Hive QL Project

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Feb. 5th, 2021

Hive QL

- wrote Hive QL to handle structured data
- run Hive QL to execute MapReduce tasks
- Map/Filter [1]: SELECT _fields FROM _table_1 a JOIN _table_2 b ON a.foreignKey = b.foreignKey WHERE _conditions --> transformations
- Map/Filter [2]: GroupBy (Shuffling), OrderBy (Sorting), SCLFTNs (length, size) --> transformations
- Reduce: AGGFTNs (MAX, MIN, AVG, COUNT, SUM) --> actions (take, collection, foreach, reduce)

Hadoop v1.0

MapReduce
Data Processing
& Resource Management

HDFS
Distributed File Storage

Hadoop v2.0

MapReduce

Other Data Processing Frameworks

Data Processing (dynamic)

YARN
Resource Management

Data Storage (static)

HDFS
Distributed File Storage

facebook

Hive Architecture

DBeaver: HiveServer2+Beeline

Web UI + Hive CLI + JDBC/ODBC

Browse, Query, DDL

Scala

Map Reduce

User-defined Map-reduce Scripts

HDFS

APACHE Spark

hadoop YARN

MetaStore

Thrift API

MetaData

Hive QL

Parser

Planner

Optimizer

Execution

UDF/UDAF

substr

sum

average

SerDe

CSV

Thrift

Regex

FileFormats

TextFile

SequenceFile

RCFile

HIVE

hadoop

localhost:8088/cluster/apps

Logged in

All Applications

Cluster
- About
- Nodes
- Node Labels
- Applications
  - NEW
  - NEW_SAVING
  - SUBMITTED
  - ACCEPTED
  - RUNNING
  - FINISHED
  - FAILED
  - KILLED
- Scheduler

Tools

Cluster Metrics

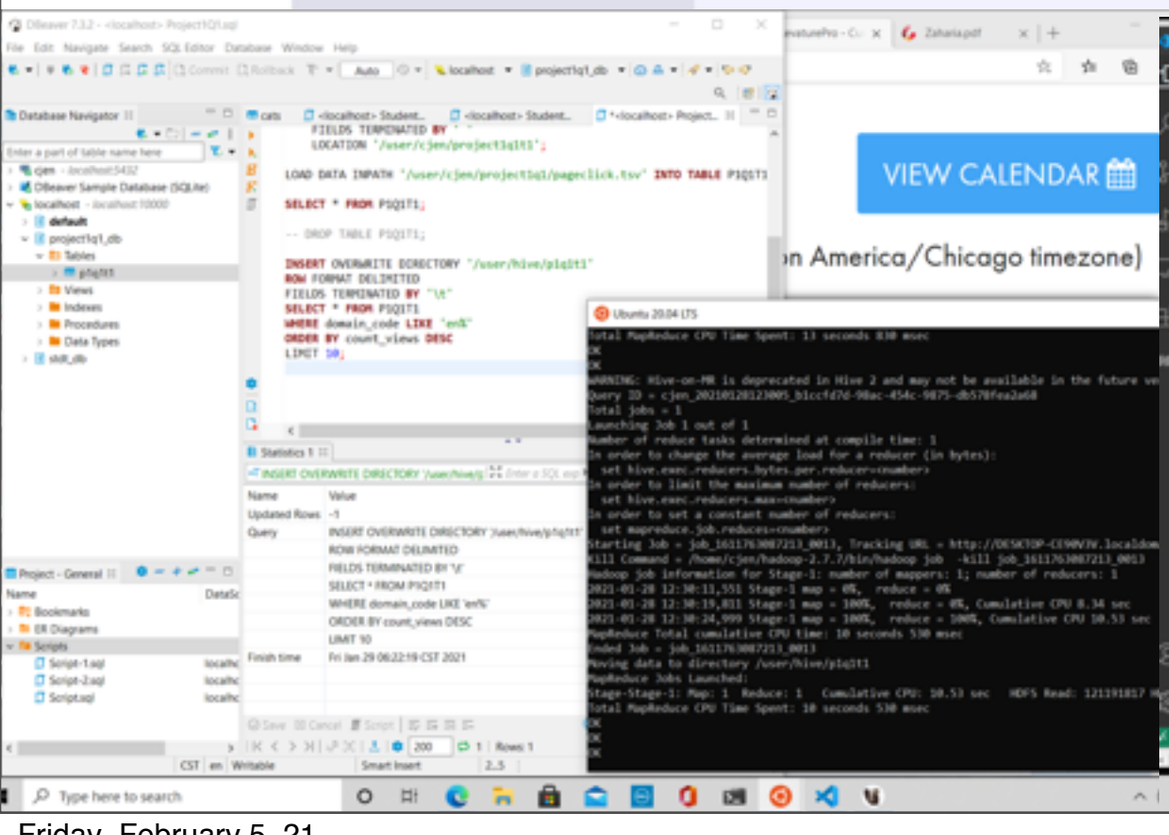
Apps Submitted	Apps Pending	Apps Running	Apps Completed	Containers Running	Memory Used	Memory Total	Memory Reserved	VCores Used	VCores Total	VCores Reserved	Active Nodes	Decommissioned Nodes	Lost Nodes	Unhealthy Nodes	R
305	0	0	305	0	0 B	8 GB	0 B	0	8	0	1	0	0	0	0

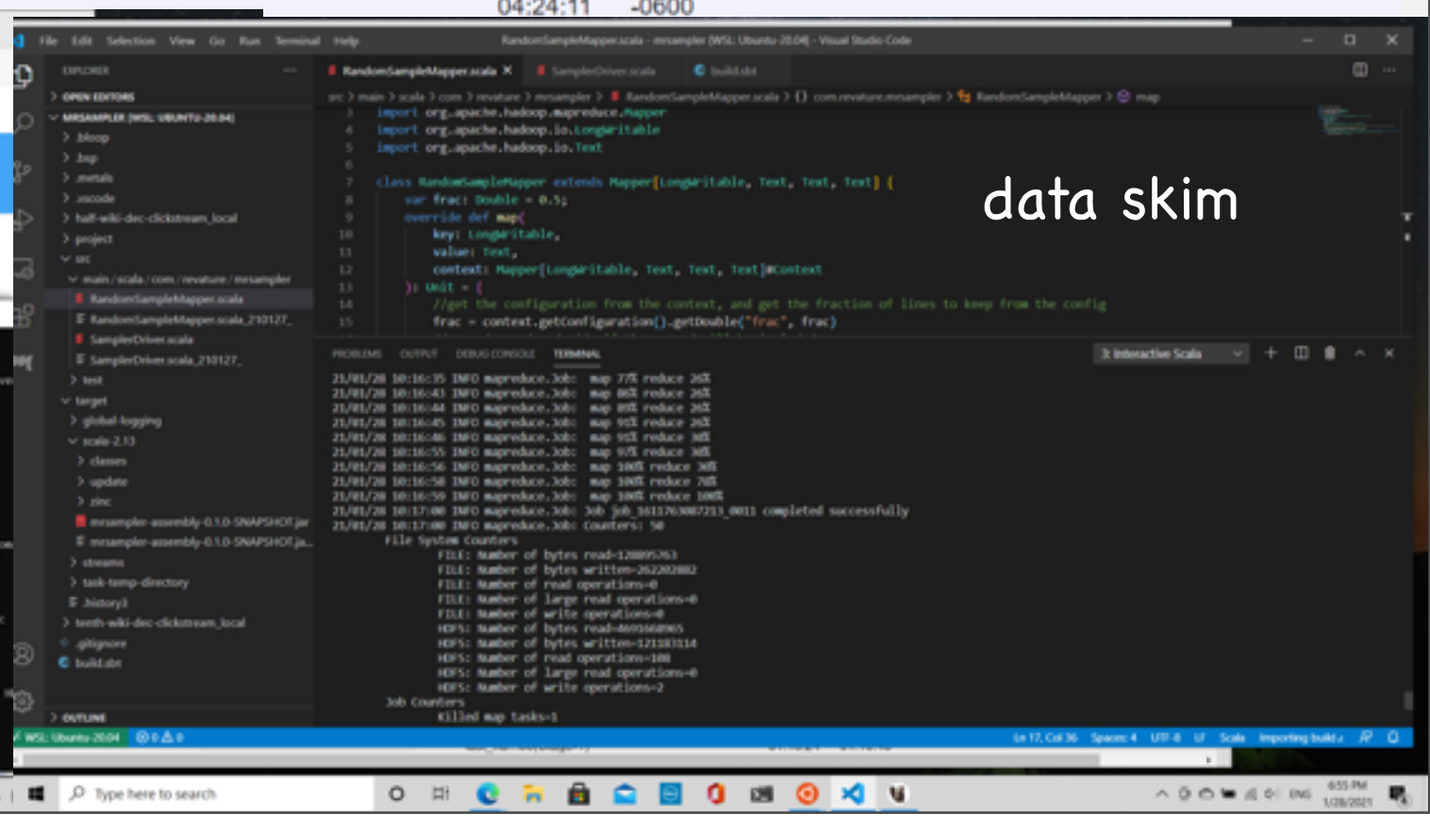
Scheduler Metrics

Scheduler Type	Scheduling Resource Type	Minimum Allocation	Maximum Allocation
Capacity Scheduler	[MEMORY]	<memory:1024, vCores:1>	<memory:8192, vCores:8>

Show 100 entries Search:

ID	User	Name	Application Type	Queue	StartTime	FinishTime	State	FinalStatus	Progress	Tracking UI	B
application_1611763087213_0308	cjen	INSERT OVERWRITE DIRECTORY '/user/hiv...DESC(Stage-2)	MAPREDUCE	default	Mon Feb 1 04:40:14 -0600 2021	Mon Feb 1 04:40:31 -0600 2021	FINISHED	SUCCEEDED		History	N
application_1611763087213_0307	cjen	INSERT OVERWRITE DIRECTORY '/user/hiv...DESC(Stage-1)	MAPREDUCE	default	Mon Feb 1 04:39:42 -0600 2021	Mon Feb 1 04:40:11 -0600 2021	FINISHED	SUCCEEDED		History	N
application_1611763087213_0306	cjen	INSERT OVERWRITE DIRECTORY '/user/hiv...DESC(Stage-1)	MAPREDUCE	default	Mon Feb 1 04:34:45 -0600 2021	Mon Feb 1 04:36:46 -0600 2021	FINISHED	KILLED		History	N
application_1611763087213_0305	cjen	INSERT OVERWRITE DIRECTORY '/user/hiv...DESC(Stage-1)	MAPREDUCE	default	Mon Feb 1 04:24:11 -0600	Mon Feb 1 04:34:26 -0600	FINISHED	KILLED		History	N





Friday, February 5, 21

1. Which English wikipedia article got the most traffic on January 20, 2021? pageview-2021-0120.tsv (Wednesday)

Ans: p1q1t1.tsv update_210130

https://github.com/renjmindy/210104-usf-bigdata/tree/main/proj1_0/Q1A

- v.0:

```
SELECT *

FROM P1Q1T1

WHERE domain_code LIKE 'en%'

ORDER BY count_views DESC

LIMIT 10;
```

2. What English wikipedia article has the largest fraction of its readers follow an internal link to another wikipedia article?

clickstream-enwiki-2020-12.tsv & pageview-2020-1229.tsv (Tuesday/after Xmas/before new year)

- model 1: groupBy - prev/curr/prev+curr
  - total clicks via internal link-only (external/other)
  - ratio of clicks via internal link-only (external/other)
  - ratio of internal link-only (external/other)

Ans: p1q2t2_8.tsv update_210202 https://github.com/renjmindy/210104-usf-bigdata/blob/main/proj1_0/Q2A/p1q2t2_8.tsv

- model 2: groupBy - prev/curr/prev+curr
  - ratio of total clicks to total views (internal link not required)
  - presumably page view is uniformly distributed

Ans: p1q7t5_1.tsv update_210203 https://github.com/renjmindy/210104-usf-bigdata/blob/main/proj1_0/Q2A%2B/p1q7t5_1.tsv

2. What English wikipedia article has the largest fraction of its readers follow an internal link to another wikipedia article?

clickstream-enwiki-2020-12.tsv & pageview-2020-1229.tsv (Tuesday/after Xmas/before new year)

- model 3: groupBy - prev/curr/prev+curr
- ratio of total clicks to total views (internal link required)
- presumably page view is uniformly distributed

ongoing... can be done by the end of today (02/05/2021)

3. What series of wikipedia articles, starting with Hotel California, keeps the largest fraction of its readers clicking on internal links? This is similar to (2), but you should continue the analysis past the first article. There are multiple ways you can count this fraction, be careful to be clear about the method you find most appropriate.

clickstream-enwiki-2020-12.tsv & pageview-2020-1229.tsv (Tuesday/after Xmas/before new year)

- model 1: requiring groupBy - prev/curr/prev+curr be "Hotel_California"
  - total clicks via internal link-only (external/other)
  - ratio of clicks via internal link-only (external/other)
  - ratio of internal link-only (external/other)

Ans: p1q3t1_3.tsv update_210202 https://github.com/renjmindy/210104-usf-bigdata/blob/main/proj1_0/Q3A/p1q3t1_3.tsv

- model 2: requirning groupBy - prev/curr/prev+curr be "Hotel_California"
  - ratio of total clicks to total views (internal link not required)
  - presumably page view is uniformly distributed

Ans: p1q8t7_1.tsv update_210203 https://github.com/renjmindy/210104-usf-bigdata/blob/main/proj1_0/Q3A%2B/p1q8t7_1.tsv

3. What series of wikipedia articles, starting with Hotel California, keeps the largest fraction of its readers clicking on internal links? This is similar to (2), but you should continue the analysis past the first article. There are multiple ways you can count this fraction, be careful to be clear about the method you find most appropriate.

- model 3: requirning groupBy - prev/curr/prev+curr be "Hotel_California"
  - ratio of total clicks to total views (internal link required - very easy)
  - presumably page view is uniformly distributed
- model 4: ... very easy too!

ongoing... can be done by the end of today (02/05/2021)

4. Find an example of an English wikipedia article that is relatively more popular in the America than elsewhere. There is no location data associated with the wikipedia page-views data, but there are timestamps. You'll need to make some assumptions about internet usage over the hours of the day. pageview-2020-1229.tsv (week day/after Xmas/before new year)

- v.0:
  - 00-05: Asia/Europe
  - 06-11: America/Asia/Europe
  - 12-17: America/Europe
  - 18-23: America/Asia

```
SELECT page_title, SUM(count_views) AS total_view_counts

FROM p1q4t1d20122900

WHERE domain_code LIKE 'en%'

GROUP BY page_title

-- ORDER BY count_views DESC

ORDER BY total_view_counts DESC

LIMIT 600;
```

Ans: p1q4t1_d201229_xx_xx_X.tsv update_210131 https://github.com/renjmindy/210104-usf-bigdata/tree/main/proj1_0/Q4A

5. Analyze how many users will see the average vandalized wikipedia page before the offending edit is reversed. https://dumps.wikimedia.org/other/mediawiki_history/2021-01/ wiki_db = enwiki

- groupBy - page_id
- average over ratios of summed event_user_count

  to summed page_revision_count
- Cuts:
  - page_is_deleted = TRUE AND
  - revision_is_deleted_by_page_deletion = TRUE AND
  - revision_is_identity_reverted = TRUE OR revision_is_identity_revert = TRUE

```
+--------------+-------+--------------+
|wiki_db       |month  |revision_count|
+--------------+-------+--------------+
|wikidatawiki  |2019-12|21511762      |
|commonswiki   |2019-12|6046688       |
|enwiki        |2019-12|4756250       |
|arwiki        |2019-12|1599840       |
|frwiki        |2019-12|903838        |
|dewiki        |2019-12|795638        |
|eswiki        |2019-12|710516        |
|viwiki        |2019-12|679525        |
|ruwiki        |2019-12|652051        |
|itwiki        |2019-12|563592        |
+--------------+-------+--------------+
only showing top 10 rows
```

```
SELECT page_id,
       ROUND(Avg(avgSum_users_per_page), 2) AS avg_users_per_page
FROM P1Q5T4
GROUP BY page_id;
```

Ans: p1q5t4_1.tsv update_210202 https://github.com/renjmindy/210104-usf-bigdata/blob/main/proj1_0/Q5A/p1q5t4_1.tsv

6. Self Analysis. https://dumps.wikimedia.org/other/mediawiki_history/2021-01/ wiki_db = enwiki

Entity	Event Type	Meaning	ratio (no cuts)	ratio (cuts)
revision	create	edit	92.76%	0.03%
page	create	create	3.75%	0.00%
page	delete	delete	0.70%	0.00%
page	move	change	0.71%	0.00%
page	restore	undelete	0.004%	0.00%
user	create	register	2.09%	0.00%
user	rename	change	0.005%	0.00%
user	altergroups	change	0.005%	0.00%
user	alterblocks	block/ unblock	0.010%	0.00%

- similar to 5.
- break down to three entities
- split into various event types

Ans: p1q6t1_*.tsv update_210202 https://github.com/renjmindy/210104-usf-bigdata/tree/main/proj1_0/Q6A