

CS300 Couchbase NoSQL Server Administration

Lab 5 Exercise Manual



Release: 6.5.1

Revised: June 22nd, 2020



Lab #5: GSI Indexes and N1QL

Objective: This 1-hour lab will first walk you through adding nodes #3 and #4 back into the cluster. Then create and use N1QL indexes.


Overview: The following high-level steps are involved in this lab:

- Add nodes #3 and #4 back into cluster
- Add two sample buckets for beer-sample and gamesim-sample into the cluster

Add Nodes #3 and #4 back into the Cluster:

The last lab concluded with leaving the cluster in a degraded state with just 2 healthy data service nodes (Node #1 and #2) running in Server Group 1. In this section, we'll re-join Nodes #3 and #4 into the existing cluster using the Web UI.

The Server Nodes page should currently show 2 nodes in your environment, which 5 Active items on each of the 2 nodes. In your specific environment, you may see 6 items on one node and 4 items on the other node... this is normal also. The items in Couchbase will not necessarily be split exactly evenly across the 2 nodes every time.



6 Node Cluster > Servers

FILTER

GROUPS

Dashboard

Servers

Buckets

Indexes

Search

Query

XDCR

Security

Settings

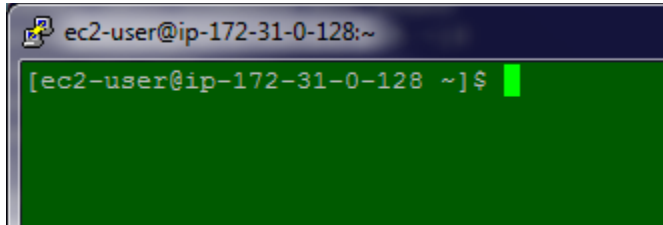
Logs

name	group	services	CPU	RAM	swap	disk used	items
ec2-13-56-207-54.us-west-1.compute.amazonaws.com	Group 1	data	1.02%	30%	---	16.9MB	5/5
ec2-54-183-85-83.us-west-1.compute.amazonaws.com	Group 1	data	2.51%	35%	---	19.6MB	5/5
ec2-54-193-62-173.us-west-1.compute.amazonaws.com	Group 2	full text index query	2.01%	26.3%	---	---	0/0
ec2-54-193-79-108.us-west-1.compute.amazonaws.com	Group 1	full text index query	1.5%	29.3%	---	---	0/0



First, we need to start the Couchbase service on Nodes #3 and #4.

Log into Node #3 (Green VM):



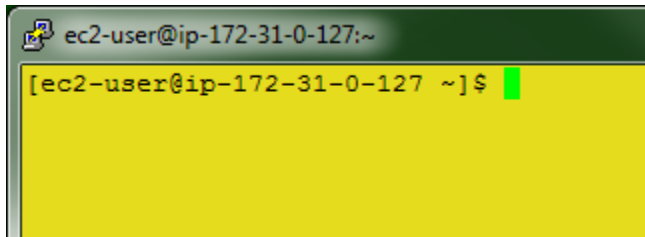
Run the following command to start Couchbase server and check its status:

```
[ec2-user@couchbase03 ~]$ sudo systemctl start couchbase-server
[ec2-user@couchbase03 ~]$
```

Wait 15 seconds for the service to start and then verify the status:

```
[ec2-user@ip-172-31-0-128 ~]$ sudo systemctl status couchbase-server
couchbase-server is running
```

Next, log into Node #4 (Yellow VM) and start Couchbase there as well:



Run the following command to start Couchbase server and check its status:

```
[ec2-user@couchbase04 ~]$ sudo systemctl start couchbase-server
[ec2-user@couchbase04 ~]$
```

Wait 15 seconds for the service to start and then verify the status:

```
[ec2-user@ip-172-31-0-127 ~]$ sudo systemctl status couchbase-server
• couchbase-server.service - Couchbase Server
  Loaded: loaded (/usr/lib/systemd/system/couchbase-server.service; enabled; vendor preset: disabled)
  Active: active (running) since Wed 2016-07-20 14:59:05 EDT; 22s ago
    Docs: http://docs.couchbase.com
  Process: 29766 ExecStop=/opt/couchbase/bin/couchbase-server -k (code=exited, status=0/SUCCESS)
  Process: 2061 ExecStart=/opt/couchbase/bin/couchbase-server -- -noinput -detached (code=exited, status=0/SUCCESS)
 Main PID: 2131 (beam.smp)
```



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```

CGroup: /system.slice/couchbase-server.service
-2074 /opt/couchbase/lib/erlang/erts-5.10.4.0.0.1/bin/epmd -daemon...
-2106 /opt/couchbase/lib/erlang/erts-5.10.4.0.0.1/bin/beam.smp -A...
-2131 /opt/couchbase/lib/erlang/erts-5.10.4.0.0.1/bin/beam.smp -A...
-2159 sh -s disksup
-2161 /opt/couchbase/lib/erlang/lib/os_mon-2.2.14/priv/bin/cpu_su...
-2162 /opt/couchbase/lib/erlang/lib/os_mon-2.2.14/priv/bin/memsup...
-2163 inet_gethost 4
-2164 inet_gethost 4
-2292 /opt/couchbase/lib/erlang/erts-5.10.4.0.0.1/bin/beam.smp -P...
-2317 sh -s disksup
-2318 /opt/couchbase/lib/erlang/lib/os_mon-2.2.14/priv/bin/memsup...
-2319 /opt/couchbase/lib/erlang/lib/os_mon-2.2.14/priv/bin/cpu_su...
-2324 /opt/couchbase/bin/priv/godu
-2325 sh -s ns_disksup
-2329 /opt/couchbase/bin/priv/godu
-2334 /opt/couchbase/bin/saslauthd-port
-2336 portsigar for ns_1@ec2-54-209-38-55.compute-1.amazonaws.com...
-2366 /opt/couchbase/bin/goport
-2370 /opt/couchbase/bin/goxdcr -localProxyPort=11215 -sourceKVAd...
-2379 /opt/couchbase/lib/erlang/erts-5.10.4.0.0.1/bin/beam.smp -P...
-2396 /opt/couchbase/bin/memcached -C /opt/couchbase/var/lib/couc...

```

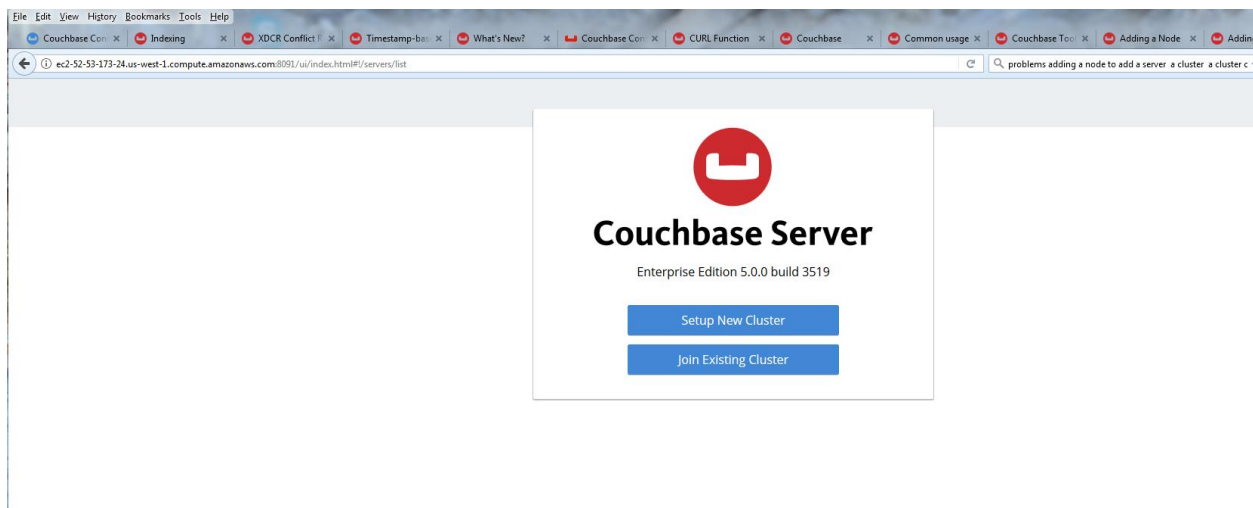
```

Jul 20 14:59:01 Couchbase04 systemd[1]: Starting Couchbase Server...
Jul 20 14:59:02 Couchbase04 systemd[1]: PID file /opt/couchbase/var/lib/couc...
Jul 20 14:59:05 Couchbase04 systemd[1]: couchbase-server.service: Supervisin...
Jul 20 14:59:05 Couchbase04 systemd[1]: Started Couchbase Server.
Hint: Some lines were ellipsized, use -l to show in full.

```

Point your browser to the URL for node 3:

<http://ec2-13-57-48-149.us-west-1.compute.amazonaws.com:8091/ui/index.html>



Choose

Join Existing Cluster



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Fill in the information required making sure to use the Amazon ec2 address for both cluster and joining node name.

Select data service(deselect other services)

Edit index path to /opt/couchbase/var/lib/couchbase/index

Couchbase > Join Cluster

Cluster Host Name/IP Address
ec2-13-56-178-208.us-west-1.compute.amazonaws.com

Cluster Admin Username
Administrator

Cluster Admin Password

▼ Configure Services & Settings For This Node

☒ Data
☐ Index
☐ Search
☐ Query
☐ Eventing
☐ Analytics ⓘ

This Node: Host Name/IP Address Usually localhost or similar
ec2-18-144-52-30.us-west-1.compute.amazonaws.com

Data Disk Path Path cannot be changed after setup
/opt/couchbase/var/lib/couchbase/data
Free: 6 GB

Indexes Disk Path Path cannot be changed after setup
/opt/couchbase/var/lib/couchbase/index
Free: 6 GB

Analytics Disk Paths Paths cannot be changed after setup
/opt/couchbase/var/lib/couchbase/analytics
Free: 6 GB

< Back Join With Custom Configuration

Click

Join With Custom Configuration

Repeat this procedure for Node #4



Lab-5: Views/indexes page 6

You should now see as ADD Pending Rebalance.

6 Node Cluster > Servers

✓ This server has been associated with the cluster and will join on the next rebalance operation.

name	group	services	CPU	RAM	swap	disk used	items
ec2-13-56-207-54.us-west-1.compute.amazonaws.com	Group 1	data	1.51%	27.3%	---	16.9MB	5/5
ec2-13-57-48-149.us-west-1.compute.amazonaws.com	Group 1	data	0.5%	17.4%	---	---	0/0
New node Not taking traffic ADD pending rebalance							
ec2-52-53-173-24.us-west-1.compute.amazonaws.com	Group 1	data	1%	19.7%	---	---	0/0
New node Not taking traffic ADD pending rebalance							
ec2-54-183-85-83.us-west-1.compute.amazonaws.com	Group 1	data	3%	31.9%	---	19.6MB	5/5
ec2-54-193-62-173.us-west-1.compute.amazonaws.com	Group 2	full text index query	1.5%	24.1%	---	---	0/0
ec2-54-193-79-108.us-west-1.compute.amazonaws.com	Group 1	full text index query	3.03%	26.6%	---	---	0/0

Click the Rebalance button

Rebalance

6 Node Cluster > Servers

rebalancing 6 nodes 33.3%

name	group	services	CPU	RAM	swap	disk used	items
ec2-13-56-207-54.us-west-1.compute.amazonaws.com	Group 1	data	82.1%	27.3%	---	16.9MB	5/5
ec2-13-57-48-149.us-west-1.compute.amazonaws.com	Group 1	data	78.8%	18.3%	---	10.7KB	0/0
ec2-52-53-173-24.us-west-1.compute.amazonaws.com	Group 1	data	80.8%	20.6%	---	10.7KB	0/0
ec2-54-183-85-83.us-west-1.compute.amazonaws.com	Group 1	data	75.6%	30.7%	---	19.6MB	5/5
ec2-54-193-62-173.us-west-1.compute.amazonaws.com	Group 2	full text index query	65.6%	24.7%	---	---	0/0
ec2-54-193-79-108.us-west-1.compute.amazonaws.com	Group 1	full text index query	67.7%	27.2%	---	---	0/0

The rebalance operation will start running:

Within about 2 minutes the cluster should fully rebalance and you should see the Items' active and replica copies scattered across the 4 data service nodes:



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6 Node Cluster > Servers									
Dashboard	name	group	services	CPU	RAM	swap	disk used	items	
Servers	ec2-13-56-207-54.us-west-1.compute.amazonaws.com	Group 1	data	2.01%	28.2%	---	13MB	2/3	
Buckets	ec2-13-57-48-149.us-west-1.compute.amazonaws.com	Group 1	data	2.51%	20.3%	---	5MB	2/2	
Indexes	ec2-52-53-173-24.us-west-1.compute.amazonaws.com	Group 1	data	3.01%	22.2%	---	5.01MB	3/2	
Search	ec2-54-183-85-83.us-west-1.compute.amazonaws.com	Group 1	data	2%	31.2%	---	12.8MB	3/3	
Query	ec2-54-193-62-173.us-west-1.compute.amazonaws.com	Group 2	full text index query	2.5%	25.1%	---	---	0/0	
XDCR	ec2-54-193-79-108.us-west-1.compute.amazonaws.com	Group 1	full text index query	0.5%	27.3%	---	---	0/0	
Security									
Settings									
Logs									

Go to the servers links and then to the groups link and place both of the newly joining nodes(3 and 4) into group 2

6 Node Cluster > Servers > Server Groups									
Dashboard									Reset Apply Changes Add Group
Servers	Group 1 edit name								
Buckets	ec2-13-56-207-54.us-west-1.compute.amazonaws.com	Data							move to ▼
Indexes	ec2-13-57-48-149.us-west-1.compute.amazonaws.com	Data		✓ pending move to Group 2					cancel
Search	ec2-52-53-173-24.us-west-1.compute.amazonaws.com	Data		✓ pending move to Group 2					cancel
Query	ec2-54-183-85-83.us-west-1.compute.amazonaws.com	Data							move to ▼
XDCR	ec2-54-193-79-108.us-west-1.compute.amazonaws.com	Full Text Index Query							move to ▼
Security	Group 2 edit name								
Settings	ec2-54-193-62-173.us-west-1.compute.amazonaws.com	Full Text Index Query							move to ▼
Logs									

Click

Apply Changes

Then rebalance cluster.

Add 3 sample buckets into the cluster:

Next we will add the beer-sample and gamesim-sample buckets back into the cluster so we can generate views upon them.

Click on Settings at the top right, then choose “Sample Buckets”. Under “Available Samples” place a check mark next to “beer-sample” , “gamesim-sample” and “travel sample” then click ‘Load Sample Data’:



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6 Node Cluster > Settings

Cluster Software Updates Node Availability Email Alerts Auto-Compaction Sample Buckets ▾

Dashboard
Servers
Buckets
XDCR
Security
Settings
Logs

Documents
Query
Search
Analytics
Eventing
Indexes

Sample buckets contain example data and Couchbase views.
You can provision one or more sample buckets to help you discover the power of Couchbase Server.

Sample buckets (like all buckets in Couchbase Server 5.0+) can only be accessed by a user with privileges for that bucket.

Available Samples

- ☐ beer-sample
- ☐ gamesim-sample
- ☐ travel-sample

Installed Samples

none

Load Sample Data

6 Node Cluster > Settings

Cluster Software Updates Node Availability Email Alerts Auto-Compaction Sample Buckets ▾

Dashboard
Servers
Buckets
XDCR
Security
Settings
Logs

Documents
Query
Search
Analytics
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Sample buckets contain example data and Couchbase views.
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Sample buckets (like all buckets in Couchbase Server 5.0+) can only be accessed by a user with privileges for that bucket.

Available Samples

- ☒ beer-sample
- ☒ gamesim-sample
- ☒ travel-sample

Installed Samples

none

Load Sample Data

click on “Data Buckets” link in the side menu to verify that the 3 sample buckets have indeed been loaded. You should see 7,303 items in the beer-sample bucket and 586 items in the gamesim-sample bucket and finally 31591 items in the travel-sample bucket:

6 Node Cluster > Buckets

name ▾	items	resident	ops/sec	RAM used/quota	disk used
beer-sample	7,303	100%	0	56.8MB / 400MB	57.4MB
default	10	100%	0	48.5MB / 7.1GB	38.6MB
gamesim-sample	586	100%	0	48.5MB / 400MB	12.5MB
travel-sample	31,591	100%	0	133MB / 400MB	179MB

Dashboard
Servers
Buckets
Indexes
Search
Query
XDCR
Security
Settings
Logs



Lab #5: Global Secondary Indexes and N1QL

Objective: This lab will first walk you through creating indexes and views using the N1QL prompt. And cover some of the more common N1QL statements.

Overview: The following high-level steps are involved in this lab:

- Use the Couchbase Query Tool to:
- Create Primary Beer index
- Create Secondary beer indexes
- Use the "Explain" N1QL statement
- Use the "Select" N1QL statement to display keyspaces and indexes
- Connect to a couchbase query service node using cbq command from a query node and from an application server.



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The screenshot shows the Couchbase Query Editor interface. The top bar indicates a '6 Node Cluster' and the 'Query' tab is active. The left sidebar contains navigation links: Dashboard, Servers, Buckets, Indexes, Search, Query, XDCR, Security, Settings, and Logs. The main area is divided into 'Query Editor' and 'Query Results'.

Query Editor: The query entered is `select * from system:keyspaces`. Below the query bar, there are buttons for 'Execute', 'Explain', and 'Preferences'. The status bar shows 'success | elapsed: 151.32ms | execution: 151.31ms | count: 4 | size: 910'.

Query Results: The results are displayed in JSON format. The output shows four documents, each representing a keyspace. The first document is for 'travel-sample', the second for 'beer-sample', the third for 'default', and the fourth for 'gamesim-sample'. Each document contains metadata like 'datastore_id', 'id', 'name', and 'namespace_id'.

Bucket Insights: On the right side, there is a 'Bucket Insights' panel. It shows 'Fully Queryable Buckets' with a summary of 3 flavors found and a sample size of 1000 documents. It lists three flavors: 'Flavor 1 (98.4%)', 'Flavor 2 (1.4%)', and 'Flavor 3 (0.2%)'. Below this, it lists various indexed fields like 'address', 'city', 'code', 'country', 'description', 'geo', 'name', 'phone', 'state', 'type', 'updated', and 'website'. It also shows 'Indexes' for 'beer_primary', 'gamesim-sample (586)', and 'travel-sample (31591)'. At the bottom, it lists 'Queryable on Indexed Fields' and 'Non-Indexed Buckets'.

Try pasting the following commands into your Query tab Execute window in the Couchbase GUI

```
cbq> select * from system:keyspaces;
```

```
cbq> select * from system:indexes;
```

```
cbq> select * from `beer-sample` limit 10;
```

```
cbq> create primary index on `beer-sample` using view;
```



```
cbq> select * from `beer-sample` limit 1;
```

```
cbq> select * from `beer-sample` limit 10;
```

```
cbq> create primary index on `beer-sample` using gsi;
```

```
cbq> create primary index on `default` using view;
```

```
cbq> create primary index on `default` using gsi;
```

```
cbq> create primary index on `game-sample` using view;
```

```
cbq> create primary index on `game-sample` using gsi;
```

```
"msg": "Keyspace not found keyspace game-sample - cause: No bucket named game-sample"  
"status": "fatal",
```

```
cbq> create primary index on `gamesim-sample` using gsi;
```

```
cbq> create index levels on `gamesim-sample`(level) using gsi;
```

```
cbq>create index Beer_abv on `beer-sample`(abv) using gsi;
```

```
cbq> create index Beer_by_state on `beer-sample`(state) using gsi;
```

```
cbq> create index Beer_by_state on `beer-sample`(state) using view;
```

```
cbq> create index Beer_by_phone on `beer-sample`(phone) using gsi;
```

```
cbq> create index Beer_abv on `beer-sample`(abv) using gsi;
```

Now repeat the commands if you have time in the cbq> command line prompt.

Change the output format from json to table, Tree, Plan & Plan text

Try some of the sample commands again using the explain button.