

## Managing Apache Hive

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## ACID operations

Apache Hive supports ACID (atomicity, consistency, isolation, and durability) v2 transactions at the row level without any configuration. Knowing what this support entails helps you determine the table type you create.

By default, managed tables are ACID tables. You cannot disable ACID transactions on managed tables, but you can change the Hive default behavior to create external tables by default to mimic legacy releases. Application development and operations are simplified with strong transactional guarantees and simple semantics for SQL commands. You do not need to bucket ACID v2 tables, so maintenance is easier. With improvements in transactional semantics, advanced optimizations, such as materialized view rewrites and automatic query cache, are available. With these optimizations, you can deploy new Hive application types.

A Hive operation is atomic. The operation either succeeds completely or fails; it does not result in partial data. A Hive operation is also consistent: After an application performs an operation, the results are visible to the application in every subsequent operation. Hive operations are isolated. Your operations do not cause unexpected side effects for other users. Finally, a Hive operation is durable. A completed operation is preserved in the event of a failure.

Hive operations are atomic at the row level instead of the table or partition level. A Hive client can read from a partition at the same time another client adds rows to the partition. Transaction streaming rapidly inserts data into Hive tables and partitions.

### Related Information

[Configuring legacy CREATE TABLE behavior](#)

## Configuring partitions for transactions

You set a couple of parameters, to prevent or permit dynamic partitioning, that inserts, updates, or deletes data into partitions implicitly created on the table.

### About this task

Configuring partitioning involves changing the following parameters to meet your needs:

- `hive.exec.max.dynamic.partitions`
- `hive.exec.max.dynamic.partitions.pernode`

You set `hive.exec.dynamic.partition.mode` to `strict` to prevent dynamic partitioning or to `nonstrict` (the default) to include `INSERT`, `UPDATE`, and `DELETE` statements in your transaction applications.

### Procedure

1. In Cloudera Manager Clusters select the Hive service. Click Configuration, and search for `hive-site.xml`.
2. In HiveServer2 Advanced Configuration Snippet (Safety Valve) for `hive-site.xml`, click + and add the `hive.exec.dynamic.partition.mode` property.
3. Set the value to `nonstrict`.
4. Save the changes and restart the Hive service.

### Related Information

[Hive Configuration Properties documentation on the Apache wiki](#)

## Viewing transactions

As Administrator, you can view a list of open and aborted transactions.

### Procedure

Enter a query to view transactions.

**SHOW TRANSACTIONS**

The following information appears in the output:

- Transaction ID
- Transaction state
- Hive user who initiated the transaction
- Host machine or virtual machine where transaction was initiated

## Viewing transaction locks

As a Hive administrator, you can get troubleshooting information about locks on a table, partition, or schema.

### About this task

Hive transactions, enabled by default, disables Zookeeper locking. DbLockManager stores and manages all transaction lock information in the Hive Metastore. Heartbeats are sent regularly from lock holders and transaction initiators to the Hive Metastore to prevent stale locks and transactions. The lock or transaction is aborted if the metastore does not receive a heartbeat within the amount of time specified by the `hive.txn.timeout` configuration property.

### Before you begin

Check that transactions are enabled (the default).

### Procedure

1. Enter a Hive query to check table locks.

```
SHOW LOCKS mytable EXTENDED;
```

2. Check partition locks.

```
SHOW LOCKS mytable PARTITION(ds='2018-05-01', hr='12') EXTENDED;
```

### 3. Check schema locks.

```
SHOW LOCKS SCHEMA mydatabase;
```

The following information appears in the output unless ZooKeeper or in-memory lock managers are used.

- Database name
- Table name
- Partition, if the table is partitioned
- Lock state:
  - Acquired - transaction initiator hold the lock
  - Waiting - transaction initiator is waiting for the lock
  - Aborted - the lock has timed out but has not yet been cleaned
- Lock type:
  - Exclusive - the lock cannot be shared
  - Shared\_read - the lock cannot be shared with any number of other shared\_read locks
  - Shared\_write - the lock may be shared by any number of other shared\_read locks but not with other shared\_write locks
- Transaction ID associated with the lock, if one exists
- Last time lock holder sent a heartbeat
- Time the lock was acquired, if it has been acquired
- Hive user who requested the lock
- Host machine or virtual machine on which the Hive user is running a Hive client
- Blocked By ID - ID of the lock causing current lock to be in Waiting mode, if the lock is in this mode

#### Related Information

[Apache wiki transaction configuration documentation](#)

## Data compaction

As administrator, you need to manage compaction of delta files that accumulate during data ingestion. Compaction is a process that performs critical cleanup of files.

Hive creates a set of delta files for each transaction that alters a table or partition. By default, compaction of delta and base files occurs at regular intervals. Compactions occur in the background without affecting concurrent reads and writes.

There are two types of compaction:

- Minor  
Rewrites a set of delta files to a single delta file for a bucket.
- Major

Rewrites one or more delta files and the base file as a new base file for a bucket. A major compaction runs if there are multiple deltas and no base file.

Carefully consider the need for a major compaction as this process can consume significant system resources and take a long time. Base and delta files for a table or partition are compacted.

You can configure automatic compactions or do manual compactions. Start a major compaction during periods of low traffic. You use an ALTER TABLE statement to start compaction manually. A manual compaction either returns the accepted compaction request ID or shows the ID (and current state) of a compaction request for the very same target. The request is stored in the COMPACTION\_QUEUE table.

You can configure automatic compactions or do manual compactions.

### Related Information

[Apache Wiki transactions and compaction documentation](#)

## Compaction prerequisites

To prevent data loss or an unsuccessful compaction, you must meet the prerequisites before compaction occurs.

### Exclude compaction users from Ranger policies

Compaction causes data loss if Apache Ranger policies for masking or row filtering are enabled and the user hive or any other compaction user is included in the Ranger policies.

1. Set up Ranger masking or row filtering policies to exclude the user hive from the policies.

The user (named hive) appears in the Users list in the Ranger Admin UI.

Policy ID	Policy Name	Policy Labels	Status	Audit Logging	Roles	Groups	Users
7	all - hiveservice	--	Enabled	Enabled	--	--	hive rangerlookup impala

2. Identify any other compaction users from the masking or row filtering policies for tables as follows:
  - If the `hive.compaction.run.as.user` property is configured, the user runs compaction.
  - If a user is configured as owner of the directory on which the compaction will run, the user runs compaction.
  - If a user is configured as the table owner, the user runs compaction
3. Exclude compaction users from the masking or row filtering policies for tables.

Failure to perform these critical steps can cause data loss. For example, if a compaction user is included in an enabled Ranger masking policy, the user sees only the masked data, just like other users who are subject to the Ranger masking policy. The unmasked data is overwritten during compaction, which leads to data loss of unmasked content as only the underlying tables will contain masked data. Similarly, if Ranger row filtering is enabled, you do not see, or have access to, the filtered rows, and data is lost after compaction from the underlying tables.

The worker process executes queries to perform compaction, making Hive data subject to data loss ([HIVE-27643](#)). MapReduce-based compactions are not subject to the data loss described above as these compactions directly use the MapReduce framework.

### Related Information

[Row-level filtering and column masking in Hive with Ranger policies](#)

## Compaction tasks

Compaction in Hive goes hand-in-hand with Hive ACID. Compaction is not, however, necessarily required for Hive ACID. You need to understand when you want, or do not want, compaction to occur.

If you confine your ACID operations tables to full reloads and some delta merges, the performance is steady. As tables are always rewritten (dropped and recreated), there is no need for compaction. In this case, consider disabling automatic compaction.

Compaction occurs for the following reasons:

- You explicitly trigger compaction on a table or partition.
- Automatic compaction finds something to compact.

You run an `ALTER TABLE` statement to start explicit compaction. Automatic compaction happens without your intervention when Hive periodically crawls through the transaction information, finds tables/partitions affected and

those fit for the pre-defined conditions, and marks them for compaction. Conditions are based on the number of deltas, amount of change, and so on.

Compaction of sorted tables is not supported.

In a data pipeline, creating staging or temporary tables can significantly increase the compaction throughput. Avoid compaction of these tables.

### Related Information

[Initiating automatic compaction](#)

[Starting compaction manually](#)

[Disabling automatic compaction](#)

## Initiating automatic compaction in Cloudera Manager

Several properties in the Hive and Hive metastore service configurations must be set to enable automatic compaction. You need to check that the property settings are correct and to add one of the properties to the Hive on Tez service. Automatic compaction will then occur at regular intervals, but only if necessary.

### About this task

Initiator threads should run in only one metastore server/HA configuration. Disable Initiator threads in other metastore server/HA configurations. The following properties must be set in Hive metastore (Hive-1) and Hive on Tez services as follows:

- `hive.compactor.initiator.on` = true (default)
- `hive.compactor.worker.threads` = <a value greater than 0> (default and recommended value = 5)
- `hive.metastore.runworker.in` = hs2 (default)

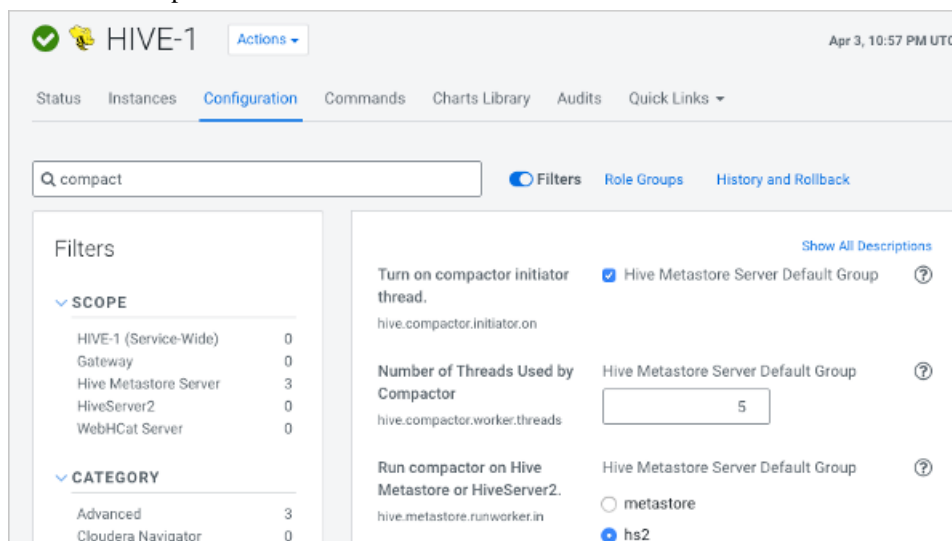
You must run the compactor initiator on only one HMS instance at a time.

### Before you begin

Tables or partitions you are compacting must be full ACID or insert-only ACID tables.

### Procedure

1. In Cloudera Manager, select the Hive metastore service: Clusters Hive-1 Configuration .
2. Search for compact.





3. Check that Turn on Compactor Initiator Thread (`hive.compactor.initiator.on`), Number of Threads Used by Compactor (`hive.compactor.worker.threads`), and Run Compactor on Hive Metastore or HiveServer2 (`hive.metastore.runworker.in`) are set to the values shown above.
4. Save the changes.
5. In Cloudera Manager, select the Hive on Tez service: Clusters HIVE\_ON\_TEZ-1 Configuration .
6. Search for compact.

The screenshot shows the Cloudera Manager interface for the HIVE\_ON\_TEZ-1 service. The 'Configuration' tab is active, and a search for 'compact' has been performed. The 'Filters' section on the left shows the 'SCOPE' as 'HIVE\_ON\_TEZ-1 (Service-Wide)' and the 'CATEGORY' as 'HiveServer2'. The main configuration area displays two settings: 'Number of Threads Used by Compactor' (hive.compactor.worker.threads) with a value of 5, and 'Run compactor on Hive Metastore or HiveServer2' (hive.metastore.runworker.in) with the 'hs2' option selected.

7. Check that the Number of Threads Used by Compactor (`hive.compactor.worker.threads`), and Run compactor on Hive Metastore or HiveServer2 (`hive.metastore.runworker.in`) is set to `hs2`.
8. Save the changes and restart the Hive on Tez and Hive (HIVE-1) metastore services at an appropriate time.

## Starting compaction manually

You manually start compaction when automatic compaction fails for some reason. You can start compaction by running a Hive statement.

### About this task

You can run compaction pseudo-synchronously using the `AND WAIT` clause. Compaction actually occurs asynchronously, but seems synchronous. The compaction request is recorded and queued, and remains in a waiting cycle, querying the status of the compaction in the background until a failure, success, or timeout occurs. The `hive.compactor.wait.timeout` (default: 300s) property sets the timeout.

Start compaction using a query

You use the following syntax to issue a query that starts compaction:

```
ALTER TABLE tablename [PARTITION (partition_key='partition_value' [...])]
COMPACT 'compaction_type'
```

### Before you begin

- Tables or partitions you are compacting must be full ACID or insert-only ACID tables.
- Compaction must be enabled (initiator `hive.compactor.initiator.on=true`)

### Procedure

1. Run a query to start a major compaction of a table.

```
ALTER TABLE mytable COMPACT 'major'
```

Use the COMPACT 'minor' clause to run a minor compaction. ALTER TABLE compacts tables even if the NO\_AUTO\_COMPACTION table property is set.

2. Start compaction in a pseudo-synchronous way.

```
ALTER TABLE mydb.mytable PARTITION (mypart='myval') COMPACT 'MAJOR' AND  
WAIT;
```

## Viewing compaction progress

You view the progress of compactons by running Hive queries.

### About this task

Authorization is not required to use the SHOW COMPACTIONS statement. Every user can view compactons and can see the current state of compactons.

### Procedure

Enter the query to view the progress of compactons.

```
SHOW COMPACTIONS;
```

- Unique internal ID
- Database name
- Table name
- Partition name
- Major or minor compaction
- Compaction state:
  - Initiated - waiting in queue
  - Working - currently compacting
  - Ready for cleaning - compaction completed and old files scheduled for removal
  - Failed - the job failed. Details are printed to the metastore log.
  - Succeeded
  - Attempted - initiator attempted to schedule a compaction but failed. Details are printed to the metastore log.
- Thread ID
- Start time of compaction
- Duration
- Job ID - ID of the submitted MapReduce job

## Disabling automatic compaction

You can disable automatic compaction of a particular Hive ACID table by setting a Hive table property. By default, compaction is enabled, so you must enter an ALTER TABLE command to disable it.

### About this task

Compaction of a full ACID table is skipped under the following conditions:

- Another compaction is either running or already initiated for the target.
- The compaction target table is already dropped.

- Table is explicitly configured to be skipped by the auto-compaction

Compaction of an insert-only, ACID table is skipped if `hive.compactor.compact.insert.only` is set to false (turned off). The default is true. Although you can disable automatic compaction, tables still can be compacted if you explicitly request compaction. Disabling automatic compaction does not prevent you from performing manual compaction.

The compaction auto-initiator can be disabled on service instance level (disabled by default). You can independently enable or disable compaction workers on service instance level. Compaction merges only the bucket files with the same index and keeps the same number of bucket files in base. Compaction does not rebalance the rows between the buckets.

### Procedure

Start the Hive shell, and in the database of the target table, alter the TBLPROPERTIES.

```
ALTER TABLE my_t SET TBLPROPERTIES ( 'NO_AUTO_COMPACTION'='true' );
```

## Configuring compaction using table properties

You see how to configure compaction using table properties and learn about the advantage of using this method of configuration.

### About this task

You can configure compaction using table properties. Using table properties, you can group all table and partition compactions into a specific queue to match your use case. You can also size the compactor job based on the tables parameters like size and compression.

### Procedure

Set table properties to adjust the compaction initiator properties.

```
ALTER TABLE mydb.mytable
SET TBLPROPERTIES (
'compactorthreshold.hive.compactor.delta.pct.threshold'='0.2f',
'compactorthreshold.hive.compactor.delta.num.threshold'='20');
```

These properties change thresholds, as the names imply: the deltas/base size percentage override threshold and the number of deltas threshold.

## Configuring compaction in Cloudera Manager

You see how to configure compaction properties exposed in Cloudera Manager. You rarely need to configure other compaction properties, but need to know how to do this.

### About this task

You can configure Hive metastore (HMS) and HiveServer (HS2) properties. Compaction properties you typically configure appear in Cloudera Manager. You search for a property to change it. Occasionally, you might add a property to hive-site or core-site using the Cloudera Manager Safety Valve.

### Procedure

1. In Cloudera Manager, click **Clusters Hive Configuration**, and search for a property, such as `hive.compactor.worker.threads`.

The screenshot shows a configuration page in Cloudera Manager. The title is "Number of Threads Used by Compactor". Below the title is the property name "hive.compactor.worker.threads" and a gear icon. The value is displayed in a text box as "5". To the right, there is a link "hive\_compactor\_worker\_threads".

2. Change the value, and save.
3. Restart the Hive cluster.

## Configuring the compaction check interval

You need to know when and how to control the compaction process checking, performed in the background, of the file system for changes that require compaction.

When you turn on the compaction initiator, consider setting the `hive.compactor.check.interval` property. This property determines how often the initiator should search for possible tables, partitions, or compaction. By default, the value for this property is set to 300 seconds. Decreasing `hive.compactor.check.interval` has the following effect:

- Reduces the time it takes for compaction to be started for a table or partition that requires compaction.
- Requires several calls to the file system for each table or partition that has undergone a transaction since the last major compaction, resulting in increases to the load on the filesystem.

The compaction initiator first checks the completed transactions (`COMPLETED_TXN_COMPONENTS`), excluding those that already have completed compactions, searching for potential compaction targets. The search of the first iteration includes all transactions. Further searching of iterations are limited to the time-frame since the last iteration.

To configure the compaction check interval, set the `hive.compactor.check.interval`. For example:

From Cloudera Manager, go to **Clusters HIVE-1 Configuration** and set the value for the `hive.compactor.check.interval` parameter in the Hive Metastore Server Advanced Configuration Snippet (Safety Valve) for `hive-site.xml` file.

## Compactor properties

You check and change a number of Apache Hive properties to configure the compaction of delta files that accumulate during data ingestion. You need to know the defaults and valid values.

### Basic compactor properties

#### `hive.compactor.initiator.on`

Default=false

Whether to run the initiator and cleaner threads on this metastore instance or not. Set in only one instance.

#### `hive.compactor.worker.threads`

Default=0

Set this to a positive number to enable Hive transactions, which are required to trigger transactions. Worker threads spawn jobs to perform compactions, but do not perform the compactions themselves. Increasing the number of worker threads decreases the time that it takes tables or

partitions to be compacted. However, increasing the number of worker threads also increases the background load on the CDP cluster because they cause more jobs to run in the background.

**hive.metastore.runworker.in**

Default=HS2

Specifies where to run the Worker threads that spawn jobs to perform compactions. Valid values are HiveServer (HS2) or Hive metastore (HMS).

**hive.compactor.abortedtxn.threshold**

Default=1000 aborts

The number of aborted transactions that triggers compaction on a table/partition.

**hive.compactor.aborted.txn.time.threshold**

Default=12 hours

The hours of aborted transactions that trigger compaction on a table/partition.

**Advanced compactor properties****hive.compactor.worker.timeout**

Default=86400s

Expects a time value using d/day, h/hour, m/min, s/sec, ms/msec, us/usec, or ns/nsec (default is sec). Time in seconds after which a compaction job will be declared failed and the compaction re-queued.

**hive.compactor.check.interval**

Default=300s

A valid value is a time with unit (d/day, h/hour, m/min, s/sec, ms/msec, us/usec, ns/nsec), which is sec if not specified.

Time in seconds between checks to see if any tables or partitions need to be compacted. This value should be kept high because each check for compaction requires many calls against the NameNode. Decreasing this value reduces the time it takes to start compaction for a table or partition that requires it. However, checking if compaction is needed requires several calls to the NameNode for each table or partition involved in a transaction done since the last major compaction. Consequently, decreasing this value increases the load on the NameNode.

**hive.compactor.delta.num.threshold**

Default=10

Number of delta directories in a table or partition that triggers a minor compaction.

**hive.compactor.delta.pct.threshold**

Default=0.1

Percentage (fractional) size of the delta files relative to the base that triggers a major compaction. (1.0 = 100%, so the default 0.1 = 10%.)

**hive.compactor.max.num.delta**

Default=500

Maximum number of delta files that the compactor attempts to handle in a single job.

**hive.compactor.wait.timeout**

Default=300000

The value must be greater than 2000 milliseconds.

Time out in milliseconds for blocking compaction.

**hive.compactor.initiator.failed.compacts.threshold**

Default=2

A valid value is between 1 and 20, and must be less than hive.compactor.history.retention.failed.

The number of consecutive compaction failures (per table/partition) after which automatic compactons are not scheduled any longer.

**hive.compactor.cleaner.run.interval**

Default=5000ms

A valid value is a time with unit (d/day, h/hour, m/min, s/sec, ms/msec, us/usec, ns/nsec), which is msec if not specified.

The time between runs of the cleaner thread.

**hive.compactor.job.queue**

Specifies the Hadoop queue name to which compaction jobs are submitted. If the value is an empty string, Hadoop chooses the default queue to submit compaction jobs.

Providing an invalid queue name results in compaction job failures.

**hive.compactor.compact.insert.only**

Default=true

The compactor compacts insert-only tables, or not (false). A safety switch.

**hive.compactor.crud.query.based**

Default=false

Performs major compaction on full CRUD tables as a query, and disables minor compaction.

**hive.split.grouping.mode**

Default=query

A valid value is either query or compactor.

This property is set to compactor from within the query-based compactor. This setting enables the Tez SplitGrouper to group splits based on their bucket number, so that all rows from different bucket files for the same bucket number can end up in the same bucket file after the compaction.

**hive.compactor.history.retention.succeeded**

Default=3

A valid value is between 0 and 100.

Determines how many successful compaction records are retained in compaction history for a given table/partition.

**hive.compactor.history.retention.failed**

Default=3

A valid value is between 0 and 100.

Determines how many failed compaction records are retained in compaction history for a given table/partition.

**hive.compactor.history.retention.attempted**

Default=2

A valid value is between 0 and 100.

Determines how many attempted compaction records are retained in compaction history for a given table/partition.

**hive.compactor.history.reaper.interval**

Default=2m

A valid value is a time with unit (d/day, h/hour, m/min, s/sec, ms/msec, us/usec, ns/nsec), which is msec if not specified.

Determines how often the compaction history reaper runs.

## Query vectorization

You can use vectorization to improve instruction pipelines and cache use. Vectorization enables certain data and queries to process batches of primitive types on the entire column rather than one row at a time.

### Default vectorized query execution

CDP enables vectorization by default and the value of `hive.vectorized.execution.enabled` is set to `true`. Vectorized query execution processes Hive data in batch, channeling a large number of rows of data into columns, foregoing intermediate results. This technique is more efficient than the MapReduce execution process that stores temporary file.

### Unsupported functionality on vectorized data

Some functionality is not supported on vectorized data:

- DDL queries
- DML queries other than single table, read-only queries
- Formats other than Optimized Row Columnar (ORC)

### Supported functionality on vectorized data

The following functionality is supported on vectorized data:

- Single table, read-only queries  
Selecting, filtering, and grouping data is supported.
- Partitioned tables
- The following expressions:
  - Comparison: `>`, `>=`, `<`, `<=`, `=`, `!=`
  - Arithmetic plus, minus, multiply, divide, and modulo
  - Logical AND and OR
  - Aggregates sum, avg, count, min, and max

### Supported data types

You can query data of the following types using vectorized queries:

- tinyint
- smallint
- int
- bigint
- date
- boolean
- float
- double
- timestamp
- stringchar
- varchar
- binary

## Query vectorization properties

You can manage query vectorization by setting properties in Cloudera Manager. The names of each property and its description helps set up vectorization.

### Vectorization properties

#### **hive.vectorized.groupby.checkinterval**

In vectorized group-by, the number of row entries added to the hash table before re-checking average variable size for memory usage estimation.

#### **hive.vectorized.groupby.flush.percent**

Ratio between 0.0 and 1.0 of entries in the vectorized group-by aggregation hash that is flushed when the memory threshold is exceeded.

#### **hive.vectorized.execution.enabled**

Enable optimization that vectorizes query execution by streamlining operations by processing a block of 1024 rows at a time.

#### **hive.vectorized.execution.reduce.enabled**

Whether to vectorize the reduce side of query execution.

#### **hive.vectorized.use.vectorized.input.format**

If enabled, Hive uses the native vectorized input format for vectorized query execution when it is available.

#### **hive.vectorized.use.checked.expressions**

To enhance performance, vectorized expressions operate using wide data types like long and double. When wide data types are used, numeric overflows can occur during expression evaluation in a different manner for vectorized expressions than they do for non-vectorized expressions. Consequently, different query results can be returned for vectorized expressions compared to results returned for non-vectorized expressions. When this configuration is enabled, Hive uses vectorized expressions that handle numeric overflows in the same way as non-vectorized expressions are handled.

#### **hive.vectorized.adaptor.usage.mode**

Vectorized Adaptor Usage Mode specifies the extent to which the vectorization engine tries to vectorize UDFs that do not have native vectorized versions available. Selecting the "none" option specifies that only queries using native vectorized UDFs are vectorized. Selecting the "chosen" option specifies that Hive chooses to vectorize a subset of the UDFs based on performance benefits using the Vectorized Adaptor. Selecting the "all" option specifies that the Vectorized Adaptor be used for all UDFs even when native vectorized versions are not available.

#### **hive.vectorized.use.vector.serde.deserialize**

If enabled, Hive uses built-in vector SerDes to process text and sequencefile tables for vectorized query execution.

#### **hive.vectorized.input.format.excludes**

Specifies a list of file input format classnames to exclude from vectorized query execution using the vectorized input format. Note that vectorized execution can still occur for an excluded input format based on whether row SerDes or vector SerDes are enabled.

## Checking query execution

You can determine if query vectorization occurred during execution by running the EXPLAIN VECTORIZATION query statement.



## Procedure

1. Start Hive from Beeline.

```
$ hive
```

2. Set hive.explain.user to false to see vector values.

```
SET hive.explain.user=false;
```

3. Run the EXPLAIN VECTORIZATION statement on the query you want CDP to process using vectorization.

```
EXPLAIN VECTORIZATION SELECT COUNT(*) FROM employees where emp_no>10;
```

The following output confirms that vectorization occurs:

```
+-----+
| Explain |
+-----+
| Plan optimized by CBO. |
| |
| Vertex dependency in root stage |
| Reducer 2 <- Map 1 [CUSTOM_SIMPLE_EDGE] *vectorized* |
|   File Output Operator [FS_14] |
|     Group By Operator [GBY_13] (rows=1 width=12) |
|       Output:["_col0"],aggregations:["count(VALUE._col0)"] |
|     <-Map 1 [CUSTOM_SIMPLE_EDGE] vectorized |
|       PARTITION_ONLY_SHUFFLE [RS_12] |
|         Group By Operator [GBY_11] (rows=1 width=12) |
|           Output:["_col0"],aggregations:["count()"] |
|         Select Operator [SEL_10] (rows=1 width=4) |
|           Filter Operator [FIL_9] (rows=1 width=4) |
|             predicate:(emp_no > 10) |
|             TableScan [TS_0] (rows=1 width=4) |
|               default@employees,employees,Tbl:COMPLETE,Col:NONE,Ou |
| tput: ["emp_no"] |
+-----+
23 rows selected (1.542 seconds)
```

## Tracking Hive on Tez query execution

You need to know how to monitor Hive on Tez queries during execution. Several tools provide query details, such as execution time.

### About this task

You can retrieve local fetch details about queries from HiveServer (HS2) logs, assuming you enable a fetch task. You configure the following properties:

#### hive.fetch.task.conversion

Value: minimal

Some select queries can be converted to a single FETCH task instead of a MapReduce task, minimizing latency. A value of none disables all conversion, minimal converts simple queries such as SELECT \* and filter on partition columns, and more converts SELECT queries including FILTERS.

#### hive.fetch.task.conversion.threshold

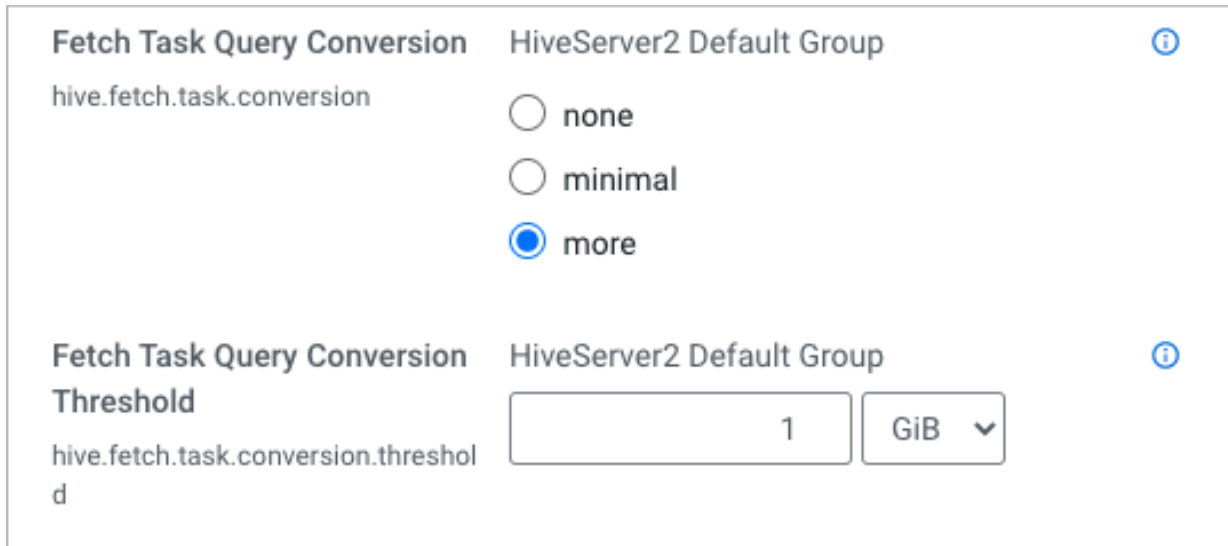
Value: 1 GiB

Above this size, queries are converted to fetch tasks.

Increasing the static pool does not speed reads and there is not recommended.

### Procedure

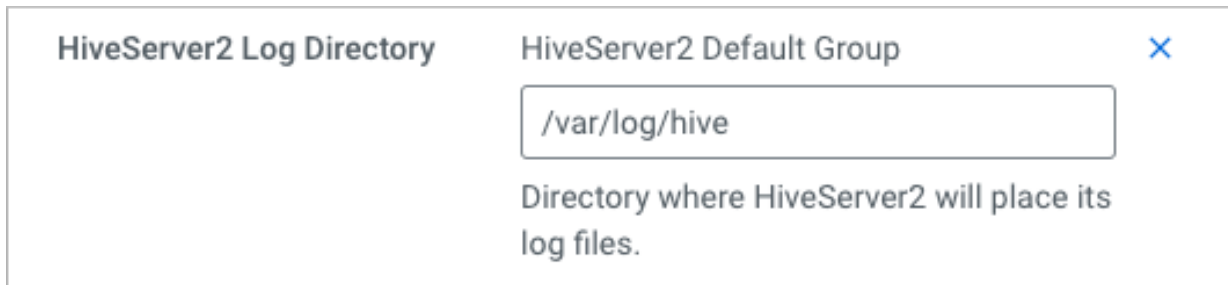
1. In Cloudera Manager, click Clusters Hive on Tez Configuration , and search for fetch.
2. Accept, or change, the default values of the fetch task properties.



The screenshot shows two configuration sections in Cloudera Manager. The top section, titled 'Fetch Task Query Conversion', has the property 'hive.fetch.task.conversion' and three radio button options: 'none', 'minimal', and 'more'. The 'more' option is selected. The bottom section, titled 'Fetch Task Query Conversion Threshold', has the property 'hive.fetch.task.conversion.threshold' and a value of '1' in a text box, followed by a unit dropdown menu set to 'GiB'. Both sections have an information icon (i) in the top right corner.

3. Navigate to the HiveServer log directory and look at the log files.

In Cloudera Manager, you can find the location of this directory as the value of HiveServer2 Log Directory.



The screenshot shows the 'HiveServer2 Log Directory' configuration in Cloudera Manager. It has the property 'HiveServer2 Log Directory' and a text box containing the value '/var/log/hive'. Below the text box is a description: 'Directory where HiveServer2 will place its log files.' The section has a close icon (X) in the top right corner.

4. In Cloudera Manager, click **Clusters** **Hive on Tez Configuration** , and click to the **HiveServer Web UI**.

**HIVE\_ON\_TEZ-1** Actions ▾ Sep 13, 10:43 PM

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## HiveServer2

### Active Sessions

User Name	IP Address	Operation Count	Active Time (s)	Idle Time (s)
admin	172.27.72.74	0	58523	58466

Total number of sessions: 1

### Open Queries

User Name	Query	Execution Engine	State	Opened Timestamp	Opened (s)	Latency (s)	Drilldown Link
Total number of queries: 0							

### Last Max 25 Closed Queries

User Name	Query
admin	INSERT INTO TABLE sample_07

5. Use Hue to track query progress.

## Tracking an Apache Hive query in YARN

You need to know how to monitor Apache Hive queries in YARN. Using information from the output of query execution in Beeline, you can accomplish this task.

### About this task

### Procedure

1. Run a query in Beeline.


```
0: jdbc:hive2://ip-10-10-10-10.cloudera.site:> select * from depts;
INFO : Compiling command(queryId=hive_1599978188515_5723b397-c375-48c2-ab38-7be298603de9): select * from depts
...
```

2. Scroll down the output until you find the INFO containing the YARN App id.

```
...
INFO : Status: Running (Executing on YARN cluster with App id applicatio
n_1599978188515_0010)
```

VERTICES			MODE	STATUS	TOTAL	COMPLETED	RUNNING	PE
ENDING	FAILED	KILLED						
...								

3. In Cloudera Manager, click Clusters Yarn Instances Web UI .

 YARN-1 Actions

Status

Instances

Configuration

Commands

Applications

Charts Library

Audits

Web UI

Quick Links

ResourceManager Web UI (nightly7x-unsecure-3)

HistoryServer Web UI (nightly7x-unsecure-3)

4. Click Resource Web UI Applications

Application ID	Application Type	Application Tag	Application Name	User	State	Queue
application_1599978188515_0010	TEZ	N/A	HIVE-dcb03c1e-...	hive	Running	default
application_1599978188515_0009	SPARK	N/A	PySparkShell	hdfs	Finished	default

5. Find the match for the App id and gather information you want.

# Application not running message

Understanding the Application not running message from TEZ that appears in the YARN application log prevents confusion when inspecting Hive queries.

During startup, HiveServer starts sessions that are available until tez.session.am.dag.submit.timeout.secs expires, and then the Application Masters are killed. HiveServer transparently restarts dead AMs on demand when you run another query. HiveServer tries to clean up sessions from the Tez pool during shutdown. "Application not running" message in a stack trace logging is not an issue. This message is just a trace logged when the session is closed or restarted and the AM has timed out.