Workload XM 2.2.2

Workload XM Cluster Optimization

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Specifying a time range

Choose a time period in which your workload results are displayed in Workload XM for analysis and troubleshooting.

About this task

Describes how to specify a time period for displaying current or historical data about your cluster and the jobs performed in that cluster.

By default, Workload XM displays workload data for the last 24 hours. If there is no data available during that time, Workload XM displays the nearest date range that is available.

Procedure

1. In a supported browser, log in to the Workload XM web UI by doing the following:
   a) In the web browser URL field, enter the Workload XM URL that you were given by your system administrator and press Enter.
   b) When the Workload XM Log in page opens, enter your Workload XM user name and password access credentials.
   c) Click Log in.
2. In the Clusters page, select the cluster required for analysis.
3. From the time-range list in the Cluster Summary page, 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.
4. Click Ok, which clears any existing workload data from the chart and table components for the existing period of time.

Results

All charts and tables in Workload XM are updated to reflect the workload data for the chosen time period.

Analyzing Your Workload Cluster Costs with Workload XM Cost Centers

Define customized cost centers based on user or pool resource criteria and CPU and memory consumption with the Chargeback feature. Once defined Workload XM visually displays a Workload cluster's current and historical costs. With these cost insights you can then plan and forecast budgets and future workload environments and/or justify current user groups and resources.

Creating a Workload XM Cost Center

Create Workload XM cost centers that enable you to display your current and historical workload cluster and resource costs that can be used for planning, budgeting, and forecasting future workload environments.

About this task

Describes how to configure your Workload XM Chargeback settings, which define your cost centers and the unit costs of your resources, and create a Workload XM cost center.

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

Procedure

1. In a supported browser, log in to the Workload XM web UI by doing the following:
   a) In the web browser URL field, enter the Workload XM URL that you were given by your system administrator and press Enter.
   b) When the Workload XM Log in page opens, enter your Workload XM user name and password access credentials.
   c) Click Log in.
2. From the Workload XM Navigation side-bar, select Chargeback.
3. Globally define your cost center criteria and memory and CPU costs by clicking Chargeback Setup.
4. From the Setup page, do the following:

   a. From the Select Chargeback criteria section, select your cluster's chargeback criteria.

   Note: Cost centers are associated with a specific criteria. If you later change the Chargeback criteria setting the cost centers associated with the previous selection are hidden. You can revert back to these cost centers by reselecting their Chargeback criteria.

   To revert back to previous cost centers, from the Actions list on the Chargeback page, select Chargeback Settings and then reselect their criteria option.

   b. From the Cluster list of the Cluster Selection section, select the clusters required for your cost centers. Where, the cost calculations use resource utilization for each of your chosen clusters.

   c. In the CPU field of the Unit cost section, enter the amount, in dollars, for each CPU core hour.

   d. In the Memory field of the Unit cost section, enter the amount, in dollars, for each Gigabyte hour.

   e. Click Complete Setup.

5. From the Chargeback page, create a new cost center by clicking Create a Cost Center.
    a. In the Name field, enter a unique name for your cost center.
    b. (Optional) In the Description field, enter a meaningful description for the cost center.
    c. Depending on the Chargeback criteria value you selected when you configured your Chargeback settings, do one of the following:
        - If you selected Pool, in the Add Pools field, enter one or multiple resource pools.
        - If you selected User, in the Add Users field, enter one or multiple users.
    d. Click Create.

Results

Once you have configured your Chargeback settings and created a cost center you can view your job costs associated with a cost center cluster.

Displaying Your Job Costs Associated with a Cost Center Cluster

Steps for displaying your Workload cluster jobs associated with a cost center cluster.

About this task

Describes how to view your workload costs associated with a cluster.

Procedure

1. In a supported browser, log in to the Workload XM web UI by doing the following:
    a) In the web browser URL field, enter the Workload XM URL that you were given by your system administrator and press Enter.
    b) When the Workload XM Log in page opens, enter your Workload XM user name and password access credentials.
    c) Click Log in.
2. From the Workload XM Navigation side-bar, select Chargeback.
3. In the Chargeback page, select a cost center.

    Your cost center page opens displaying the costs, and the CPU and memory usage associated with the cost center.
4. To view more details about the pool, user, and job costs for a specific cluster in the cost center, from the Cluster column, locate the cluster and then either click its name or click the greater-than arrow (>) at the end of its row.

Assigning Uncategorized Resources to a Cost Center

Steps for moving unassigned resources into an existing or a new Workload XM cost center.

About this task

Describes how to locate and move uncategorized resources into an existing or a new Workload XM cost center.

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

Procedure

1. In a supported browser, log in to the Workload XM web UI by doing the following:
   a) In the web browser URL field, enter the Workload XM URL that you were given by your system administrator and press Enter.
   b) When the Workload XM Log in page opens, enter your Workload XM user name and password access credentials.
   c) Click Log in.
2. From the Workload XM Navigation side-bar, select Chargeback.
3. In the Chargeback page, select a cost center and then a cluster.
4. From the Overview tab, scroll down and click inside the Uncategorized section.

   The Uncategorized page opens.
5. Select the required uncategorised resource tab.
6. From either the Pools, Users, or Clusters page, select the check boxes of the resources you require for your cost center.

   The Assign Cost Center button becomes visible.
7. Click Assign Cost Center.
8. From the Select Cost Center list, do one of the following:

   a. To add the uncategorized resource/s in a new cost center, select New Cost Center and then click Create a new cost center.

   b. To add the uncategorized resource/s in an existing cost center, select an existing cost center and then click Assign to Cost Center.
9. (Optional) Repeat steps 4-8 until all your uncategorized resources are placed in your Workload XM cost centers.

Triggering an Action across Jobs and Queries

You can trigger actions, in real-time, across jobs and queries with Workload XM auto action events that are defined by you. When a job or query matches your action's criteria and its conditions exist, the auto action event is triggered. For example, memory exhaustion can cause nodes to crash or jobs to fail. Knowing when available memory is falling below a specific threshold enables you to take steps before a potential problem occurs. With the Auto Actions feature, you can create an action that informs you through an email when a job is consuming too much memory so that you can take steps to alleviate a potential problem.

Creating an Auto Action Event

The steps to create a Workload XM auto action event, which is triggered when a job or query meets the action’s criteria and conditions. For example, when a job uses too much memory it may cause other jobs to fail or increase a job’s runtime. You can create an action that informs you when a job is consuming too much memory.

About this task

Describes how to create a Workload XM Auto Action.

Procedure

1. In a supported browser, log in to the Workload XM web UI by doing the following:
   a) In the web browser URL field, enter the Workload XM URL that you were given by your system administrator and press Enter.
   b) When the Workload XM Log in page opens, enter your Workload XM user name and password access credentials.
   c) Click Log in.
2. From the Workload XM Navigation side-bar, select Auto Actions.
3. Do one of the following:

   - If no other auto actions exist, click Auto Actions Setup.
   - If other auto actions exist, click Create an Auto Action.

   The Auto Actions Create page opens.
4. In the Auto Action Name field, enter a unique name that is easily identifiable.
5. From the Engine list, do nothing.

   Note: At this time only Spark Engines are supported for the Auto Action feature.

6. (Optional) Define the criteria for the auto action by doing the following:

   a. From the Criteria list, choose between Pool and User.
   b. From the Operator list, choose between ANY OF and NONE OF.
   c. 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.

   Note: An Auto Action does not require the Criteria filter:

   - When included, only those jobs on the selected engine that meet the criteria conditions are tested by the Trigger.
   - When not included, all jobs on the selected engine are tested by the Trigger.

7. Define the trigger for the auto action by doing the following:

   a. From the Metric list, choose between Memory Allocated (MB) and Application Name.
   b. From the Operator list, select an operator.
   c. 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.

   d. From the Action options, do nothing.

   Note: At this time only email notifications are supported for the Auto Action feature.

   e. In the Emails field, enter the email address that you use to log into Workload XM.
   f. In the Subject field, enter the subject for the email that distinguishes the subject matter from other auto action emails.
   g. Click Create, which creates the action and adds it on the Auto Actions home page.

   The Auto Actions page displays the action's configuration and status details in the following entry fields:

   - Status, contains the current state of the action, as either Enabled or Disabled.
   - Name, contains the unique name you entered for the auto action.
   - Action, contains either the command that is to be executed or the function that is to be performed when the action is triggered.
   - Engine, contains the selected engine on which the action is to be performed.
   - Triggers, contains the action's Trigger conditions.
   - Criteria, contains the action's Criteria filters.

Results

When a job or query meets the auto action's criteria and conditions the action event is triggered.

Managing your Auto Actions

Steps for updating, deleting, and disabling an auto action, and viewing your actions in Cloudera Manager.

The following Auto Actions management tasks are performed in the Auto Actions page, which is accessed by selecting Auto Actions in the Workload XM Navigation side-bar.

Updating your Auto Action

In the Auto Action page, click the action’s vertical ellipsis, and select Edit. Make your changes and then click Update.

Deleting an Auto Action

In the Auto Action 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.

Disabling an Auto Action

In the Auto Action 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 Auto Actions page.

Viewing Workload XM Auto Actions in Cloudera Manager

You can display more details about your Workload XM actions in Cloudera Manager.

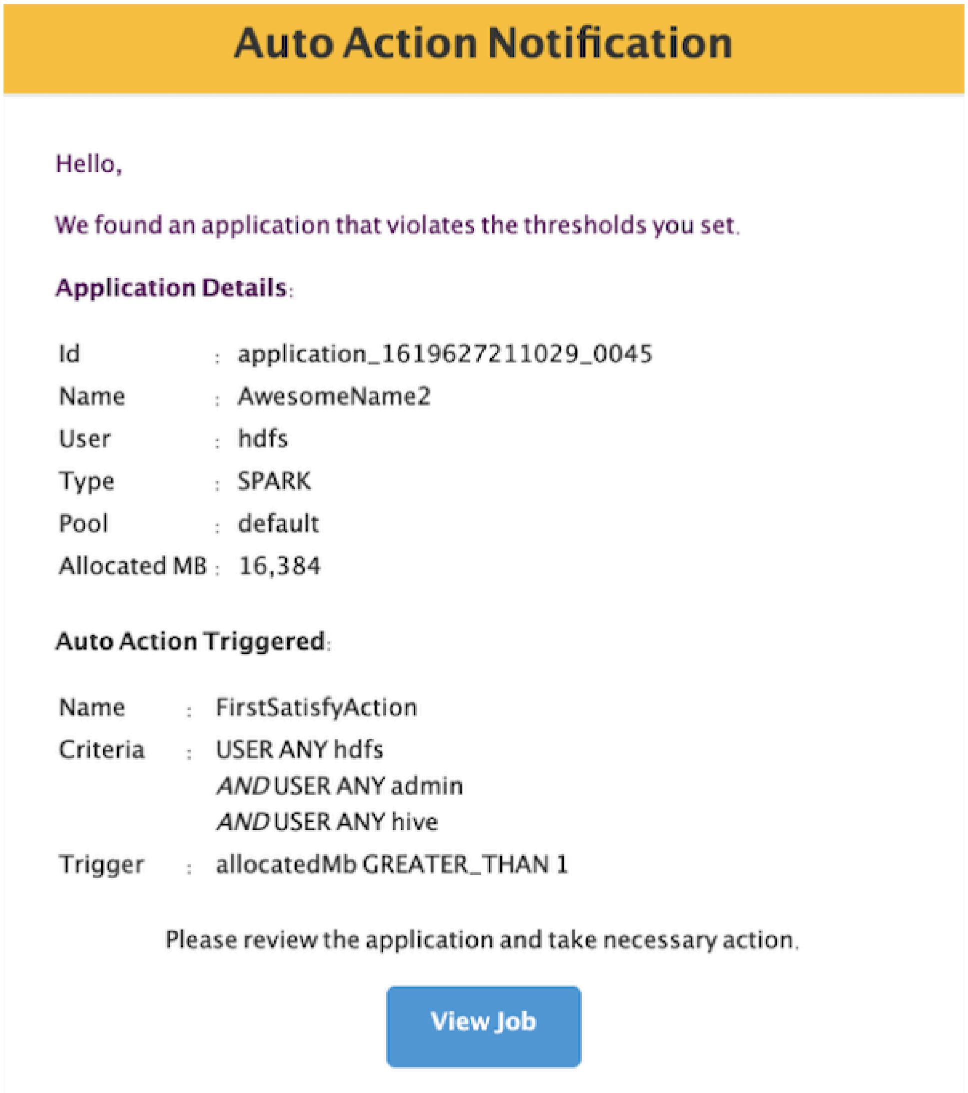
To view your Workload XM Auto Actions in Cloudera Manager:

- In a supported web browser log in to Cloudera Manager.
- From the Cloudera Manager Navigation side-bar, click Diagnostics and then select Events.
- In the Events page, search for Content that contains AUTOACTIONTRIGGER.
- Expand your action to display more information about the event.

Trigger Email Notification Example

An example of a Workload XM Auto Actions Notification email that was triggered when the job matched the action’s criteria and condition.

The following email notification example was sent when the listed application met the action's criteria and the trigger conditions, which are also included in the email notification.



Auto Action Notification

Hello,

We found an application that violates the thresholds you set.

Application Details:

Id	: application_1619627211029_0045
Name	: AwesomeName2
User	: hdfs
Type	: SPARK
Pool	: default
Allocated MB	: 16,384

Auto Action Triggered:

Name	: FirstSatisfyAction
Criteria	: USER ANY hdfs *AND* USER ANY admin *AND* USER ANY hive
Trigger	: allocatedMb GREATER_THAN 1

Please review the application and take necessary action.

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 are performing on your cluster that are sent by a specific user.

Working with Auto Generated Workload Views

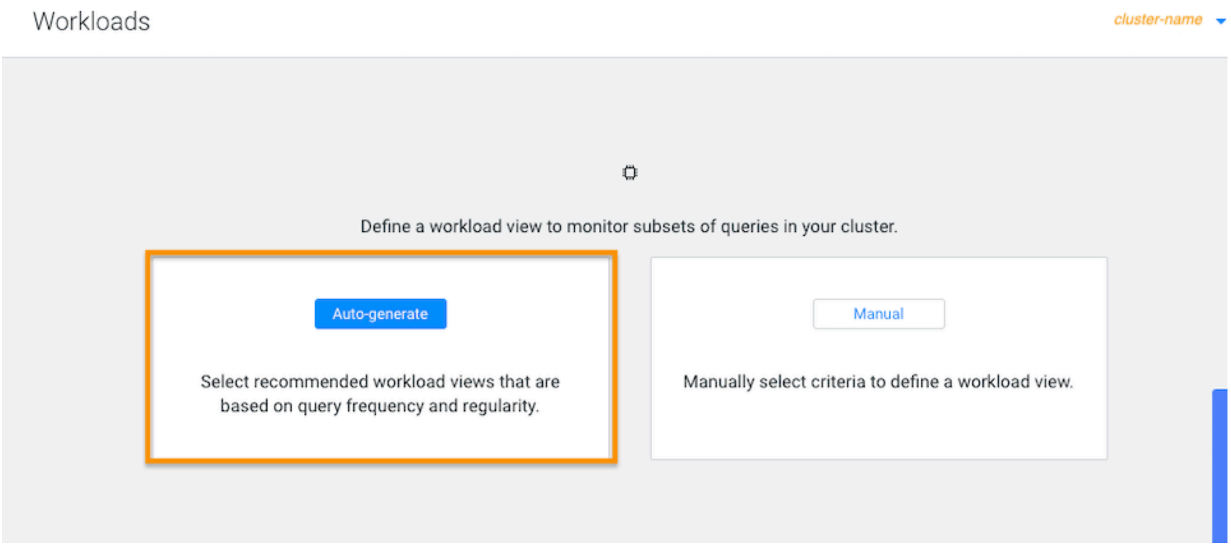
Steps for using the Workload XM default workload views.

About this task

Describes how to use the workload views that Workload XM automatically generates.

Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Clusters page do one of the following:
   - In the Search field, enter the name of the cluster whose workloads you want to analyze.
   - From the Cluster Name column, locate and click on the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.
4. From the navigation panel, select Workloads.
5. In the Workloads page, click Auto-generate:



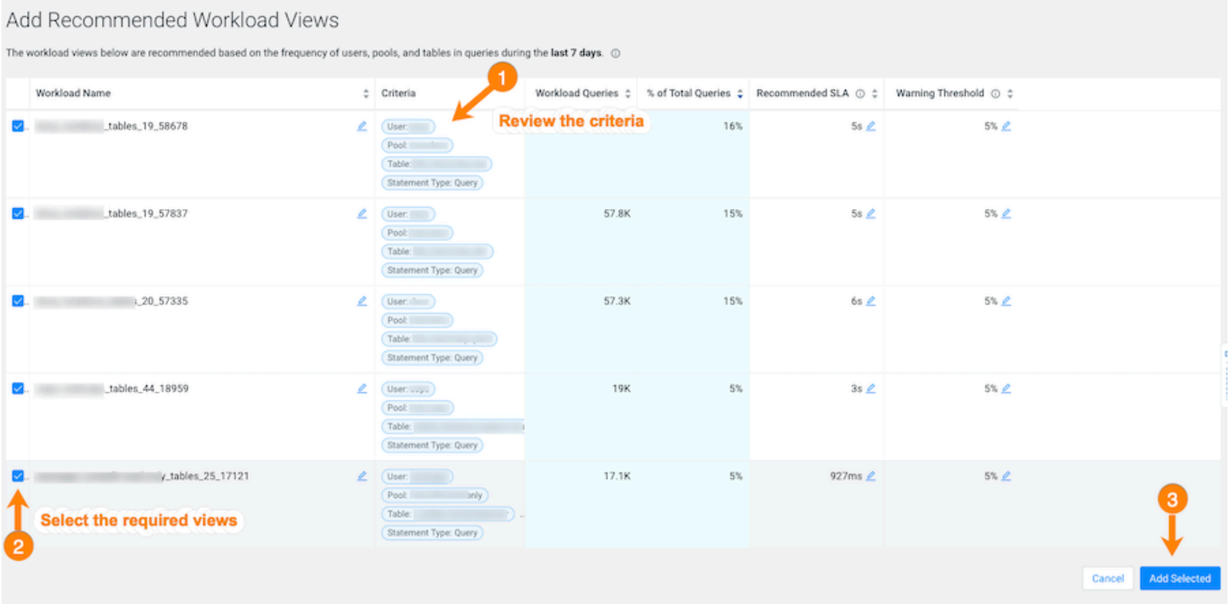
Workloads

Define a workload view to monitor subsets of queries in your cluster.

Select recommended workload views that are based on query frequency and regularity.

Manually select criteria to define a workload view.

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



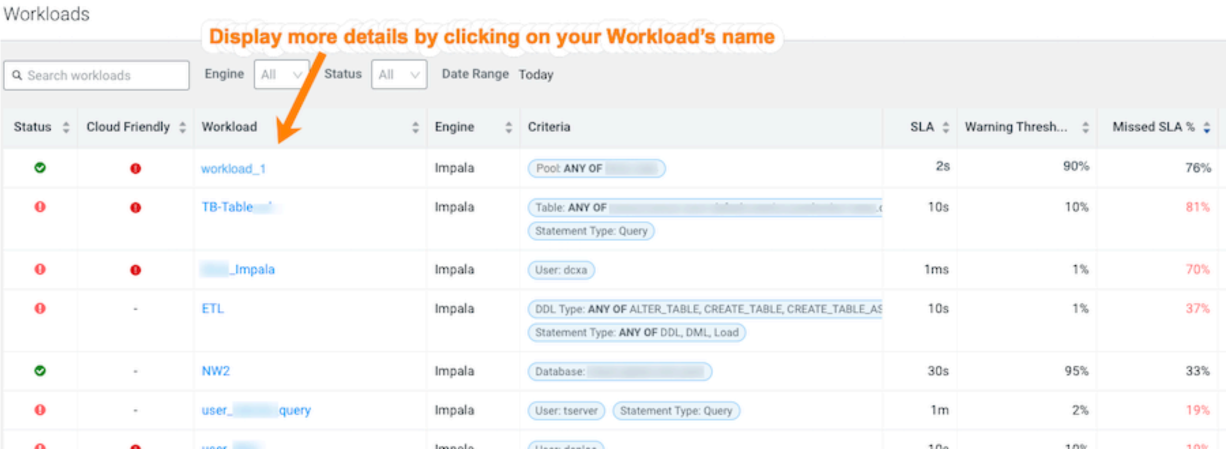
Add Recommended Workload Views

The workload views below are recommended based on the frequency of users, pools, and tables in queries during the **last 7 days**.

	Workload Name	Criteria	Workload Queries	% of Total Queries	Recommended SLA	Warning Threshold
☑	_tables_19_58678	User: Pool: Table: Statement Type: Query		16%	5s	5%
☑	_tables_19_57837	User: Pool: Table: Statement Type: Query	57.8K	15%	5s	5%
☑	_20_57335	User: Pool: Table: Statement Type: Query	57.3K	15%	6s	5%
☑	_tables_44_18959	User: Pool: Table: Statement Type: Query	19K	5%	3s	5%
☑	y_tables_25_17121	User: Pool: only Table: Statement Type: Query	17.1K	5%	927ms	5%

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

7. To verify your workload views, from the navigation panel, select Workloads and then on the Workload page locate the workload view you added. When verified, click the workload to view its details:



Workloads

Engine All Status All Date Range Today

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%

Defining Workload Views Manually

Steps for manually defining your workload views.

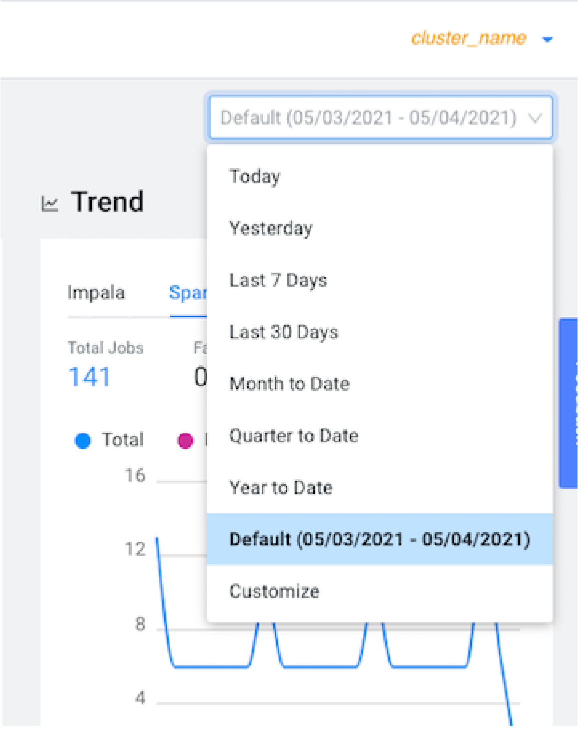
About this task

This task describes how to manually define your Workload Views.

Procedure

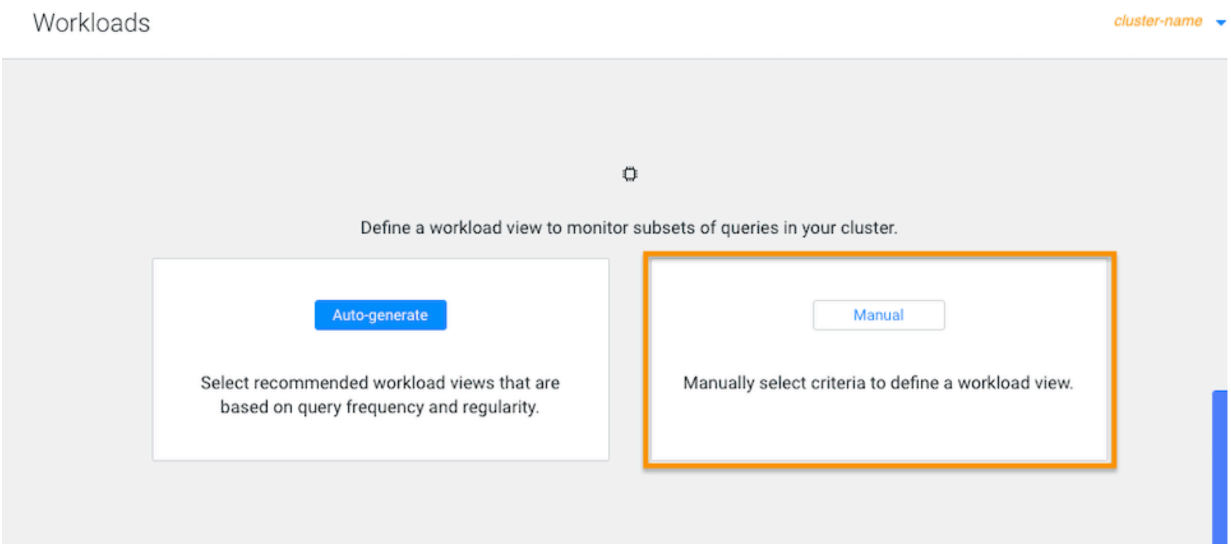
1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.

2. In the Search field of the Clusters page, enter the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.



4. From the navigation panel, select Workloads.

5. In the Workloads page, click Manual:

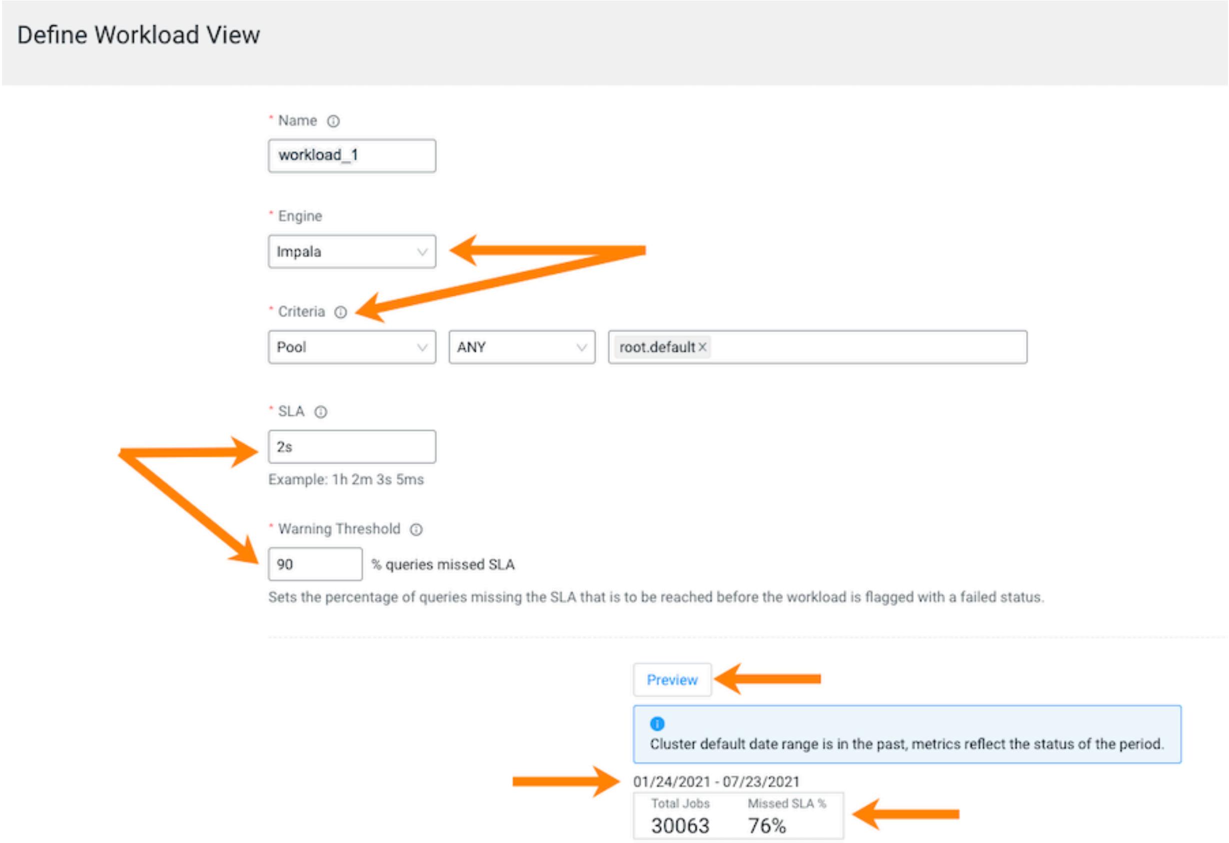


Workloads
cluster-name
Define a workload view to monitor subsets of queries in your cluster.
Auto-generate
Select recommended workload views that are based on query frequency and regularity.
Manual
Manually select criteria to define a workload view.

The Define Workload View 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, Workload XM will monitor 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:



Define Workload View

* Name: workload_1

* Engine: Impala

* Criteria: Pool | ANY | root.default ×

* SLA: 2s

Example: 1h 2m 3s 5ms

* Warning Threshold: 90 % 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.

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

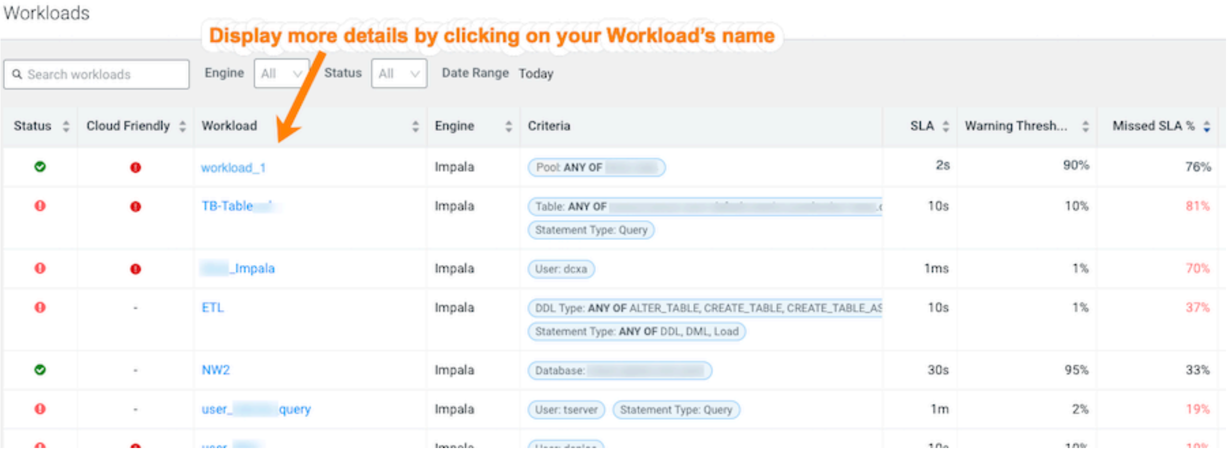
01/24/2021 - 07/23/2021

Total Jobs	Missed SLA %
30063	76%

6. (Optional) To display a summary of the queries matching your criteria, click Preview. Which displays the date range, the number of queries that match the criteria, and the number of queries that missed the SLA condition.

7. When you are satisfied with the results, click Save.

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



Workloads

Display more details by clicking on your Workload's name

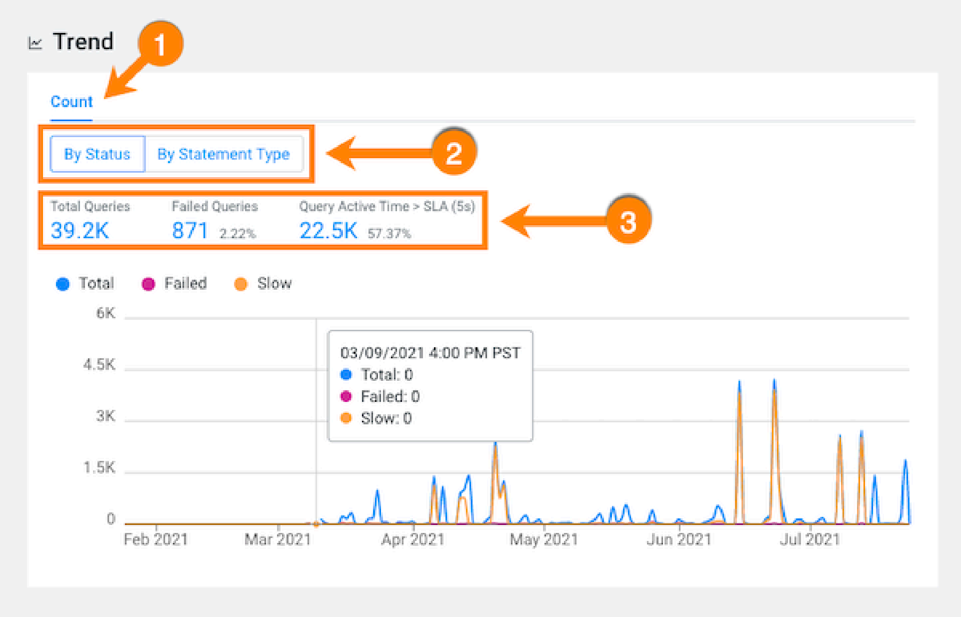
Status	Cloud Friendly	Workload	Engine	Criteria	SLA	Warning Thresh...	Missed SLA %
✓	!	workload_1	Impala	Pool: ANY OF [redacted]	2s	90%	76%
!	!	TB-Table [redacted]	Impala	Table: ANY OF [redacted] Statement Type: Query	10s	10%	81%
!	!	[redacted]_Impala	Impala	User: dcxa	1ms	1%	70%
!	-	ETL	Impala	DDL Type: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

Tip: When you have a long list of Workload views, sorting the Workload column alphabetically in ascending or descending order by clicking the up or down arrows, helps locate the workload.

8. (Optional) To view more information about the workloads using the view's formula, open the Summary page by clicking the name of the workload view in the Workload column, which visually displays the view's details as chart widgets that you can use to further analyze the results.

   The following examples, display how this group of queries are meeting the Workload view's SLA in the Trend chart, where:

   - The Count tab, displays the number of executing queries, either By Status or By Statement Type. To view further details, click the Total Queries, the Failed Queries, or the Query Active Time value.

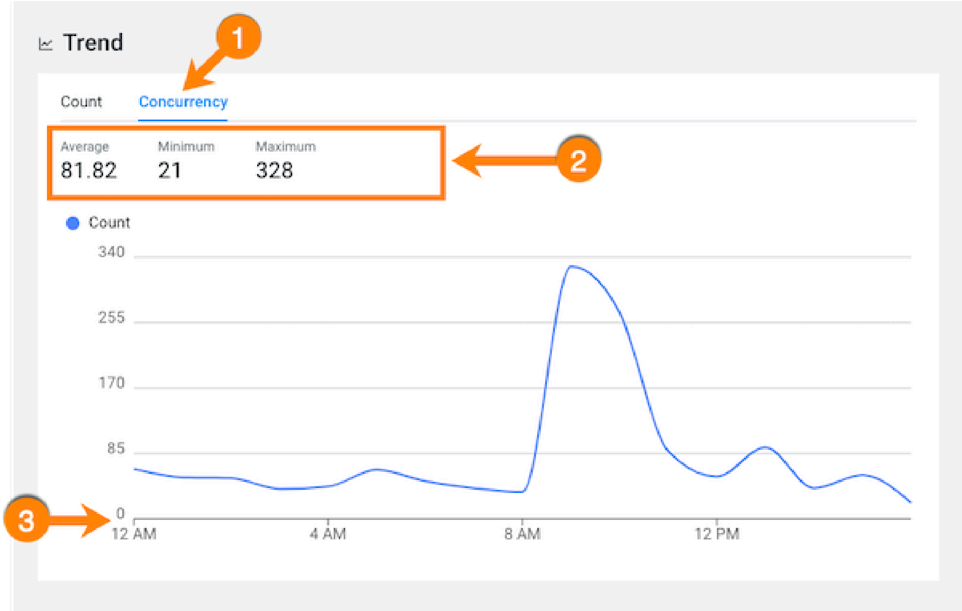


Total Queries 39.2K
Failed Queries 871 2.22%
Query Active Time > SLA (5s) 22.5K 57.37%

03/09/2021 4:00 PM PST
Total: 0
Failed: 0
Slow: 0

   - The Concurrency tab (which is not available for CDP), displays the number of queries executing concurrently.

     In the following example, the maximum concurrency for this view is 328. This indicates that for the queries monitored by this view,328 queries accessed the same data at the same time during the specified time period. The graph view displays how the concurrency fluctuates over the date range specified for the workload view.



Average 81.82
Minimum 21
Maximum 328

Assigning Access Roles in Workload XM

Workload XM 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 Workload XM 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 Workload XM environment.

Understanding the Workload XM Access Roles

Describes the Workload XM access roles.

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

Workload XM supports cluster privilege roles that define Workload XM 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 Workload XM user who is assigned the System Admin access role has full access rights and system administrator privileges across all clusters within the Workload XM 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 Workload XM cluster policies and user access from the Access Management page
Cluster	• View all the workload clusters on the Clusters page • Rename a workload cluster • Delete a workload cluster
Workloads	• Create workloads • View all the workloads in a cluster • Update all the workloads in a cluster • Delete all the workloads in a cluster
Queries	View all the queries in all the clusters of the Workload XM environment
Jobs	View all the jobs in all the clusters of the Workload XM environment

Resource	Actions
Chargeback	• Create cost centers • Update cost centers • List cost centers • Delete cost centers • View all the Chargeback related dashboards
Auto Actions	• Create auto actions • View auto actions • Update auto actions • Disable auto actions • Delete auto actions • Enable an auto action email

Cluster Admin Access Role

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

Table 2: Cluster Admin

Resource	Actions
Cluster	• View the assigned Workload cluster on the Clusters page • Rename the Workload cluster • Delete the Workload cluster
Workloads	• Create workloads • View all workloads in the assigned cluster • Update all workloads in the assigned cluster • Delete all workloads in the assigned cluster
Queries	View all the queries in the assigned cluster
Jobs	View all the jobs in the assigned cluster

Cluster User Access Role

An authentic Workload XM user who is assigned the Cluster User access role has limited access rights across an assigned cluster within the Workload XM 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 Workload XM Cluster Policy

Describes the Workload XM Cluster Policy criteria that is used to assign Workload XM access roles to your users.

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

- One or more LDAP Group identifier account names.
- One or more user names. By default, Workload XM authenticates user access by checking that the user is a member of an LDAP group.
- A Workload XM 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.

Workload XM 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 Workload XM cluster policies.

Configuring a Default Systems Administrator for Workload XM

Pre-tasks that are required before you can start enabling role based access in Workload XM.

About this task

Describes how to enable role based access in Workload XM and configure a Workload XM default systems administrator.

Before you can assign access roles in Workload XM 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 Workload XM UI and assign the System Admin access policy role to one or more users.

Procedure

1. In a supported web browser on the Workload XM on-premises cluster, log in to Cloudera Manager.
2. In Cloudera Manager, select Clusters, WXM, and then click the Configuration tab.
3. In the Configuration page, search for the Role Based Access enabled property and then select its WXM (Service-Wide) check box.

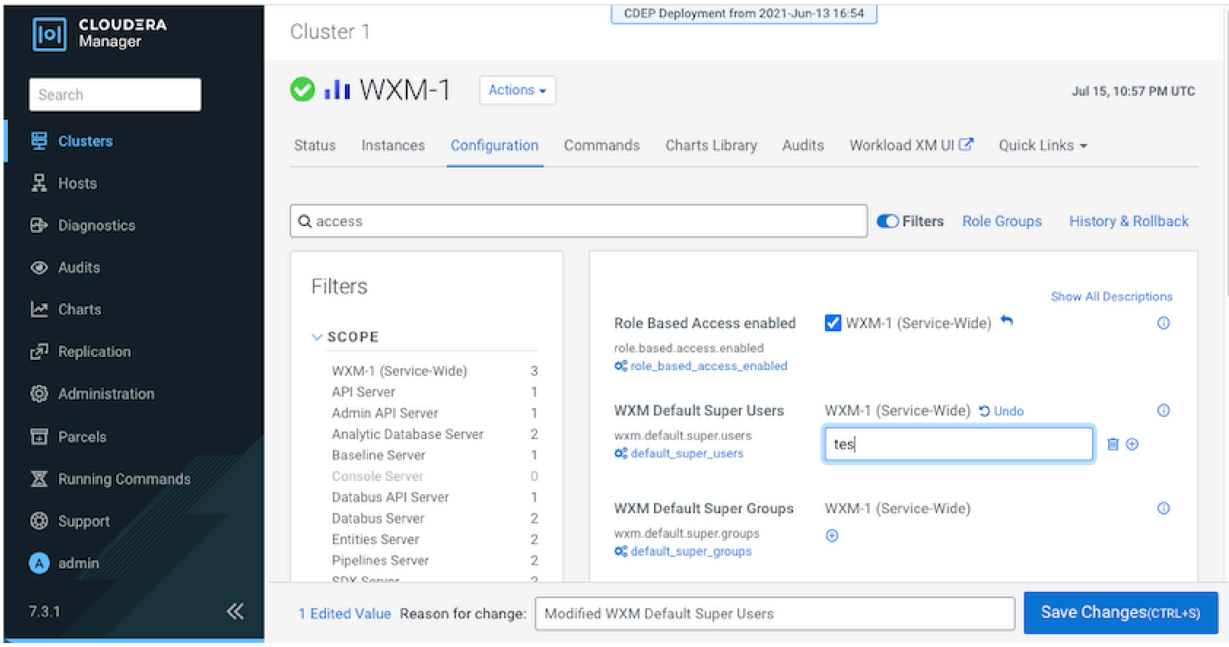
4. According to your requirements, do one of the following:

   a. In the WXM (Service Wide) field of the WXM 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 Workload XM. By default, admin.

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

   b. In the WXM (Service Wide) field of the WXM 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:



access

Filters

SCOPE

WXM-1 (Service-Wide)	3
API Server	1
Admin API Server	1
Analytic Database Server	2
Baseline Server	1
Console Server	0
Databus API Server	1
Databus Server	2
Entities Server	2
Pipelines Server	2

Role Based Access enabled — role.based.access.enabled — role_based_access_enabled: ☑ WXM-1 (Service-Wide)

WXM Default Super Users — wxm.default.super.users — default_super_users: WXM-1 (Service-Wide) Undo: tes

WXM Default Super Groups — wxm.default.super.groups — default_super_groups: WXM-1 (Service-Wide)

1 Edited Value Reason for change: Modified WXM Default Super Users

Save Changes(CTRL+S)

5. Click Save Changes.
6. Navigate to the top of the Workload XM service page and from the Actions menu, restart the Workload XM service, by selecting Restart.

Assigning Workload XM Access Roles

Role based access to your Workload jobs and queries requires a Workload XM 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.

Assigning a Workload XM System Admin Access Role

Steps for assigning a System Admin access role to your Workload XM users.

About this task

Describes how to assign a Workload XM 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 Workload XM environment and can create your Workload XM Cluster Policies that define your access roles.

Note: Generally, only a user assigned the System Admin access role can create a Workload XM 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.
- 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 Workload XM as the user with default systems administrator privileges.
2. From the Workload XM Navigation side-bar, select Access Management.
3. In the Access Management page, click New Cluster Policy.

   The Create Cluster Policy page opens.
4. 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.
5. From the Assign Roles list, select System Admin.
6. Click Create.

   Note: Workload XM will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy.

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.

Assigning a Workload XM Cluster Admin Access Role

Steps for assigning a Cluster Admin access role to your Workload XM users.

About this task

Describes how to assign a Workload XM Role Based Access (RBAC) role for a cluster administrator.

Note: Only a user assigned the System Admin access role can create a Workload XM Cluster Policy.

Procedure

1. In a supported web browser log in to Workload XM as a user that has been granted the System Admin access role.
2. From the Workload XM Navigation side-bar, select Access Management.
3. In the Access Management page, click New Cluster Policy.

   The Create Cluster Policy page opens.
4. 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.
5. From the Assign Roles list, select Cluster Admin.
6. From the Cluster list, select the name of the cluster that will be assigned to this policy's access role.
7. Click Create.

   Note: Workload XM will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy.

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.

Assigning a Workload XM Cluster User Access Role

Steps for assigning a Cluster User access role to your Workload XM users.

About this task

Describes how to assign a Workload XM Role Based Access (RBAC) role for a cluster user.

Note: Only a user assigned the System Admin access role can create a Workload XM Cluster Policy.

Procedure

1. In a supported web browser log in to Workload XM as a user that has been granted the System Admin access role.
2. From the Workload XM Navigation side-bar, select Access Management.
3. In the Access Management page, click New Cluster Policy.

   The Create Cluster Policy page opens.
4. 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.
5. From the Assign Roles list, select Cluster User.
6. From the Cluster list, select the name of the cluster that will be assigned to this policy's access role.
7. (Optional) 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:

   a. 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.

   b. 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.
8. Click Create.

   Note: Workload XM will take at least 60 minutes to assign the access role to the user, users, and/or groups provided in the Cluster Policy.

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.

Managing Your Workload XM Access Roles

Describes how to manage your Workload XM cluster policies and access roles.

Information about your Workload XM 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 Workload XM access role.
- The Role column displays the Workload XM 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 Workload XM 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.

Troubleshooting an Abnormal Job Duration

Identify areas of risk from jobs running on your cluster that complete within an unusual time period.

About this task

Describes how to locate and troubleshoot an abnormal job duration.

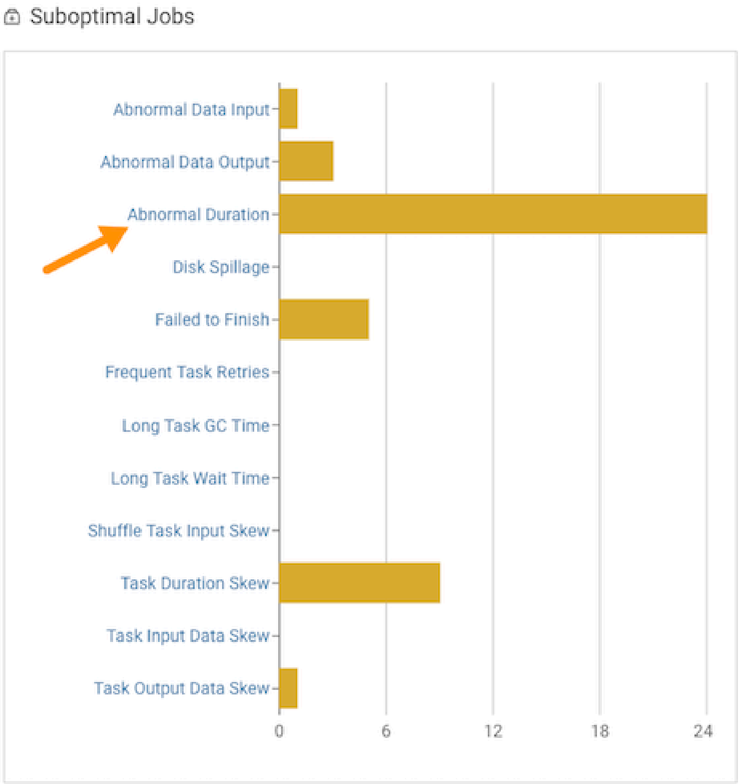
Steps with examples from a Spark engine are included that explain how to further investigate and troubleshoot the cause of an abnormal job duration.

Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Clusters page do one of the following:
   - In the Search field, enter the name of the cluster whose workloads you want to analyze.
   - From the Cluster Name column, locate and click on the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.
4. In the Usage Analysis chart, click the engine whose Failed column displays the number of jobs that did not complete.

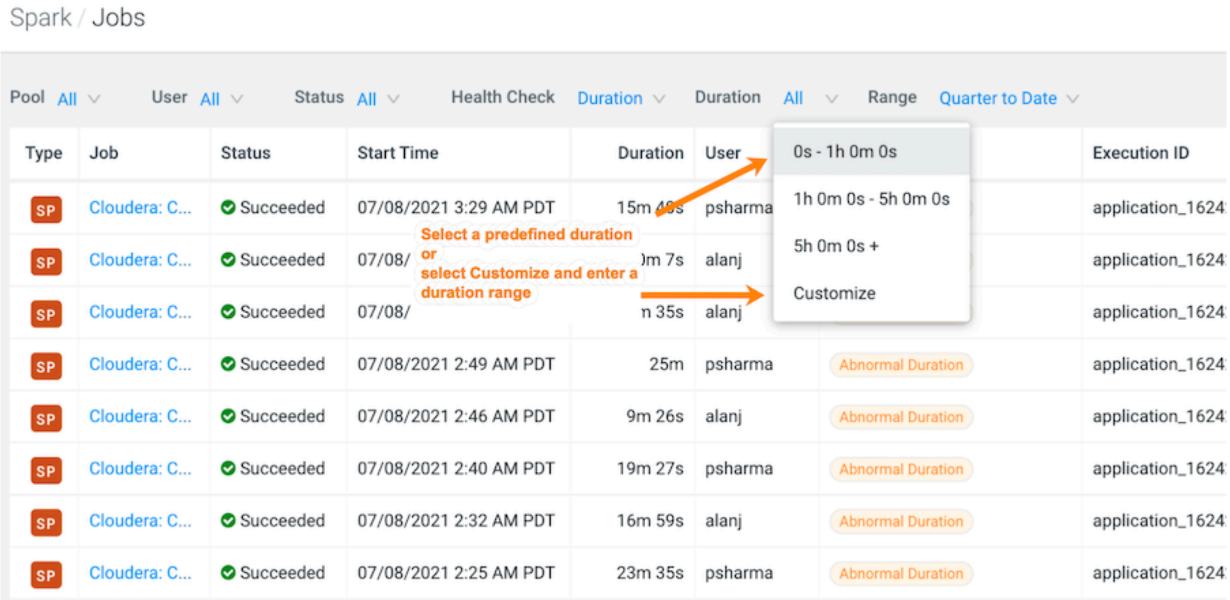
5. Depending on the engine you selected, in the engine's page that opens scroll down to either the Suboptimal Jobs or the Suboptimal Queries chart widget and click the Abnormal Duration health check bar.

   The Jobs or Queries page opens, listing all the jobs or queries that have triggered the Abnormal Duration Health check.

   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.

6. 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 list.

   Spark / Jobs

   Pool All | User All | Status All | Health Check Duration | Duration All | Range Quarter to Date

Type	Job	Status	Start Time	Duration	User		Execution ID
SP	Cloudera: C...	✓ Succeeded	07/08/2021 3:29 AM PDT	15m 40s	psharma		application_1624
SP	Cloudera: C...	✓ Succeeded	07/08/	)m 7s	alanj		application_1624
SP	Cloudera: C...	✓ Succeeded	07/08/	n 35s	alanj		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

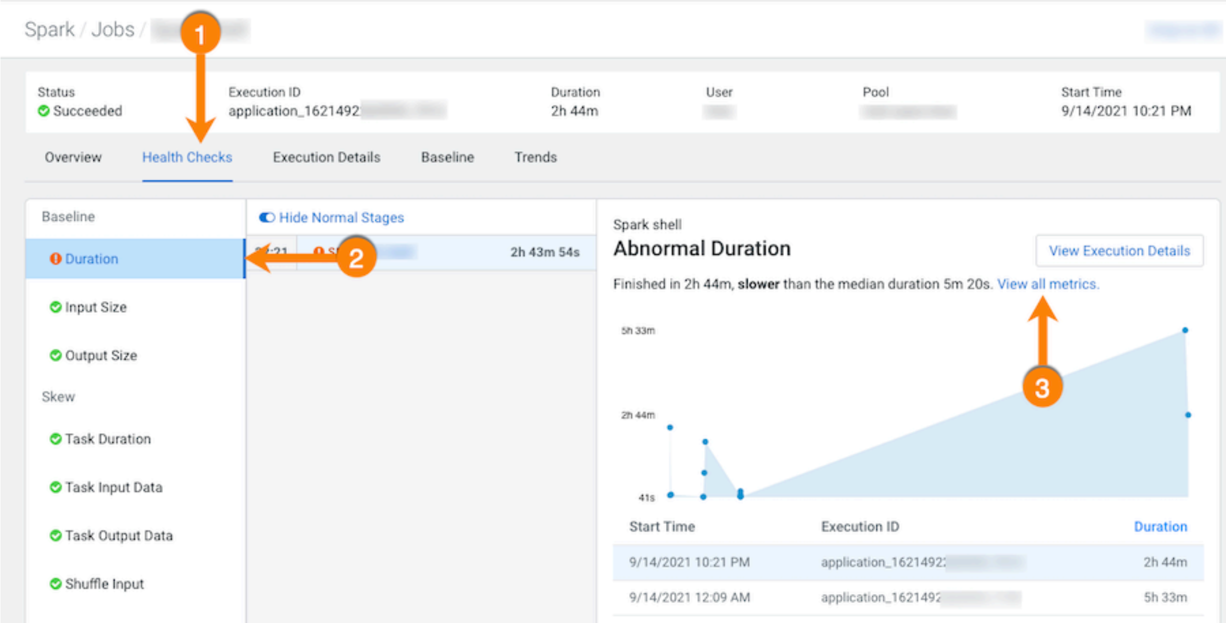
   Select a predefined duration or select Customize and enter a duration range

7. 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 Health checks are displayed.

8. Display more information about the job's duration by selecting Durationfrom 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.



Spark / Jobs / [redacted]

Status: Succeeded

Execution ID: application_1621492[redacted]

Duration: 2h 44m

User: [redacted]

Pool: [redacted]

Start Time: 9/14/2021 10:21 PM

Spark shell

Abnormal Duration

Finished in 2h 44m, **slower** than the median duration 5m 20s. View all metrics.

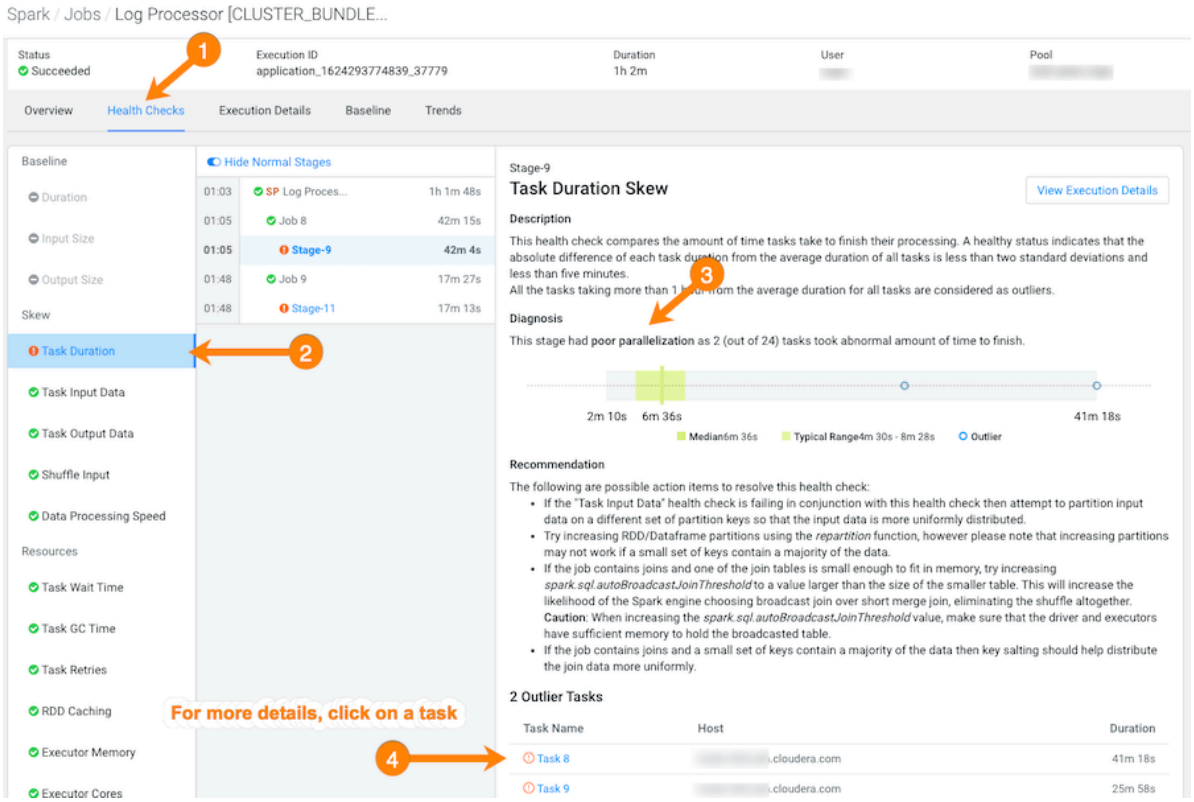
Start Time	Execution ID	Duration
9/14/2021 10:21 PM	application_1621492[redacted]	2h 44m
9/14/2021 12:09 AM	application_1621492[redacted]	5h 33m

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

10. 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:



Status
Succeeded

Execution ID
application_1624293774839_37779

Duration
1h 2m

User
[redacted]

Pool
[redacted]

Stage-9

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:

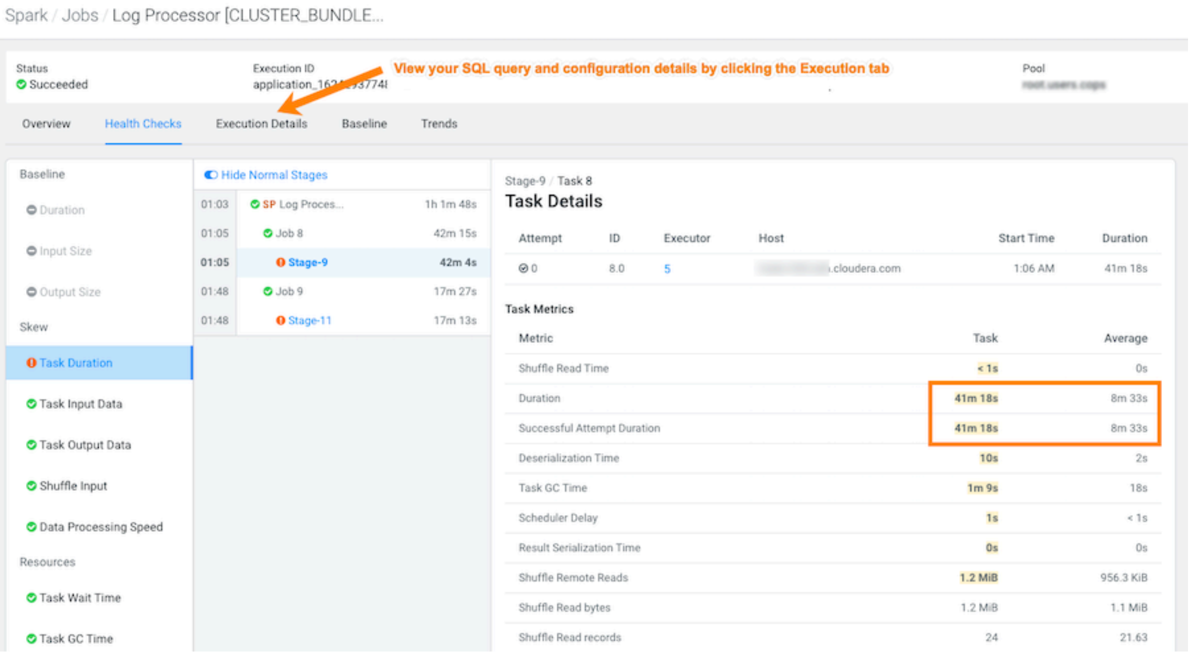
- If the "Task Input Data" health check is failing in conjunction with this health check then attempt to partition input data on a different set of partition keys so that the input data is more uniformly distributed.
- Try increasing RDD/Dataframe partitions using the *repartition* function, however 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	[redacted].cloudera.com	41m 18s
Task 9	[redacted].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:



Spark / Jobs / Log Processor [CLUSTER_BUNDLE...

Status: Succeeded | Execution ID: application_162[illegible]93774 | Pool: [redacted]

View your SQL query and configuration details by clicking the Execution tab

Baseline: Duration, Input Size, Output Size
Skew: Task Duration, Task Input Data, Task Output Data, Shuffle Input, Data Processing Speed
Resources: Task Wait Time, Task GC Time

Hide Normal Stages

01:03	SP Log Proces...	1h 1m 48s
01:05	Job 8	42m 15s
01:05	Stage-9	42m 4s
01:48	Job 9	17m 27s
01:48	Stage-11	17m 13s

Stage-9 / Task 8

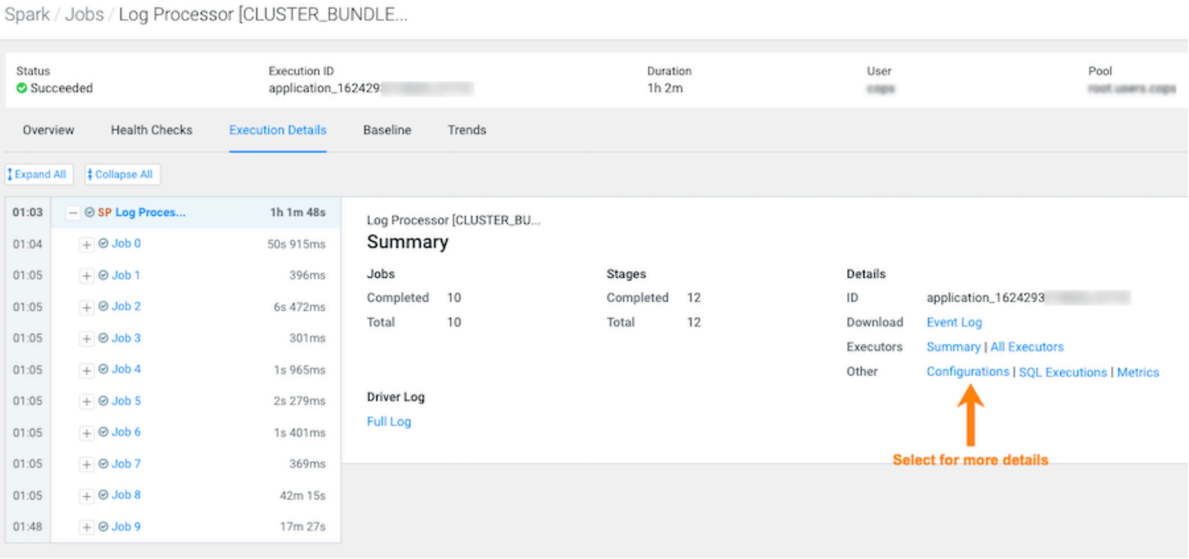
Task Details

Attempt	ID	Executor	Host	Start Time	Duration
0	8.0	5	[redacted].cloudera.com	1:06 AM	41m 18s

Task Metrics

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:



Spark / Jobs / Log Processor [CLUSTER_BUNDLE...

Status: Succeeded | Execution ID: application_162429[redacted] | Duration: 1h 2m | User: [redacted] | Pool: [redacted]

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: Completed 10, Total 10

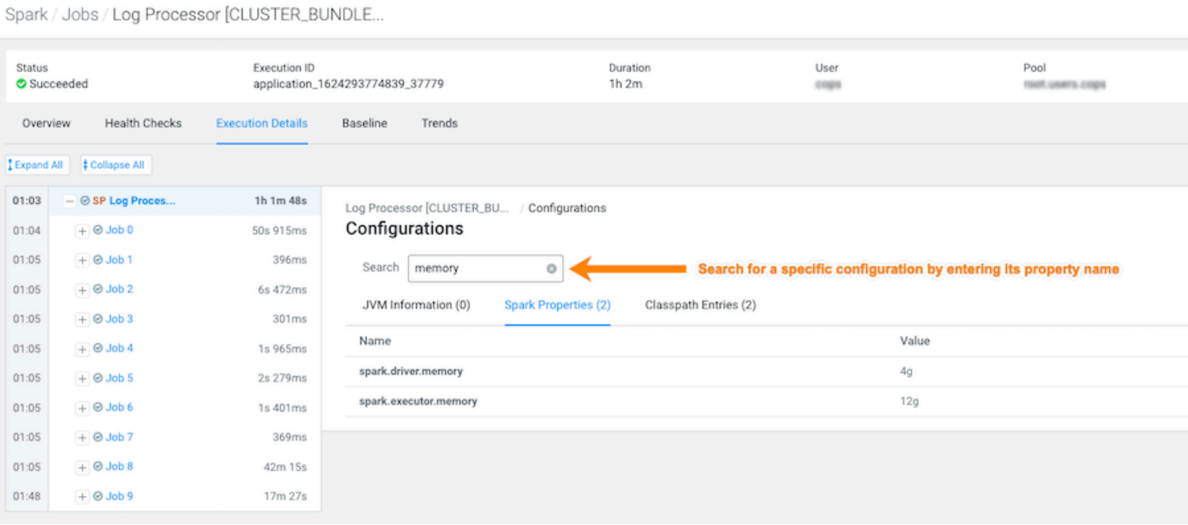
Stages: Completed 12, Total 12

Details:
ID: application_1624293[redacted]
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:



Spark / Jobs / Log Processor [CLUSTER_BUNDLE...

Status	Execution ID	Duration	User	Pool
Succeeded	application_1624293774839_37779	1h 2m	[redacted]	[redacted]

Overview Health Checks Execution Details Baseline Trends

Expand All Collapse All

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

Search for a specific configuration by entering its property name

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

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

Troubleshooting Failed Jobs

Steps for troubleshooting incomplete jobs running on your cluster.

About this task

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

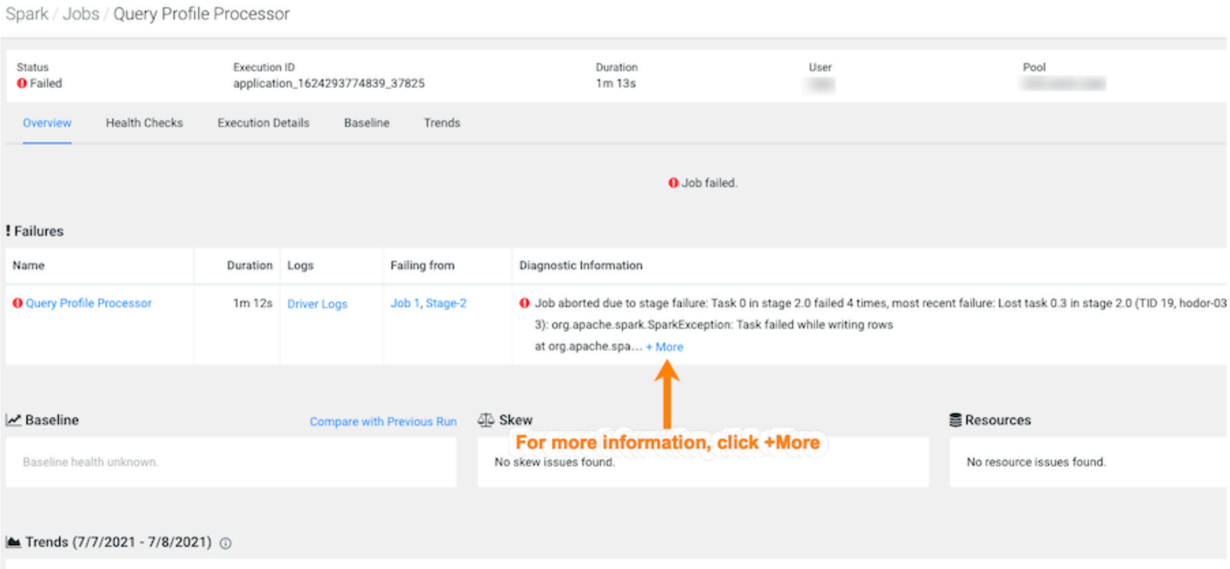
Steps with examples from a Spark engine are included that describe how to further investigate and troubleshoot the root cause of an uncompleted job.

Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Clusters page do one of the following:
   - In the Search field, enter the name of the cluster whose workloads you want to analyze.
   - From the Cluster Name column, locate and click on the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.
4. In the Usage Analysis chart widget, notice which engine's are displaying Failed jobs and then from the Trend widget, select the tab of an engine whose failed jobs you wish to analyze and then click its Total Jobs value.

   The engine's Jobs page opens.
5. From the Health Check list, select Failed to Finish, which filters the list to display a list of jobs that did not complete.

6. 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.


Spark / Jobs / Query Profile Processor
Overview
Health Checks
Execution Details
Baseline
Trends
Baseline
Compare with Previous Run
Skew
Resources
Trends (7/7/2021 - 7/8/2021)

Status: Failed

Execution ID: application_1624293774839_37825

Duration: 1m 13s

User: [redacted]

Pool: [redacted]

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 3): org.apache.spark.SparkException: Task failed while writing rows at org.apache.spa… + More

For more information, click +More

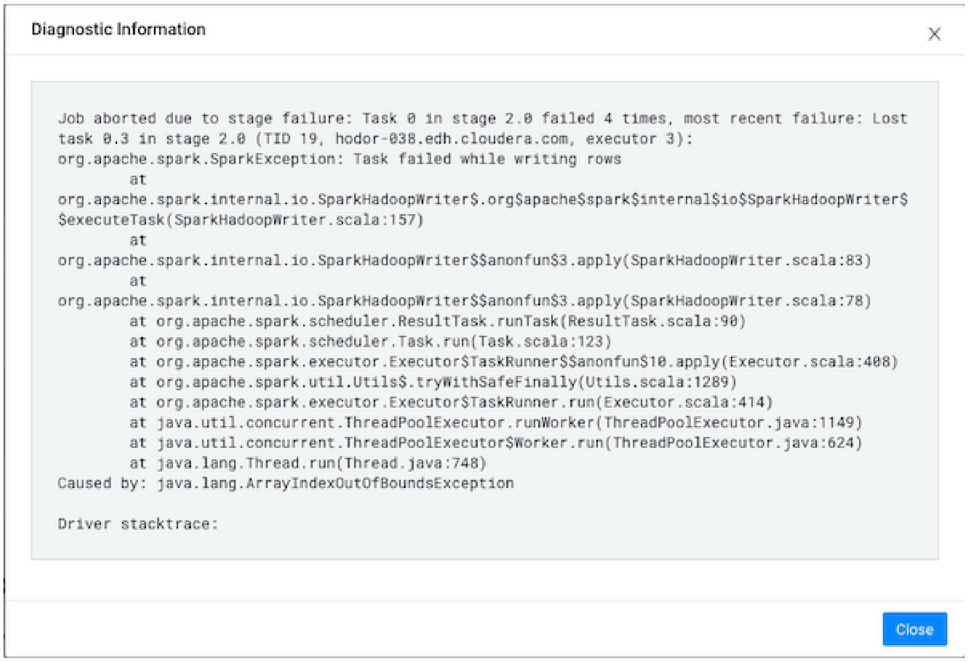
Baseline health unknown.

No skew issues found.

No resource issues found.

7. 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's case, the job was aborted whilst writing rows due to an out of bounds java exception:



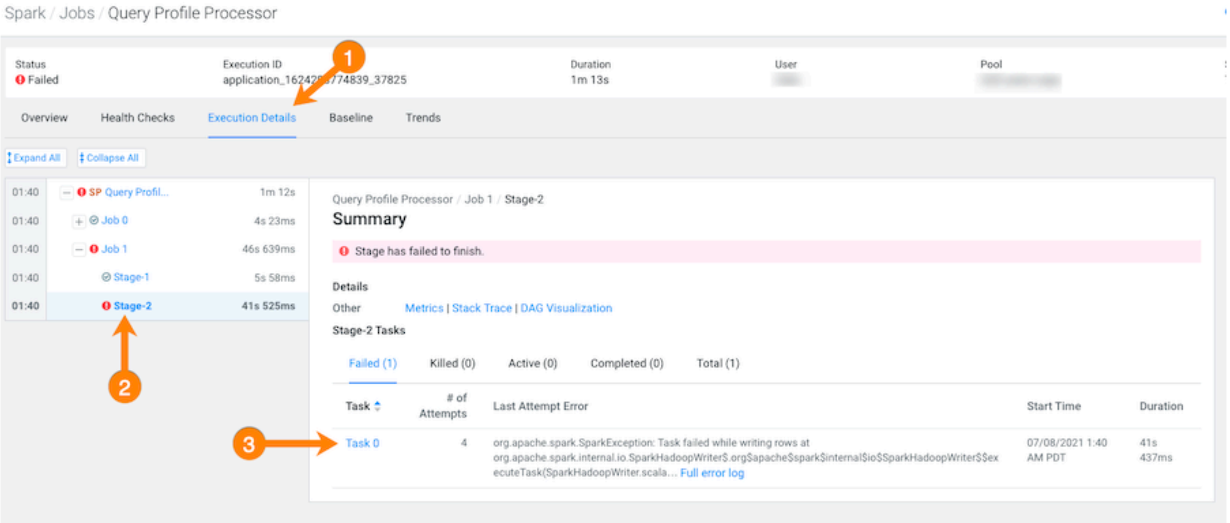
```
Job aborted due to stage failure: Task 0 in stage 2.0 failed 4 times, most recent failure: Lost
task 0.3 in stage 2.0 (TID 19, hodor-038.edh.cloudera.com, executor 3):
org.apache.spark.SparkException: Task failed while writing rows
        at
org.apache.spark.internal.io.SparkHadoopWriter$.org$apache$spark$internal$io$SparkHadoopWriter$
$executeTask(SparkHadoopWriter.scala:157)
        at
org.apache.spark.internal.io.SparkHadoopWriter$$anonfun$3.apply(SparkHadoopWriter.scala:83)
        at
org.apache.spark.internal.io.SparkHadoopWriter$$anonfun$3.apply(SparkHadoopWriter.scala:78)
        at org.apache.spark.scheduler.ResultTask.runTask(ResultTask.scala:90)
        at org.apache.spark.scheduler.Task.run(Task.scala:123)
        at org.apache.spark.executor.Executor$TaskRunner$$anonfun$10.apply(Executor.scala:408)
        at org.apache.spark.util.Utils$.tryWithSafeFinally(Utils.scala:1289)
        at org.apache.spark.executor.Executor$TaskRunner.run(Executor.scala:414)
        at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149)
        at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624)
        at java.lang.Thread.run(Thread.java:748)
Caused by: java.lang.ArrayIndexOutOfBoundsException

Driver stacktrace:
```

8. Click Close, to close the dialog box.

9. 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:



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

01:40	SP Query Profil...	1m 12s
01:40	Job 0	4s 23ms
01:40	Job 1	46s 639ms
01:40	Stage-1	5s 58ms
01:40	Stage-2	41s 525ms

Query Profile Processor / Job 1 / Stage-2

Summary

Stage has failed to finish.

Details

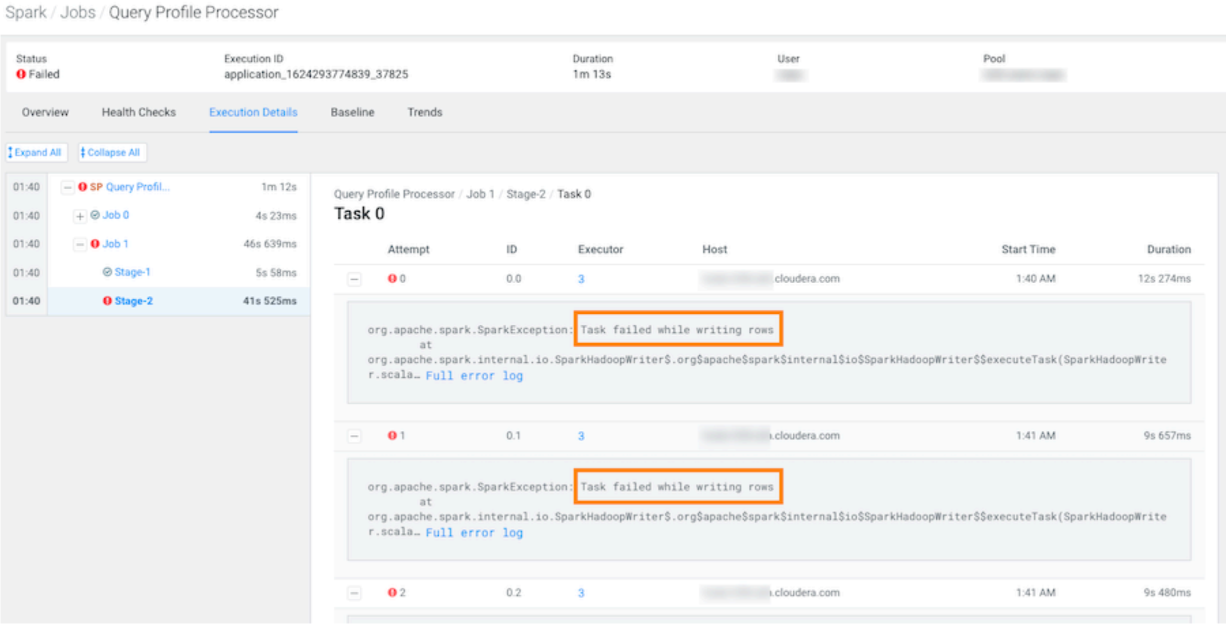
Other Metrics | Stack Trace | DAG Visualization

Stage-2 Tasks

Task	# of Attempts	Last Attempt Error	Start Time	Duration
Task 0	4	org.apache.spark.SparkException: Task failed while writing rows at org.apache.spark.internal.io.SparkHadoopWriter$.org$apache$spark$internalioSparkHadoopWriter$$executeTask(SparkHadoopWriter.scala... Full error log	07/08/2021 1:40 AM PDT	41s 437ms

10. 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.



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

01:40	SP Query Profil...	1m 12s
01:40	Job 0	4s 23ms
01:40	Job 1	46s 639ms
01:40	Stage-1	5s 58ms
01:40	Stage-2	41s 525ms

Query Profile Processor / Job 1 / Stage-2 / Task 0

Task 0

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

```
org.apache.spark.SparkException: Task failed while writing rows
        at
org.apache.spark.internal.io.SparkHadoopWriter$.org$apache$spark$internal$io$SparkHadoopWriter$$executeTask(SparkHadoopWrite
r.scala… Full error log
```

```
org.apache.spark.SparkException: Task failed while writing rows
        at
org.apache.spark.internal.io.SparkHadoopWriter$.org$apache$spark$internal$io$SparkHadoopWriter$$executeTask(SparkHadoopWrite
r.scala… Full error log
```

Determining the Cause of Slow and Failed Queries

Identifying the cause of slow query run times and queries that fail to complete.

About this task

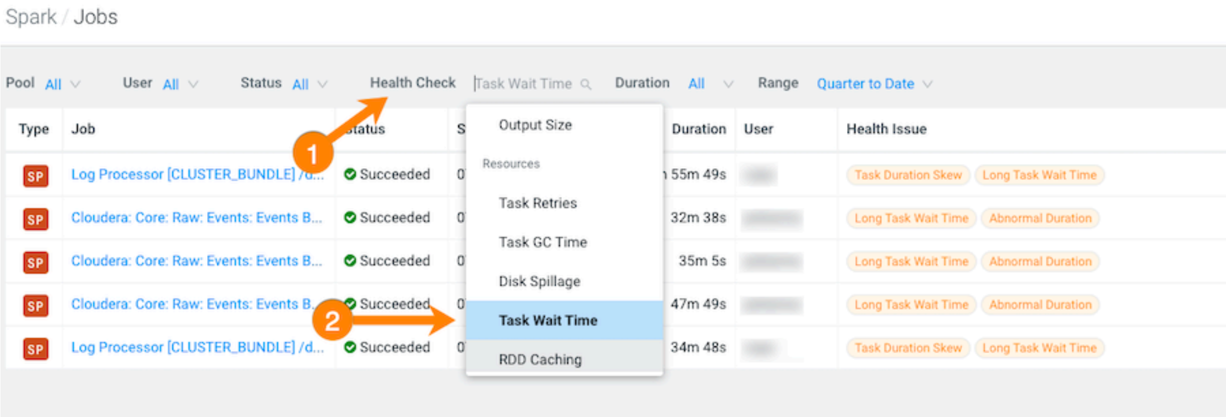
Describes how to determine the cause of slow and failed queries.

Steps with examples from a Spark engine are included that explain how to further investigate and troubleshoot the cause of a slow and failed query.

Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Clusters page do one of the following:
   - In the Search field, enter the name of the cluster whose workloads you want to analyze.
   - From the Cluster Name column, locate and click on the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.
4. From the Trend widget, select the tab of an engine whose jobs you wish to analyze and then click its Total Jobs value.

   The engine's Jobs page opens.
5. From the Health Check list in the Jobs page, select Task Wait Time, which filters and displays a list of jobs with longer than average wait times before the process was executed.



Spark / Jobs

Pool All | User All | Status All | Health Check Task Wait Time | Duration All | Range Quarter to Date

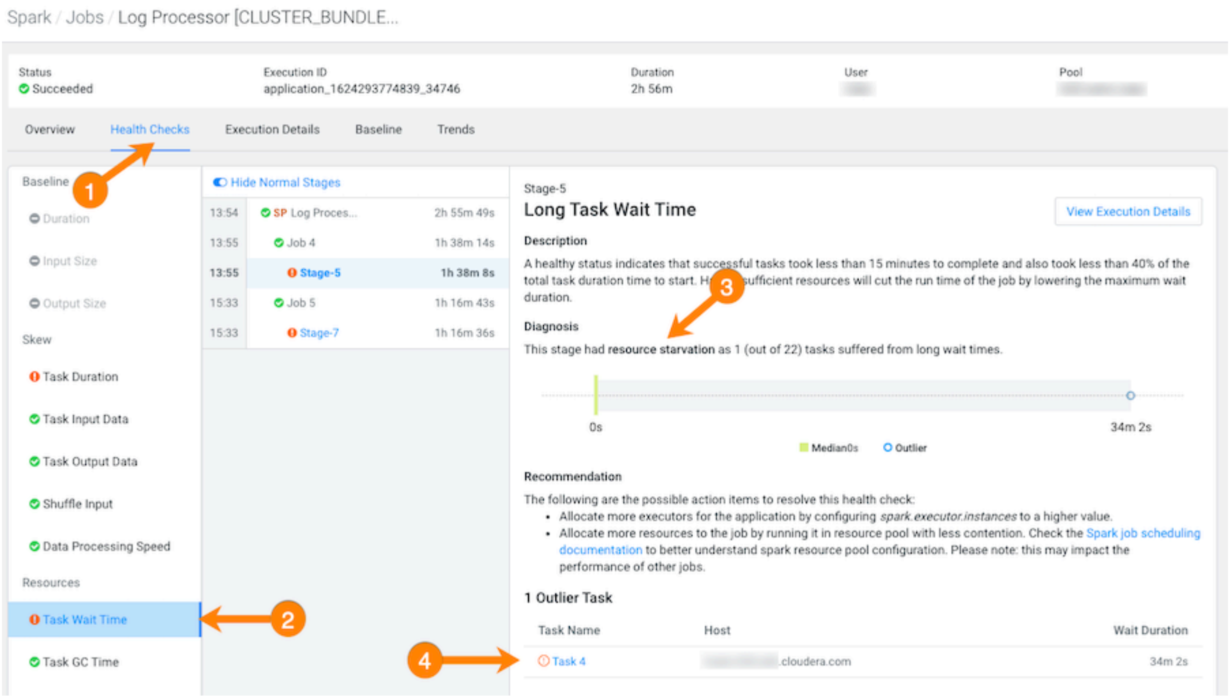
Type	Job	Status	S	Duration	User	Health Issue
SP	Log Processor [CLUSTER_BUNDLE] /d...	Succeeded	0	55m 49s	[redacted]	Task Duration Skew Long Task Wait Time
SP	Cloudera: Core: Raw: Events: Events B...	Succeeded	0	32m 38s	[redacted]	Long Task Wait Time Abnormal Duration
SP	Cloudera: Core: Raw: Events: Events B...	Succeeded	0	35m 5s	[redacted]	Long Task Wait Time Abnormal Duration
SP	Cloudera: Core: Raw: Events: Events B...	Succeeded	0	47m 49s	[redacted]	Long Task Wait Time Abnormal Duration
SP	Log Processor [CLUSTER_BUNDLE] /d...	Succeeded	0	34m 48s	[redacted]	Task Duration Skew Long Task Wait Time

6. 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.

7. 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:



Spark / Jobs / Log Processor [CLUSTER_BUNDLE...

Status: ✓ Succeeded | Execution ID: application_1624293774839_34746 | Duration: 2h 56m | User: [redacted] | Pool: [redacted]

Overview | Health Checks | Execution Details | Baseline | Trends

Baseline
- ⊖ Duration
- ⊖ Input Size
- ⊖ Output Size

Skew
- ❗ Task Duration
- ✓ Task Input Data
- ✓ Task Output Data
- ✓ Shuffle Input
- ✓ Data Processing Speed

Resources
- ❗ Task Wait Time
- ✓ Task GC Time

Hide Normal Stages

13:54	✓ SP Log Proces...	2h 55m 49s
13:55	✓ Job 4	1h 38m 14s
13:55	❗ Stage-5	1h 38m 8s
15:33	✓ Job 5	1h 16m 43s
15:33	❗ Stage-7	1h 16m 36s

Stage-5

Long Task Wait Time

View Execution Details

Description

A healthy status indicates that successful tasks took less than 15 minutes to complete and also took less than 40% of the total task duration time to start. H sufficient resources will cut the run time of the job by lowering the maximum wait duration.

Diagnosis

This stage had **resource starvation** as 1 (out of 22) tasks suffered from long wait times.

0s 34m 2s

🟩 Median0s ○ Outlier

Recommendation

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

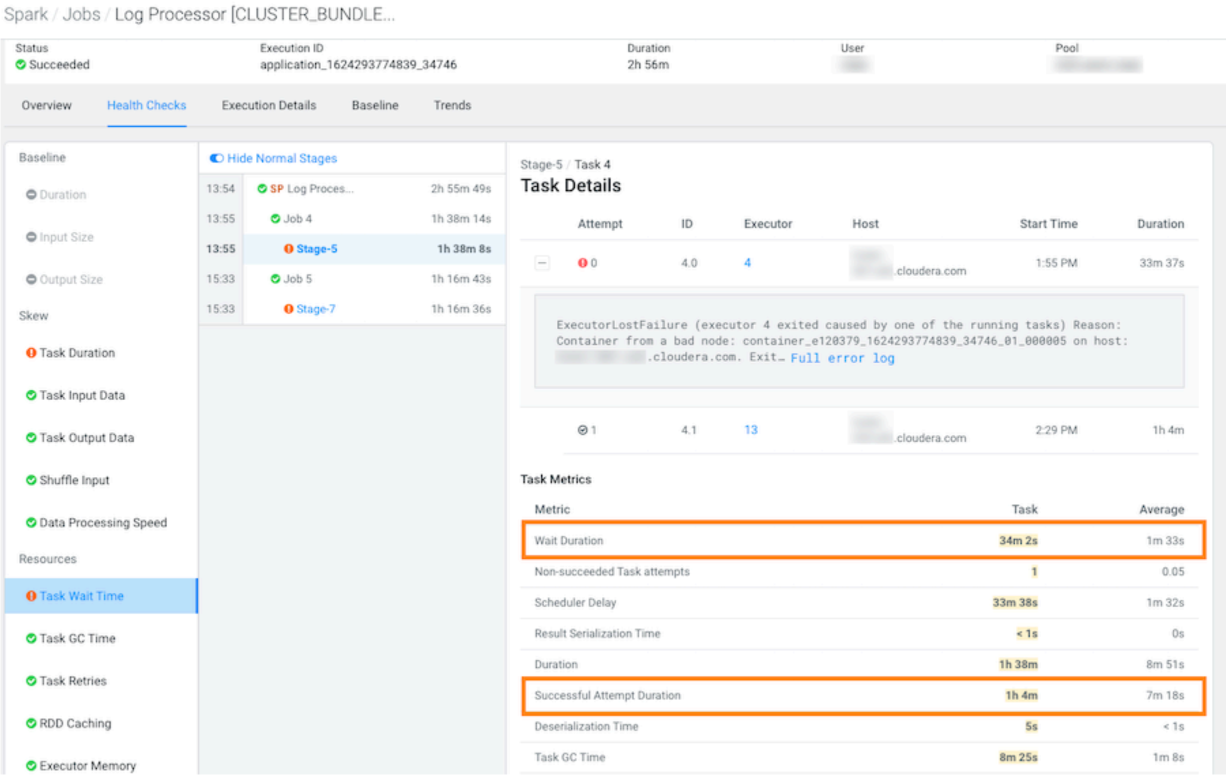
- Allocate more executors for the application by configuring *spark.executor.instances* to a higher value.
- Allocate more resources to the job by running it in resource pool with less contention. Check the Spark job scheduling documentation to better understand spark resource pool configuration. Please note: this may impact the performance of other jobs.

1 Outlier Task

Task Name	Host	Wait Duration
❗ Task 4	[redacted].cloudera.com	34m 2s

8. 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 maybe found by clicking Full error log and reviewing the log:



Status: Succeeded
Execution ID: application_1624293774839_34746
Duration: 2h 56m
User: [redacted]
Pool: [redacted]

13:54	SP Log Proces...	2h 55m 49s
13:55	Job 4	1h 38m 14s
13:55	Stage-5	1h 38m 8s
15:33	Job 5	1h 16m 43s
15:33	Stage-7	1h 16m 36s

Stage-5 / Task 4

Task Details

Attempt	ID	Executor	Host	Start Time	Duration
0	4.0	4	[redacted].cloudera.com	1:55 PM	33m 37s
1	4.1	13	[redacted].cloudera.com	2:29 PM	1h 4m

```
ExecutorLostFailure (executor 4 exited caused by one of the running tasks) Reason:
Container from a bad node: container_e120379_1624293774839_34746_01_000005 on host:
[redacted].cloudera.com. Exit… Full error log
```

Task Metrics

Metric	Task	Average
Wait Duration	34m 2s	1m 33s
Non-succeeded Task attempts	1	0.05
Scheduler Delay	33m 38s	1m 32s
Result Serialization Time	< 1s	0s
Duration	1h 38m	8m 51s
Successful Attempt Duration	1h 4m	7m 18s
Deserialization Time	5s	< 1s
Task GC Time	8m 25s	1m 8s

Troubleshooting with the Job Comparison Feature

Steps for comparing 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 Spark engine are included that help explain how to further investigate and troubleshoot.

Note: When a job is flagged as slow, you can select the slow job from the Slow Jobs 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

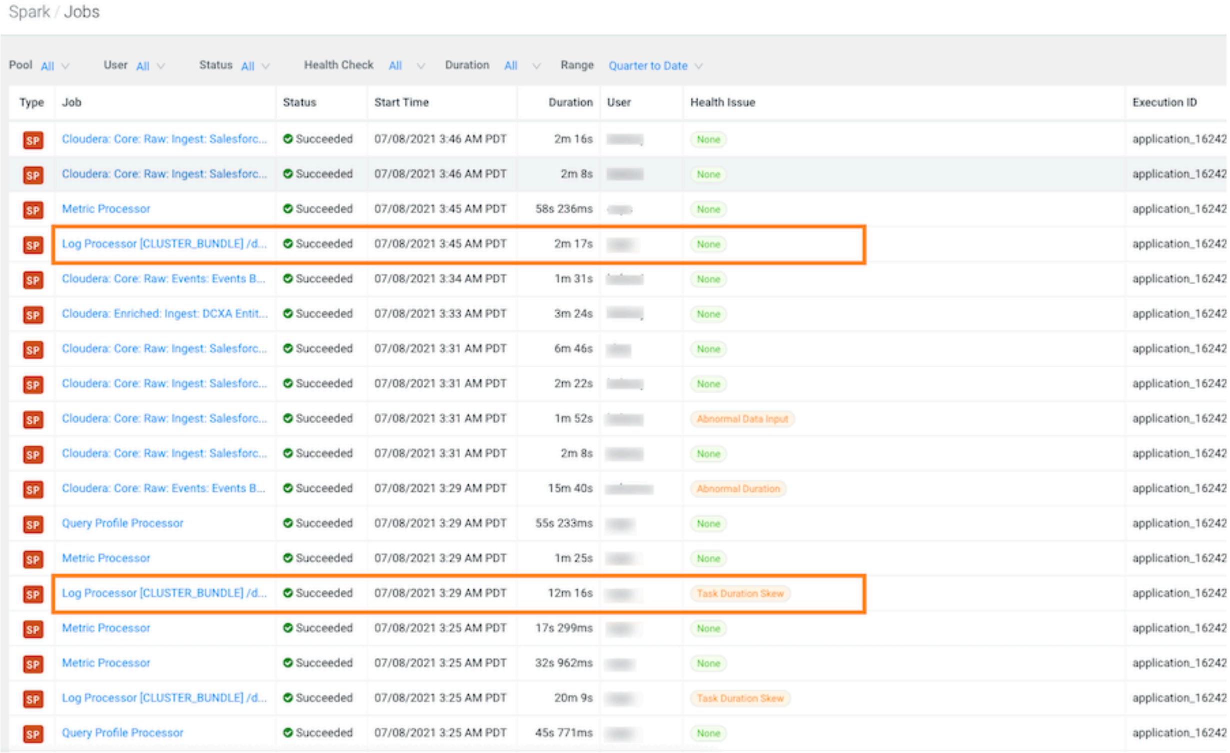
1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Search field of the Clusters page, enter the name of the cluster whose workloads you want to analyze.
3. From the time-range list in the Cluster Summary page, select a time period that meets your requirements.

4. In the Trend widget, select the tab of an engine whose jobs you want to analyze and then click its Total Jobs value.

   The engine's Jobs page opens.

5. 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:



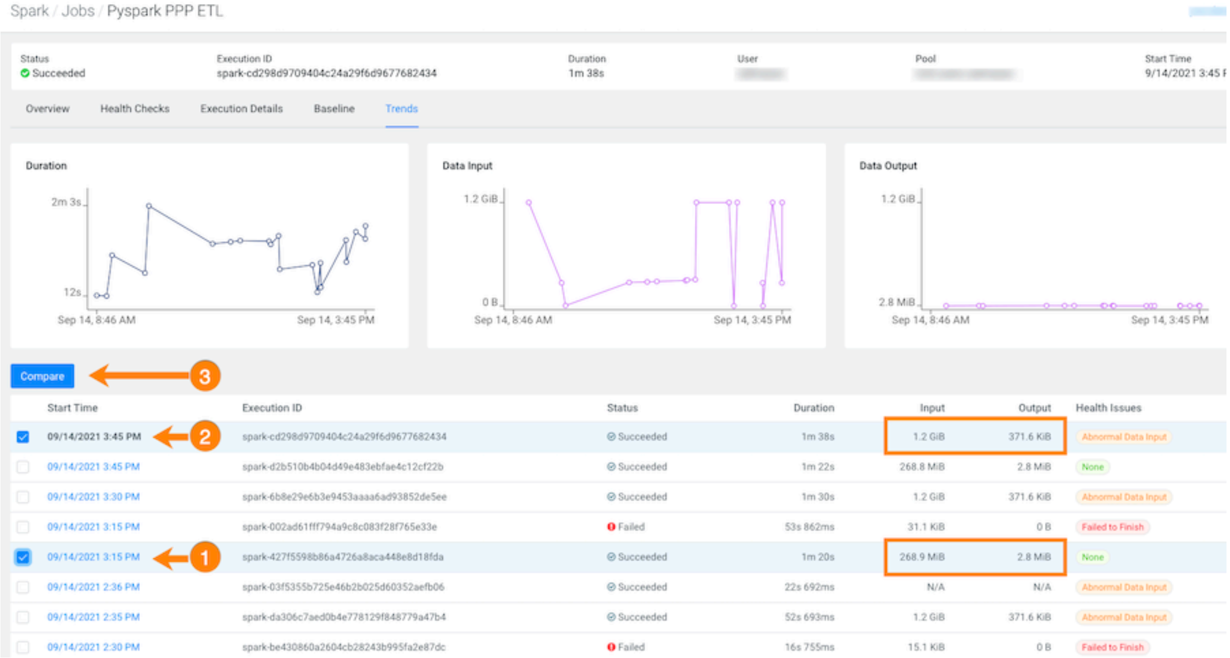
Spark / Jobs

Pool All ⌵ User All ⌵ Status All ⌵ Health Check All ⌵ Duration All ⌵ Range Quarter to Date ⌵

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

6. 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 we will compare a run with no health issues with the last run of the job:



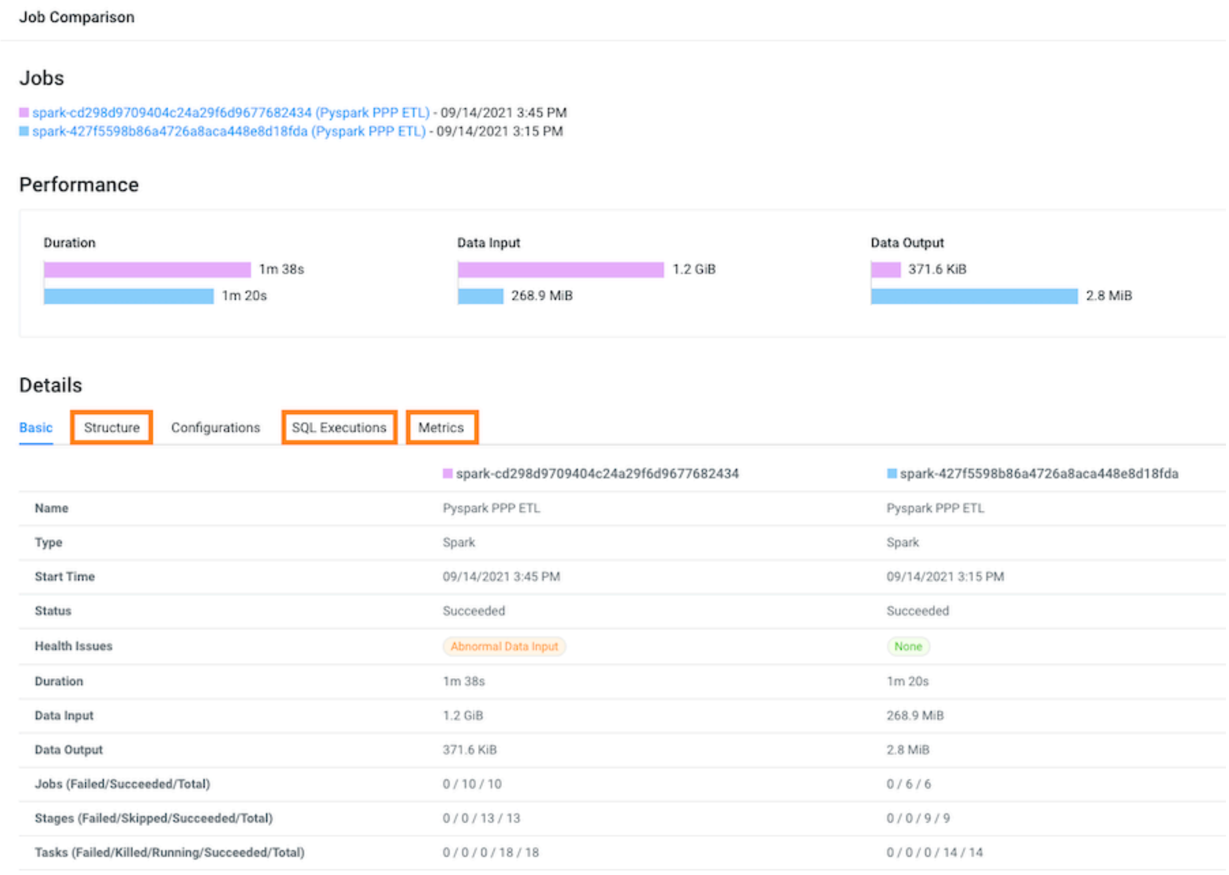
Status	Execution ID	Duration	User	Pool	Start Time
Succeeded	spark-cd298d9709404c24a29f6d9677682434	1m 38s	[redacted]	[redacted]	9/14/2021 3:45

	Start Time	Execution ID	Status	Duration	Input	Output	Health Issues
☑	09/14/2021 3:45 PM	spark-cd298d9709404c24a29f6d9677682434	Succeeded	1m 38s	1.2 GiB	371.6 KiB	Abnormal Data Input
☐	09/14/2021 3:45 PM	spark-d2b510b4b04d49e483ebfae4c12cf22b	Succeeded	1m 22s	268.8 MiB	2.8 MiB	None
☐	09/14/2021 3:30 PM	spark-6b8e29e6b3e9453aaaa6ad93852de5ee	Succeeded	1m 30s	1.2 GiB	371.6 KiB	Abnormal Data Input
☐	09/14/2021 3:15 PM	spark-002ad61fff794a9c8c083f28f765e33e	Failed	53s 862ms	31.1 KiB	0 B	Failed to Finish
☑	09/14/2021 3:15 PM	spark-427f5598b86a4726a8aca448e8d18fda	Succeeded	1m 20s	268.9 MiB	2.8 MiB	None
☐	09/14/2021 2:36 PM	spark-03f5355b725e46b2b025d60352aefb06	Succeeded	22s 692ms	N/A	N/A	Abnormal Data Input
☐	09/14/2021 2:35 PM	spark-da306c7aed0b4e778129f848779a47b4	Succeeded	52s 693ms	1.2 GiB	371.6 KiB	Abnormal Data Input
☐	09/14/2021 2:30 PM	spark-be430860a2604cb28243b995fa2e87dc	Failed	16s 755ms	15.1 KiB	0 B	Failed to Finish

7. 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:



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

Duration	Data Input	Data Output
1m 38s	1.2 GiB	371.6 KiB
1m 20s	268.9 MiB	2.8 MiB

Details

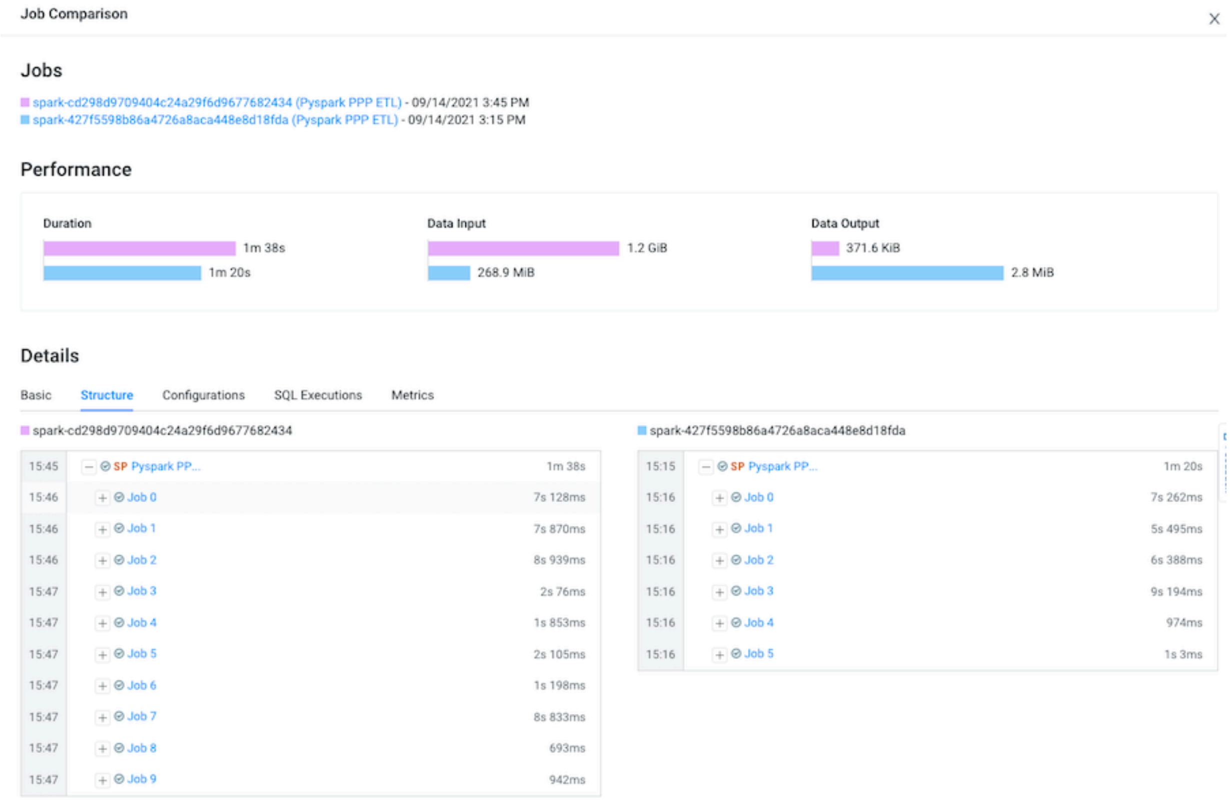
Basic | Structure | Configurations | SQL Executions | Metrics

	🟪 spark-cd298d9709404c24a29f6d9677682434	🟦 spark-427f5598b86a4726a8aca448e8d18fda
Name	Pyspark PPP ETL	Pyspark PPP ETL
Type	Spark	Spark
Start Time	09/14/2021 3:45 PM	09/14/2021 3:15 PM
Status	Succeeded	Succeeded
Health Issues	Abnormal Data Input	None
Duration	1m 38s	1m 20s
Data Input	1.2 GiB	268.9 MiB
Data Output	371.6 KiB	2.8 MiB
Jobs (Failed/Succeeded/Total)	0 / 10 / 10	0 / 6 / 6
Stages (Failed/Skipped/Succeeded/Total)	0 / 0 / 13 / 13	0 / 0 / 9 / 9
Tasks (Failed/Killed/Running/Succeeded/Total)	0 / 0 / 0 / 18 / 18	0 / 0 / 0 / 14 / 14

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

8. **8.** 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 1minute 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.



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

Duration	Data Input	Data Output
1m 38s	1.2 GiB	371.6 KiB
1m 20s	268.9 MiB	2.8 MiB

Details

Basic Structure Configurations SQL Executions Metrics

spark-cd298d9709404c24a29f6d9677682434

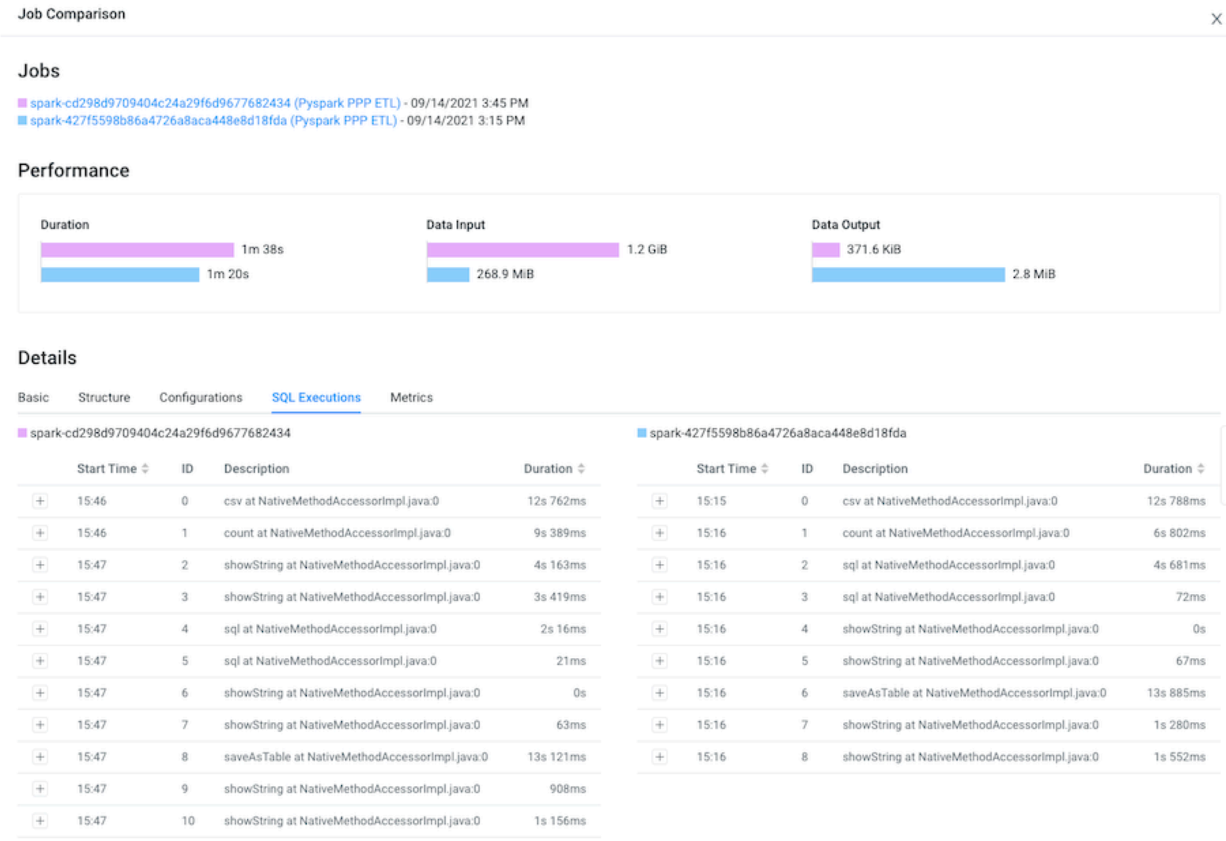
15:45	− SP Pyspark PP...	1m 38s
15:46	+ Job 0	7s 128ms
15:46	+ Job 1	7s 870ms
15:46	+ Job 2	8s 939ms
15:47	+ Job 3	2s 76ms
15:47	+ Job 4	1s 853ms
15:47	+ Job 5	2s 105ms
15:47	+ Job 6	1s 198ms
15:47	+ Job 7	8s 833ms
15:47	+ Job 8	693ms
15:47	+ Job 9	942ms

spark-427f5598b86a4726a8aca448e8d18fda

15:15	− SP Pyspark PP...	1m 20s
15:16	+ Job 0	7s 262ms
15:16	+ Job 1	5s 495ms
15:16	+ Job 2	6s 388ms
15:16	+ Job 3	9s 194ms
15:16	+ Job 4	974ms
15:16	+ Job 5	1s 3ms

9. Display and compare what Spark SQL was 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 performed on the data 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

	Duration	Data Input	Data Output
🟪	1m 38s	1.2 GiB	371.6 KiB
🟦	1m 20s	268.9 MiB	2.8 MiB

Details

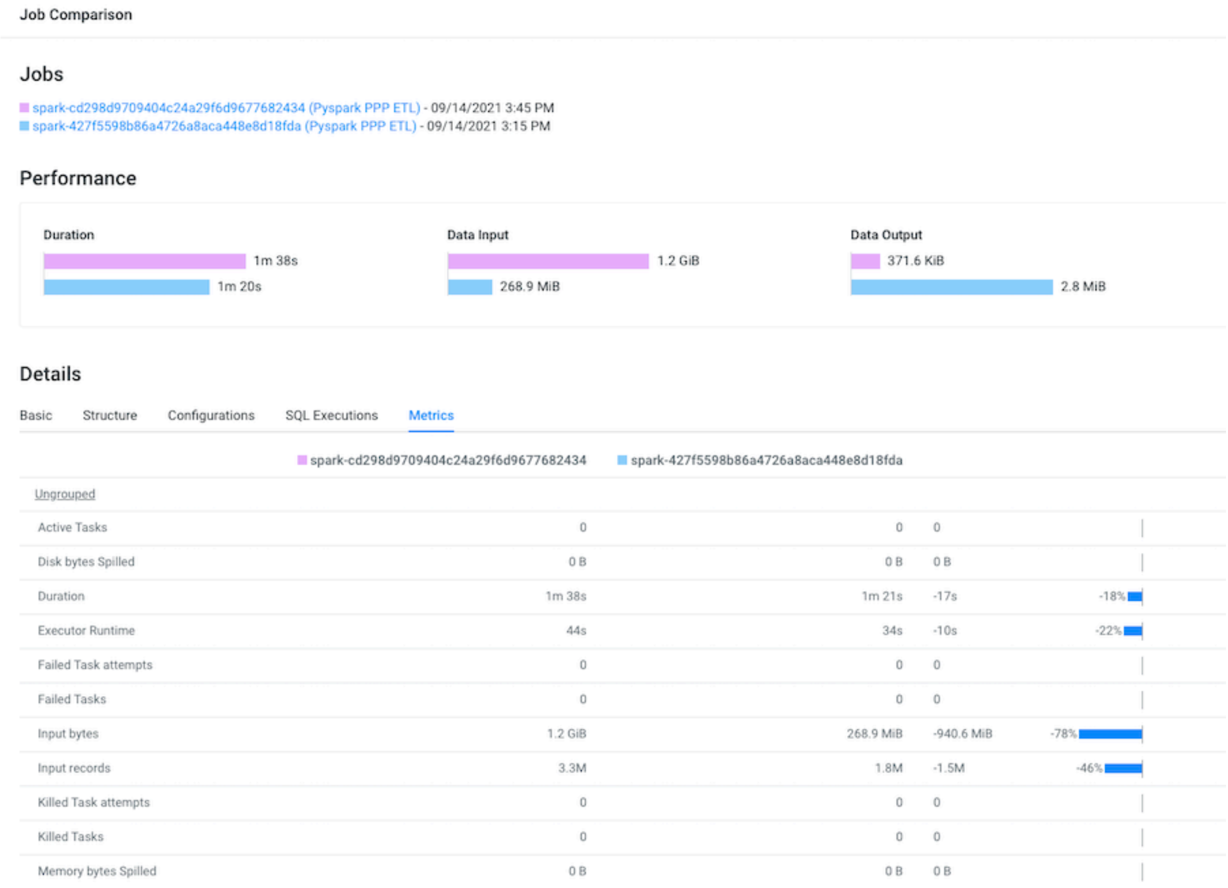
🟪 spark-cd298d9709404c24a29f6d9677682434

	Start Time	ID	Description	Duration
+	15:46	0	csv at NativeMethodAccessorImpl.java:0	12s 762ms
+	15:46	1	count at NativeMethodAccessorImpl.java:0	9s 389ms
+	15:47	2	showString at NativeMethodAccessorImpl.java:0	4s 163ms
+	15:47	3	showString at NativeMethodAccessorImpl.java:0	3s 419ms
+	15:47	4	sql at NativeMethodAccessorImpl.java:0	2s 16ms
+	15:47	5	sql at NativeMethodAccessorImpl.java:0	21ms
+	15:47	6	showString at NativeMethodAccessorImpl.java:0	0s
+	15:47	7	showString at NativeMethodAccessorImpl.java:0	63ms
+	15:47	8	saveAsTable at NativeMethodAccessorImpl.java:0	13s 121ms
+	15:47	9	showString at NativeMethodAccessorImpl.java:0	908ms
+	15:47	10	showString at NativeMethodAccessorImpl.java:0	1s 156ms

🟦 spark-427f5598b86a4726a8aca448e8d18fda

	Start Time	ID	Description	Duration
+	15:15	0	csv at NativeMethodAccessorImpl.java:0	12s 788ms
+	15:16	1	count at NativeMethodAccessorImpl.java:0	6s 802ms
+	15:16	2	sql at NativeMethodAccessorImpl.java:0	4s 681ms
+	15:16	3	sql at NativeMethodAccessorImpl.java:0	72ms
+	15:16	4	showString at NativeMethodAccessorImpl.java:0	0s
+	15:16	5	showString at NativeMethodAccessorImpl.java:0	67ms
+	15:16	6	saveAsTable at NativeMethodAccessorImpl.java:0	13s 885ms
+	15:16	7	showString at NativeMethodAccessorImpl.java:0	1s 280ms
+	15:16	8	showString at NativeMethodAccessorImpl.java:0	1s 552ms

10. 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

	🟪 spark-cd298d9709404c24a29f6d9677682434	🟦 spark-427f5598b86a4726a8aca448e8d18fda		
Ungrouped				
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	

Identifying File Size Storage Issues

Data stored in small files or partitions may create performance issues. The File size reporting feature helps you identify data that is stored inefficiently in small files or partitions.

Important: At this time the Workload XM File Size Report feature is only supported on CDH Workload clusters, version 6.3 to version 7.0, with Cloudera Navigator enabled. CDP Workload clusters are not supported.

A table's data maybe stored in a large number of files, perhaps millions of files. For example, the first time you run an Impala query it loads the metadata for each file, which can cause processing delays. In addition, every time you change a query, refresh the metadata, or add a new file or partition, Impala reloads the metadata. This puts pressure on the NameNode, which stores each file's metadata.

The Workload XM file size reporting enables you to identify tables that have a large number of files or partitions. For example, for queries that run slowly or when an Impala cluster crashes, you can view a table's metadata to determine whether a large number of files or partitions are causing the problem.

Note: Before you can view the file size metadata in Workload XM, you must enable file size reporting in Cloudera Manager. Once enabled, the file size metadata is saved in HDFS, which is then forwarded to Workload XM by Telemetry Publisher.

Displaying File Size Metadata

Steps for displaying a table's File Size report and the metadata that describes the table's file size distribution.

About this task

Describes how to open a table's File Size report and display the metadata.

Important: At this time the Workload XM File Size Report feature is only supported on CDH Workload clusters, version 6.3 to version 7.0, with Cloudera Navigator enabled. CDP Workload clusters are not supported.

Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Search field of the Clusters page, enter the name of the cluster whose workloads you want to analyze.
3. From the navigation panel, select File Size Report.
4. In the File Size Report page, either search for a specific table, or locate the table by sorting the tables by the number of files, the number of partitions, or the table size.

   For example, the File Size Reports shows that the Animantarx table has 7 million files and 913 partitions.

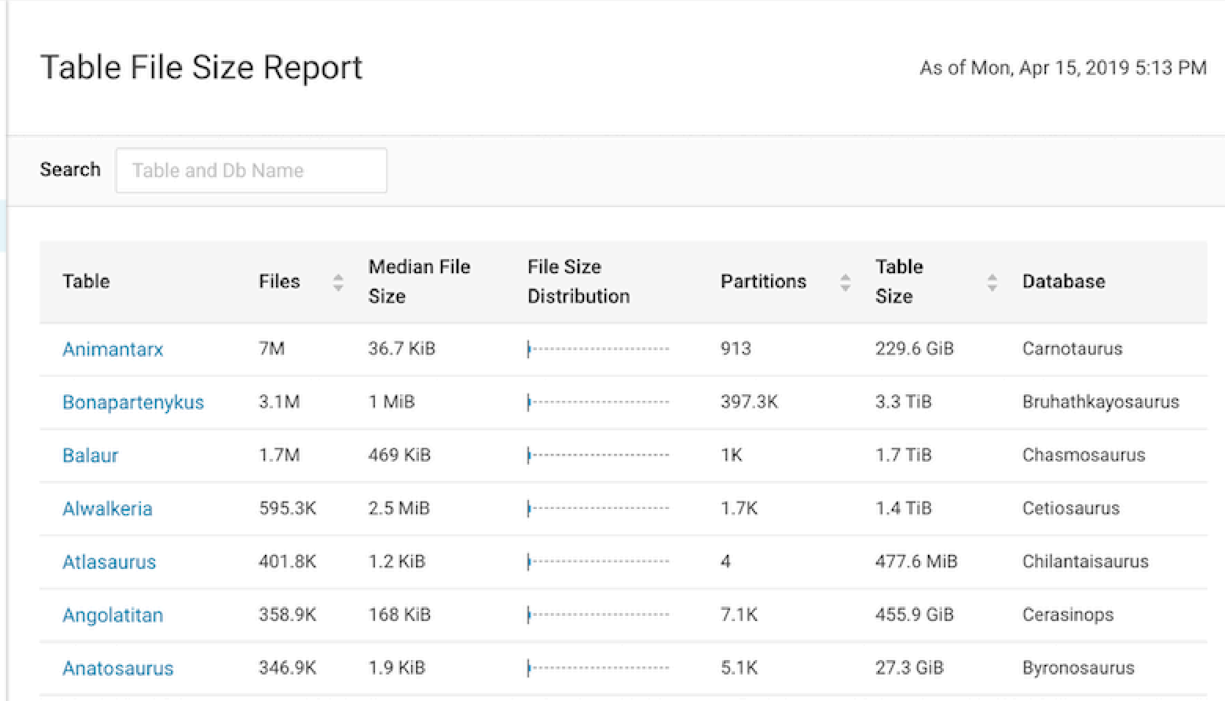


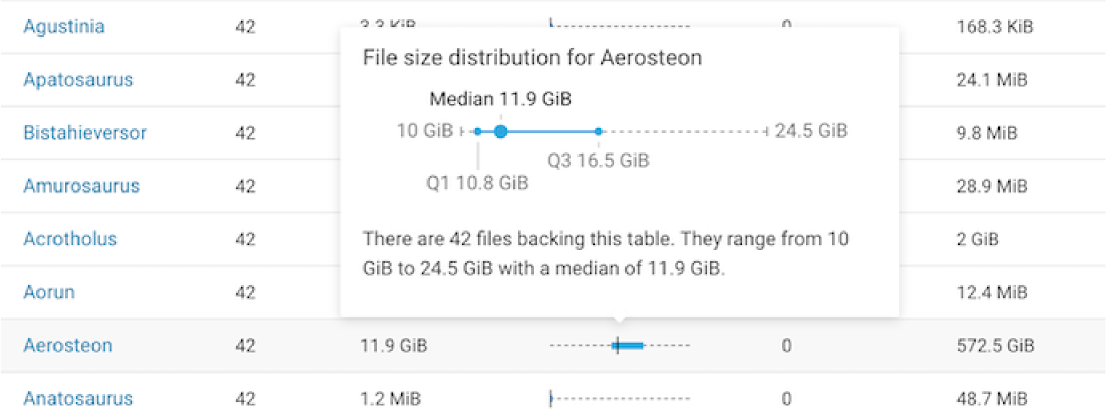
Table File Size Report

As of Mon, Apr 15, 2019 5:13 PM

Table	Files	Median File Size	File Size Distribution	Partitions	Table Size	Database
Animantarx	7M	36.7 KiB		913	229.6 GiB	Carnotaurus
Bonapartenykus	3.1M	1 MiB		397.3K	3.3 TiB	Bruhathkayosaurus
Balaur	1.7M	469 KiB		1K	1.7 TiB	Chasmosaurus
Alwalkeria	595.3K	2.5 MiB		1.7K	1.4 TiB	Cetiosaurus
Atlasaurus	401.8K	1.2 KiB		4	477.6 MiB	Chilantaisaurus
Angolatitan	358.9K	168 KiB		7.1K	455.9 GiB	Cerasinops
Anatosaurus	346.9K	1.9 KiB		5.1K	27.3 GiB	Byronosaurus

5. To display details about the table's file size distribution, select a table name.

   For example, the following details window shows that the Aerosteon table uses 42 data files that range from 10 to 24.5 GiB and the graph displays the Q1 and Q3 file size distribution.



Agustinia	42	3.3 KiB		0	168.3 KiB
Apatosaurus	42				24.1 MiB
Bistahieversor	42				9.8 MiB
Amurosaurus	42				28.9 MiB
Acrotholus	42				2 GiB
Aorun	42				12.4 MiB
Aerosteon	42	11.9 GiB		0	572.5 GiB
Anatosaurus	42	1.2 MiB		0	48.7 MiB

File size distribution for Aerosteon

There are 42 files backing this table. They range from 10 GiB to 24.5 GiB with a median of 11.9 GiB.

Displaying the Metadata of a Table

Steps for displaying a table's metadata that could be causing a query to run slowly.

About this task

Describes how to display the metadata of table used in your query, such as the table's file size distribution that could be causing your query statement to run slowly.

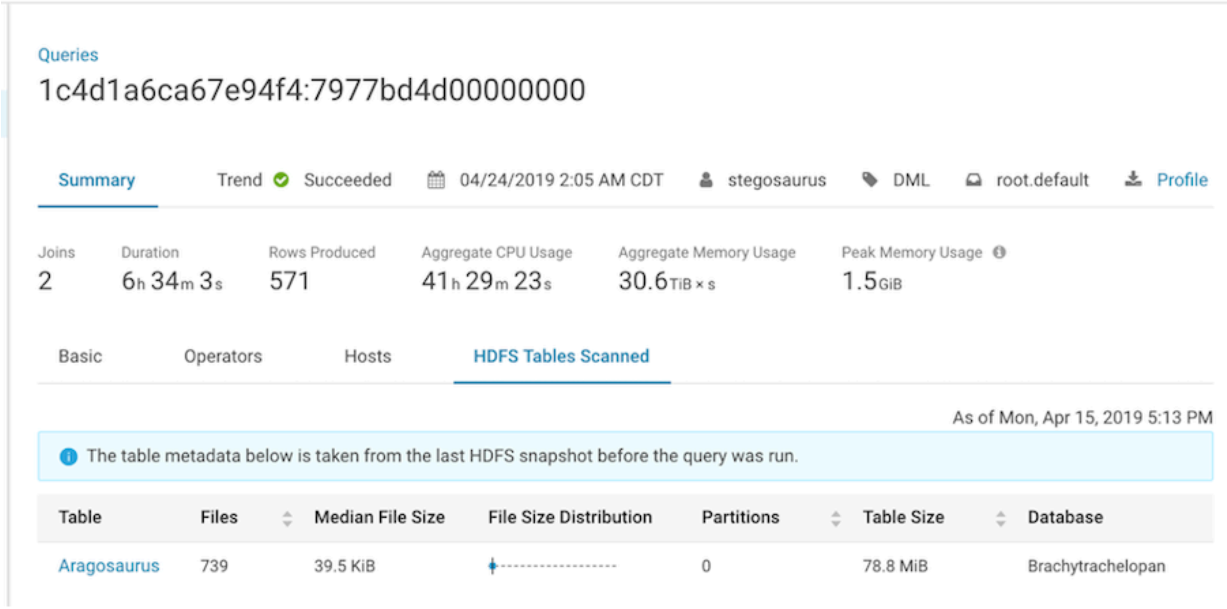
Procedure

1. In a supported browser, log in to the web UI by doing the following:
   a) In the web browser URL field, enter the URL that you were given by your system administrator and press Enter.
   b) When the Log in page opens, enter your user name and password access credentials.
   c) Click Log in.
2. In the Search field of the Clusters page, enter the name of the cluster whose workloads you want to analyze.
3. From the navigation panel under Data Warehouse, select Summary.

4. In the Queries page, select the query of interest and then select the HDFS Tables Scanned tab.

   For example, the Duration column shows that the query took over six hours to run and the HDFS Tables Scanned section displays the metadata for the tables that were scanned.

   Note: This is not the number of files accessed, but the total number of files that were in the table the last time a HDFS snapshot was taken before the query was run.



Queries

1c4d1a6ca67e94f4:7977bd4d00000000

Summary   Trend   Succeeded   04/24/2019 2:05 AM CDT   stegosaurus   DML   root.default   Profile

Joins	Duration	Rows Produced	Aggregate CPU Usage	Aggregate Memory Usage	Peak Memory Usage
2	6h 34m 3s	571	41h 29m 23s	30.6TiB × s	1.5GiB

Basic   Operators   Hosts   HDFS Tables Scanned

As of Mon, Apr 15, 2019 5:13 PM

The table metadata below is taken from the last HDFS snapshot before the query was run.

Table	Files	Median File Size	File Size Distribution	Partitions	Table Size	Database
Aragosaurus	739	39.5 KiB		0	78.8 MiB	Brachytrachelopan

5. To display details about the table's file size distribution, select a table name.

Purging HDFS Data

Reduce bottlenecks between Telemetry Publisher and Workload XM, 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 Workload XM 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-bus 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 blob store.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

Workload XM Purge Event Parameters

Lists the Workload XM 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	The purge event’s recurring schedule, based on one of the following values: • None. By default, the purge process is set to none. • Daily. When this value is set for the first time, files are automatically deleted the next day at 1am. • Weekly. By default, files are automatically deleted every Saturday at 1am. • Monthly. When this value is set for the first time, files are automatically deleted the last Saturday of the month at 1am. Thereafter, files are deleted every 28th day. The monthly parameter uses the 28 day calendar format	blobstore.purger.frequency = none
blobstore.purger.start.time	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 By default, Workload XM schedules the purge process when it will cause the least amount of disruption to users. **Note:** Cloudera recommends scheduling a time during non-peak working hours or job execution hours.	blobstore.purger.start.time = 01:00

Parameter	Description	Example
blobstore.purger.paths.to.keep	Lists the files and directories that are to be excluded from the purge event. Where each file and/or directory is separated by a comma and where: • a file value must use its full path, directory name, and file name. • a directory value must use its full path and directory name.	blobstore.purger.paths.to.keep=/cloudera-dbus/ImpalaQueryProfile/2021030217/7d2bcefa-8819 -4fa1-be0c-4529ee4eb98f,/cloudera-dbus/HiveAudit,/cloudera-sigma-olap-impala/02f54999-b9a 4-4dca-8237-d1b047755efb,/cloudera-sigma-sdx-payloads/2bc85719-7a3e-4438-96a4-8fc0f77ff
blobstore.purger.delete.request.limit	The maximum deletion limit. 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. When the deletion limit is met, the purge process: • Stops processing for a daily scheduled value. • Stops processing and restarts the next day for all other scheduled values. **Note:** 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.	blobstore.purger.delete.request.limit=500000

Configuring the Workload XM Purge Event

Steps for scheduling and configuring a purge event.

About this task

Describes how to schedule and configure the Workload XM 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 WXM.
3. In the Status Summary panel of the WXM page, select Admin API Server.
4. Click the Configuration tab.
5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the wxm-conf/sigmaadminapi.properites option.
6. In the text field enter your purge event's parameter settings, using the *Purge Event Parameters* table.

   For example,

```
blobstore.purger.delete.request.limit=9990000
blobstore.purger.paths.to.keep=/cloudera-dbus/ImpalaQueryProfile/202103021
7/7d2bcefa-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
```

```
blobstore.purger.frequency=daily
blobstore.purger.start.time = 0:00
```

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 Workload XM 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 Workload XM purge event.

A one-time purge event is based on the maximum data retention policy using the Workload XM 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 WXM.
3. In the Status Summary panel of the WXM page, select Admin API Server.
4. Click the Configuration tab.
5. Search for the Admin API Server Advanced Configuration Snippet (Safety Valve) for the wxm-conf/sigmaadminapi.properites option.
6. In the text field enter your purge event's parameter settings, using the *Purge Event Parameters* table.

   For example,

   ```
   blobstore.purger.delete.request.limit=9990000
   blobstore.purger.paths.to.keep=/cloudera-dbus/ImpalaQueryProfile/202103021
   7/7d2bcefa-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
   blobstore.purger.frequency=none
   blobstore.purger.start.time = 0:00
   ```
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 WXM.
    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 Workload XM Purge Event

Steps for updating, stopping, and troubleshooting your Workload XM Purge event.

The following management tasks can be performed:

Updating your Workload XM Purging 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 WXM.
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 wxm-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 Workload XM 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 WXM.
    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 wxm-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 WXM.
    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 wxm-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 Workload XM purge event does not delete directories and files that do not have the full wxm 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 wxm 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 wxm 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.