section, do the following:

- a) In the Emails field, enter one or more email addresses that you use to log into Cloudera Observability on premises.



**Important:** You must ensure that the domain of any email address you use in the Emails field for an Auto Action is included in the Notifications Allowed Domains list. Only Account Administrators can update the Allowed Domains list, available under the Notifications section of Management Console. For more information, see [Creating and managing distribution lists](#).

- b) In the Slack Channel IDs field, enter the Slack channel ID.



**Important:** The Slack Channel ID field is enabled only when Slack is integrated on the Notifications tab. For more information, see the [Setting up Slack for resource notifications \[Technical Preview\]](#) documentation.

- c) In the Subject field, enter a subject for the email that distinguishes the email from another email for a different Auto Action.

9. Click Create, which creates the Auto Action, adds an event denoting its creation to the Action Events tab and displays the Auto Action with an enabled status on the Management tab.

## Results

The Auto Action executes the defined action when an application, job, or query meets the action's criteria and trigger conditions.

## Related Information

[Enabling the Auto Actions feature in Telemetry Publisher](#)

[Telemetry Publisher configuration settings for Auto Actions](#)

## Criteria selection information

This section provides additional information on criteria selection.

## Criteria list

**Scope:** All services except Impala Query.

Criteria	Description
Application Tags	Value found in the Application Tags property based on the operator selected.

Criteria	Description
Query Name	Name of the query
Pool	The name of the YARN queue to which the application was submitted.
User	The user who initiated the application.

**Scope:** Impala Query only

Criteria	Description
Pool	The name of the YARN queue to which the application was submitted.
User	The user who initiated the application.



**Note:** Application tags are represented as a long string with delimited entries, typically formatted as key=value pairs. Cloudera recommends using the contains operator to search for specific values within application tags, as the desired value may appear anywhere in the string. Conversely, using the equals operator assumes that the application tags string exactly matches the specified value.

### Tez Session exceptions:

- The User criteria will only match a user=hive because Hive creates the Tez session. No other user will be present in this field.
- The User criteria only match user=hive because Hive creates the Tez session. To match a non-Hive user, use the Application Tags criteria with the contains operator to find a query run by a specific user. For example, Application Tags that contain *CLUSTERUSER7* are the only way to identify a Hive query started by *CLUSTERUSER7* that is running within a Tez session.

Criteria

-
+

### Trigger selection information

This section provides additional information on trigger selection.

### Trigger list

**Scope:** All services except Impala Query.

Triggers	Description
Allocated Cores	The total number of virtual cores allocated to the application's running containers.
Allocated Memory	The total memory, in MB, allocated to the application's running containers.
Duration	The time elapsed since the application started, measured in milliseconds.
Number of Containers	The current number of containers running for the application.

Triggers	Description
Total Core Duration (virtual core-seconds)	The CPU resources allocated to the application, measured in virtual core-seconds.
Total Memory Duration (MB-seconds)	The memory allocated to the application, measured in megabyte-seconds.

**Scope:** Spark only.

Triggers	Description	Additional information
Requested Containers	The total number of containers the application requests.	For Spark, this includes containers allocated for both the Driver and Executors.
Requested Memory	The total amount of memory the application requests across all containers.	For Spark, this includes memory allocated for the Driver, Executors, and any additional overhead.
Requested VCores	The total number of virtual cores (vCores) the application requests across all containers.	For Spark, this includes vCores allocated to the Driver and Executors.

**Scope:** Impala Query only

Triggers	Description
Memory Used	The amount of memory used
CPU Usage	The amount of CPU time used
Duration	The duration of a ReservationRequest is the consecutive time for which the requested resource allocation must be available.



**Note:** All triggers are evaluated based on the Tez session, not the individual Hive queries running within the Tez session. For example, if you set a trigger for **Duration > 60min** to identify long-running Hive queries, the duration is measured against the Tez session, which spans a longer time. In this scenario, if a Tez session exceeds 60 minutes and includes a Hive query that has been running for only 4 minutes, the trigger will terminate the Tez session after it surpasses the 60-minute threshold. Consequently, the 4-minute Hive query will also be terminated if it has not completed.

## Events and management details of auto actions

Describes the fields in the Auto Actions Events and Management pages of Cloudera Observability on premises.

The Events and Management pages help you monitor, manage, and troubleshoot your Auto Actions.

### Events

The **Events** page displays information about your auto action audit events:

Status	Type	Details	Auto Action Name	Engine	Time
❌	Execution	<a href="#">Notify only</a>	Notify on spark jobs taking more than 10h	Spark	10 days ago
✅	Execution	<a href="#">Kill Impala Query</a>	Kill long jobs by ...	Spark	10 days ago
✅	Execution	<a href="#">Kill Impala Query</a>	Kill impala queries taking more than 1TB of memory	Impala	10 days ago
✅	Update	<a href="#">Admin</a>	Kill long jobs by ...	Impala	10 days ago
✅	Execution	<a href="#">Kill Impala Query</a>	Kill impala queries taking more than 1TB of memory	Impala	10 days ago
✅	Execution	<a href="#">Kill Impala Query</a>	Notify on spark jobs taking more than 10h	Spark	10 days ago
⚠️	Execution	<a href="#">Notify only</a>	Kill long jobs by ...	Impala	10 days ago
✅	Create	<a href="#">Admin</a>	Notify on spark jobs taking more than 10h	Spark	10 days ago
✅	Delete	<a href="#">Admin</a>	Notify on spark jobs taking more than 10h	Impala	10 days ago
❌	Execution	<a href="#">Notify only</a>	Notify on impala jobs taking 10gb+ mem	Spark	10 days ago
✅	Execution	<a href="#">Notify only</a>	Notify on impala jobs taking 10gb+ mem	Impala	10 days ago

It contains the following audit entry fields:

- Status, which displays the results of the auto action event as an icon. Where, green indicates that the action was successful (SUCCEEDED). All the other icons indicate that the action was unsuccessful (FAILED).
- Type, which displays the auto action's audit event category type, such as Create or Update.
- Details, which displays the type of action. When clicked the auto action's Event Details audit log opens, as shown in the following Invoke and Update event type example images:

**Figure 1: Invoke Event Type Example**

Event Type	Scope	Status	Application/Query ID
Invoke	Spark Application	Succeeded	application_1638370829422_0014

Auto Action Details	
Name	Action
auto-action-on-user	Kill the YARN process
Triggers	Criteria
Duration > 15 minutes	User is any of hdfs, hive, admin sigma.unit.NONE

[Done](#)

**Figure 2: Update Event Type Example**

Event Details		
Event Type	Scope	Status
Update	Spark Application	Succeeded
Auto Action Details		
Attribute	Previous Version	Current Version
Name	test auto action	test auto action new name
Action	Notification only	Kill the YARN process
Criteria	Allocated Cores > 4	Allocated Memory > 2 GB
Triggers	Duration > 30 minutes	Total Core Duration > 30 minutes
Status	Enabled	Enabled

[Done](#)

- Auto Action Name, which displays the unique name you entered for the auto action.
- Scope, which displays the workload component service that is monitored by the action.
- Time, which displays the time stamp of when the auto action's audit event occurred.



**Important:** By default, the Cloudera Observability on premises UI limits the number of displayed audit events to 500 and sorts them in ascending order (newest time stamp first). To display older audit events, from the time-range list on the Auto Actions Events page, change the date range duration and/or the time range duration.

## Management

The **Management** page displays your auto action's defined settings and state:

Status	Name	Action	Scope	Criteria	Triggers
Enabled	...	Notification only	Impala Query	User = ...	Memory Used > 200 GB
Enabled	...	Notification only	Spark Application	User ends with @...	Number of Containers > 10000
Enabled	...	Notification only	Spark Application	User = ...	Duration > 1 milli
Enabled	...@users1	Notification only	Impala Query	User = *	CPU Usage > 20 hours
Enabled	...@users	Notification only	Impala Query	User is any of ...	Duration > 5 seconds

It contains the following entry fields:

- Status, which displays the current state of the action, as either Enabled or Disabled.
- Name, which contains the name of the auto action. When clicked the auto action's definition settings page opens.
- Action, which displays the name of the action that is invoked when the auto action is triggered, such as Notify Only.
- Scope, which displays the workload component service that is monitored by the action.
- Criteria, which displays the action's Criteria filters. These are attributes with static values that remain the same during the execution of a job or query.
- Triggers, which displays the action's Trigger conditions. These are attributes with dynamic values that change during the execution of a job or query.

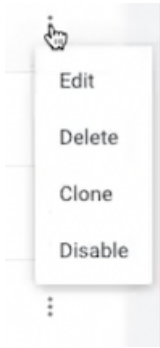
## Managing your auto actions

Describes how to update, delete, duplicate, and disable an auto action event.

The following Auto Actions management tasks are performed in the **Management** page, which is accessed by selecting the Auto Actions tab in the Cluster Summary page and then selecting the **Management** tab.

### Updating your auto action

In the Management page, click the action's vertical ellipsis, as shown in the following image, and select Edit. Make your changes and then click Update.



### Deleting an auto action

In the **Management** page, click the action's vertical ellipsis, and select Delete. In the confirmation message, click OK to confirm. The action is permanently removed.



**Note:** Unless the action is no longer required, Cloudera recommends disabling the action, as you may require the action at another time.

### Duplicating an auto action

In the **Management** page, click the action's vertical ellipsis, and select Clone. Replace the existing name with a new unique name for the cloned auto action, make any other changes, and then click Create. A new auto action is created and is displayed on the **Management** page.



**Note:** You must change the name of the cloned auto action before a new one can be created.

### Disabling an auto action

In the **Management** page, click the action's vertical ellipsis, and select Disable. In the confirmation message, click OK to confirm. The action is no longer active and the Disabled state is displayed in the action's Status column on the **Management** page.

## Auto action email notification examples

Examples of a Cloudera Observability on premises Auto Actions alert notification email.

The following sample email notifications are sent when the listed application meets the action's criteria and the trigger conditions, which are also included in the email notification. The sample email notifications are split into three sections:

- In the Application Details section, the Application ID contains a link to the workload application, job, or query.
- In the Auto Action Definition section, the Trigger and the Criteria definition display both the value and file size type that you defined and in brackets the Actual value, in megabytes, captured by the engine.
- In the Auto Action Results section, the results of the invoked auto action is displayed.

Cluster Cluster 1		Cluster Compute Cluster 1	
<b>Auto Action triggered!</b>		<b>Auto Action triggered!</b>	
<b>Application Details</b>		<b>Application Details</b>	
Application ID	application_1644390922568_0022	Application ID	application_1644420542887_0007
Name	TPCDS Queries 1-2	Name	TPC data generation
User	system	User	system
Pool	default	Pool	default
<b>Auto Action Definition</b>		<b>Auto Action Definition</b>	
Name	spark-workload-base-cluster-1	Name	spark-workload-compute-cluster
Action	Kill Yarn Application	Action	Notify Only
Scope	Spark Application	Scope	Spark Application
Criteria	Application Name contains 'TPC' (Actual: TPCDS Queries 1-2)	Trigger	Allocated Memory != -1 MB (Actual: 1024 MB)
<b>Auto Action Results</b>		<b>Auto Action Results</b>	
Status	Kill Yarn Application Succeeded	Status	Notify Only Succeeded

## Understanding, identifying, and addressing problems with Cloudera Observability on premises

Learn the tasks that help you analyze, identify and troubleshoot job and query abnormalities and failures, optimize workloads, and improve job performance with Cloudera Observability on premises.

### Specifying a time range

Enable a more in-depth analysis about your costs and workloads by displaying current or historical data for a specific time period.

#### About this task

Describes how to change the currently displayed time period from the time-range list, which appears on the **Cluster Summary**, **Engine Summary**, and **Workload Summary** pages.

By default, Cloudera Observability on premises displays workload data for the last 24 hours. If there is no data available during that time, Cloudera Observability on premises displays the nearest date range that is available.



**Note:** The time-range list converts universal time to the user's local timezone.

The following steps describe, with examples, how to change the time period from the **Cluster Summary** page.

#### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.

- d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.

2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required for analysis.



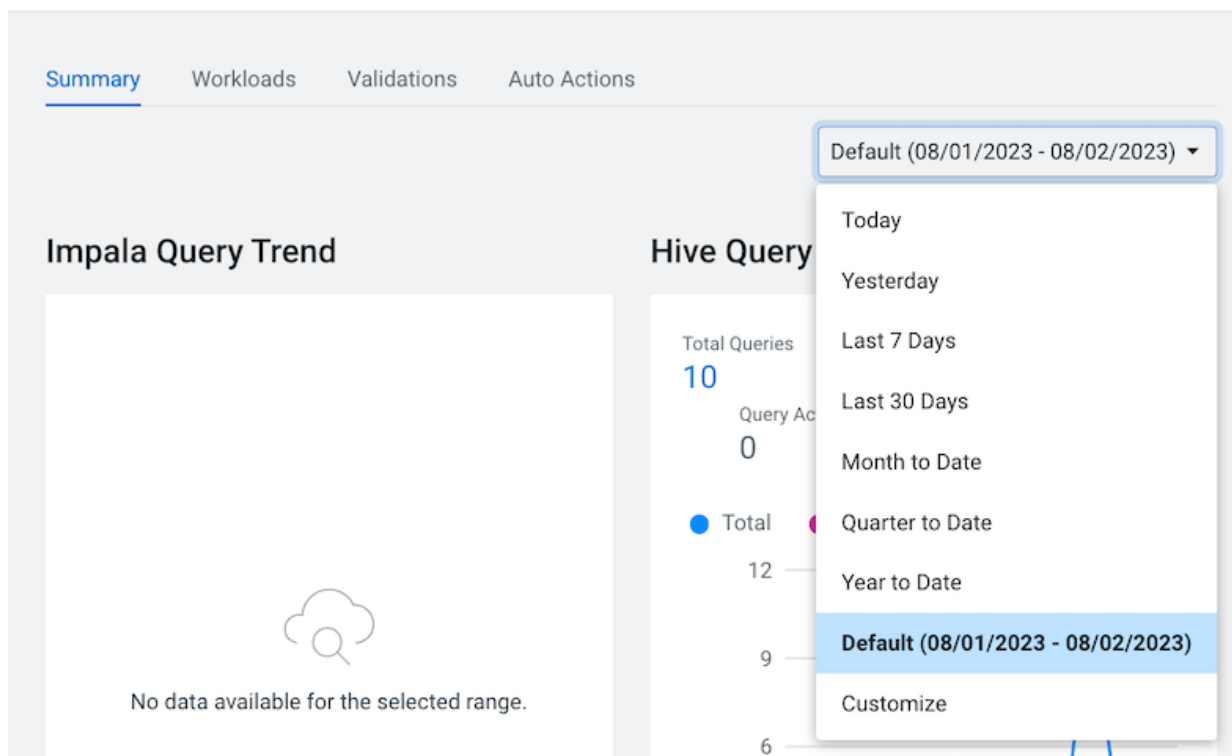
**Tip:** The page's title is displayed in the browser tab.

3. From the time-range list, do one of the following:

- For a predefined period, select one of the default periods of time that meets your requirements.
- For an exact date and time range, select Customize and then either, enter the date and time range using the YYYY/MM/DD HH:MM:SS format for the beginning and the ending time period, or in the calendar element, select the beginning and ending time period.

The following image shows an example of the time-range list on a Cluster Summary or Engine Summary page:

**Figure 3: Analytics time-range list**



4. Click Ok, which clears any existing workload data from the chart and table components and updates your workload data for the chosen time period.

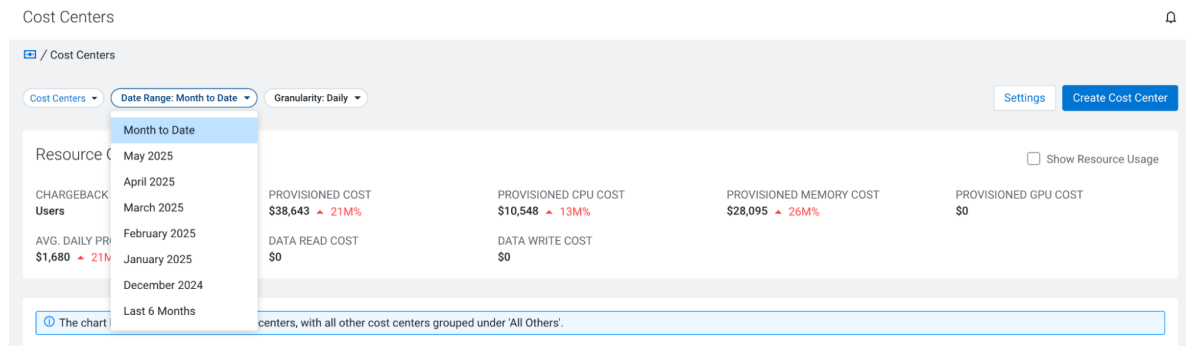
### Results

All charts and tables in Cloudera Observability on premises are updated to reflect the workload data for the chosen time period.



**Note:** The time-range list is also available on the Financial Governance Chargeback pages for historical analysis, as shown in the following example:

**Figure 4: Financial Governance time-range list**



## Exporting a report about your workload jobs and queries

You can save the job or query information displayed on the Jobs or Queries page of the Cloudera Observability on premises UI as a CSV formatted file on your system. You can use this report for further analysis using other tools or for printing and sharing with others. Learn how to export reports about your workload Jobs and Queries in Cloudera Observability on premises.

### About this task

Steps to export a report about your Spark, MapReduce, Oozie Jobs, and Impala and Hive Queries.



**Note:** The downloaded CSV file contains raw data and as such may not display in the same format as in the Cloudera Observability on premises UI. Also, in compliance with the Microsoft Excel row limit, the maximum number of jobs exported is limited to one million.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.
  - d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.
2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster that is required for analysis.



**Tip:** The page's title is displayed in the browser tab.

3. From the time-range list on the **Cluster Summary** page, select a time that meets your requirements.
4. On the **Cluster Summary** page, locate the Trend chart widget for the engine that processed your jobs or queries of interest and click its Total value. For example, locate the Hive Query Trend chart widget and click its Total Queries value.

Depending on the engine selected, the engine's Jobs or Queries page opens.

5. From the filters menu bar, click Export.

A Download Report message appears stating that the report is generating.



**Important:** Navigating to another page or browser tab during the generation process automatically stops the generation and download process.

When completed, the data displayed in the engine's Jobs or Queries page is downloaded as a CSV formatted file to your Downloads folder.

## Analyzing your tables

Minimize costs and maximize query performance by gaining more insights into your tables, including which tables are frequently or infrequently accessed, with the Cloudera Observability on premises Metastore Analytics feature. By understanding your tables and their metadata, such as a table's data volume or how often a query accesses a table, helps you troubleshoot, make informed decisions about your data, and ensures that your table data is in accordance with your Storage Policy.

The Cloudera Observability on premises Metastore Analytics feature, collects and filters the Hive Metastore (HMS) metadata into meaningful views of your tables, including which tables are hot (high frequency of access) and which tables are cold (little or no frequency of access).



### Note:

- To view table metadata in the user interface, you must have a deployed Hive Metastore (HMS) in the workload cluster. At this time, Cloudera Observability Metastore Analytics is available only for the following environments:
  - Cloudera Data Warehouse latest version
  - Cloudera Base on premises by using Cloudera Manager 7.10.1 and higher
  - Cloudera Data Hub clusters by using Cloudera Manager 7.11.0 and higher
- To provide a more accurate representation of table usage, the HMS analysis can now track Spark query counts against tables along with Hive and Impala query counts.

The Cloudera Observability on premises Metastore Analytics feature displays information that enables you to:

- Identify and track sudden table changes, such as a table's data size, the number of partitions, or the number of rows that may impact the processing of your queries. The HMS Extract, which is updated daily, lists the details about each table available in your system regardless of whether they have been queried or not. It includes the table's configurations and if enabled the table's statistics, as well as size related information, such as the table's volume, the number of partitions, and the number of rows.
- View and analyze the most frequently accessed tables from the Data Temperature's Hot Tables chart widget on the environment's Cluster Summary page. With this information you can decide which tables should be moved to performance-efficient storage, such as an SSD that can improve a query's performance due to its fast processing speed, especially queries that access large amounts of data.
- View and analyze the least frequently accessed tables from the Data Temperature's Cold Tables chart widget on the environment's Cluster Summary page. With this information you can decide which tables should be purged or moved to cost-efficient storage, which will save platform costs.
- Analyze and troubleshoot inefficiencies within your tables, such as the wrong table type or storage format. The HMS Tables view and the Table Details panel display details about each table within your system, such as the table's location, database, column names, and properties.
- Identify tables that contain huge amounts of data. With this information you can decide if partitioning is required or if more partitioning is required, which improves query performance and costs by reducing the amount of data that has to be retrieved, manipulated, and outputted, as well as making your tables easier to manage.

## Understanding the Cloudera Observability on premises metastore analytics UI elements

Learn about the Cloudera Observability on premises Metastore Analytics UI elements that display the Hive Metastore (HMS) metadata information about your tables.



### Note:

- To view table metadata in the user interface, you must have a deployed Hive Metastore (HMS) in the workload cluster. At this time, Cloudera Observability Metastore Analytics is available only for the following environments:
  - Cloudera Data Warehouse latest version
  - Cloudera Base on premises by using Cloudera Manager 7.10.1 and higher
  - Cloudera Data Hub clusters by using Cloudera Manager 7.11.0 and higher
- To provide a more accurate representation of table usage, the HMS analysis can now track Spark query counts against tables along with Hive and Impala query counts.

### About the Cloudera Observability on premises data temperatures

In Cloudera Observability on premises Hot and Cold represents the number of times a query accesses the table. Where, the color and the depth of color represents the number of times a query accesses the table in relation to all the other tables in your system:

- Hot tables (red) - are tables that were frequently accessed during the selected time-period.



**Note:** Cloudera recommends moving Hot tables into performance-efficient storage, like an SSD, due to its fast processing speed.

- Cold tables (blue) - are tables that were infrequently accessed during the selected time-period. This includes tables where no queries (zero) accessed their data during the selected time-period and by definition are considered the coldest tables.



**Note:** Cloudera recommends purging tables that are no longer required or moving infrequently accessed tables into cost-efficient storage. This saves platform costs and improves the performance of jobs that access the table data more frequently by creating more storage capacity.

### About the data temperature charts

The Cloudera Observability on premises Metastore Analytics feature has several UI elements that describe your table data.

The following charts display the data temperature information:

- Located on the environment's **Cluster Summary** page, the Data Temperature chart automatically displays the top 25 most frequently queried and the bottom 25 least frequently queried tables from both the Hive and Impala engines in the Hot Tables and the Cold Tables chart widgets respectively.
- Located on the Hive and Impala engine summary pages, the Data Temperature chart automatically displays the tables that were most frequently queried by their engine in the Hot Tables chart widget respectively.

Hovering over a Hot or Cold table with your mouse pointer, displays general information, such as, the number of queries that accessed the table, the total table size in gibibytes, the number of partitions that comprise the table, the number of files that make up the table, and whether statistics were enabled on the table's rows.

Clicking the table's name of interest in either the Hot Tables or Cold Tables chart widget or in the HMS Tables view in the HIVE METASTORE category of your environment's cluster, opens the table's **Overview Details** side drawer panel, which displays more information about the table.

### About the Overview Details side drawer panel

The **Overview Details** side drawer panel describes more information about the table. Based on the table's HMS metadata, such as the table's schema, database location, partitions, structure, and relationships, the information

displayed may vary. It also describes the table's columns, such as the column names and their data types, and the table's metadata properties that include user-defined and predefined key-value pairs.

It is accessed by clicking on the table's name of interest in either the Hot or Cold Tables chart widget or from the HMS Tables view, which is found by selecting the Tables tab in the HIVE METASTORE category of your environment's cluster.

The information collected from your table's HMS metadata is divided into sub categories and displayed in the following tabs:

- Details
- Columns
- Properties

Where, each tab displays the following general table values:

- Volume, which displays the total table size in Kilobytes.
- Rows, which displays the number of records in the table.
- Partitions, which, if applicable, displays the number of segments that comprise the table.
- Total Files, which displays the number of files that make up the table.

If your table contains partitions, the Distribution Across Partitions section is also displayed, which contains the following distribution cards:

- DATA SIZE, which displays the total data size of the table selected and the distribution across its partitions.
- NUMBER OF FILES, which displays the total number of files within the table selected and the distribution across its partitions.
- NUMBER OF ROWS, which displays the total number of rows within the table selected and the distribution across its partitions.



**Note:** The distribution cards display the minimum and maximum values, the median value, and the median Q1 and Q3 quantiles (25th and 75th percentiles) that summarize a specific set of metrics and how they are distributed across the table's partitions. These cards enable you to analyze and gain insights into the lowest and highest values, the spread of these values and where the majority of the values reside within the spread, and where outliers reside.

The HMS metadata that is displayed in each tab is dependent on the table's underlying data on which it is built. The following tables describe the most common parameters displayed in the Details, Columns, and Properties tabs:

**Table 5: Details**

Parameter	Description
Historical Trend chart	Displays the historical values for the Rows, Data Volume, and Partitions.
Database name	The database in which the table resides.
Compressed	Displays a True or False value depending on whether data compression has been applied.
Location	The table's location in HDFS.
Partition Keys	The name/s of the partition keys that are responsible for data distribution across the nodes.
Raw Data Size	The raw data size of the table, in the nearest byte unit.
Storage Format	The table's storage format, such as but not limited to: <ul style="list-style-type: none"> <li>• JDBC</li> <li>• LazySimple</li> <li>• Orc</li> <li>• Parquet</li> </ul>

Parameter	Description
Stats Enabled	Displays a True or False value depending on whether statistics were enabled.
Table Type	The table's type, such as but not limited to: <ul style="list-style-type: none"> <li>EXTERNAL_TABLE, which defines a table whose data is stored in the location specified during table creation.</li> <li>MANAGED_TABLE, which defines a table whose data is stored in the warehouse directory.</li> <li>VIRTUAL_TABLE, which defines a table that is the result of a query which has not materialized and whose data is not stored.</li> </ul>
Transactional	Displays a True or False value depending on whether the table contains one or more ACID semantic properties.
Created	The date when the table was created, using the MM-DD-YYYY date format. For example, 06-25-2023.

**Table 6: Columns**

Parameter	Description
Column Name	Lists the Column field names.
Type	The Hive data type, as one of the following: <ul style="list-style-type: none"> <li>bigint</li> <li>binary</li> <li>boolean</li> <li>chara</li> <li>date</li> <li>decimal</li> <li>double</li> <li>float</li> <li>int</li> <li>smallint</li> <li>string</li> <li>timestamp</li> <li>tinyint</li> <li>varchar</li> </ul>
Comment	An informative note about the column that was added during table creation.

**Table 7: Properties**

Parameter Sections	Description
Table Properties	Predefined and user-defined metadata key-value pair properties.
SerDe Properties	Serialization and deserialization properties.
Storage Descriptor Properties	Metadata that describes the physical storage properties of the data residing in the table.

## Understanding the Hive Metastore category

Learn about the Cloudera Observability Hive Metastore category that lists the details about each table available in your system and visually displays the current state and activity of your tables in the selected environment.

For users with a Hive Metastore deployment, Cloudera Observability captures the Hive Metastore (HMS) metadata about your tables and displays it into meaningful cards and views. These can be found in the HMS Summary and HMS Tables views, which display the current state and activity of all your tables and list details about each table available in your system, regardless of whether they have been queried or not.

The metric results displayed are dependent on your table's schema and their HMS properties and parameters.

### About the HMS Summary view

The Hive Metastore (HMS) Summary view visually displays information about the current state and activity of all your tables in the selected Environment.



**Note:** If you add a table in Hive, it will appear in the Cloudera Observability UI approximately one day later. This is because the data is extracted from the Hive Metastore only once a day and is processed after midnight.

It contains three sections:

- Overview
- Table Insights
- Table Statistics

#### Overview

The Overview section displays general information about your tables and the number of databases in which they reside.

It displays the following cards:

**Table 8: Overview cards**

Card	Description
DATABASES	The number of databases in which your tables reside.
TABLES	The number of tables and the percentage of tables that are External and Managed.
VIEWS	The number of views and the percentage of views that are Materialized and Virtual.
PARTITIONS	The number of partitions.

#### Tables Insights

This section displays the physical structure of your tables using the base table metrics. These cards enable you to identify how well your tables are structured for increased performance.



**Note:** The gathering of metric data for this section does not require statistics enablement.

It displays the following cards:



**Note:** The distribution cards display the minimum and maximum values, the median value, and the median Q1 and Q3 quantiles (25th and 75th percentiles) that summarize a specific set of metrics and how they are distributed across the table's partitions. These cards enable you to analyze and gain insights into the lowest and highest values, the spread of these values and where the majority of the values reside within the spread, and where outliers reside.

**Table 9: Tables insights cards**

Card	Description
NUMBER OF PARTITIONS	The partition distribution across all tables.
PARTITION KEY SIZE	The partition key size distribution across all tables.
COLUMN SIZE	The column size distribution across all tables.
NUMBER OF BUCKET COLUMNS SIZE	The bucket column size distribution across all tables.
BUCKETED TABLES	The number of bucketed tables and the percentage across all tables.

Card	Description
COMPRESSED TABLES	The number of compressed tables and the percentage across all tables.
NON PARTITIONED TABLES	The number of non partitioned tables and the percentage across all tables.
PARTITIONED TABLES	The number of partitioned tables and the percentage across all tables.
TABLES WITH ARRAY COLUMNS	The number of tables with array columns and the percentage across all tables.
TABLES WITH BINARY COLUMNS	The number of tables with binary columns and the percentage across all tables.
TABLES WITH MAP COLUMNS	The number of tables with map columns and the percentage across all tables.
TABLES WITH STRUCT COLUMNS	The number of tables with struct data type columns and the percentage across all tables.
TEMPORARY TABLES	The number of temporary tables and the percentage across all tables.

### Table Statistics

This section displays the physical characteristic metrics of those tables that have statistics enabled, such as the volume of data, the number of rows and files, and how these values are distributed. Table statistics improve the optimization of queries by the engine for increased performance. Understanding the size and volume of a table helps the engine organize the workload appropriately, such as for a join or insert operation.



**Note:** To display this section's metrics, statistics must be enabled on your most important tables and materialized views. To verify that table statistics are available for a table, click the Related Information link below.

It displays the following cards:

**Table 10: Table statistics cards**

Card	Description
STATISTICS ENABLED	The number and percentage across all tables with statistics enabled.
DATA VOLUME	The total size of tables with statistics enabled and the distribution across all tables.
NUMBER OF FILES displayed by distribution	The total number of files with statistics enabled and the distribution across all tables.
NUMBER OF ROWS	The total number of rows with statistics enabled and the distribution across all tables.
TOTAL DATA VOLUME	The total size of your tables with statistics enabled and the size of each storage format.
NUMBER OF FILES displayed by type	The total number of files that form the tables with statistics enabled and their storage formats displayed as a percentage as a whole.

### About the HMS Tables view

The HMS Extract, which is updated daily, is displayed in the Hive Metastore (HMS) Tables view. It lists the details about each table available in your system, regardless of whether they have been queried or not.

The Tables view contains the following columns:

Column Name	Description
Table	The name of the table.
Database	The database in which the table resides.
Partitions	The number of partitions.

Column Name	Description
Volume	The total table size in bytes.
Rows	The number of records in the table.
Files	The number of files that make up the table.
Query	Number of queries executed in the selected timerange.
Hive	Number of Hive queries executed in the selected timerange.
Impala	Number of Impala queries executed in the selected timerange.
Spark	Number of Spark queries executed in the selected timerange.
Storage Format	The table's storage format: <ul style="list-style-type: none"> <li>JDBC</li> <li>LazySimple</li> <li>Orc</li> <li>Parquet</li> </ul>
Table Type	The table's type: <ul style="list-style-type: none"> <li><b>EXTERNAL_TABLE</b>: Data stored in a specified location.</li> <li><b>MANAGED_TABLE</b>: Data stored in the warehouse directory.</li> <li><b>VIRTUAL_TABLE</b>: Result of a query that has not materialized.</li> </ul>
Last Accessed	Reflects the last recorded access within a 24-hour window, updated daily.
Last Modified	Updated daily to show the most recent modifications within a 24-hour window.

### Related Information

[Statistics generation and viewing commands in Cloudera Data Warehouse](#)

## Displaying the Metastore Analytics

Learn how to analyze, identify, and troubleshoot table changes and inefficiencies, including which tables are hot and which tables are cold.

### About this task

Steps for troubleshooting your tables and their data with the Cloudera Observability on premises Metastore Analytics feature.



#### Note:

- To view table metadata in the user interface, you must have a deployed Hive Metastore (HMS) in the workload cluster. At this time, Cloudera Observability Metastore Analytics is available only for the following environments:
  - Cloudera Data Warehouse latest version
  - Cloudera Base on premises by using Cloudera Manager 7.10.1 and higher
  - Cloudera Data Hub clusters by using Cloudera Manager 7.11.0 and higher
- To provide a more accurate representation of table usage, the HMS analysis can now track Spark query counts against tables along with Hive and Impala query counts.

### Procedure

- Verify that you are logged in to the Cloudera Observability web UI.
  - In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.

- d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.

2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required for analysis.



**Tip:** The page's title is displayed in the browser tab.

3. To display the top 25 hot tables and the bottom 25 cold tables, do the following:

- a) Locate the Data Temperature chart.
- b) In the Hot Tables chart widget, hover over each table to view information about how often the table was accessed, its volume, and the number of partitions and files it contains.
- c) View more details about a table of interest, such as the hottest table, by clicking on the table's component element.

The **Overview Details** side drawer panel opens, which enables you to view more information about the table, such as historical trends, column names, data types, and key-value pair properties. This information can be useful before you process or make changes to a query.

- d) Review the table's metadata from the Details, Columns, and Property tabs.
- e) Close the **Overview Details** side drawer panel and do the same steps in the Cold Tables chart widget.
4. To display the top 25 hot tables that were most frequently queried by either the Hive or Impala engine, do the following:

- a) From the cluster's ENGINES, select the Hive or Impala engine of interest.
- b) In the workload engine's Summary page, locate the Data Temperature chart.
- c) In the Hot Tables chart widget, hover over each table to view information about how often the table was accessed, its volume, and the number of partitions and files it contains.
- d) View more details about a table of interest, such as the hottest table, by clicking on the table's component element.

The **Overview Details** side drawer panel opens.

- e) Review the table's metadata from the Details, Columns, and Property tabs.
5. As your tables and data increases it becomes more difficult for you keep track of your tables and their data, the HMS Tables view lists your tables and provides details about each table available in your system, regardless of whether they have been queried or not.

To list the details about each table available in your system, do the following:

- a) Expand the HIVE METASTORE category for the cluster of interest.

One or multiple metastores are displayed.

- b) Select the metastore of interest.

The metastore's HMS Summary page opens displaying information about the current state and activity of all your tables in the selected Environment.

- c) To open the HMS Tables view, click the Tables tab.

- d) Locate specific tables of interest with the filter and sort functions. For example:

- Sort the tables by their name or by a table's column value, such as the highest number of Partitions.
- Reduce and locate tables by a specific value, such as filtering by their Table Type.
- Locate the tables with a specific number of rows by selecting the Rows filter, entering the minimum and maximum row values that you require, and clicking Apply.

- e) Analyze the details of those tables of interest and look for inconsistencies or issues that may interfere with optimal query performance.

- f) View more details about a specific table by doing the following:

1. Click the table's name.  
The **Overview Details** side drawer panel opens.
2. Review the table's metadata from the Details, Columns, and Property tabs.
3. Close the **Overview Details** side drawer panel and analyze another table.

## Analyzing your Hive queries for debugging and optimization

Identify operational, performance, and health issues of your Hive workloads, queries, and cluster. The following topics, guide you through the Cloudera Observability on premises Hive features that enable you to identify and troubleshoot performance and health issues.



**Note:** If you do not see any of these features and/or metrics, verify that Cloudera Manager has been upgraded to the latest version and that Telemetry Publisher was restarted.

## Identifying inefficient phases of your Hive queries

Identify inefficient phases of your Hive queries for query optimization and performance tuning, such as viewing the execution phases, the order in which the operations are executed, comparing two execution plans, and validating the events performed.

### About this task

Describes how to locate the Cloudera Observability on premises Hive SQL Query Plan and DAG, the Hive Query Plan Graph, and the Counters and Configuration panels for identifying and troubleshooting inefficient operational phases of your Hive queries.




**Note:** The Query Plan and the Query Plan Graph are only available for Hive.



**Note:** If you do not see any of these features and/or metrics, verify that Cloudera Manager has been upgraded to the latest version and that Telemetry Publisher was restarted.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.  
The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.
  - d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.  
The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.
2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required for analysis.  
 **Tip:** The page's title is displayed in the browser tab.
3. From the time-range list in the **Cluster Summary** page, select a time period that meets your requirements.
4. Locate the Hive query of interest by doing one of the following:

- In the **Cluster Summary** page, locate the Hive Query Trend chart widget, click its Total Queries value, and then from the Job column in the Queries page, locate and click the query of interest.
- If not already expanded, from the Environment navigation panel, expand the ENGINES category and then select the **Hive** engine. Locate the Slow Queries chart widget and click the query of interest.

5. From the `.../Hive/Queries/ QUERYNAME` page, select the Execution Details tab.

The execution stages appear, displaying the Query Details Summary panel.


6. To review the query's execution instructions and logical steps, do the following:

- a) In the stages column, verify that the query and not the DAG is selected.
- b) From the Query Details Summary panel, click Text.

The query's Query Plan panel opens.

The query plan displays the execution statistics in a list of execution stages that include the execution instructions and steps, such as the operations that are performed, the operators that are used, the resources that are allocated, and the stage dependencies. These stages can help you diagnose and improve a query's performance.



**Note:** You can save the Query Plan as a JSON file to your computer by clicking the download icon .

7. To visually display a graphical representation of the Query Plan's DAG, which contains individual components that represent each event and the order they are executed, do the following:

- a) In the stages column, verify that the query and not the DAG is selected.
- b) From the Query Details Summary panel, click Graphical.

The query's Query Plan Graph page opens in another tab of your browser.

The Query Plan Graph displays the order of events and the steps and phases of the query. This page enables you to visually inspect where each operation is executed and if the order is the most efficient. For example, an operator that could be draining your CPU and memory because it is joining tables that contain a large number of records before a filtering operation was performed.

You can also view an operator's location within the Query Plan and the operator's execution details by doing the following:

- To display where the operator is located in the Query Plan, hover over an event box.
- To display, in the right-side panel, the operator's execution details from the Query Plan, click on an event box.

8. To identify and validate which tasks completed or are taking too long to run, do the following:

- a) In the stages column, click the `dag_XXX` link. Where, `XXX` is the DAG ID number.
- b) From the Dag Details Summary panel, click Counters.

The Counters panel opens.

This panel lists in detail the events performed and the total number of occurrences, which enable you to track, compare, and validate the events that were run for the query. For example, you can verify that the correct number of tasks were run and completed, that the number of records, rows, and the amount of bytes were read and written, and that the correct amount of CPU and memory was consumed for the query.

9. To verify that the query's configuration settings align with your expectations, do one or more of the following:

- To understand the query's execution configuration setting details:
  - a. In the stages column, click the query link.
  - b. From the Query Details Summary panel, click Configurations.
- To understand the query's DAG execution configuration setting details:
  - a. In the stages column, click the `dag_XXX` link. Where, `XXX` is the DAG ID number.
  - b. From the Dag Details Summary panel, click Configurations.

10. To troubleshoot performance-related issues between two different runs of the same query, do the following:

- a) From the query's page, select the Trends tab.

- b) Scroll down and from the table, select the check boxes adjacent to the query's job runs that you require, such as the latest run with a run from a week ago, and then click Compare.

The Job Comparison page opens displaying more details about each job.

- c) From the Details section, select the Query Plan tab.

You can view and analyze the selected query plans Side By Side or as a Unified plan that highlights the differences in color, which enables you to quickly identify what changed between the selected execution runs of the query.

The Job Comparison page not only enables you to compare the query plans but also the following:

- The Duration, Data Input, and Data Output of the selected job runs from the Performance section.
- Their run-times by selecting the Structure tab.
- Configuration differences by selecting the Configurations tab.
- Statistical differences by selecting the Metrics tab.

## About the Cloudera Observability on premises Hive cluster service metrics

The Cloudera Observability on premises Hive cluster service metrics are displayed as graphical reports that show the state, activity, and performance of your workload Hive service, including recommendations on how to resolve a problem. They help you monitor the health, performance, and workload usage of your Hive service for identifying and troubleshooting existing and potential problems.

Cloudera Observability on premises collects diagnostic data from a series of health checks that are performed on your Hive service. When completed they are compared to their defined thresholds that determine if the service is Good, Concerning, or Bad and the results are displayed on the **Analysis** page, which is accessed from the Hive engine's Queries page.

Cloudera Observability on premises helps you distinguish between a healthy and an unhealthy state by including a severity level icon adjacent to the health test using the following colors:

**Table 11: Severity Colors**

Severity Color	Description
Green	Good- The health check result is normal and within the acceptable range.
Yellow	Concerning- The health check result has exceeded the Warning threshold limit and indicates a potential problem, which eventually must be resolved but does not have to be completed at this time. See the Recommendation actions.
Red	Bad- The health check result has exceeded the Critical threshold limit and indicates a serious problem, which must be resolved immediately. See the Recommendation actions.

For descriptions of the Hive cluster health checks performed by Cloudera Observability on premises, the severity conditions and thresholds, and what actions you should consider to resolve a problem, click the Related Information link below.

You can also manually build a Hive service chart in the **Metrics** page, without having to leave Cloudera Observability on premises, using the Cloudera Manager service metrics and Chart Builder.



**Note:** This feature is intended for Advanced Hive Users and requires knowledge of the Cloudera Manager service metrics and the Cloudera Manager's Chart Builder.

For more information about the Cloudera Manager health checks performed on the Hive service, click the Related Information link below.

### Related Information

[Cloudera Observability Hive cluster metrics](#)

[Cloudera Manager Metrics](#)

## Monitoring your Hive service

Identify Hive service problems that may be affecting your Hive workloads, such as queries that are running slow or that are failing, with the Cloudera Observability on premises Hive cluster service metrics.

### About this task

Describes where to view the Cloudera Observability on premises Hive cluster service metrics and how to build your own service chart from the Cloudera Manager service metrics and Chart Builder.




**Note:** If you do not see any of these features and/or metrics, verify that Cloudera Manager has been upgraded to the latest version and that Telemetry Publisher was restarted.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.
  - d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.
2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required for analysis.

 **Tip:** The page's title is displayed in the browser tab.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.
4. Locate the Hive query of interest by doing one of the following:
  - In the Cluster Summary page, locate the Hive Query Trend chart widget, click its Total Queries value, and then from the Job column in the Queries page, locate and click the query of interest.
  - If not already expanded, from the Environment navigation panel, expand the ENGINES category and then select the **Hive** engine. Locate the Slow Queries chart widget and click the query of interest.
5. From the `.../Hive/Queries/ QUERYNAME` page, select the Cluster tab.

The Analysis page opens, which lists the Hive cluster health check metrics that are performed by Cloudera Observability on premises at the end of a Hive job.
6. Select, either the metric you require for analysis or a metric that displays a red or yellow icon adjacent to the metric, which represents the threshold warning or error state for at least one unhealthy role instance.

The Analysis summary page opens, which describes the health check metric performed by Cloudera Observability on premises on the Hive service, the severity conditions and thresholds, and the remediation actions you should consider to resolve a problem. It also contains:

  - The Analysis chart, which displays the severity condition of the operation during the job run and displays the state of each role instance 5 minutes before the start of the job and 5 minutes after the job has completed.
  - The Host Status section, which displays the full list of workload role instances and the hosts they are running on, their health check result, and the severity state icon.
7. To build your own chart from a Cloudera Manager health check service metric, click the Service Metrics option. For information, see *Tracking query service metrics*.

## Query and job resource optimization using resource efficiency analysis

You can evaluate the efficiency of individual jobs or queries based on the insights related to the resources requested versus the actual consumption. Queries or jobs with excess resource allocation waste cluster resources that can be better utilized for other tasks. Therefore, it is important to identify and analyze these inefficient jobs or queries.

### Resource efficiency analysis feature availability

- The Cloudera Observability On-Premises Resource efficiency analysis feature is available only for Cloudera Base on premises and Cloudera Data Hub environments.
- Currently, the feature is available for Hive on Tez when using YARN as a scheduler.



#### Important:

- The Query Cost analysis is available for Hive and Impala.
- The Resource Efficiency Analysis chart widget is available only for Hive. Query cost and efficiency analysis information is displayed only if the Tez engine is used for query execution. The Tez engine is typically utilized for complex queries.
- Currently, the Resource Efficiency Analysis feature for Spark only reports CPU inefficiencies.

### Key benefits

- **Identifies inefficiencies:** Highlight jobs or queries that over-allocate resources such as CPU and memory.
- **Optimizes resource allocation:** Ensure resources are allocated more efficiently, reducing waste and improving overall system performance.
- **Cost analysis:** Provides insights into costs associated with different resources used by the query.

## Identifying inefficient jobs and queries

Identify inefficient jobs or queries for resource optimization, such as viewing the top queries or jobs by CPU wastage and memory wastage or viewing the CPU and memory consumption for the selected query.

### About this task

Describes how to locate the Cloudera Observability On-Premises Resource Efficiency Analysis chart widget for identifying inefficient jobs and queries.



**Note:** If you do not see any of these features and/or metrics, verify that Cloudera Manager has been upgraded to the latest version and that Telemetry Publisher is restarted.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability web user interface landing page opens, which by default displays the Analytics Environments page that lists your Workload cluster environments.
  - d) From the **Environment Name** column in the Environment's table, select the environment required for analysis.

The Environments navigation panel opens, which hierarchically lists the environment's cluster, engines, and if applicable the Hive Metastore category.
2. Depending on the environment selected, verify that the **Cluster Summary** page is displayed for the environment's cluster required for analysis.



**Tip:** The page's title is displayed in the browser tab.

3. Go to the Analytics tab.
4. From the time-range list in the **Cluster Summary** page, select a time period that meets your requirements.
5. From the Environment navigation panel expand the Engines list, and select Hive engine.
6. On the **Hive Summary** page, locate the Resource Efficiency Analysis chart widget. The Resource Efficiency Analysis chart widget displays resource wastage analysis across queries. See *Resource efficiency analysis across queries*.
7. In the Resource Efficiency Analysis chart, from the Queries column, locate and select the query for which you want to view resource efficiency and potential savings metrics. See *Resource efficiency and potential savings metrics*.

## Resource efficiency analysis across queries

Use the Resource Efficiency Analysis chart widget to filter queries, users, and pools by CPU or memory wastage to spot inefficiencies.

- **Queries:** Lists the top queries that inefficiently utilize the most CPU and memory resources.
- **Users:** Lists the top users who inefficiently run queries or jobs.
- **Pools:** Lists the top resource pools that inefficiently utilize the most CPU and memory.

## Resource efficiency and potential savings metrics

The Query Cost and Resource Efficiency Analysis metrics dashboard in Cloudera Observability on premises provides detailed insights into the efficiency of your query, including usage percentages and potential savings.



**Important:** You must configure the chargeback cost to view query cost or job cost details. For information on configuring chargeback cost, see *Configuring the cost center criteria*.

- **Query Cost:** Displays the total cost of a specific query with a detailed breakdown by CPU, Memory, Data Input, and Data Output, measured in USD.
- **CPU:** Displays the percentage of CPU resources utilized by the job or query execution.  
Potential savings are displayed by multiplying the CPU cost defined at chargeback setup \* unused CPU core hours.
- **Memory:** Indicates the total memory consumed by the job or query, represented as a percentage. This is calculated using the peak memory used during execution, measured in gigabytes multiplied by milliseconds.  
Potential savings are displayed by multiplying the memory cost defined at chargeback setup \* unused Memory GB hours.
- **Overall:** Displays the average usage for both CPU and memory. The percentage is calculated as (CPU percentage + Memory percentage) / 2.  
Potential savings are calculated by adding potential savings from all resources: (CPU Potential Savings + Memory Potential Savings).

These metrics help you identify the under-utilization of resources. High CPU or memory wastage may suggest the need to reallocate resources, optimize usage, or adjust configurations to allocate fewer resources.

### Dashboard color indicators:

- **Green:** Usage is between 75% and 100%—indicating efficient utilization.
- **Orange:** Usage is between 25% and 74%—indicating moderate utilization.
- **Blue:** Usage is between 0% and 24%—indicating low utilization.



**Note:** Potential savings for CPU, memory, and overall metrics are calculated based on the definition of the chargeback rate. If the utilization percentage is 75% or higher, potential savings are not displayed.

### Spark resource recommendations

This section provides the Spark value recommendations as prescriptive configuration values for optimizing resource allocation in Spark applications. This helps in improving resource efficiency by providing actionable suggestions and recommending optimal values for Spark configuration settings.

This feature provides prescriptive suggestions for configuring `spark.executor.memory` based on the analysis of allocated memory and peak memory usage from a single application run. By offering optimized memory recommendations, this feature helps improve resource allocation and application performance. However, recommendations are not provided for Spark applications utilizing complex memory configurations, specifically those with explicitly defined values for `spark.memory.offHeap.size`, `spark.executor.pyspark.memory`, or `spark.executor.memoryOverhead`.



**Note:** Spark resource recommendation is available only when [Memory resource efficiency analysis](#) is available, and you have resolved all [troubleshooting issues](#).

### Memory Optimization recommendations for Spark executors

Memory usage optimization helps maintain optimal performance in your Spark workloads on Cloudera clusters. These recommendations ensure that your Spark executors utilize memory efficiently, balancing performance with resource allocation. This feature addresses two main scenarios: **Underutilization** (memory usage below 60%) and **Overutilization** (peak memory usage above 90%).

#### Underutilization scenario

If the memory utilization of a Spark executor is less than 60%, then decreasing the executor memory will be recommended. The new recommended value will be peak memory usage plus a 25% buffer.

The recommended values are rounded up to a full GB value. For example, if the currently configured value is 10 GB and the peak usage is 5 GB, then by adding a 25% buffer, the computed value results in 6.25 GB, which will be rounded up to 7 GB.

Recommendations are not provided under the following conditions:

- The Total Garbage Collection (GC) duration across all tasks is over 10 minutes.
- The Total shuffle data spills across all tasks and exceeds 500MB.
- Advanced memory configurations have been explicitly set for the following properties:
  - `spark.memory.offHeap.size`
  - `spark.executor.pyspark.memory`
  - `spark.executor.memoryOverhead`
- The calculated recommended memory is less than 1 GB.
- When calculated recommended value is the same as the already configured value: For example, if 2 GB is allocated and 1 GB is used, adding 25% to the used amount results in 1.25 GB. Rounding this value up to the nearest whole number results in 2 GB. Because the calculated value equals the current allocation, no recommendation is displayed.

#### Overutilization Scenario

In the case of Overutilization (peak memory usage greater than 90%), the executor is experiencing memory pressure, which can lead to performance degradation or out-of-memory errors. The recommendation is to increase the executor memory by 1 GB. This small increase aims to alleviate the memory pressure. To prevent runaway resource allocation, the maximum recommended increase for the executor memory is capped at 32 GB.



**Important:** Always monitor subsequent runs after applying changes, as the recommendation is based on a single run and has limitations, such as potential performance degradation, cluster-level resource impact, seasonal trends, and the possibility of a one-off anomaly run.

### Limitations of the recommendation system

When applying configuration changes based on the recommendation system, you must monitor the subsequent runs of your applications. Based on the recommendations, you must know the limitations when you apply the suggested changes.

#### Seasonal trends may affect resource allocation

The volume of data processed by Spark jobs may exhibit seasonal variability. Consequently, if the system provides an exact resource value recommendation based solely on utilization during a low-traffic period, the subsequent peak season may result in potential issues, specifically failure (due to out-of-memory errors) or performance degradation (due to under-allocation of resources during high-traffic periods).

#### Cluster-Level Resource Impact

When you increase resource allocation for a specific Spark application, this action can adversely impact other workloads currently running on the cluster. You must consider the overall cluster health and resource availability before implementing recommendations that involve increased allocation.

#### Anomaly in a single application run

The recommendation is based on the resource consumption of the application's current run, not its past runs. The current run may be a one-off anomaly, consuming either higher or lower resources compared to a regular execution of the same application. Therefore, monitoring subsequent runs is critical to confirming the stability and efficacy of the recommended configuration.

#### Possibility of performance degradation

For certain applications, reducing the allocated memory might lead to a slowdown in execution. For example, a reduction in memory could result in increased shuffle spill, which degrades performance. You must verify that a reduction in resources does not introduce an unacceptable latency or slowness.

#### Jobs older than 90 days

If the jobs are older than 90 days, resource recommendations are not provided.

### Enabling Spark configuration for memory efficiency analysis

Memory resource efficiency analysis for Spark jobs is available on Spark engine version 3.3.0 and higher. This feature requires that the `spark.executor.processTreeMetrics.enabled` configuration be set to true. You can enable this configuration at the individual job level or at the Spark cluster level for all jobs.

#### Procedure

1. Log in to Cloudera Manager
2. On the left navigation pane, click `Clusters SPARK3_ON_YARN-1`
3. Search for Spark 3 Client Advanced Configuration Snippet (Safety Valve) for `spark3-conf/spark-defaults.conf`
4. Add `spark.executor.processTreeMetrics.enabled=true`
5. Click Save Changes
6. Click `SPARK3_ON_YARN`
7. Click Stale Configuration: Client configuration redeployment needed. The Stale Configurations page opens
8. Click Deploy Client Configuration
9. Click Finish

### Troubleshooting memory efficiency metrics not reported or missing

This topic describes the possible causes and solutions when memory efficiency is not reported for a Spark application.

### Cluster type

Memory efficiency analysis is supported only for Cloudera Private Cloud Base and Cloudera Data Hub type clusters. For Cloudera Data Engineering and Cloudera AI, this feature is not supported.

### Spark version

You must be on Spark version 3.3.0 or higher to see the data for Spark jobs on the memory wastage widget. Spark version 3.3.0 is included in Cloudera Runtime 7.1.9 and higher.

### Missing configuration

If you are unable to see the data for Spark jobs on the memory wastage widget even after upgrading to Spark 3.3.0 or higher, you have to ensure you enable `spark.executor.processTreeMetrics.enabled=true`. For more information, see the [Enabling Spark configuration for memory consumption analysis](#) documentation.

### Spark Jobs with shorter tasks

Memory usage metrics for Spark applications with short-running tasks may not be captured because the default sampling interval is 10 seconds. Tasks can complete and terminate between these sampling periods, resulting in incomplete metric data.

**Solution:** You can resolve this by explicitly configuring the `spark.executor.metrics.pollingInterval` property to a smaller value, such as 5000 (5000 milliseconds). The default value for this property is inherited from `spark.executor.heartbeatInterval`, which is 10 seconds.



**Note:** Cloudera recommends configuring a smaller value for `spark.executor.metrics.pollingInterval` for a specific Spark application rather than reducing it at the cluster level. Note that decreasing this value will increase polling overhead on the driver side, and a higher number of active executors will also increase this overhead.

### Missing proc filesystem

The `/proc` filesystem, which is required to collect process memory usage metrics, is missing.

**Solution:** Enable the `/proc` filesystem on your cluster nodes. For more information, see the [/proc Filesystem](#) documentation.

## Troubleshooting an abnormal job duration

You can identify areas of risk from jobs running on your workload cluster that complete within an unusual time period, using Cloudera Observability on premises.

### About this task

Describes how to locate and troubleshoot an abnormal job duration.

Steps with examples from a Virtual Cluster's Spark engine are used to explain how to further investigate and troubleshoot the cause of an abnormal job duration.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Environment Name column in the Environments page, locate and click the name of the environment whose workload diagnostic information requires analysis and troubleshooting.

For this example, select **Virtual Cluster** from the Environments list and then select a Virtual Cluster required for analysis.

The Environment navigation panel opens, which hierarchically lists the environment and its services hosted on the selected environment.

3. Verify that the **Cluster Summary** page is displayed.



**Tip:** The page's title is displayed in the browser tab.

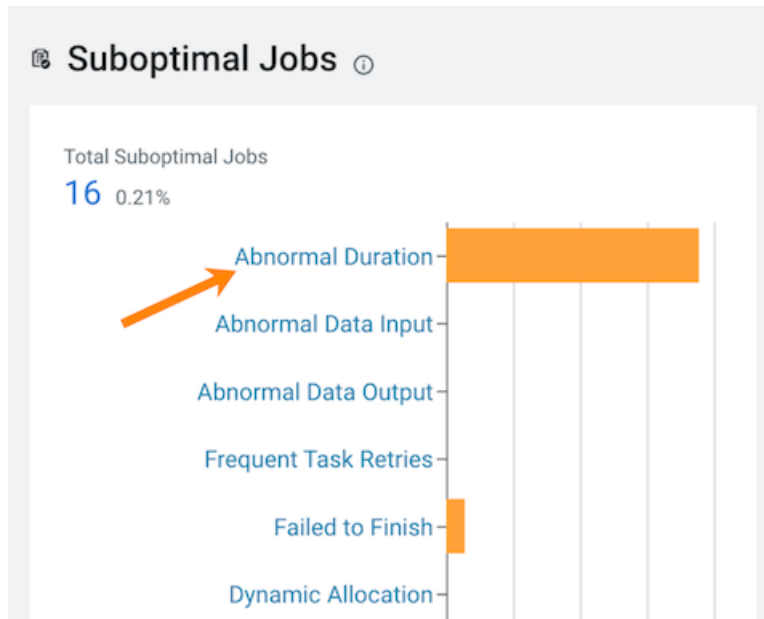
The **Cluster Summary** page, displays performance trends and metrics about the cluster's processed jobs and queries.

4. From the time-range list, select a time period that meets your requirements.
5. If not already expanded, from the Environment navigation panel expand the Virtual Cluster and then select the **Spark** engine.
6. Scroll down to the Suboptimal Jobs chart widget and click the Abnormal Duration health check bar.

The Jobs page opens, listing all the jobs that triggered the Abnormal Duration Health check during the time period, including their health status, the length of time the job took to run, the user who ran the job, the job identification number, and the amount of CPU used to run the job.



**Tip:** Any jobs or queries that fall outside of their baseline are counted. You can hover over each bar within the chart to view how many jobs or queries triggered each health check.



7. Specify a specific amount of time in which the job either ran less than or more than the Health check rule by either selecting a predefined time duration or selecting Customize and enter the minimum or maximum time period from the Duration filter.

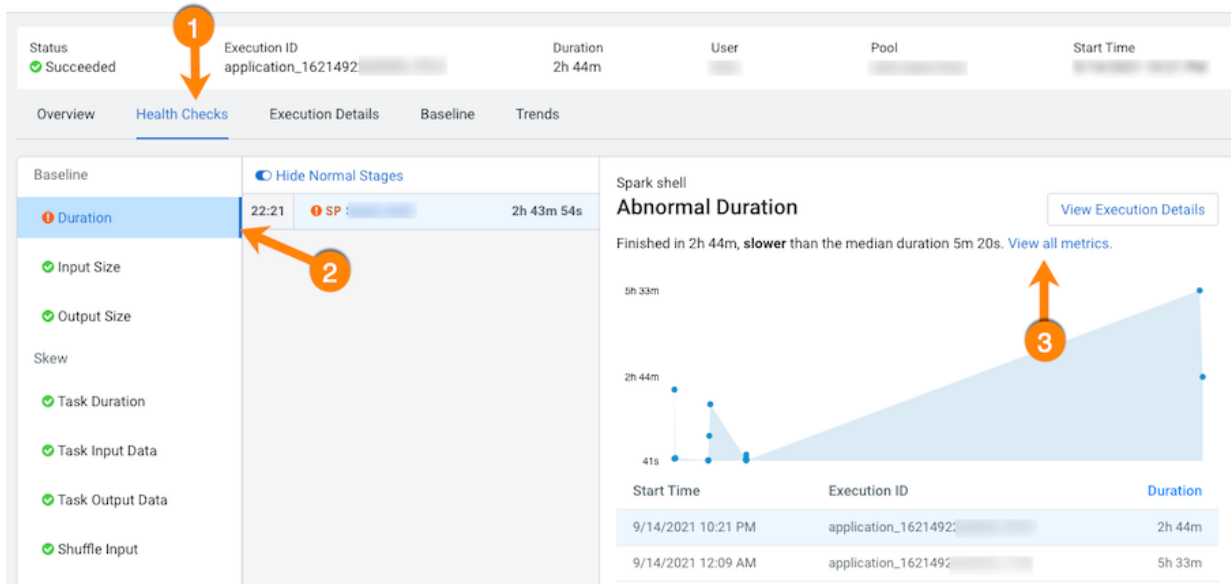
Type	Job	Status	Start Time	Duration	User	Range	Execution ID
SP	Cloudera: C...	✔ Succeeded	07/08/2021 3:29 AM PDT	15m 46s	psharma	0s - 1h 0m 0s	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/	1m 7s	alanj	1h 0m 0s - 5h 0m 0s	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/	1n 35s	alanj	5h 0m 0s +	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/2021 2:49 AM PDT	25m	psharma	Abnormal Duration	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/2021 2:46 AM PDT	9m 26s	alanj	Abnormal Duration	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/2021 2:40 AM PDT	19m 27s	psharma	Abnormal Duration	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/2021 2:32 AM PDT	16m 59s	alanj	Abnormal Duration	application_1624
SP	Cloudera: C...	✔ Succeeded	07/08/2021 2:25 AM PDT	23m 35s	psharma	Abnormal Duration	application_1624

8. View more details about a job by selecting a job's name from the Job column and then clicking the Health Checks tab.

The Baseline and Skew Health checks are displayed.

9. Display more information about the job's duration by selecting Duration from the Baseline section. As shown in the image below.

In the following example, the job finished much slower than the baseline duration, which is the aggregate calculated over multiple jobs.



10. Compare and analyze this job against other baseline metrics by clicking View all metrics.

11. Continue to analyze and search for probable causes by doing one or more of the following:

- To display more information about the length of time the processing tasks took within a job, select Task Duration, which opens a panel that describes the health check, displays information about the possible causes, and lists recommended solutions.

In the following example, issues arose during Stage-9 of the job due to poor parallelization. The Recommendation section lists items for you to complete that may resolve the problem and the specific outlier tasks that produced the unusual results:

**Task Duration Skew**

**Description**  
This health check compares the amount of time tasks take to finish their processing. A healthy status indicates that the absolute difference of each task duration from the average duration of all tasks is less than two standard deviations and less than five minutes. All the tasks taking more than 1 hour from the average duration for all tasks are considered as outliers.

**Diagnosis**  
This stage had poor parallelization as 2 (out of 24) tasks took abnormal amount of time to finish.

**Recommendation**  
The following are possible action items to resolve this health check:

- If the "Task Input Data" health check is failing in conjunction with this health check then attempt to partition input data on a different set of partition keys so that the input data is more uniformly distributed.
- Try increasing RDD/Dataframe partitions using the `repartition` function, however please note that increasing partitions may not work if a small set of keys contain a majority of the data.
- If the job contains joins and one of the join tables is small enough to fit in memory, try increasing `spark.sql.autoBroadcastJoinThreshold` to a value larger than the size of the smaller table. This will increase the likelihood of the Spark engine choosing broadcast join over short merge join, eliminating the shuffle altogether. **Caution:** When increasing the `spark.sql.autoBroadcastJoinThreshold` value, make sure that the driver and executors have sufficient memory to hold the broadcasted table.
- If the job contains joins and a small set of keys contain a majority of the data then key salting should help distribute the join data more uniformly.

**2 Outlier Tasks**

Task Name	Host	Duration
Task 8	cloudera.com	41m 18s
Task 9	cloudera.com	25m 58s

- To display more details about an outlier, click the outlier task, which opens the Task Details panel.

In the following example, the Task Details show that the outlier task took significantly more time to complete compared to previous runs. In this case, 41 minutes as compared to 8 minutes:

**Task Details**

Metric	Task	Average
Shuffle Read Time	< 1s	0s
Duration	41m 18s	8m 33s
Successful Attempt Duration	41m 18s	8m 33s
Deserialization Time	10s	2s
Task GC Time	1m 9s	18s
Scheduler Delay	1s	< 1s
Result Serialization Time	0s	0s
Shuffle Remote Reads	1.2 MiB	956.3 KiB
Shuffle Read bytes	1.2 MiB	1.1 MiB
Shuffle Read records	24	21.63

- To gain more insights about the task's duration, such as checking memory allocation, click the Execution Details tab and then in the Summary panel, click Configurations:

Status: Succeeded Execution ID: application\_162429 Duration: 1h 2m User: cmap Pool: root.users.cmap

Overview Health Checks Execution Details Baseline Trends

Expand All Collapse All

Time	Job	Duration
01:03	SP Log Proces...	1h 1m 48s
01:04	Job 0	50s 915ms
01:05	Job 1	396ms
01:05	Job 2	6s 472ms
01:05	Job 3	301ms
01:05	Job 4	1s 965ms
01:05	Job 5	2s 279ms
01:05	Job 6	1s 401ms
01:05	Job 7	369ms
01:05	Job 8	42m 15s
01:48	Job 9	17m 27s

Log Processor [CLUSTER\_BU...]

**Summary**

Jobs	Stages	Details
Completed 10	Completed 12	ID application_1624293
Total 10	Total 12	Download Event Log
		Executors Summary   All Executors
		Other Configurations   SQL Executions   Metrics

Driver Log Full Log

Select for more details

- In the Configurations panel, click the Spark Properties tab and search for the memory configuration settings and their values. If memory is less than the recommended value, increasing its value will improve cluster performance:

Status: Succeeded Execution ID: application\_1624293774839\_37779 Duration: 1h 2m User: cmap Pool: root.users.cmap

Overview Health Checks Execution Details Baseline Trends

Expand All Collapse All

Time	Job	Duration
01:03	SP Log Proces...	1h 1m 48s
01:04	Job 0	50s 915ms
01:05	Job 1	396ms
01:05	Job 2	6s 472ms
01:05	Job 3	301ms
01:05	Job 4	1s 965ms
01:05	Job 5	2s 279ms
01:05	Job 6	1s 401ms
01:05	Job 7	369ms
01:05	Job 8	42m 15s
01:48	Job 9	17m 27s

Log Processor [CLUSTER\_BU... / Configurations]

**Configurations**

Search: memory

JVM Information (0) Spark Properties (2) Classpath Entries (2)

Name	Value
spark.driver.memory	4g
spark.executor.memory	12g

Search for a specific configuration by entering its property name

## Troubleshooting failed jobs

You can identify and troubleshoot incomplete jobs on your cluster using Cludera Observability on premises.

### About this task

Describes how to locate and troubleshoot jobs that have failed to complete.

Steps with examples from a Virtual Cluster's Spark engine are used to describe how to further investigate and troubleshoot the root cause of a job that failed to finish.

### Procedure

- Verify that you are logged in to the Cludera Observability web UI.
  - In the URL field of a supported web browser, enter the Cludera Observability URL that you were given by your system administrator and press Enter.
  - When the Cludera Observability Log in page opens, enter your Cludera Observability user name and password access credentials.
  - Click Log in.

The Cludera Observability landing page opens.

- From the Environment Name column in the Environments page, locate and click the name of the environment whose workload diagnostic information requires analysis and troubleshooting.

For this example, select Virtual Cluster from the Environments list and then select a Virtual Cluster required for analysis.

The Environment navigation panel opens, which hierarchically lists the environment and its services hosted on the selected environment.

- Verify that the **Cluster Summary** page is displayed.



**Tip:** The page's title is displayed in the browser tab.

The **Cluster Summary** page, displays performance trends and metrics about the cluster's processed jobs and queries.

- From the time-range list, select a time period that meets your requirements.
- In the **Cluster Summary** page, locate the Spark Jobs Trend chart widget and then click its Failed/Killed Jobs value.

The engine's Jobs page opens.

- From the Health Check filter's list, select Failed to Finish, which filters the list to display a list of jobs that did not complete.
- To view more details about why a job failed to complete, from the Job column select a job's name. The job's page opens displaying information about the job you selected and where the failure happened.

Status	Execution ID	Duration	User	Pool
Failed	application_1624293774839_37825	1m 13s		

Overview | Health Checks | Execution Details | Baseline | Trends

Job failed.

**! Failures**

Name	Duration	Logs	Failing from	Diagnostic Information
Query Profile Processor	1m 12s	Driver Logs	Job 1, Stage-2	Job aborted due to stage failure: Task 0 in stage 2.0 failed 4 times, most recent failure: Lost task 0.3 in stage 2.0 (TID 19, hodor-03): org.apache.spark.SparkException: Task failed while writing rows at org.apache.spa... <a href="#">+ More</a>

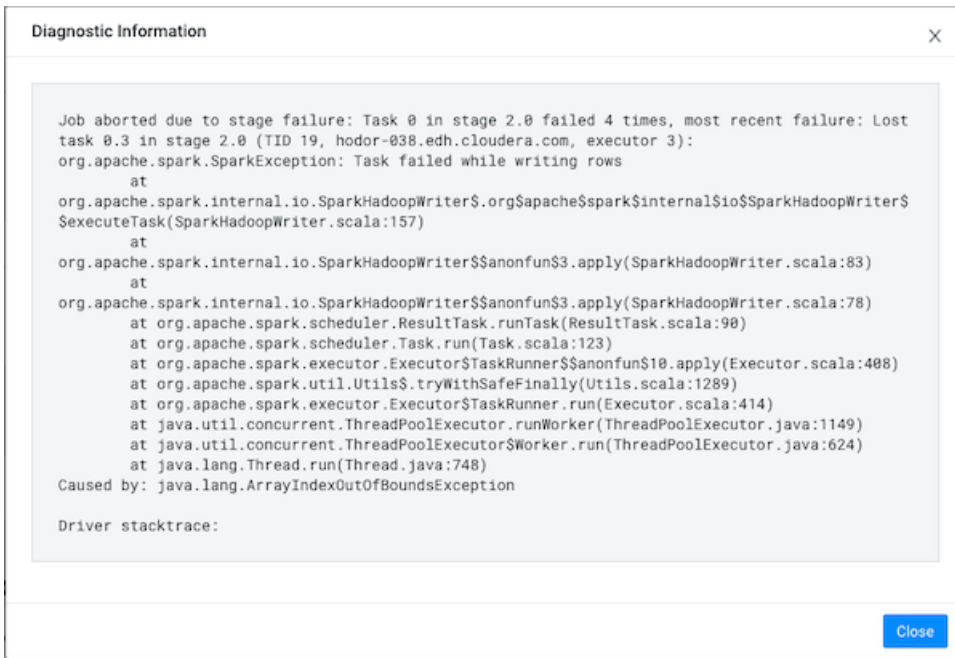
Baseline | Compare with Previous Run | Skew | Resources

Baseline health unknown. | No skew issues found. | No resource issues found.

Trends (7/7/2021 - 7/8/2021)

- From the Failures section in the Diagnostic Information column, click More.

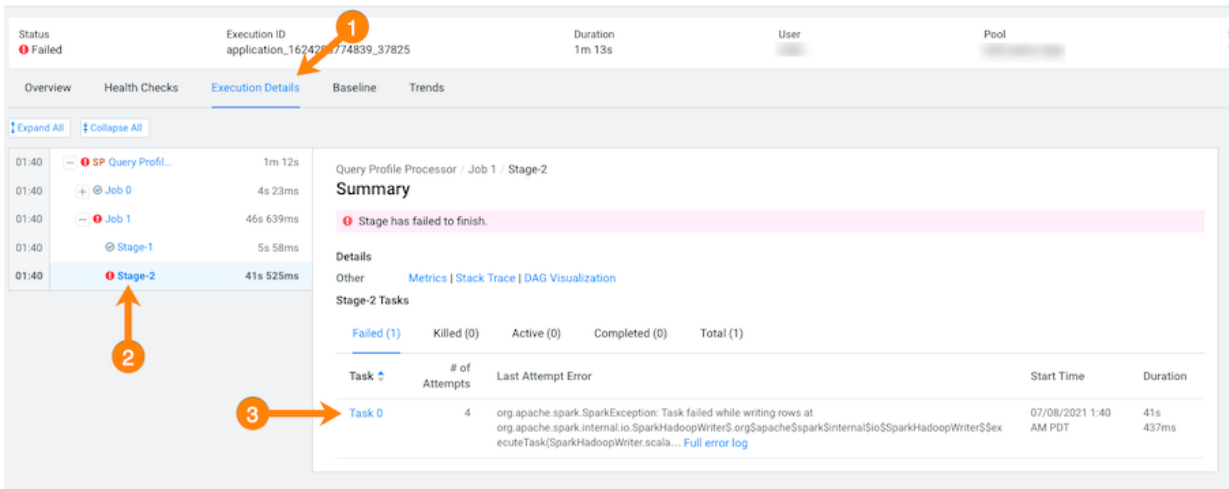
The Diagnostic Information dialog box opens, which describes more details about why the job aborted. In the following example, the job was aborted whilst writing rows due to an out of bounds java exception:



9. Click Close.

10. To display more information about the stage where the job failed, in this case the Stage-2 process, in the Failing from column, click the stage's link. Or select the Execution Details tab and then click the failed stage's link.

In the following example's Summary panel, it shows that Task 0 was attempted 4 times:



11. To display more information about all the failed attempts, in the Summary panel, click the Failed task value.

In the following example, the job aborted when Task 0 was writing rows. To understand more about what triggered the SparkException error message and to further troubleshoot the root cause, you can open the associated log file by clicking Full error log.

The screenshot shows the Cloudera Observability web UI. At the top, the status is 'Failed' with a red circle icon. The execution ID is 'application\_1624293774839\_37825' and the duration is '1m 13s'. The 'Execution Details' tab is selected, showing a tree view of the execution plan. The main area displays 'Task 0' details, including a table of attempts and error logs. The error logs show a 'Task failed while writing rows' exception.

Attempt	ID	Executor	Host	Start Time	Duration
0	0.0	3	cloudera.com	1:40 AM	12s 274ms
1	0.1	3	cloudera.com	1:41 AM	9s 657ms
2	0.2	3	cloudera.com	1:41 AM	9s 480ms

## Determining the cause of slow and failed queries

You can identify the cause of slow query run times and queries that fail to complete using Cloudera Observability on premises.

### About this task

Describes how to determine the cause of slow and failed queries.

Steps with examples from a Virtual Cluster's Spark engine are used to explain how to further investigate and troubleshoot the cause of slow query run times.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Environment Name column in the Environments page, locate and click the name of the environment whose workload diagnostic information requires analysis and troubleshooting.

For this example, select Virtual Cluster from the Environments list and then select a Virtual Cluster required for analysis.

The Environment navigation panel opens, which hierarchically lists the environment and its services hosted on the selected environment.

3. Verify that the **Cluster Summary** page is displayed.

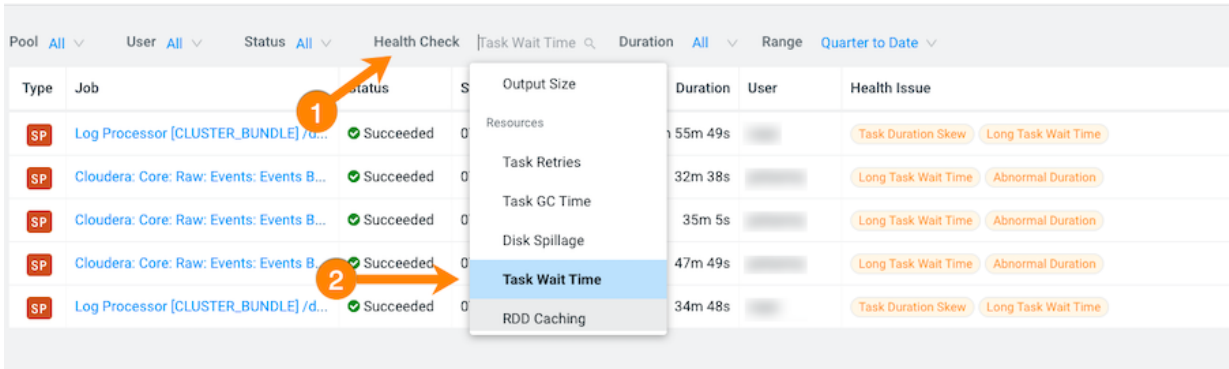


**Tip:** The page's title is displayed in the browser tab.

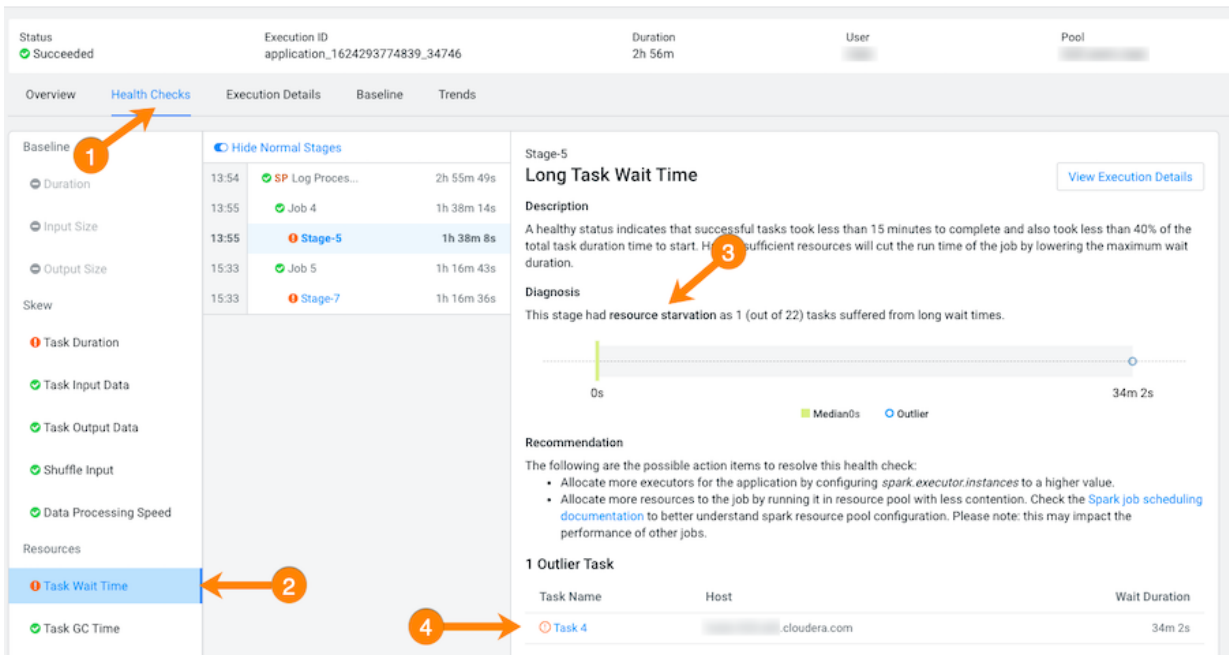
The **Cluster Summary** page, displays performance trends and metrics about the cluster's processed jobs and queries.

4. From the time-range list, select a time period that meets your requirements.

- If not already expanded, from the Environment navigation panel expand the Virtual Cluster and then select the **Spark** engine.  
The engine's Summary page opens, in this case the Spark Summary page.
- From the Job Trend widget, click its Total Jobs value.  
The engine's Jobs page opens.
- From the Health Check filter's list, select Task Wait Time, which filters and displays a list of jobs with longer than average wait times before the process was executed.



- Display more details by selecting a job's name from the Job column and then clicking the Health Checks tab.  
The Baseline Health checks are displayed.
- From the Health Checks panel on the left, click the Task Wait Time health check, which opens a panel that describes the health check, displays information about the possible causes, and lists recommended solutions.  
In the following example, the long wait time occurred in Stage-5 of the job process due to insufficient resources. The Recommendation section lists items for you to complete that may resolve the problem and the specific outlier tasks that produced the unusual results:



- To display more details about why this job is experiencing longer than average wait times, click one of the tasks listed under Outlier Tasks.  
In the following example, the Task Metrics section shows higher than average criteria measurement results and the Task Details reveal an ExecutorLostFailure error. This indicates a probable memory issue, where the container is exceeding the memory limits. In this case, more details may be found by clicking Full error log and reviewing the log:

The screenshot displays the Cloudera Observability web UI for a job execution. At the top, the status is 'Succeeded', the execution ID is 'application\_1624293774839\_34746', and the duration is '2h 56m'. The 'Health Checks' tab is active, showing a 'Baseline' section with a 'Hide Normal Stages' toggle. A table lists stages: 'Log Proces...' (2h 55m 49s), 'Job 4' (1h 38m 14s), 'Stage-5' (1h 38m 8s), 'Job 5' (1h 16m 43s), and 'Stage-7' (1h 16m 36s). The 'Task Details' section shows a table with columns: Attempt, ID, Executor, Host, Start Time, and Duration. A task with Attempt 0, ID 4.0, Executor 4, Host .cloudera.com, and Duration 33m 37s is highlighted. Below this, an error message is displayed: 'ExecutorLostFailure (executor 4 exited caused by one of the running tasks) Reason: Container from a bad node: container\_e129379\_1624293774839\_34746\_01\_000005 on host: .cloudera.com. Exit- Full error log'. The 'Task Metrics' section includes a table with columns: Metric, Task, and Average. Metrics include Wait Duration (34m 2s, Average 1m 33s), Non-succeeded Task attempts (1, Average 0.05), Scheduler Delay (33m 38s, Average 1m 32s), Result Serialization Time (< 1s, Average 0s), Duration (1h 38m, Average 8m 51s), Successful Attempt Duration (1h 4m, Average 7m 18s), Deserialization Time (5s, Average < 1s), and Task GC Time (8m 25s, Average 1m 8s).

## Troubleshooting with the Job Comparison Feature

You can compare two different runs of the same job, which is especially useful when you notice unexpected changes, such as when you have a job that consistently completes within a specific amount of time and then it starts taking longer. Comparing two runs of the same job enables you to analyze the performance and differences so that you can troubleshoot the cause.

### About this task

Describes how to compare any two runs of a job using the Job Comparison tool.

Steps with examples from a Virtual Cluster's Spark engine are used to explain how to use the job comparison feature for further investigation and troubleshooting.



**Note:** When a job is flagged as slow, you can select the slow job from the Slow Jobs chart widget in the job's engine page and then in the details page, click Compare with Previous Run. The job is compared with its last run and the results are displayed in the **Job Comparison** page for you to analyze.

### Procedure

1. Verify that you are logged in to the Cloudera Observability web UI.
  - a) In the URL field of a supported web browser, enter the Cloudera Observability URL that you were given by your system administrator and press Enter.
  - b) When the Cloudera Observability Log in page opens, enter your Cloudera Observability user name and password access credentials.
  - c) Click Log in.

The Cloudera Observability landing page opens.

2. From the Environment Name column in the Environments page, locate and click the name of the environment whose workload diagnostic information requires analysis and troubleshooting.

For this example, select Virtual Cluster from the Environments list and then select a Virtual Cluster required for analysis.

The Environment navigation panel opens, which hierarchically lists the environment and its services hosted on the selected environment.

3. Verify that the **Cluster Summary** page is displayed.



**Tip:** The page's title is displayed in the browser tab.

The **Cluster Summary** page, displays performance trends and metrics about the cluster's processed jobs and queries.

4. From the time-range list, select a time period that meets your requirements.
5. If not already expanded, from the Environment navigation panel expand the Virtual Cluster and then select the **Spark** engine.

The engine's Summary page opens, in this case the Spark Summary page.

6. From the Job Trend widget, click its Total Jobs value.

The engine's Jobs page opens.

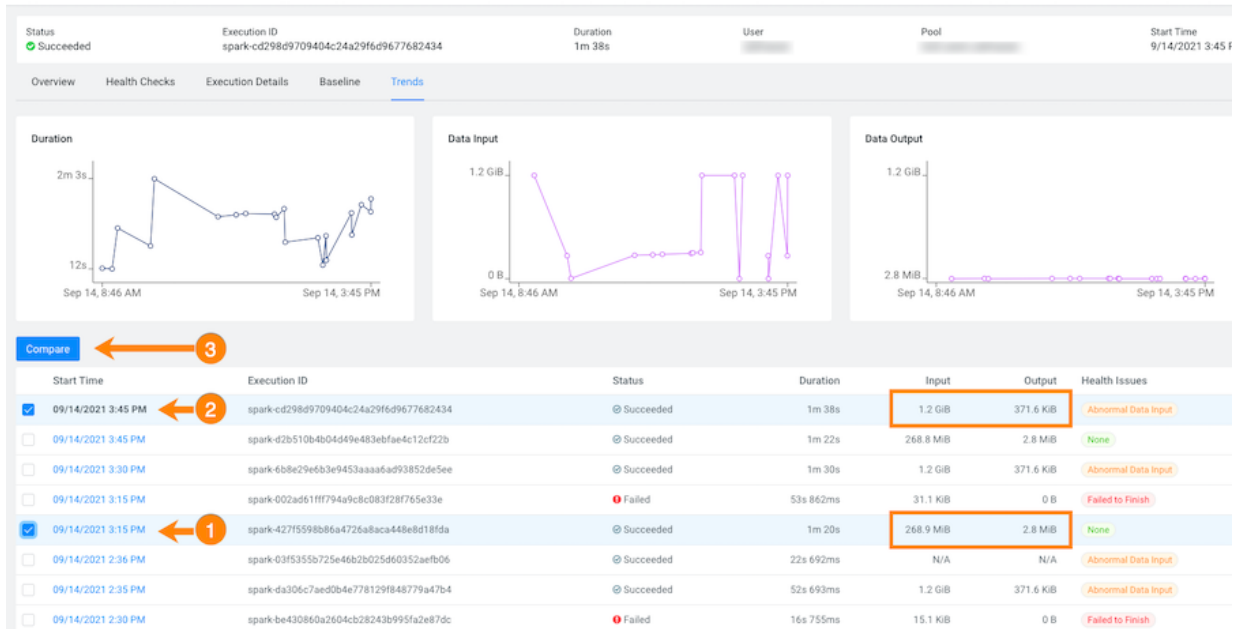
7. Examine the list of jobs that have executed during the selected time period and manually compare runs of the same job.

For example, as shown in the following image, when manually comparing the last two runs of the Log Processor job we can see that there are duration differences. In this example, the older run had a Task duration skew health issue, which appears to be fixed.

Type	Job	Status	Start Time	Duration	User	Health Issue	Execution ID
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:46 AM PDT	2m 16s		None	application_16242
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:46 AM PDT	2m 8s		None	application_16242
SP	Metric Processor	Succeeded	07/08/2021 3:45 AM PDT	58s 236ms		None	application_16242
SP	Log Processor [CLUSTER_BUNDLE] /d...	Succeeded	07/08/2021 3:45 AM PDT	2m 17s		None	application_16242
SP	Cloudera: Core: Raw: Events: Events B...	Succeeded	07/08/2021 3:34 AM PDT	1m 31s		None	application_16242
SP	Cloudera: Enriched: Ingest: DCXA Entf...	Succeeded	07/08/2021 3:33 AM PDT	3m 24s		None	application_16242
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:31 AM PDT	6m 46s		None	application_16242
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:31 AM PDT	2m 22s		None	application_16242
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:31 AM PDT	1m 52s		Abnormal Data Input	application_16242
SP	Cloudera: Core: Raw: Ingest: Salesforc...	Succeeded	07/08/2021 3:31 AM PDT	2m 8s		None	application_16242
SP	Cloudera: Core: Raw: Events: Events B...	Succeeded	07/08/2021 3:29 AM PDT	15m 40s		Abnormal Duration	application_16242
SP	Query Profile Processor	Succeeded	07/08/2021 3:29 AM PDT	55s 233ms		None	application_16242
SP	Metric Processor	Succeeded	07/08/2021 3:29 AM PDT	1m 25s		None	application_16242
SP	Log Processor [CLUSTER_BUNDLE] /d...	Succeeded	07/08/2021 3:29 AM PDT	12m 16s		Task Duration Skew	application_16242
SP	Metric Processor	Succeeded	07/08/2021 3:25 AM PDT	17s 299ms		None	application_16242
SP	Metric Processor	Succeeded	07/08/2021 3:25 AM PDT	32s 962ms		None	application_16242
SP	Log Processor [CLUSTER_BUNDLE] /d...	Succeeded	07/08/2021 3:25 AM PDT	20m 9s		Task Duration Skew	application_16242
SP	Query Profile Processor	Succeeded	07/08/2021 3:25 AM PDT	45s 771ms		None	application_16242

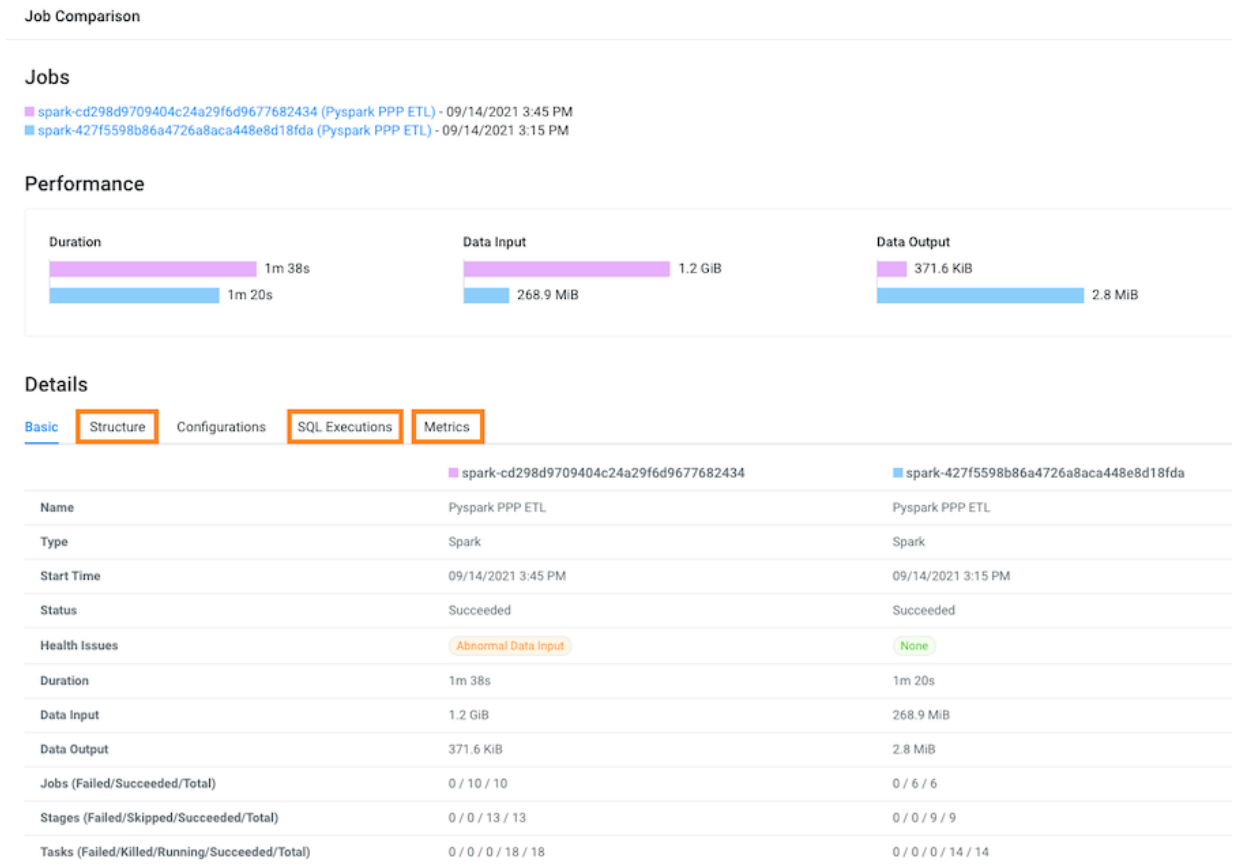
8. List and display details of all the runs of a specific job of interest by selecting one of the job runs and then in its jobs details page, click the Trends tab.

In the following example, notice how the amount of Input and Output data changes between runs. The Job Comparison tool enables you to examine more details about two runs to determine why the amount of data changed. In this case you can compare a run with no health issues with the last run of the job:



- To compare two job runs, select the check boxes adjacent to the job runs you require and then click Compare. The Job Comparison page opens, displaying more details about each job.

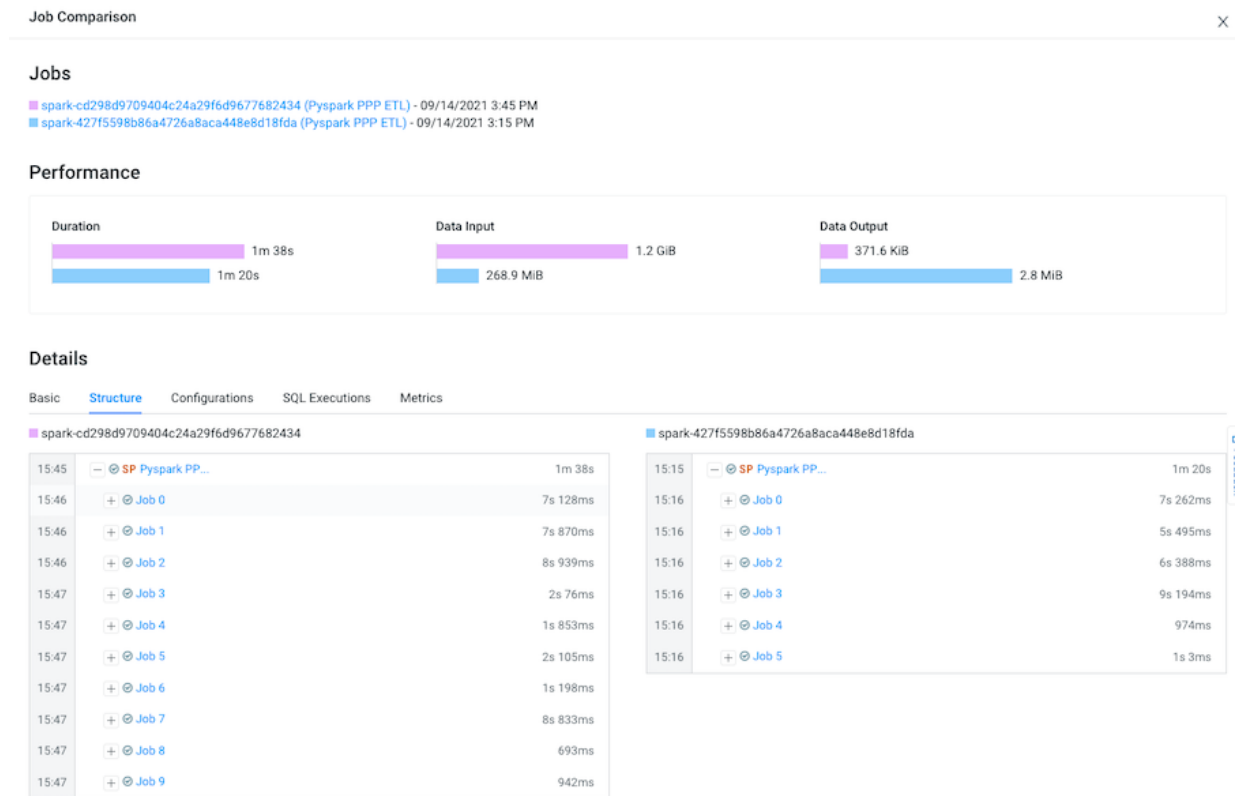
For this example's comparison, the tabs that contain more information about the job runs are the Structure, SQL Executions, and the Metrics tabs:



**Note:** The SQL Executions tab is only available for Spark jobs.

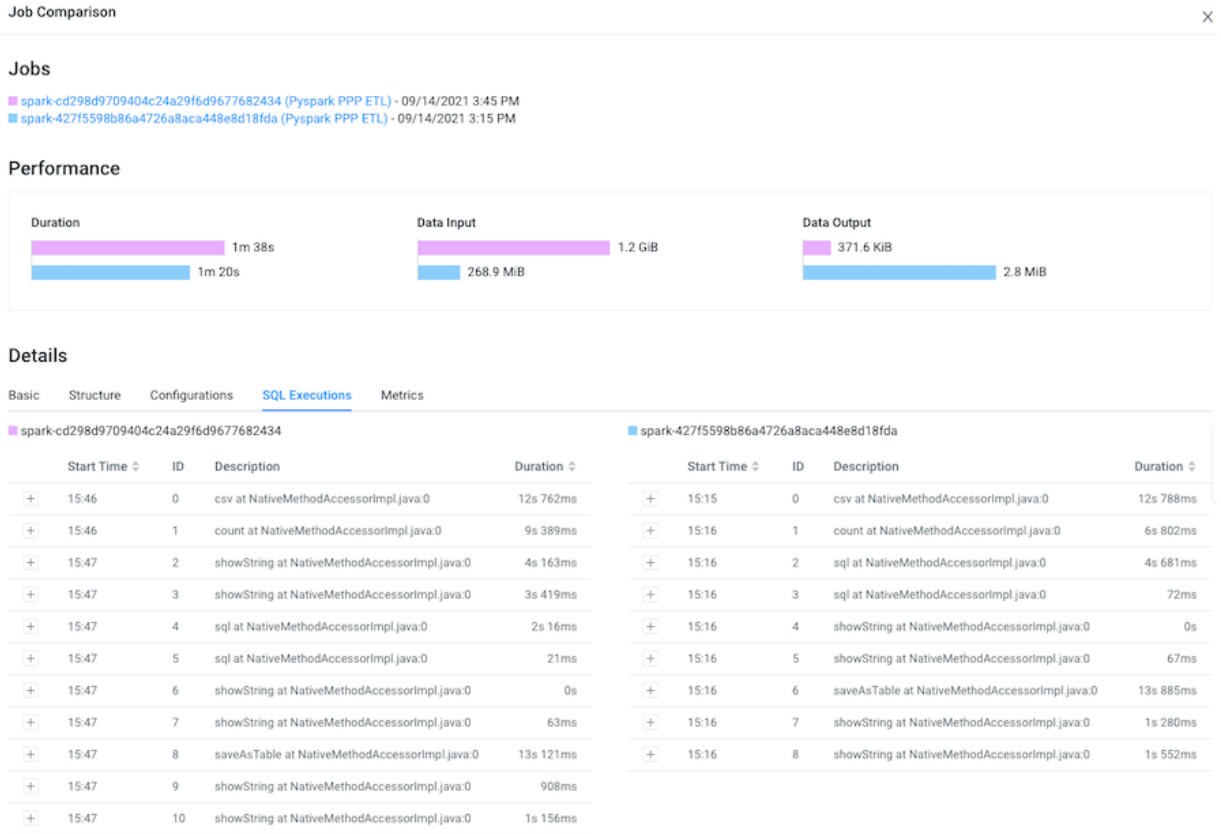
**10.** Display and compare the sub-jobs executed for both of your selected job runs by selecting the Structure tab.

For example, as shown in the following image, the last run of the job (with health issues) completed in 1 minute and 38 seconds and executed 9 sub-jobs and the run that had no health issues took 1 minute and 20 seconds but only executed 5 sub-jobs. Clicking any of the listed sub-jobs displays more details.



**11.** Display and compare Spark SQL queries that were run and how long they ran for both of your selected job runs by selecting the SQL Executions tab.

For example, as shown in the following image, more Spark SQL queries were run on the data in the last job run.



12. Display and compare what metrics were performed on both of your selected job runs by selecting the Metrics tab. For example, as shown in the following image, more input records were digested in the last job run.

Job Comparison

Jobs

- spark-cd298d9709404c24a29f6d9677682434 (Pyspark PPP ETL) - 09/14/2021 3:45 PM
- spark-427f5598b86a4726a8aca448e8d18fda (Pyspark PPP ETL) - 09/14/2021 3:15 PM

Performance



Details

- Basic
- Structure
- Configurations
- SQL Executions
- Metrics

	spark-cd298d9709404c24a29f6d9677682434	spark-427f5598b86a4726a8aca448e8d18fda	
<u>Ungrouped</u>			
Active Tasks	0	0	0
Disk bytes Spilled	0 B	0 B	0 B
Duration	1m 38s	1m 21s	-17s -18%
Executor Runtime	44s	34s	-10s -22%
Failed Task attempts	0	0	0
Failed Tasks	0	0	0
Input bytes	1.2 GiB	268.9 MiB	-940.6 MiB -78%
Input records	3.3M	1.8M	-1.5M -46%
Killed Task attempts	0	0	0
Killed Tasks	0	0	0
Memory bytes Spilled	0 B	0 B	0 B

## Understanding the Cloudera Observability on premises cluster services metrics

Describes the Cloudera Observability on premises cluster services metrics, which are visually displayed in a series of charts that show the state, activity, and performance of the Cloudera Observability on premises cluster services. Accessed from Cloudera Manager they help you monitor the health, performance, and workload usage of your Cloudera Observability on premises Cluster Services for identifying and troubleshooting existing and potential problems.



**Note:** The Cloudera Observability on premises cluster services metrics are viewable in Cloudera Manager version 7.5.3 and above. They also require Cloudera Observability on premises version 2.2.2 or 2.3.0 and the latest version of Telemetry Publisher.

The Cloudera Observability on premises cluster services metric charts are displayed on the Cloudera Observability on premises Cluster and the Cloudera Observability on premises Services pages located in the Cloudera Manager Admin Console. For further analysis, each metric chart can be opened to display more detailed information.

The metrics displayed are dependent on the selected Cloudera Observability on premises element. But, whether you view a chart from the Cloudera Observability on premises Cluster Status tab page, the Charts Library tab page, or a Cloudera Observability on premises Service's page, the basic functionality works in the same way.

For example, you can:

- Change the size of the chart by dragging its lower-right corner.
- View detailed information about elements of interest in the chart by hovering your mouse over the element. When you move your mouse horizontally across the chart, the data values will change according to the time represented.
- For additional information, you can enlarge the pop-up window by clicking Click to expand.
- When the pop-up window is fully expanded you can view:

- The Cloudera Observability on premises service associated with the chart by clicking View Service.
- Display the chart on its own page by clicking View Entity Chart.



**Note:** If the chart displays more than one stream of data, the new chart displays only the stream that was selected.

For more information about charts in Cloudera Manager, click the Related Information link below.

### Cloudera Observability on premises cluster chart library categories

The Cloudera Observability on premises Status Page visually displays a limited set of metrics that are based on historical Cloudera Observability on premises user payload analysis.

The Charts Library displays a much larger set of metric charts, which are organized into categories.

The following lists the Cloudera Observability on premises Chart Library categories available on the Charts Library page, accessed by clicking the Charts Library tab:

- Status Page Charts, whose charts display a consolidated view of the overall Cloudera Observability on premises cluster metrics.
- Zookeeper Queue, whose charts display the ZooKeeper service metrics, including the number of queues and shards for all streams.

When the number of messages in a Zookeeper queue exceeds the defined threshold limits, a Cloudera Observability on premises health check alert is triggered. For more information about the Zookeeper Elevated Queue Count alerts, click the Related Information link below.

- Counters, whose charts display the number of jobs received and the number of jobs that failed. Counter metrics are also separated into Pipeline, Analytic Database, and Cloudera Shared Data Experience service categories.
- Processing Timers, whose charts display the average job processing time and the average rate across servers. They are calculated using the 75th and 95th percentiles. Processing Timer metrics are also separated into Pipelines and Analytic Database service categories.

When less than 75% of the service's audit payloads are processing slower than the defined yellow and red timer threshold limits, a Cloudera Observability on premises health check alert is triggered. For more information about the Slow Payload Processing Timer alerts, click the Related Information link below.

- Events, whose charts display the number of important and informational alerts.

### Cloudera Observability on premises services categories

The Cloudera Observability on premises Services chart categories are accessed by selecting the Cloudera Observability on premises service in the Status Summary section of the Cloudera Observability on premises Status page.

The following lists the Cloudera Observability on premises service's chart categories. As they are dependent on the service you are viewing, not all of the following categories will be displayed:

- Status Page Charts, whose charts display a limited set of Cloudera Observability on premises service's metrics.
- Counters, whose charts display the number of jobs or queries received and the number of jobs or queries that failed.
- Processing Timers, whose charts display the average job processing time and the average rate across servers. They are calculated using the 75th and 95th percentiles. Processing Timer metrics are also separated into Pipelines and Analytic Database service categories.
- Payload Size, whose histogram charts display the average, maximum, minimum, and 75th percentile processing payload sizes.
- Process Resources, whose charts display metrics about the service's processing resources, such as the amount of resident memory used.
- Host Resources, whose charts display metrics about the service's host, which are broken down, depending on the service, into CPU, Memory, Disk Aggregates, Disk Comparison, Network Aggregates, Network Interface Comparison, File Descriptors, and Entropy categories.

- Liveness, whose chart displays metrics about the service's processing performance.
- Events, whose charts display the number of important and informational alerts

### Related Information

[Understanding the Cloudera Observability on premises services health check alerts](#)

[Viewing Charts for Cluster, Service, Role, and Host Instances](#)

## Understanding the Cloudera Observability on premises services health check alerts

Describes the Cloudera Observability on premises cluster services health check alerts and thresholds, and what actions are required to resolve the problem.

### Understanding the health check alert threshold colors

Cloudera Observability on premises Health Check Alerts and suggested actions are located on the Cloudera Observability on premises service's health test page. When completed they are compared to their defined thresholds that determine if the service element is Good, Concerning, or Bad. For example, when a service's ZooKeeper queue size has exceeded the Critical threshold (Red Alert) limit, the health check will trigger an alert and display an alert message, the cause, and corrective actions.

For descriptions of the health checks performed on each Cloudera Observability on premises cluster service, click the Related Information link below.

To help you recognize the severity level of the Cloudera Observability on premises health check, the health check results include the following colors:

**Table 12: Health check alert colors**

Alert Color	Severity
Green	Good - The health check result is normal and within the acceptable range.
Yellow	Concerning - The health check result has exceeded the Warning threshold limit and indicates a potential problem, which eventually must be resolved but does not have to be completed at this time.  See the corrective actions in the Actions and Advice sections.
Red	Bad - The health check result has exceeded the Critical threshold limit and indicates a serious problem, which must be resolved immediately.  See the corrective actions in the Actions and Advice sections.  For example, the Hive Audit Zookeeper queue size has exceeded the Critical threshold limit and can no longer process messages. Possible actions are: <ul style="list-style-type: none"> <li>• Change the Hive Audit Zookeeper queue size for this role instance, which will reduce the number of messages in the queue.</li> <li>• View the log for the role instance at the time of the health test to see what changed.</li> </ul>

### Elevated queue count

A Cloudera Observability on premises health check alert is triggered when the number of messages in the workload queue exceeds the defined yellow and red threshold limits.

**Table 13: ZooKeeper elevated queue count**

Queue Name	Default Yellow Alert Threshold	Default Red Alert Threshold
SparkEventLog	100K	200K
PSE	400K	800K
Other services	200K	400K

To address an alert consider the following:

- Check the status of Telemetry Publisher, specifically did it restart after a long pause, as this will create a sudden influx of pending workload data records and increase the size of the queue.
- Check whether any pipelines or ADB services are down, as this will prevent the queues from clearing and workloads from being processed.
- Check whether any new environment, cluster, or workloads are now publishing to your Cloudera Observability on premises cluster, as this could result in new jobs sending large amounts of data at the same time as your jobs.
- Check the health of the Zookeeper service.



**Note:** The Zookeeper service is used by Cloudera Observability on premises to manage workload queues.

- Check whether the maximum number of Zookeeper connections is configured correctly for your environment.

If none of the above corrects the problem, contact Cloudera Support and create a support ticket.

### Slower Payload Processing times

A health check alert is triggered when less than 75% of the service's audit payloads are processing slower than the defined yellow and red timer threshold limits.

**Table 14: Slower Payload Processing Times**

Payload Type	Default Yellow Alert Threshold	Default Red Alert Threshold
All services	30 seconds	60 seconds

To address an alert consider the following:

- Check the number of items in the ZooKeeper queue, as too many items can slow down processing.
- Check that the HBase Region Servers are in good health.
- Check that the Phoenix Query Server (PSQ) instances are up and running.
- Check that the Pipeline server instances are up and running.
- Check the Pipeline Server payload size metric, which denotes the size of each job and how much data is being sent. An increase in the average payload size will lead to longer processing times.

If none of the above corrects the problem, contact Cloudera Support and create a support ticket.

### Related Information

[Cloudera Observability on premises cluster health checks](#)

## Accessing the Cloudera Observability on premises Cluster Services Charts

Describes where to view the Cloudera Observability on premises cluster services charts in Cloudera Manager that show the state, activity, and performance of the Cloudera Observability on premises services.

### About this task

Steps for accessing the Cloudera Observability on premises cluster services charts in Cloudera Manager.

### Procedure

1. In a supported web browser, log in to Cloudera Manager as a user with full system administrative privileges.
2. From the Navigation panel, select Clusters and then OBSERVABILITY.

A subset of the most commonly used Cloudera Observability on premises Cluster services metrics are displayed as charts in the Charts section.

3. Do one or more of the following:

- To display more Cloudera Observability on premises metrics, select the Charts Library tab and then select a category.

- To display metrics for a specific Cloudera Observability on premises service, in the Status Summary section of the Status page, click a server name.

### What to do next

Manually create your own Cloudera Observability on premises charts using the Cloudera Manager Chart builder and the Cloudera Observability on premises service metric name. For more information on how to build your own chart, click the Related Information links below.

### Related Information

[Building your own Cloudera Observability on premises services metric chart](#)

[Cloudera Observability on premises cluster services metrics](#)

## Building your own Cloudera Observability on premises services metric chart

Describes the steps to manually build a Cloudera Observability on premises metric chart in Cloudera Manager using the Cloudera Manager Chart builder and the Cloudera Observability on premises services metric name.

### About this task

Steps for building your own Cloudera Observability on premises Services metrics chart.



**Note:** Displaying the predefined Cloudera Observability on premises Services metric charts in Cloudera Manager requires Cloudera Manager version 7.11.3 CHF9 and higher.



**Note:** These instructions assume that you have read and recorded the required service metric name for your chart from the predefined Cloudera Observability on premises Cluster Services Metrics.

For more information about the metrics collected from each server by Cloudera Observability on premises, click the Related Information link below.

### Procedure

- In a supported web browser, log in to Cloudera Manager as a user with full system administrative privileges.
- From the Navigation panel, select Charts and then Chart Builder.
- In the Search field, enter SELECT and then the metric name:

```
SELECT METRIC_NAME
```

For example, SELECT observability\_dbus\_api\_service\_heap\_used

- Click Build Chart.

### Related Information

[Cloudera Observability on premises cluster services metrics](#)

## Monitoring Cloudera Data Engineering with Cloudera Observability on premises

Integrating Cloudera Data Engineering on premises with Cloudera Observability on premises allows for collecting Spark job telemetry, viewing resource usage through job-level metrics, optimizing Spark workloads, troubleshooting performance through dashboards, and accessing historical analysis from the Cloudera Data Engineering job runs page.

Integrating Cloudera Data Engineering with Cloudera Observability on premises enables the collection of execution telemetry for Spark jobs. This integration provides administrators and users with visibility into resource usage and monitors Spark job-specific execution metrics. Using the generated dashboards, you can administer, optimize, and troubleshoot Spark job workloads grouped by users and pools.

For Cloudera Data Engineering users, Cloudera Observability on premises provides a historical analysis tool for Spark batch jobs. After a job completes, you can navigate directly from the Cloudera Data Engineering job runs page to Cloudera Observability on premises to understand why a specific run took a certain amount of time. This historical context allows you to compare current runs against previous performance trends and perform a deeper analysis of job stages, including CPU, memory, and I/O usage.

**Feature highlights:**

- **Historical trends and baseline analysis:** Establish performance benchmarks by analyzing long-term telemetry patterns for Spark job runs.
- **Baseline scores and anomaly detection:** Identify performance deviations by using baseline scores for Spark job telemetry payloads.
- **Job comparison:** Compare Spark job behavior and performance across different runs using telemetry data.
- **Health checks:** Use health check features to monitor Spark job status.
- **Resource analysis widgets:** Use dedicated widgets to analyze resource consumption for Spark job telemetry.
- **Cost tracking:** Calculate Spark job costs based on actual resource consumption recorded in telemetry payloads.



**Important:**

- To monitor Cloudera Data Engineering with Cloudera Observability on premises, you must either upgrade to Cloudera Data Services on premises 1.5.5 SP2 or create a new cluster with Cloudera Data Services on premises 1.5.5 SP2.
- Cloudera Observability limited features are available to monitor the Cloudera Data Engineering service.
- In Cloudera Observability on premises, Cloudera Data Engineering is available under the Cloudera Private Cloud Base cluster. You can also search for a specific cluster by using the Environments field.

For information on integrating the Cloudera Data Engineering cluster with Cloudera Observability on premises, see [Adding a Cloudera Data Engineering service](#).

## Monitoring Cloudera Data Warehouse with Cloudera Observability on premises

Integrating Cloudera Data Warehouse on premises with Cloudera Observability on premises allows you to collect query and job-level telemetry payloads. The dashboards help optimize Hive and Impala queries, ensure SLA compliance, and monitor performance.

Cloudera Data Warehouse integration with Cloudera Observability on premises enables the collection and analysis of query and job-level metrics. This integration provides administrators and users with visibility into resource consumption, allowing them to monitor the health and performance of queries and jobs. By gathering these metrics, you can identify how resources are used and ensure that your critical workloads meet their Service Level Agreements (SLAs).

You can use the dashboards to optimize and troubleshoot Hive and Impala queries. These views help you set performance thresholds and understand individual query costs based on resource usage. This transparency helps you improve the efficiency of your overall workload footprint.

**Feature highlights:**

- **Historical trends and baseline analysis:** Establish performance benchmarks by analyzing long-term query patterns.
- **Baseline scores for queries and anomaly detection:** Identify performance deviations using baseline scores for queries.
- **Query comparison:** Compare query behavior and performance across different executions.

- **Query health checks:** Use health check features to monitor query status.
- **Resource analysis widgets:** Use dedicated widgets to perform query-level resource analysis.
- **Cost tracking:** Calculate the cost of queries based on actual resource consumption.



**Important:**

- To monitor Cloudera Data Warehouse with Cloudera Observability on premises, you must either upgrade to Cloudera Data Services on premises 1.5.5 SP2 or create a new cluster with Cloudera Data Services on premises 1.5.5 SP2.
- Cloudera Observability limited features are available to monitor the Cloudera Data Warehouse service.
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- In Cloudera Observability on premises, Cloudera Data Warehouse is available under the Cloudera Base on premises cluster. You can also search for a specific cluster by using the Environments field.

For information on integrating the Cloudera Data Warehouse cluster with Cloudera Observability on premises, see [Activating an environment in Cloudera Data Warehouse on premises](#).