Enterprise Searching with Solr

Raymond Xie , 2018.05

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# Solr Environment Setup

Windows

Linux

Standalone

Cloud Mode

# Data Preparation

FIX data will be used as example in this book.

Shell script to generate the sample dataset:

gen\_fix.sh

## Sample data

Purpose: In general, each dataflow has its own data format; for each data format, the design and implementation is different – however, similar to each other. The key components are Schema and Parser. For this book’ scope, two data formats are included: FIX and XML.

### FIX sample data

FIX stands for Financial Information eXchange and is widely used as the communication protocol for international real-time exchange of information in Financial Industry (especitally in Securities). More details can be found here: <https://en.wikipedia.org/wiki/Financial_Information_eXchange>

### Basic format

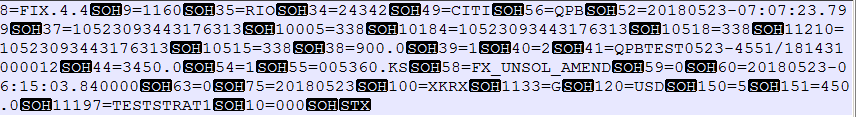
FIX data is essentially a special hybrid variant of *CSV + <Tag, Value>*, the difference are

1. Delimiter is an invisible ASCII code of \x01 or SOH (Start Of Head);

2. Each Tag comes with its correspondent value.

### Sample and explain

Example of a FIX message :



8=FIX.4.4|9=1160|35=RIO|34=24342|49=CITI|56=QPB|52=20180523-07:07:23.799|37=10523093443176313|10005=338|10184=10523093443176313|10518=338|11210=10523093443176313|10515=338|38=900.0|39=1|40=2|41=QPBTEST0523-4551/181431000012|44=3450.0|54=1|55=005360.KS|58=FX\_UNSOL\_AMEND|59=0|60=20180523-06:15:03.840000|63=0|75=20180523|100=XKRX|1133=G|120=USD|150=5|151=450.0|11197=TESTSTRAT1|10=000|

In the above FIXMessage: tags are the left side of the equation pair and value is the right side of the equation.

8=FIX4.2: 8 means BeginString, corresponds to the protocol’s edition which is FIX4.2

9=178:

35=8:

**Body**

Order / Trade Details Info

**Trailer**

Security Check through Signature and CheckSum.

* Tag name and field mapping is listed in the appendix.

## Solr instance

Solr instance is to be created for Indexing purpose, ideally there should be a united single instance for all data formats. In this project, CitiFX and CitiML uses different Solr instance.

### CitiFX Solr instance – instance creation

solrctl instancedir --generate $HOME/indexer\_demo\_fix

### CitiFX Solr instance – schema distribution

solrctl instancedir --create indexer\_demo\_fix $HOME/indexer\_demo\_fix

### CitiFX Solr instance – collection creation

solrctl collection --create indexer\_demo\_fix -s 1 -r 2

### CitiML Solr instance – instance creation

solrctl instancedir --generate $HOME/indexer\_demo\_xml

### CitiML Solr instance – schema distribution

solrctl instancedir --create indexer\_demo\_xml $HOME/indexer\_demo\_xml

### CitiML Solr instance – collection creation

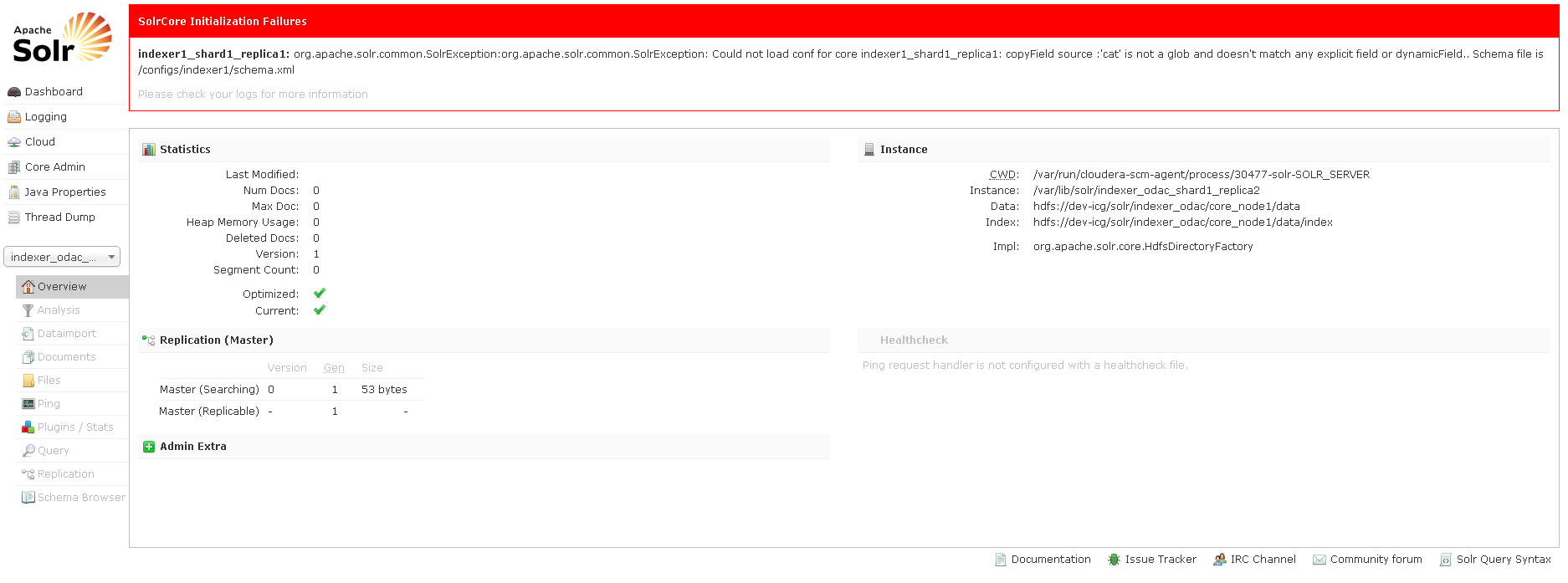
solrctl collection --create indexer\_demo\_xml -s 1 -r 2

## Working with Solr

Accessing solr is based on the solr server on port 8983.

### Finding solr server info

Select the collection indexer\_odac from left pane:



### Specify Solr server

solrctl collection --create debugger -s 1 -r 2 -n dsnyr002d01i1d.nam.nsroot.net:8983\_solr,dsnyr002d02i1d.nam.nsroot.net:8983\_solr

### Index location

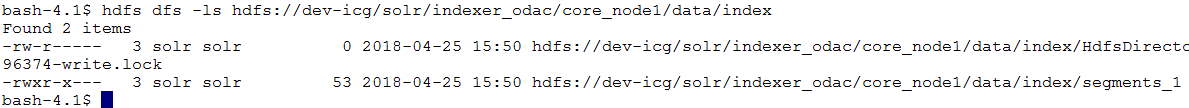
As per indicated in Solr Admin:

Index:hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index

To check the index location:

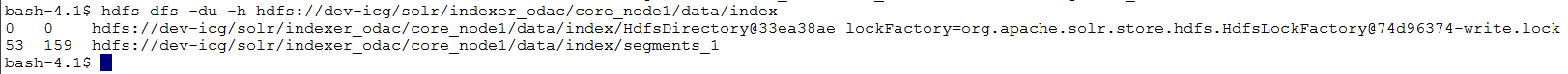
kinit -k -t /tmp/solr.dsnyr003d01i1d.keytab [solr/dsnyr003d01i1d.nam.nsroot.net@NAMUXDEV.DYN.NSROOT.NET](mailto:solr/dsnyr003d01i1d.nam.nsroot.net@NAMUXDEV.DYN.NSROOT.NET)

hdfs dfs -ls hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index



Size of Index:

hdfs dfs -du -h hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index



### Schema distribution

Distribute default schema for the new instance to the cluster’s master nodes

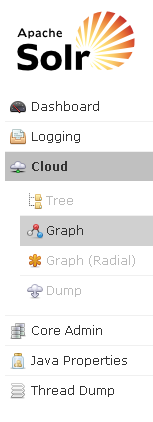
$ solrctl instancedir --create indexer\_odac $HOME/indexer\_odac

Uploading configs from /home/rx52019/indexer\_odac/conf to dsnymaster03i1d.nam.nsroot.net:2181,dsnymaster02i1d.nam.nsroot.net:2181,dsnyproxy02i1d.nam.nsroot.net:2181/solr. This may take up to a minute..

### Collection creation

$ solrctl collection --create indexer\_odac -s 1 -r 2

From Solr Admin find out the lead Solr server is: dsnyr00301i1d





For the new collection indexer\_odac, it is registered to dsnyr003d01i1d (two replica and one shard, this is by the creation command option -s 1 -r 2)

Once knowing which Solr server the new collection is registered to, it can be further explored in the Solr Admin on that Solr server, in this case it is:

<http://dsnyr003d01i1d.nam.nsroot.net:8983>

### Schema change

As the schema would differ from case to case, it must be updated across the whole cluster accordingly and reloaded to become effective

### Update the schema on the instance

From dsnyproxy01i1d

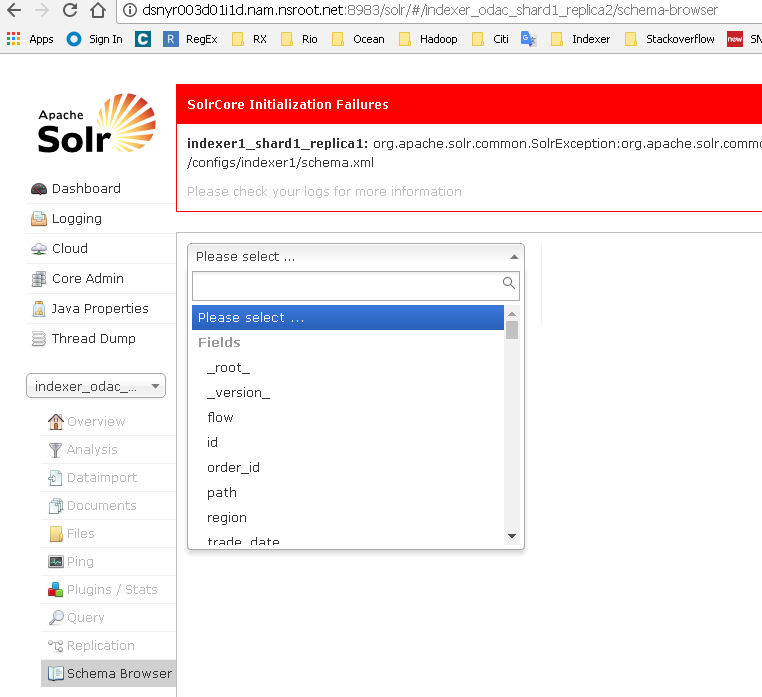
$ solrctl instancedir --update indexer\_odac $HOME/indexer\_odac

Uploading configs from /home/rx52019/indexer\_odac/conf to dsnymaster03i1d.nam.nsroot.net:2181,dsnymaster02i1d.nam.nsroot.net:2181,dsnyproxy02i1d.nam.nsroot.net:2181/solr. This may take up to a minute.

### Reload the schema

$solrctl collection --reload indexer\_odac

### Verify the schema update



## Parser Components

### Parser

Parser is one of the critical components in a Solr based Indexer system, it is needed to extract meta data from the raw data and save to an acceptable format by Solr (csv, xml, json), in this project JSON is chosen as the format.

Literally every data format needs its unique parser, to give the most flexibility to the project, the parser is designed as much modulizations as possible, in the current stage, two key modules are created to process CitiFX and CifiML respectively, they share all the other funtions in the same program, options are created in the program to allow the operator to specify the data format.

parser.add\_option("-t", "--msgtype", dest="msgtype", help="Enter msgtype", metavar="PATH")

parser.add\_option("-r", "--region", dest="region", help="Enter region", metavar="PATH")

parser.add\_option("-f", "--flow", dest="flow", help="enter flow", metavar="PATH")

parser.add\_option("-p", "--path", dest="input\_path", help="bz2 file path", metavar="PATH")

parser.add\_option("-o", "--output", dest="output\_dir", help="json file path", metavar="OUTPUT")

parser.add\_option("-q", "--quiet", action="store\_false", dest="verbose", default=True)



### Look up table

To allow the most flexibility for CitiFX, a tag-field look up table (values.py) is included as part of the parser.



### Validator

To allow the searching result be validatable, a validator is developed.



## Demo 1

### Test data

Raw Data Source: WORM drive on fxodwap03u-phys

Location: /global/ocean/data/ocean/archive\_worm/incoming/<region>/<system>/odac/<year>/<month>/<date(yyyymmdd)>/data

Region: apac

Flow: apeq

/global/ocean/data/ocean/archive\_worm/incoming/apac/apeq/odac/2018/04/20180413/data/apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2

Local Solr server location: dsnyr003d01i1d

Folder:

On the Solr server dsnyr003d01i1d, create the same folder hierachy to mock up the WORM drive:

/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data

Copy the data from WORM into it:

scp apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2

rx52019@dsnyr003d01i1d:/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data

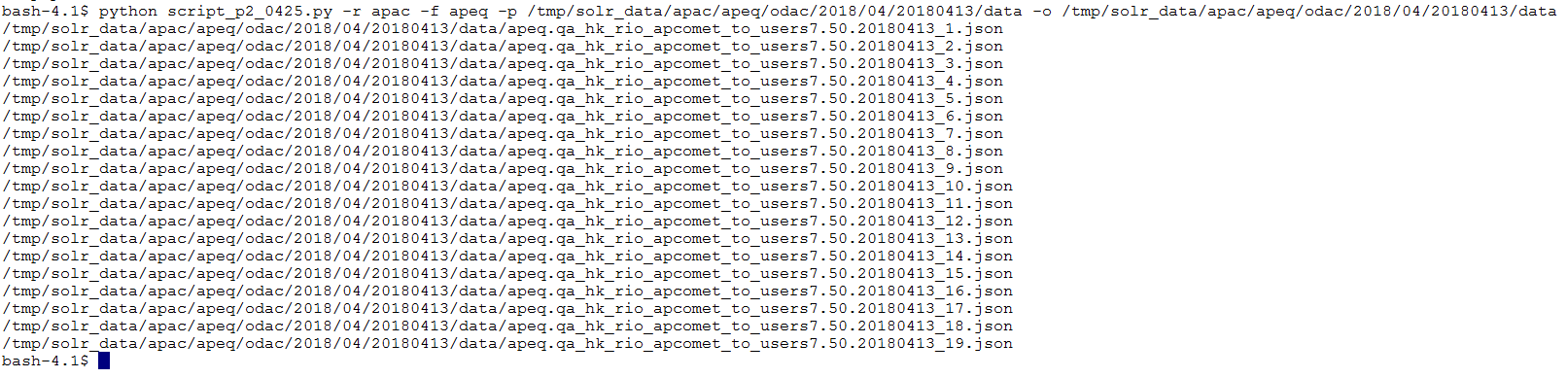
### Command/location:

Parser location: dsnyr003d01i1d: /tmp/parser

The parser is copied to the Solr host where the test data is ready, in this case, dsnyr003d01i1d

Parser name: script\_p2\_0425.py

bash-4.1$ python script\_p2\_0425.py -r apac -f apeq -p /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data -o /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data



### Adding the data folder to the index

Host: dsnyr003d01i1d (where the Solr server is registered to for the new collection)

path: /opt/cloudera/parcels/CDH/jars

command:

data folder: /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data

make sure only json files in the folder

java -Dtype=application/json -Drecursive -Durl="http:// dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs" -jar post.jar /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data

bash-4.1$ java -Dtype=application/json -Drecursive -Durl="http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs" -jar post.jar /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data

SimplePostTool version 1.5

Posting files to base url http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs using content-type application/json..

Entering recursive mode, max depth=999, delay=0s

Indexing directory /tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data (19 files, depth=0)

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_17.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_9.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_6.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_19.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_13.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_1.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_4.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_5.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_16.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_15.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_18.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_14.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_12.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_8.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_10.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_2.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_11.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_7.json

POSTing file apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413\_3.json

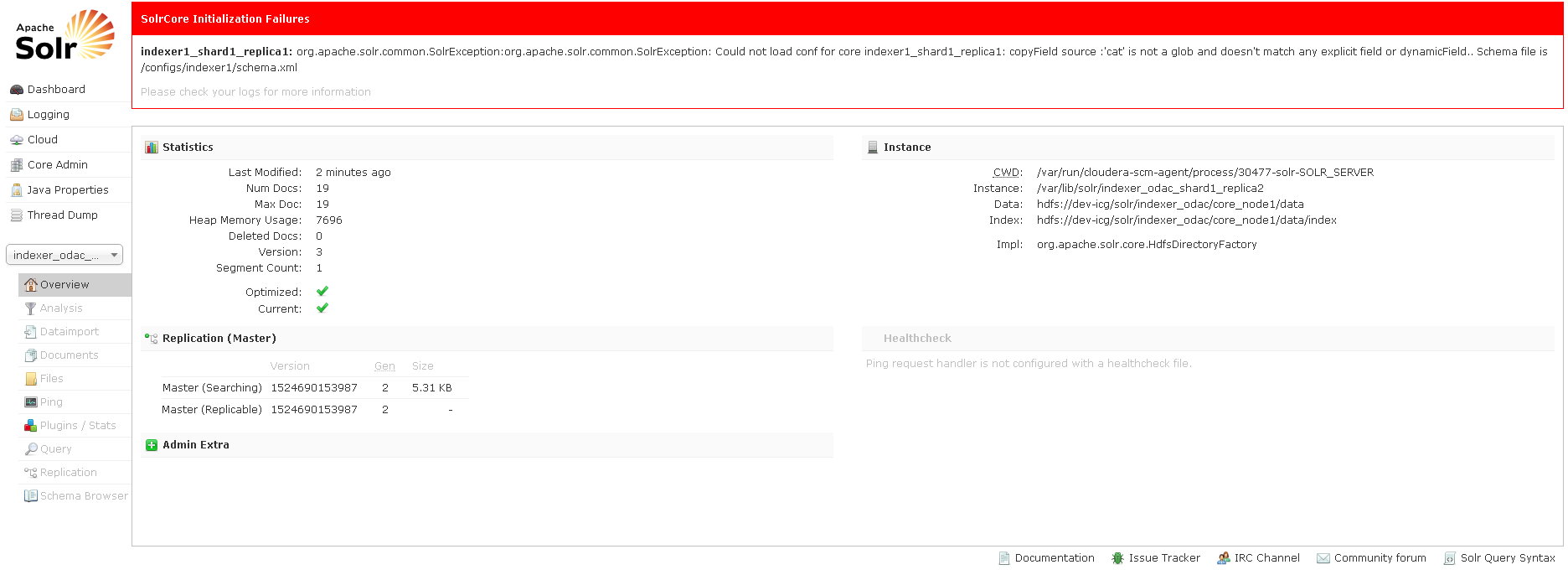
19 files indexed.

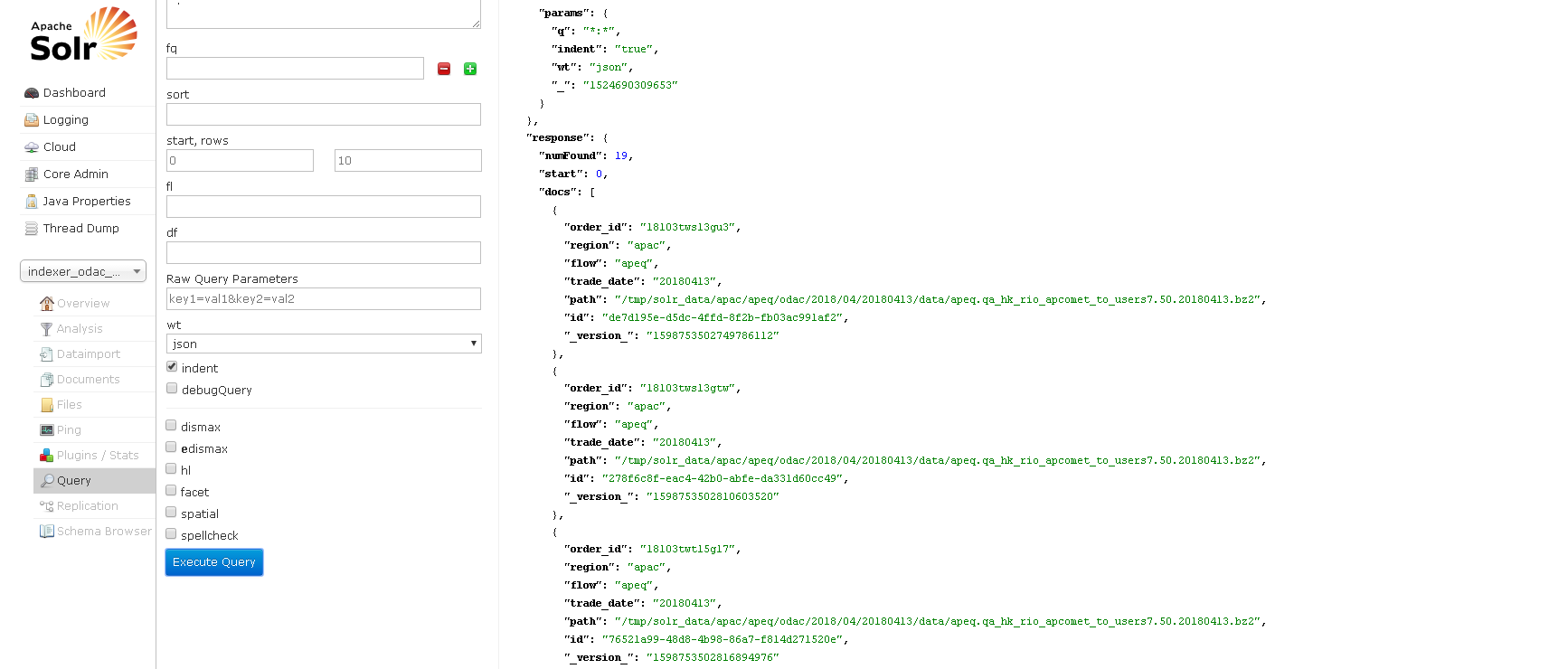
COMMITting Solr index changes to http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs..

Time spent: 0:00:00.850

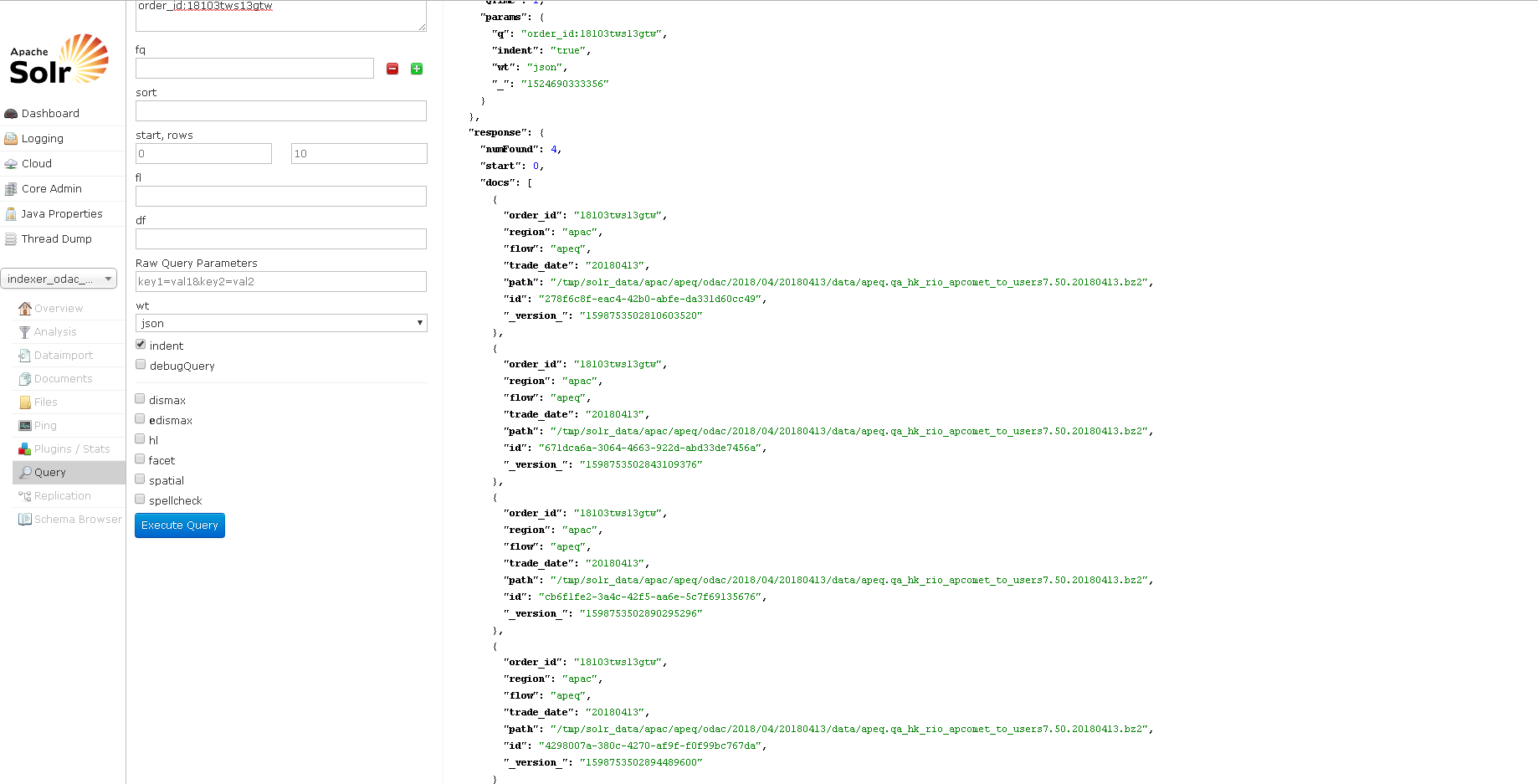
### Check the document/index

### Solr Admin





Search order\_id: 18103tws13gtw



<http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer_odac_shard1_replica2/select?q=order_id%3A18103tws13gtw&wt=json&indent=true>

{

"responseHeader":{

"status":0,

"QTime":1,

"params":{

"q":"order\_id:18103tws13gtw",

"indent":"true",

"wt":"json"}},

"response":{"numFound":4,"start":0,"docs":[

{

"order\_id":"18103tws13gtw",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180413",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data/apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2",

"id":"278f6c8f-eac4-42b0-abfe-da331d60cc49",

"\_version\_":"1598753502810603520"},

{

"order\_id":"18103tws13gtw",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180413",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data/apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2",

"id":"671dca6a-3064-4663-922d-abd33de7456a",

"\_version\_":"1598753502843109376"},

{

"order\_id":"18103tws13gtw",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180413",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data/apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2",

"id":"cb6f1fe2-3a4c-42f5-aa6e-5c7f69135676",

"\_version\_":"1598753502890295296"},

{

"order\_id":"18103tws13gtw",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180413",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180413/data/apeq.qa\_hk\_rio\_apcomet\_to\_users7.50.20180413.bz2",

"id":"4298007a-380c-4270-af9f-f0f99bc767da",

"\_version\_":"1598753502894489600"}]

}}

## Demo 2

### Test data

Raw Data Source: WORM drive on fxodwap03u-phys

Location: /global/ocean/data/ocean/archive\_worm/incoming/<region>/<system>/odac/<year>/<month>/<date(yyyymmdd)>/data

Region: apac

Flow: apeq

/global/ocean/data/ocean/archive\_worm/incoming/apac/apeq/odac/2018/04/20180403/data

In total there 2037 zip files that contains

Local Solr server location: dsnyr003d01i1d

Folder:

On the Solr server dsnyr003d01i1d, create the same folder hierachy to mock up the WORM drive:

/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

Copy the data from WORM into it:

scp \* rx52019@dsnyr003d01i1d:/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

Archives number: 2037

Delete all archive files with the size of 14 – empty archive

find . -size 14c -delete

Now the effective archive number is: 1873

### Command/location:

Parser location: dsnyr003d01i1d: /tmp/parser

The parser is copied to the Solr host where the test data is ready, in this case, dsnyr003d01i1d

Parser name: script\_p2\_0425.py

bash-4.1$ python script\_p2\_0425.py -r apac -f apeq -p /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data -o /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

bash-4.1$ ls /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data | wc -l

325420

Remove the .bz2

323547

### Adding the data folder to the index

Host: dsnyr003d01i1d (where the Solr server is registered to for the new collection)

path: /opt/cloudera/parcels/CDH/jars

command:

data folder: /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

make sure only json files in the folder

java -Dtype=application/json -Drecursive -Durl="http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs" -jar post.jar /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

POSTing file apeq.qa\_hk\_rio\_aplqfi\_to\_users8.23.20180403\_592.json

POSTing file apeq.qa\_hk\_rio\_aplqfi\_to\_users10.15.20180403\_299.json

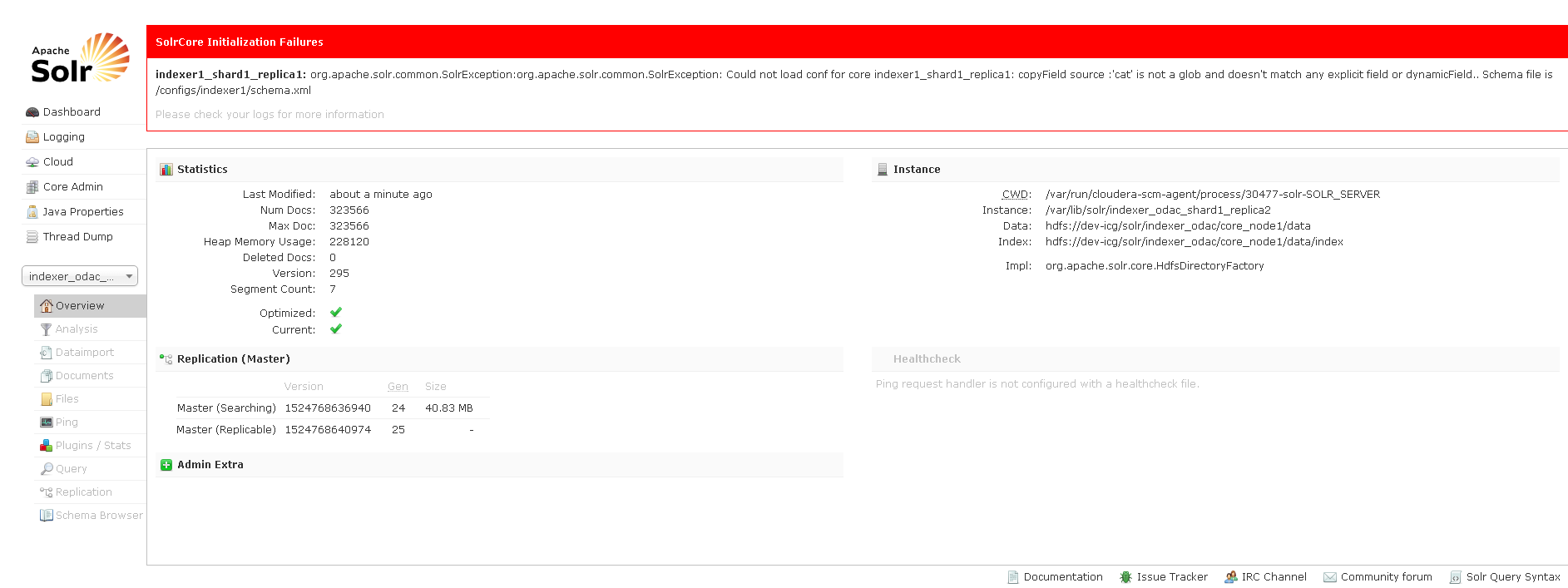
323547 files indexed.

COMMITting Solr index changes to http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs..

Time spent: 0:22:07.436

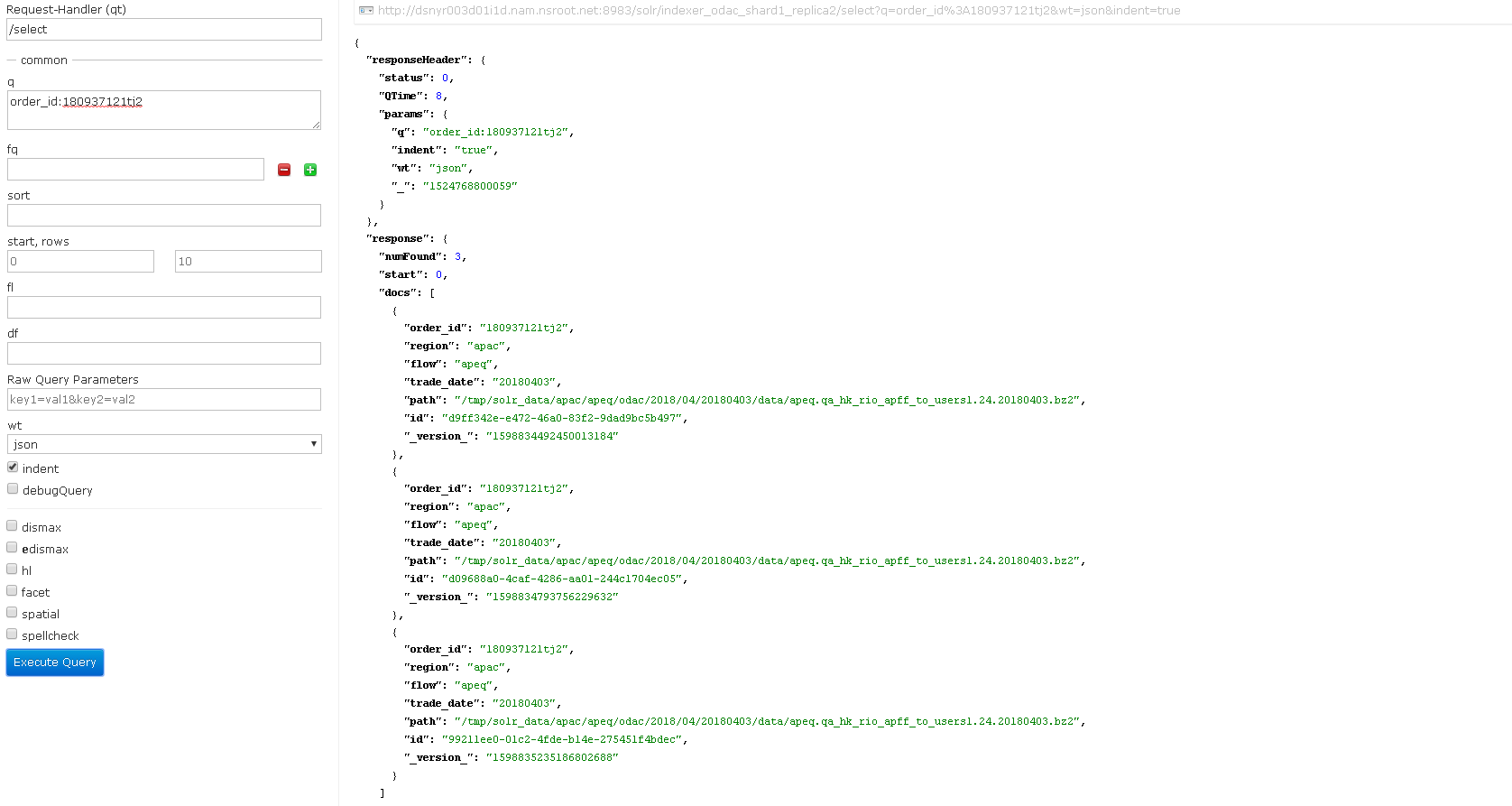
### Check the document/index

#### Solr Admin





Search "order\_id:180937121tj2"



#### RESTFul

<http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer_odac_shard1_replica2/select?q=order_id%3A180937121tj2&wt=json&indent=true>

{

"responseHeader":{

"status":0,

"QTime":1,

"params":{

"q":"order\_id:180937121tj2",

"indent":"true",

"wt":"json"}},

"response":{"numFound":3,"start":0,"docs":[

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"d9ff342e-e472-46a0-83f2-9dad9bc5b497",

"\_version\_":"1598834492450013184"},

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"d09688a0-4caf-4286-aa01-244c1704ec05",

"\_version\_":"1598834793756229632"},

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"99211ee0-01c2-4fde-b14e-275451f4bdec",

"\_version\_":"1598835235186802688"}]

}}

## Demo 3

### Test data

Raw Data Source: WORM drive on fxodwap03u-phys

Location: /global/ocean/data/ocean/archive\_worm/incoming/<region>/<system>/odac/<year>/<month>/<date(yyyymmdd)>/data

Region: nam

Flow: cx

/global/ocean/data/ocean/archive\_worm/incoming/nam/cx/odac/2018/04/20180403/data

In total there 467 zip files that contains

Local Solr server location: dsnyr003d01i1d

Folder:

On the Solr server dsnyr003d01i1d, create the same folder hierachy to mock up the WORM drive:

mkdir -p /tmp/solr\_data/nam/cx/odac/2018/04/20180403/data

/tmp/solr\_data/nam/cx/odac/2018/04/20180403/data

Copy the data from WORM into it:

scp \* rx52019@dsnyr003d01i1d:/tmp/solr\_data/nam/cx/odac/2018/04/20180403/data

Archives number: 467

Delete all archive files with the size of 14 – empty archive

find . -size 14c -delete

Now the effective archive number is: 447

### Command/location:

Parser location: dsnyr003d01i1d: /tmp/parser

The parser is copied to the Solr host where the test data is ready, in this case, dsnyr003d01i1d

Parser name: script\_p2\_0425.py

bash-4.1$ python script\_p2\_0425.py -r nam -f cx -p /tmp/solr\_data/nam/cx/odac/2018/04/20180403/data -o /tmp/solr\_data/nam/cx/odac/2018/04/20180403/data

bash-4.1$ ls /tmp/solr\_data/nam/cx/odac/2018/04/20180403/data | wc -l

1429

Remove the .bz2

### Adding the data folder to the index

Host: dsnyr003d01i1d (where the Solr server is registered to for the new collection)

path: /opt/cloudera/parcels/CDH/jars

command:

data folder: /tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data

make sure only json files in the folder

java -Dtype=application/json -Drecursive -Durl="http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs" -jar post.jar /tmp/solr\_data/nam/cx/odac/2018/04/20180403/data

POSTing file cx.rio\_uscx19.31.20180403\_6.json

POSTing file cx.rio\_uscx20.39.20180403\_781.json

POSTing file cx.rio\_uscx15.6.20180403\_5.json

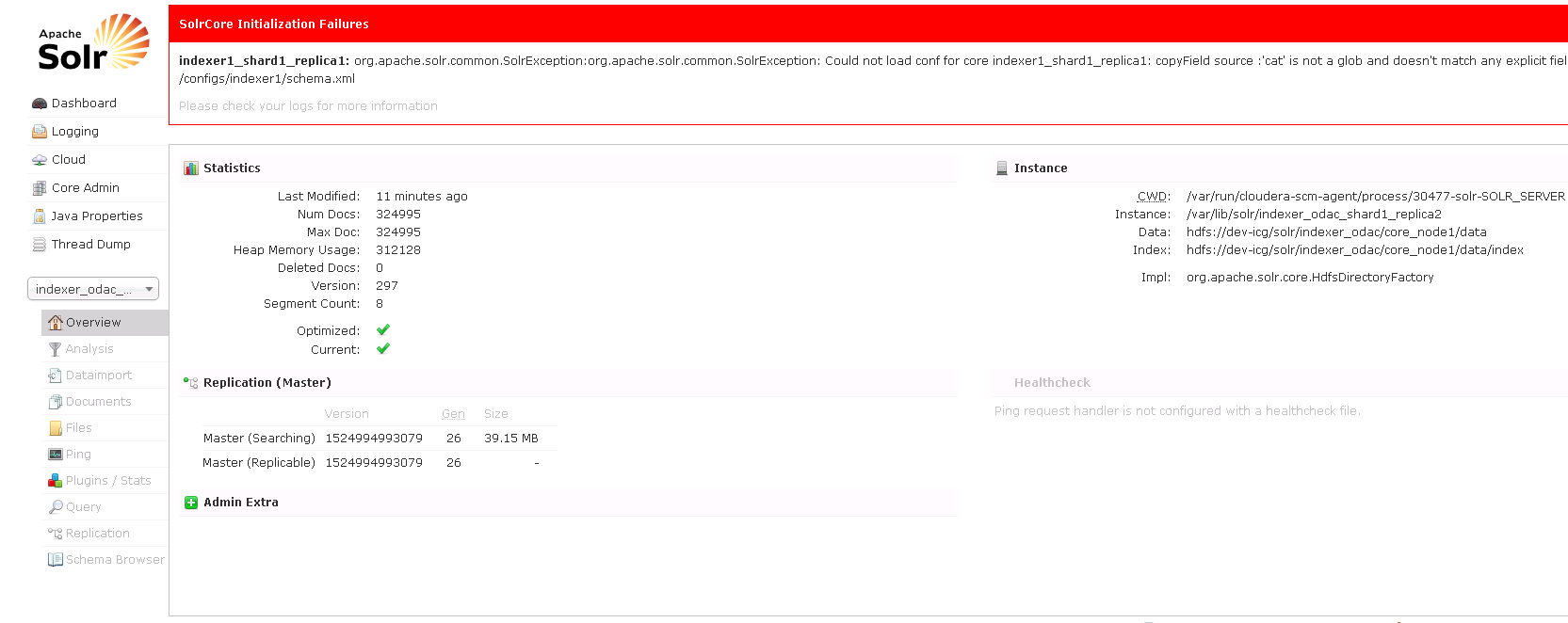
1429 files indexed.

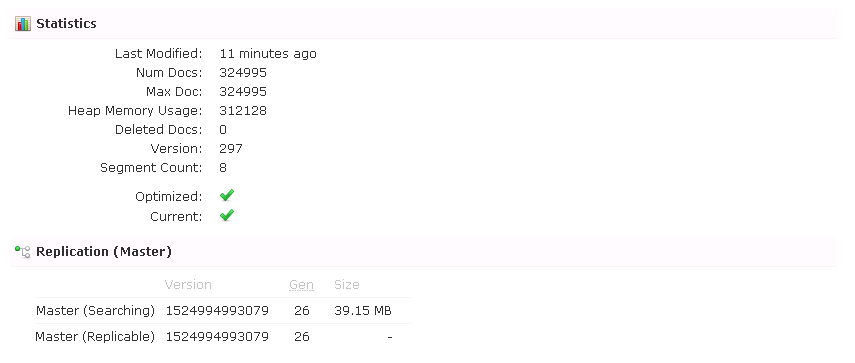
COMMITting Solr index changes to http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer\_odac/update/json/docs..

Time spent: 0:00:07.979

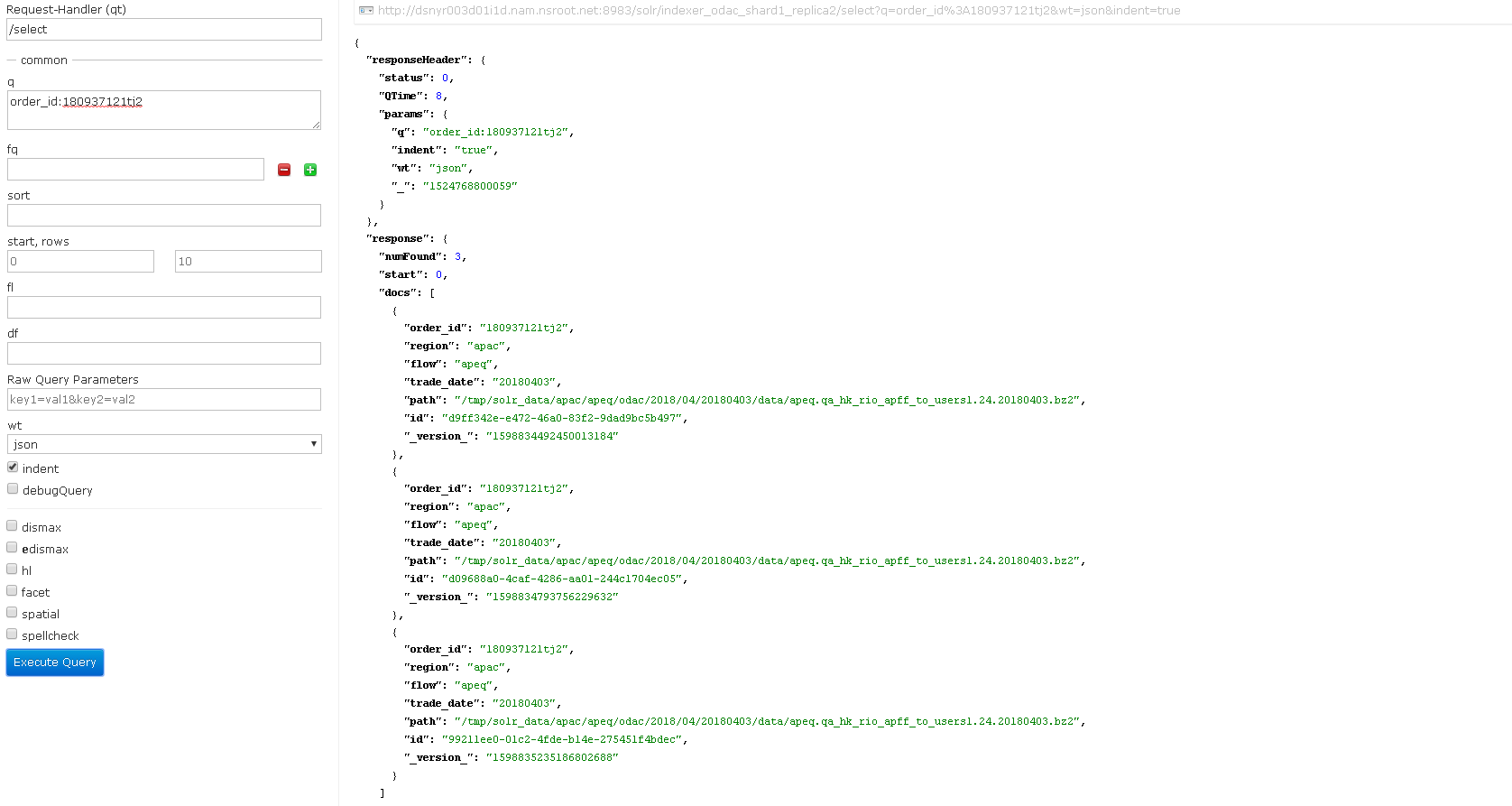
### Check the document/index

#### Solr Admin





Search "order\_id:180937121tj2"



#### RESTFul

<http://dsnyr003d01i1d.nam.nsroot.net:8983/solr/indexer_odac_shard1_replica2/select?q=order_id%3A180937121tj2&wt=json&indent=true>

{

"responseHeader":{

"status":0,

"QTime":1,

"params":{

"q":"order\_id:180937121tj2",

"indent":"true",

"wt":"json"}},

"response":{"numFound":3,"start":0,"docs":[

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"d9ff342e-e472-46a0-83f2-9dad9bc5b497",

"\_version\_":"1598834492450013184"},

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"d09688a0-4caf-4286-aa01-244c1704ec05",

"\_version\_":"1598834793756229632"},

{

"order\_id":"180937121tj2",

"region":"apac",

"flow":"apeq",

"trade\_date":"20180403",

"path":"/tmp/solr\_data/apac/apeq/odac/2018/04/20180403/data/apeq.qa\_hk\_rio\_apff\_to\_users1.24.20180403.bz2",

"id":"99211ee0-01c2-4fde-b14e-275451f4bdec",

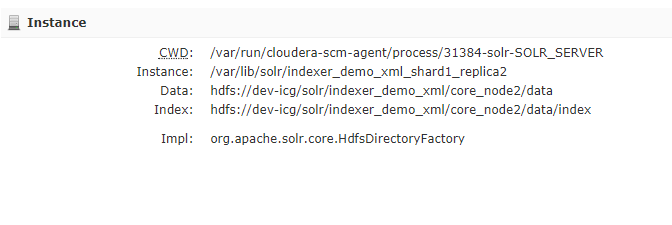
"\_version\_":"1598835235186802688"}]

}}

## Indexing

### Index Location

Index location can be found in the Instance section in Solr Admin



On any host with keytab access, kinit with Solr user:

kinit -k -t /tmp/solr.dsnyproxy02i1d.keytab [solr/dsnyproxy02i1d.nam.nsroot.net@NAMUXDEV.DYN.NSROOT.NET](mailto:solr/dsnyproxy02i1d.nam.nsroot.net@NAMUXDEV.DYN.NSROOT.NET)

Once privilege is in place, just use regular hdfs dfs -l command to check the index information.

### Example, index size (after Demo 1):

Check the Index or other data stats on HDFS:

$ hdfs dfs -du -h hdfs://dev-icg/solr/indexer\_odac/core\_node1/data

5.3 K 15.9 K hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index

0 0 hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/snapshot\_metadata

4.0 K 384 M hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/tlog

### Example, index size (after Demo 2):

Check the Index or other data stats on HDFS:

$ hdfs dfs -du -h hdfs://dev-icg/solr/indexer\_odac/core\_node1/data

40.8 M 122.5 M hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index

0 0 hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/snapshot\_metadata

73.3 K 384 M hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/tlog

### Example, index size (after Demo 3):

Check the Index or other data stats on HDFS:

$ hdfs dfs -du -h hdfs://dev-icg/solr/indexer\_odac/core\_node1/data

39.2 M 117.5 M hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/index

0 0 hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/snapshot\_metadata

263.8 K 384 M hdfs://dev-icg/solr/indexer\_odac/core\_node1/data/tlog

## Supplemental reading[[1]](#footnote-1)

1. When the number of fields is small, the size of the norms is negligible, independently of the size and number of documents.
2. When the documents are large, the stop words help reducing the size of the index significantly. Maybe here is important to note two things. In first place, the documents fetched from Wikipedia are writen using traditional language, and are all writen in English, while the documents fetched from Twitter are writen using modern language, and in many different languages. In second place, I didn’t measure the precision and recall of the system when using stop words, so it is possible that the findability in a real scenario won’t be good.
3. If you’re storing the documents, and they are big enough, it’s not so important if you store the term vectors or not, so if you’re using a feature such as highlighting and you are looking for good performance, you should store them. If you’re not storing documents, or your documents are small, you should think twice before storing the term vectors, because they’re going to increase significantly your index’s size.

According to this, CitiFX has a compact format while CitiML is much sparse. For CitiML, implementing stop words would help reducing the size of the index significantly.

## Advance Solring

### Near Real Time Searching

# Rollback

## Deletion of index[[2]](#footnote-2)

<delete><query>\*:\*</query></delete>

<query>\*:\*</query> will delete everything while \*:\* can be replaced by a condition to delete only specific index.

## Deletion of collection

example: collection: indexer\_0419

http://dsnyr001d02i1d.nam.nsroot.net:8983/solr/admin/collections?action=DELETE&name=indexer\_0419

## Deletion of instance

solrctl instancedir --delete indexer\_0419

## Deletion of the instance folder

rm -r $HOME/indexer\_0419

# Project 1 Indexing FIX data on File System

# Project 2 Indexing FIX data on HDFS

# Project 3 Near Realtime Indexing with Flume + Solr

# Project 4 Full text searching with Hbase + Solr

# Project 5 Machine-learned ranking[[3]](#footnote-3)

Modify managed-schema.xml

1. text field

includes the text fields that you'll need for your model. First, change the text field so that it is of the text\_general type (which is already defined inside managed-schema). The text\_general type will allow you to calculate BM25 similarities. Because the text field already exists (it was automatically created when you indexed the tweets), you need to use the replace-field command like so:

**curl -X POST -H 'Content-type:application/json' --data-binary '{  
  "replace-field" : {  
     "name":"text",  
     "type":"text\_general",  
     "indexed":"true",  
     "stored":"true",  
     "multiValued":"true"}  
}' http://localhost:8983/solr/test/schema**

1. create a new field text\_tfidf

**curl -X POST -H 'Content-type:application/json' --data-binary '{  
  "add-field-type" : {  
     "name":"text\_tfidf",  
     "class":"solr.TextField",  
     "positionIncrementGap":"100",  
     "indexAnalyzer":{  
        "tokenizer":{  
           "class":"solr.StandardTokenizerFactory"},  
        "filter":{  
           "class":"solr.StopFilterFactory",  
           "ignoreCase":"true",  
           "words":"stopwords.txt"},  
        "filter":{  
           "class":"solr.LowerCaseFilterFactory"}},  
     "queryAnalyzer":{  
        "tokenizer":{  
           "class":"solr.StandardTokenizerFactory"},  
        "filter":{  
           "class":"solr.StopFilterFactory",  
           "ignoreCase":"true",  
           "words":"stopwords.txt"},  
        "filter":{  
           "class":"solr.SynonymGraphFilterFactory",  
           "ignoreCase":"true",  
           "synonyms":"synonyms.txt"},  
        "filter":{  
           "class":"solr.LowerCaseFilterFactory"}},  
     "similarity":{  
           "class":"solr.ClassicSimilarityFactory"}}  
}'**[**http://localhost:8983/solr/test/schema**](http://localhost:8983/solr/test/schema)

1. add a text\_tfidf field that will be of the text\_tfidf type defined above:

**curl -X POST -H 'Content-type:application/json' --data-binary '{  
  "add-field" : {  
     "name":"text\_tfidf",  
     "type":"text\_tfidf",  
     "indexed":"true",  
     "stored":"false",  
     "multiValued":"true"}  
}' http://localhost:8983/solr/test/schema**

1. add copy field

**curl -X POST -H 'Content-type:application/json' --data-binary '{  
  "add-copy-field" : {  
     "source":"text",  
     "dest":"text\_tfidf"}  
}'**[**http://localhost:8983/solr/test/schema**](http://localhost:8983/solr/test/schema)

1. index the data
2. restart Solr
   1. stop Solr server
   2. start Solr server with LTR enabled

**bin/solr start -Dsolr.ltr.enabled=true**

1. Push the model features and the model specification to Solr with a json formatted file:

**my\_efi\_features.json:**

**[  
  {  
    "store" : "my\_efi\_feature\_store",  
    "name" : "tfidf\_sim\_a",  
    "class" : "org.apache.solr.ltr.feature.SolrFeature",  
    "params" : { "q" : "{!dismax qf=text\_tfidf}${text\_a}" }  
  },  
  {  
    "store" : "my\_efi\_feature\_store",  
    "name" : "tfidf\_sim\_b",  
    "class" : "org.apache.solr.ltr.feature.SolrFeature",  
    "params" : { "q" : "{!dismax qf=text\_tfidf}${text\_b}" }  
  },  
  {  
    "store" : "my\_efi\_feature\_store",  
    "name" : "bm25\_sim\_a",  
    "class" : "org.apache.solr.ltr.feature.SolrFeature",  
    "params" : { "q" : "{!dismax qf=text}${text\_a}" }  
  },  
  {  
    "store" : "my\_efi\_feature\_store",  
    "name" : "bm25\_sim\_b",  
    "class" : "org.apache.solr.ltr.feature.SolrFeature",  
    "params" : { "q" : "{!dismax qf=text}${text\_b}" }  
  },  
  {  
    "store" : "my\_efi\_feature\_store",  
    "name" : "max\_sim",  
    "class" : "org.apache.solr.ltr.feature.SolrFeature",  
    "params" : { "q" : "{!dismax qf='text text\_tfidf'}${text}" }  
  }  
]**

1. **Store:** where to store the feature;
2. **Name:** name of the feature;
3. **Class:** specifies which [Java class will handle the feature](https://lucene.apache.org/solr/guide/6_6/learning-to-rank.html#LearningToRank-Featureengineering);
4. **Params:** additional information about the feature required by its Java class

# Project 6 Parallel Indexing with Spark + Solr

# Project 7 Analytical in Solr Searching

Started Solr5.3, post-searching result grouping was introduced as Subfacets (a.k.a. Nested Facets) which provides [facet functions](http://yonik.com/solr-facet-functions/) (statistics) and makes real-time analytics possible:

* Can add a subfacet to any facet type (field, query, range)
* A subfacet can be of any type (field/terms, query, range)
* A given facet can have multiple subfacets
* Just like top-level facets, each subfacet can have it’s own configuration (i.e. offset, limit, sort, stats)

#### Subfacet Syntax

Subfacets are part of the new Facet Module, and are naturally expressed in the [JSON Facet API](http://yonik.com/json-facet-api). Every facet command is actually a sub-facet since there is an implicit top-level facet bucket (the domain) defined by the documents matching the main query and filters. Simply add a **facet** section to the parameters of any existing facet command.

For example, a terms facet on the “genre” field looks like:

top\_genres:{

type: terms,

field: genre,

limit: 5

}

Now if we wanted to add a subfacet to find the top 4 authors for each genre bucket:

top\_genres:{

type: terms,

field: genre,

limit: 5,

facet:{

top\_authors:{

type: terms,

field: author,

limit: 4

}

}

}

#### Complex Subfacet Examples

Assume we want to do the following complex faceting request:

* Facet on the “genre” field and find the top buckets
* For ever “genre” bucket generated above, find the top 7 authors
* For ever “genre” bucket, create a bucket of high popularity items (defined by popularity 8 – 10) and call it “highpop”
* For ever “highpop” bucket generated above, find the top 5 publishers

In short, this request finds the top authors for each genre and finds the the top publishers for high popularity books in each genre.  
Using the JSON Facet API, the full request (using curl) would look like the following:

$ curl http://localhost:8983/solr/query -d 'q=\*:\*&

json.facet=

{

top\_genres:{

type: terms,

field: genre,

facet:{

top\_authors: {

type : terms, // nested terms facet

field: author,

limit: 7

},

highpop:{

type : query, // nested query facet

q: "popularity:[8 TO 10]", // lucene query string

facet:{

publishers:{

type: terms, // nested terms facet under the nested query facet

field: publisher,

limit: 5

}

}

}

}

}

}

'

An example response would look like the following:

|  |
| --- |
| [...]    "facets":{      "top\_genres":{        "buckets":[{            "val":"Fantasy",            "count":5432,            "top\_authors":{  // these are the top authors in the "Fantasy" genre              "buckets":[{                  "val":"Mercedes Lackey",                  "count":121},                {                  "val":"Piers Anthony",                  "count":98}]}},            "highpop":{  // bucket for books in the "Fantasy" genre with popularity  //between 8 and 10              "count":876              "publishers":{  // top publishers in this bucket (highpop fantasy)                "buckets":[{                    "val":"Bantam Books",                    "count":346},                  {                    "val":"Tor",                    "count":217}]}},            {            "val":"Science Fiction",  // the next genre bucket            "count":4188,  [...] |
|  |

All the reporting and sorting was done using document count (i.e. number of books). If instead, we wanted to find **top authors by total revenue** (assuming we had a “sales” field), then we could simply change the author facet from the previous example as follows:

top\_authors:{

type: terms,

field: author,

limit: 7,

sort: "revenue desc",

facet:{

revenue: "sum(sales)"

}

}

# Appendix 1 Fields by Tag (FIX 4.4)[[4]](#footnote-4)

|  |  |
| --- | --- |
| **Tag** | **Field** |
| [1](http://www.onixs.biz/fix-dictionary/4.4/tagNum_1.html) | [Account](http://www.onixs.biz/fix-dictionary/4.4/tagNum_1.html) |
| [2](http://www.onixs.biz/fix-dictionary/4.4/tagNum_2.html) | [AdvId](http://www.onixs.biz/fix-dictionary/4.4/tagNum_2.html) |
| [3](http://www.onixs.biz/fix-dictionary/4.4/tagNum_3.html) | [AdvRefID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_3.html) |
| [4](http://www.onixs.biz/fix-dictionary/4.4/tagNum_4.html) | [AdvSide](http://www.onixs.biz/fix-dictionary/4.4/tagNum_4.html) |
| [5](http://www.onixs.biz/fix-dictionary/4.4/tagNum_5.html) | [AdvTransType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_5.html) |
| [6](http://www.onixs.biz/fix-dictionary/4.4/tagNum_6.html) | [AvgPx](http://www.onixs.biz/fix-dictionary/4.4/tagNum_6.html) |
| [7](http://www.onixs.biz/fix-dictionary/4.4/tagNum_7.html) | [BeginSeqNo](http://www.onixs.biz/fix-dictionary/4.4/tagNum_7.html) |
| [8](http://www.onixs.biz/fix-dictionary/4.4/tagNum_8.html) | [BeginString](http://www.onixs.biz/fix-dictionary/4.4/tagNum_8.html) |
| [9](http://www.onixs.biz/fix-dictionary/4.4/tagNum_9.html) | [BodyLength](http://www.onixs.biz/fix-dictionary/4.4/tagNum_9.html) |
| [10](http://www.onixs.biz/fix-dictionary/4.4/tagNum_10.html) | [CheckSum](http://www.onixs.biz/fix-dictionary/4.4/tagNum_10.html) |
| [11](http://www.onixs.biz/fix-dictionary/4.4/tagNum_11.html) | [ClOrdID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_11.html) |
| [12](http://www.onixs.biz/fix-dictionary/4.4/tagNum_12.html) | [Commission](http://www.onixs.biz/fix-dictionary/4.4/tagNum_12.html) |
| [13](http://www.onixs.biz/fix-dictionary/4.4/tagNum_13.html) | [CommType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_13.html) |
| [14](http://www.onixs.biz/fix-dictionary/4.4/tagNum_14.html) | [CumQty](http://www.onixs.biz/fix-dictionary/4.4/tagNum_14.html) |
| [15](http://www.onixs.biz/fix-dictionary/4.4/tagNum_15.html) | [Currency](http://www.onixs.biz/fix-dictionary/4.4/tagNum_15.html) |
| [16](http://www.onixs.biz/fix-dictionary/4.4/tagNum_16.html) | [EndSeqNo](http://www.onixs.biz/fix-dictionary/4.4/tagNum_16.html) |
| [17](http://www.onixs.biz/fix-dictionary/4.4/tagNum_17.html) | [ExecID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_17.html) |
| [18](http://www.onixs.biz/fix-dictionary/4.4/tagNum_18.html) | [ExecInst](http://www.onixs.biz/fix-dictionary/4.4/tagNum_18.html) |
| [19](http://www.onixs.biz/fix-dictionary/4.4/tagNum_19.html) | [ExecRefID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_19.html) |
| [20](http://www.onixs.biz/fix-dictionary/4.4/tagNum_20.html) | [ExecTransType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_20.html) |
| [21](http://www.onixs.biz/fix-dictionary/4.4/tagNum_21.html) | [HandlInst](http://www.onixs.biz/fix-dictionary/4.4/tagNum_21.html) |
| [22](http://www.onixs.biz/fix-dictionary/4.4/tagNum_22.html) | [SecurityIDSource](http://www.onixs.biz/fix-dictionary/4.4/tagNum_22.html) |
| [23](http://www.onixs.biz/fix-dictionary/4.4/tagNum_23.html) | [IOIID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_23.html) |
| [24](http://www.onixs.biz/fix-dictionary/4.4/tagNum_24.html) | [IOIOthSvc (no longer used)](http://www.onixs.biz/fix-dictionary/4.4/tagNum_24.html) |
| [25](http://www.onixs.biz/fix-dictionary/4.4/tagNum_25.html) | [IOIQltyInd](http://www.onixs.biz/fix-dictionary/4.4/tagNum_25.html) |
| [26](http://www.onixs.biz/fix-dictionary/4.4/tagNum_26.html) | [IOIRefID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_26.html) |
| [27](http://www.onixs.biz/fix-dictionary/4.4/tagNum_27.html) | [IOIQty](http://www.onixs.biz/fix-dictionary/4.4/tagNum_27.html) |
| [28](http://www.onixs.biz/fix-dictionary/4.4/tagNum_28.html) | [IOITransType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_28.html) |
| [29](http://www.onixs.biz/fix-dictionary/4.4/tagNum_29.html) | [LastCapacity](http://www.onixs.biz/fix-dictionary/4.4/tagNum_29.html) |
| [30](http://www.onixs.biz/fix-dictionary/4.4/tagNum_30.html) | [LastMkt](http://www.onixs.biz/fix-dictionary/4.4/tagNum_30.html) |
| [31](http://www.onixs.biz/fix-dictionary/4.4/tagNum_31.html) | [LastPx](http://www.onixs.biz/fix-dictionary/4.4/tagNum_31.html) |
| [32](http://www.onixs.biz/fix-dictionary/4.4/tagNum_32.html) | [LastQty](http://www.onixs.biz/fix-dictionary/4.4/tagNum_32.html) |
| [33](http://www.onixs.biz/fix-dictionary/4.4/tagNum_33.html) | [NoLinesOfText](http://www.onixs.biz/fix-dictionary/4.4/tagNum_33.html) |
| [34](http://www.onixs.biz/fix-dictionary/4.4/tagNum_34.html) | [MsgSeqNum](http://www.onixs.biz/fix-dictionary/4.4/tagNum_34.html) |
| [35](http://www.onixs.biz/fix-dictionary/4.4/tagNum_35.html) | [MsgType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_35.html) |
| [36](http://www.onixs.biz/fix-dictionary/4.4/tagNum_36.html) | [NewSeqNo](http://www.onixs.biz/fix-dictionary/4.4/tagNum_36.html) |
| [37](http://www.onixs.biz/fix-dictionary/4.4/tagNum_37.html) | [OrderID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_37.html) |
| [38](http://www.onixs.biz/fix-dictionary/4.4/tagNum_38.html) | [OrderQty](http://www.onixs.biz/fix-dictionary/4.4/tagNum_38.html) |
| [39](http://www.onixs.biz/fix-dictionary/4.4/tagNum_39.html) | [OrdStatus](http://www.onixs.biz/fix-dictionary/4.4/tagNum_39.html) |
| [40](http://www.onixs.biz/fix-dictionary/4.4/tagNum_40.html) | [OrdType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_40.html) |
| [41](http://www.onixs.biz/fix-dictionary/4.4/tagNum_41.html) | [OrigClOrdID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_41.html) |
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| [916](http://www.onixs.biz/fix-dictionary/4.4/tagNum_916.html) | [StartDate](http://www.onixs.biz/fix-dictionary/4.4/tagNum_916.html) |
| [917](http://www.onixs.biz/fix-dictionary/4.4/tagNum_917.html) | [EndDate](http://www.onixs.biz/fix-dictionary/4.4/tagNum_917.html) |
| [918](http://www.onixs.biz/fix-dictionary/4.4/tagNum_918.html) | [AgreementCurrency](http://www.onixs.biz/fix-dictionary/4.4/tagNum_918.html) |
| [919](http://www.onixs.biz/fix-dictionary/4.4/tagNum_919.html) | [DeliveryType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_919.html) |
| [920](http://www.onixs.biz/fix-dictionary/4.4/tagNum_920.html) | [EndAccruedInterestAmt](http://www.onixs.biz/fix-dictionary/4.4/tagNum_920.html) |
| [921](http://www.onixs.biz/fix-dictionary/4.4/tagNum_921.html) | [StartCash](http://www.onixs.biz/fix-dictionary/4.4/tagNum_921.html) |
| [922](http://www.onixs.biz/fix-dictionary/4.4/tagNum_922.html) | [EndCash](http://www.onixs.biz/fix-dictionary/4.4/tagNum_922.html) |
| [923](http://www.onixs.biz/fix-dictionary/4.4/tagNum_923.html) | [UserRequestID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_923.html) |
| [924](http://www.onixs.biz/fix-dictionary/4.4/tagNum_924.html) | [UserRequestType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_924.html) |
| [925](http://www.onixs.biz/fix-dictionary/4.4/tagNum_925.html) | [NewPassword](http://www.onixs.biz/fix-dictionary/4.4/tagNum_925.html) |
| [926](http://www.onixs.biz/fix-dictionary/4.4/tagNum_926.html) | [UserStatus](http://www.onixs.biz/fix-dictionary/4.4/tagNum_926.html) |
| [927](http://www.onixs.biz/fix-dictionary/4.4/tagNum_927.html) | [UserStatusText](http://www.onixs.biz/fix-dictionary/4.4/tagNum_927.html) |
| [928](http://www.onixs.biz/fix-dictionary/4.4/tagNum_928.html) | [StatusValue](http://www.onixs.biz/fix-dictionary/4.4/tagNum_928.html) |
| [929](http://www.onixs.biz/fix-dictionary/4.4/tagNum_929.html) | [StatusText](http://www.onixs.biz/fix-dictionary/4.4/tagNum_929.html) |
| [930](http://www.onixs.biz/fix-dictionary/4.4/tagNum_930.html) | [RefCompID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_930.html) |
| [931](http://www.onixs.biz/fix-dictionary/4.4/tagNum_931.html) | [RefSubID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_931.html) |
| [932](http://www.onixs.biz/fix-dictionary/4.4/tagNum_932.html) | [NetworkResponseID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_932.html) |
| [933](http://www.onixs.biz/fix-dictionary/4.4/tagNum_933.html) | [NetworkRequestID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_933.html) |
| [934](http://www.onixs.biz/fix-dictionary/4.4/tagNum_934.html) | [LastNetworkResponseID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_934.html) |
| [935](http://www.onixs.biz/fix-dictionary/4.4/tagNum_935.html) | [NetworkRequestType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_935.html) |
| [936](http://www.onixs.biz/fix-dictionary/4.4/tagNum_936.html) | [NoCompIDs](http://www.onixs.biz/fix-dictionary/4.4/tagNum_936.html) |
| [937](http://www.onixs.biz/fix-dictionary/4.4/tagNum_937.html) | [NetworkStatusResponseType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_937.html) |
| [938](http://www.onixs.biz/fix-dictionary/4.4/tagNum_938.html) | [NoCollInquiryQualifier](http://www.onixs.biz/fix-dictionary/4.4/tagNum_938.html) |
| [939](http://www.onixs.biz/fix-dictionary/4.4/tagNum_939.html) | [TrdRptStatus](http://www.onixs.biz/fix-dictionary/4.4/tagNum_939.html) |
| [940](http://www.onixs.biz/fix-dictionary/4.4/tagNum_940.html) | [AffirmStatus](http://www.onixs.biz/fix-dictionary/4.4/tagNum_940.html) |
| [941](http://www.onixs.biz/fix-dictionary/4.4/tagNum_941.html) | [UnderlyingStrikeCurrency](http://www.onixs.biz/fix-dictionary/4.4/tagNum_941.html) |
| [942](http://www.onixs.biz/fix-dictionary/4.4/tagNum_942.html) | [LegStrikeCurrency](http://www.onixs.biz/fix-dictionary/4.4/tagNum_942.html) |
| [943](http://www.onixs.biz/fix-dictionary/4.4/tagNum_943.html) | [TimeBracket](http://www.onixs.biz/fix-dictionary/4.4/tagNum_943.html) |
| [944](http://www.onixs.biz/fix-dictionary/4.4/tagNum_944.html) | [CollAction](http://www.onixs.biz/fix-dictionary/4.4/tagNum_944.html) |
| [945](http://www.onixs.biz/fix-dictionary/4.4/tagNum_945.html) | [CollInquiryStatus](http://www.onixs.biz/fix-dictionary/4.4/tagNum_945.html) |
| [946](http://www.onixs.biz/fix-dictionary/4.4/tagNum_946.html) | [CollInquiryResult](http://www.onixs.biz/fix-dictionary/4.4/tagNum_946.html) |
| [947](http://www.onixs.biz/fix-dictionary/4.4/tagNum_947.html) | [StrikeCurrency](http://www.onixs.biz/fix-dictionary/4.4/tagNum_947.html) |
| [948](http://www.onixs.biz/fix-dictionary/4.4/tagNum_948.html) | [NoNested3PartyIDs](http://www.onixs.biz/fix-dictionary/4.4/tagNum_948.html) |
| [949](http://www.onixs.biz/fix-dictionary/4.4/tagNum_949.html) | [Nested3PartyID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_949.html) |
| [950](http://www.onixs.biz/fix-dictionary/4.4/tagNum_950.html) | [Nested3PartyIDSource](http://www.onixs.biz/fix-dictionary/4.4/tagNum_950.html) |
| [951](http://www.onixs.biz/fix-dictionary/4.4/tagNum_951.html) | [Nested3PartyRole](http://www.onixs.biz/fix-dictionary/4.4/tagNum_951.html) |
| [952](http://www.onixs.biz/fix-dictionary/4.4/tagNum_952.html) | [NoNested3PartySubIDs](http://www.onixs.biz/fix-dictionary/4.4/tagNum_952.html) |
| [953](http://www.onixs.biz/fix-dictionary/4.4/tagNum_953.html) | [Nested3PartySubID](http://www.onixs.biz/fix-dictionary/4.4/tagNum_953.html) |
| [954](http://www.onixs.biz/fix-dictionary/4.4/tagNum_954.html) | [Nested3PartySubIDType](http://www.onixs.biz/fix-dictionary/4.4/tagNum_954.html) |
| [955](http://www.onixs.biz/fix-dictionary/4.4/tagNum_955.html) | [LegContractSettlMonth](http://www.onixs.biz/fix-dictionary/4.4/tagNum_955.html) |
| [956](http://www.onixs.biz/fix-dictionary/4.4/tagNum_956.html) | [LegInterestAccrualDate](http://www.onixs.biz/fix-dictionary/4.4/tagNum_956.html) |

# Security

Raw data is parsed into tokenized items in json format, where flow’s name is retained as part of the meta data, in the searching presentation part, all the matching result will be retrieved directly from the Solr, and be programmatically filtered based on the flow’s name.

In consideration of the sensitivity of the data after it is exposed to search, highest security metric is to be applied, in this case, a DAP policy is to be created and everyone who is entitiled to the data (according to his or her entitlement defined in Netezza) can apply for the access of the searching site/port through the current WAIS procedure.

# Automation

As the parsing and indexing can be performed with CLI command line, it can be easily used by shell scripting so that the further automation job could become easy based on the script.

AutoSys would be the future platform for automating the parsing and indexing procedure.

# Scalability

The parser has a flexibile design to include as much scalability as possible based on the existing infrastructure:

1. The parser uses a separate lookup table to find out the correspondent field name for given tag
2. The lookup table allows easy add/remove tags, and allows future tag change (e.g. new extended tags introduced in CitiFX), or new FIX protocol used by new data flow;
3. The module used in the parser could be re-used for other format;

# Flexibility

The flexibility part in this project is mainly about the parsing and indexing

1. Switch between data formats:
   * The program is designed to provide multiple options so the pasring operator can switch between various data formats;
   * The program is designed to provide the most reusabe modules so that it can be scaled to processing other data formats in the future;
2. Parsing: it is designed to combined the parser with the capability of processing archives as flexible as possible:
   * Mutiple options are enabled in the program so that the program can differ various data format, debugging need
   * Built with the capability of taking folder as the option so that the program can process entire folder instead of going through each individual archive file;
   * Built with the capability to processing folder with multiple sub folder(s)
   * Built with the capability of processing single archive which is useful in situation of troubleshooting

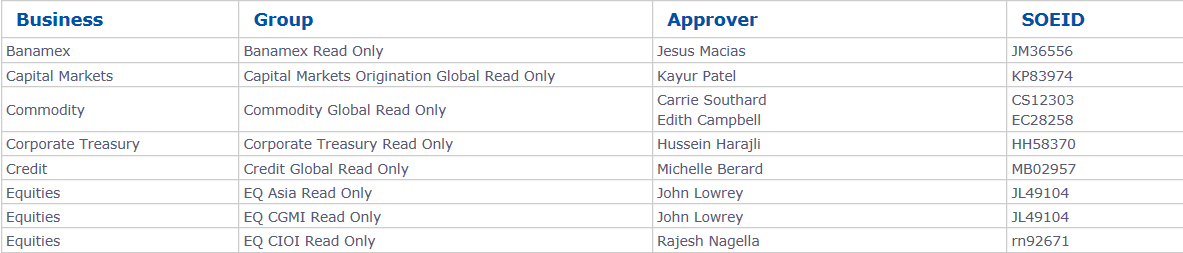
# Entitlement (proposal)

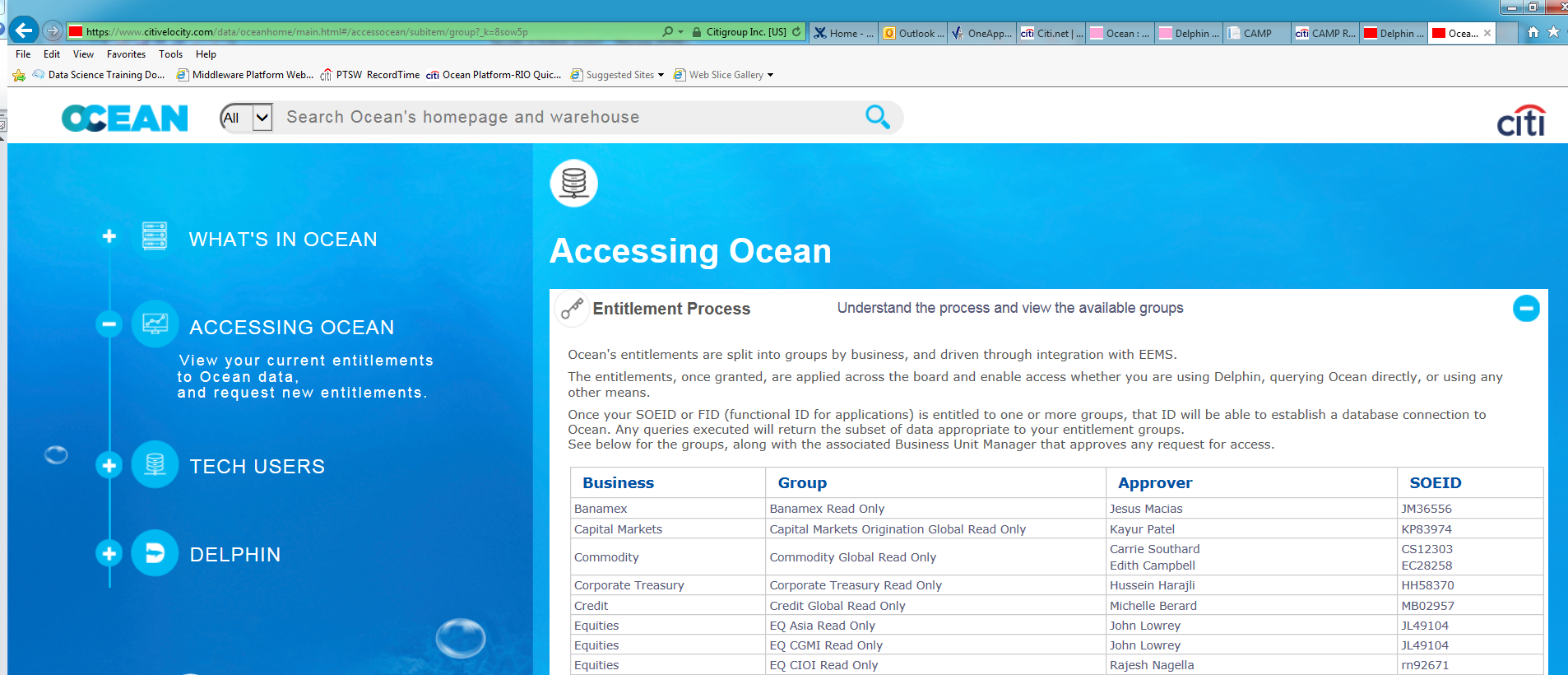
1. User: any user belongs to a business, for example, Ocean;

User’s access could be requested through

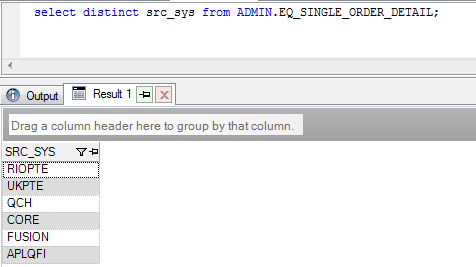
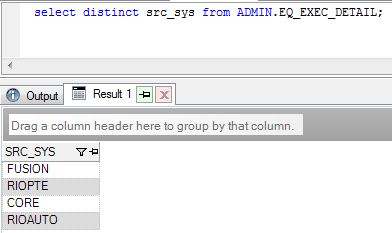
1. Group: any business has been pre-defined groups it is entitled to

<https://www.citivelocity.com/data/oceanhome/main.html#/accessocean/subitem/group?_k=8sow5p>





1. Final data: Ocean’s ETL will add SRC\_SYS to each table when the raw data is extracted and saved into Netezza database

1. Different data is saved into different table, and has different SRC\_SYS, the SRC\_SYS corresponds to the Business
2. Business information within raw message

For dataflow using CitiFX format, there is a Citi customized tag 10005 indicating business, quoted below from CitiFX:

10005: Unique system id for each application such PTMS, GEOTRADER,etc RootSrcSystemID and PreviousLinkSrcSystemID also have the same enum values BOOKBUILDER\_SRCSYS\_ID 34619 COMET\_EMEA 157514 COMET\_EMEA\_TRADER 157514 LIQUIFI\_EMEA 158948 CITISMART\_EMEA 50503 FIX-946

There are currently 334 values available for different meaning that links to various business, e.g. 178 is for VIPER\_HK

Two options:

1. The entitlement design could use this tag (and/or other tags) together with the user’s business group to determine the user’s entitlement to the message.
2. As indicated by Development team/BA, the business group assigned to the message in the database has alreay been completed, when needed, the Solr Post-Searching user presentation part can refer to the same information in the database so as the proper entitlement filtering can apply.

# Maintenance

The key component in this project is the parser.

To facilitate future usage and on-going maintenance, logging function is developed to enable detailed logging during the parsing process, the log includes not only information messages but also error messages, as well as detailed stats report with the option to choose to if include the detailed history debugging info or not. At the same time, screen output is provided for the convenience of parser operator.

Sample log 1 (without history debugging info):

2018-05-16 14:27:45,657 DEBUG Output file path derived by joining Output directory: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-3 and,   
2018-05-16 14:27:45,657 DEBUG input bz2 filename - \apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2 by removing the parent folderpath -C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1 from input bz2 file path - C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2  
2018-05-16 14:27:45,658 INFO Processing C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2  
2018-05-16 14:27:45,658 INFO Processing C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2  
2018-05-16 14:27:45,661 INFO Saved C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-3\staging\apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2.json  
2018-05-16 14:27:45,667 INFO ===========================================================================================2018-05-16 14:27:45,667 INFO Report for the session  
2018-05-16 14:27:45,667 INFO Time the session started: 2018-05-16 14:27:45.658000  
2018-05-16 14:27:45,667 INFO Time the session ended: 2018-05-16 14:27:45.668000  
2018-05-16 14:27:45,667 INFO Time the session costs: 0:00:00.010000  
2018-05-16 14:27:45,667 INFO Data Type processed in this session: fix  
2018-05-16 14:27:45,667 INFO Data Region processed in this session: apac  
2018-05-16 14:27:45,667 INFO Data Flow processed in this session: apeq  
2018-05-16 14:27:45,667 INFO Data processed in this session: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\apeq.qa\_hk\_rio\_apcomet\_to\_users4.4.20180313.bz2  
2018-05-16 14:27:45,667 INFO Result generated in this session: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-3  
2018-05-16 14:27:45,667 INFO Total bz2 archives to be processed: 1  
2018-05-16 14:27:45,668 INFO Total bz2 archives processed: 1  
2018-05-16 14:27:45,668 INFO Total bz2 archives failed: 0  
2018-05-16 14:27:45,668 INFO Total completed json outputs: 1  
2018-05-16 14:27:45,668 INFO \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Detailed processing history -- Start \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  
2018-05-16 14:27:45,668 INFO \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Detailed processing history -- End \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  
2018-05-16 14:27:45,668 INFO Log location for this session: C:\Users\RX52019\PycharmProjects\FIX\_Indexer/log/20180516142745.log  
2018-05-16 14:27:45,676 INFO Job/report processed by: rx52019 on host: NAMHURDEV7D-670  
2018-05-16 14:27:45,676 INFO ===========================================================================================

Sample log 2 (with history debugging info):

2018-05-16 15:45:46,734 INFO Saved C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\staging\sub2\apeq.qa\_hk\_rio\_apares\_to\_users1.55.20180330-1.bz2\apeq.qa\_hk\_rio\_apares\_to\_users1.55.20180330-1.bz2\_2.json  
2018-05-16 15:45:46,747 DEBUG Output file path derived by joining Output directory: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7 and,   
2018-05-16 15:45:46,747 DEBUG input bz2 filename - \test\_data\_fix1\sub2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2 by removing the parent folderpath -C:\Users\RX52019\PycharmProjects\FIX\_Indexer from input bz2 file path - C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\sub2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2  
2018-05-16 15:45:46,749 INFO Processing C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\sub2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2  
2018-05-16 15:45:46,749 INFO Processing C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1\sub2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2  
2018-05-16 15:45:46,750 INFO Saved C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\staging\sub2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2\apeq.qa\_hk\_rio\_apcomet\_to\_users8.28.20180313.bz2.json

2018-05-16 15:45:46,757 INFO Report for the session  
2018-05-16 15:45:46,757 INFO Time the session started: 2018-05-16 15:45:46.535000  
2018-05-16 15:45:46,757 INFO Time the session ended: 2018-05-16 15:45:46.758000  
2018-05-16 15:45:46,759 INFO Time the session costs: 0:00:00.223000  
2018-05-16 15:45:46,759 INFO Data Type processed in this session: fix  
2018-05-16 15:45:46,759 INFO Data Region processed in this session: apac  
2018-05-16 15:45:46,759 INFO Data Flow processed in this session: apeq  
2018-05-16 15:45:46,759 INFO Data processed in this session: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix1  
2018-05-16 15:45:46,759 INFO Result generated in this session: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7  
2018-05-16 15:45:46,759 INFO Total bz2 archives to be processed: 9  
2018-05-16 15:45:46,759 INFO Total bz2 archives processed: 9  
2018-05-16 15:45:46,759 INFO Total bz2 archives failed: 0  
2018-05-16 15:45:46,759 INFO Total completed json outputs: 24  
2018-05-16 15:45:46,759 INFO \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Detailed processing history -- Start \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  
2018-05-16 15:45:46,759 INFO Archive location: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\staging\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2  
2018-05-16 15:45:46,759 INFO Json output: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\final\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\_1.json  
2018-05-16 15:45:46,759 INFO Json output: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\final\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\_2.json  
2018-05-16 15:45:46,759 INFO Json output: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\final\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\_3.json  
2018-05-16 15:45:46,759 INFO Json output: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\final\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\apeq.qa\_au\_iress\_to\_rio3.3.20180313.bz2\_4.json  
2018-05-16 15:45:46,759 INFO Archive location: C:\Users\RX52019\PycharmProjects\FIX\_Indexer\test\_data\_fix\_0516-7\staging\apeq.qa\_hk\_rio\_apcomet\_to\_users4.5.20180313.bz2

# Identified Inconsistency on current data

Issue 1: format not consistent

Region: Nam

Flow: tpsctml

Detail: The flow does not have a consistent data format, it was using CitiFX format until 20180327, in 20180328 it switched to CitiML and the data was broken for that date, started from 20180329 it is in CitiML.

Issue 2: zip file could contain empty message

Region: all regions

Flow: all flows

Detail: there are zip files (.bz2) with the size of 14 Bytes, those files contain empty message, it is suggested to exclude those files during the index creation.

# To be included in the future phase

1. Performance: Real-time or Near Real-time indexing and searching ready
2. Security: the searching page or URL should be restricted to only authorized user
3. Scalability: the POC should be scaled to include all system/flow in APAC, and then move to other region
4. Automation: the ultimate goal is to setup watchers on every system/flow so that newly arrived messages will be indexed and become searchable with minimum human interference
5. Monitoring: Admin functionalities be provided to admin group members

1. <https://dzone.com/articles/solr-index-size-analysis> [↑](#footnote-ref-1)
2. <http://blog.dileno.com/archive/201106/delete-documents-from-solr-index-by-query/> [↑](#footnote-ref-2)
3. <https://opensource.com/article/17/11/learning-rank-apache-solr> [↑](#footnote-ref-3)
4. <http://www.onixs.biz/fix-dictionary/4.4/fields_by_tag.html> [↑](#footnote-ref-4)