Couchbase

Function Design Document

COUCHBASE-SHERLOCK

2nd Index Tooling Metric Support + Query Metric support

Table of Contents

Revision and Signoff History

Doc Version#	CRM Fusion	Date	Reviewer	Comments
1.0	Sherlock	Nov 11, 2014	Sean Frogner	Original Creation
1.1	Sherlock	12/17/2014	Sean Frogner	Update per John Liang/Siri Input
1.2	Sherlock	12/19/2014	Sean Frogner	Added per Dave and Alk feedback
1.3	Sherlock	12/24/2014	Sean Frogner	Added N1QL and Cluster Wide Metrics
1.4	Sherlock	1/5/2015	Sean Frogner	Updated: Node Level Metrics. Changed to same navigation and context pattern. Added RAM Quota and Auto-Compaction settings

1.5	Sherlock	1/8/2015	Sean Frogner	Added Cihan Index Metrics. Added Advanced setting.
1.6	Sherlock	1/14/2015	Sean Frogner	Re-organized 2i Metrics to be Index only. Added some pieces to RAM Quota. Added visualization for holisitic view on indexes. Moved Cluster wide metrics out of the spec.
1.7	Sherlock	1/16/2015	Sean Frogner	Query updates and Index modifications

Request Details

Main Release	Sherlock	Sean Frogner	Sriram Melkote, John Liang, Aliaksey Kandratsenka

Executive Summary

Product Request Overview

With the introduction of 2nd Indexes need tooling support via the UI and CLI/Rest interfaces add and drop indexes. Additionally the ability to look at metrics concerning the 2nd index nodes.

Primary uses cases for this new capability.

1) Index on a secondary attribute that's not the Primary Key. Example
User Profile (Use Case)
UserID = PK
Email Address = Secondary Attribute

User should be able to find there profile based on the email address if they had forgotten there User Id.

2) Programmatic access to 2nd indexes.
Ability to programmatically create a secondary index to use in an Index Query.

In Sherlock we will provide Index level metrics to assist the Administrator with indexes.

Requirements

#	Feature	Priority
1	Index Metrics	1
2	Index RAM Quota and Compaction and Internal settings	1
3	Index Level Metrics	1
4	Index Metrics added to Server Resources and Summary Metrics	1
5	Index VIsualizer	1
6	Query Metrics	1
7	Node Level Query Metrics in console	1
8	RAM availability visualization graph	2
9	Cluster Wide Metrics Query	2

1. Index Metrics

Counter Metrics

1.1. Support Following Index Metrics in Administrative Console.

System wide Stats

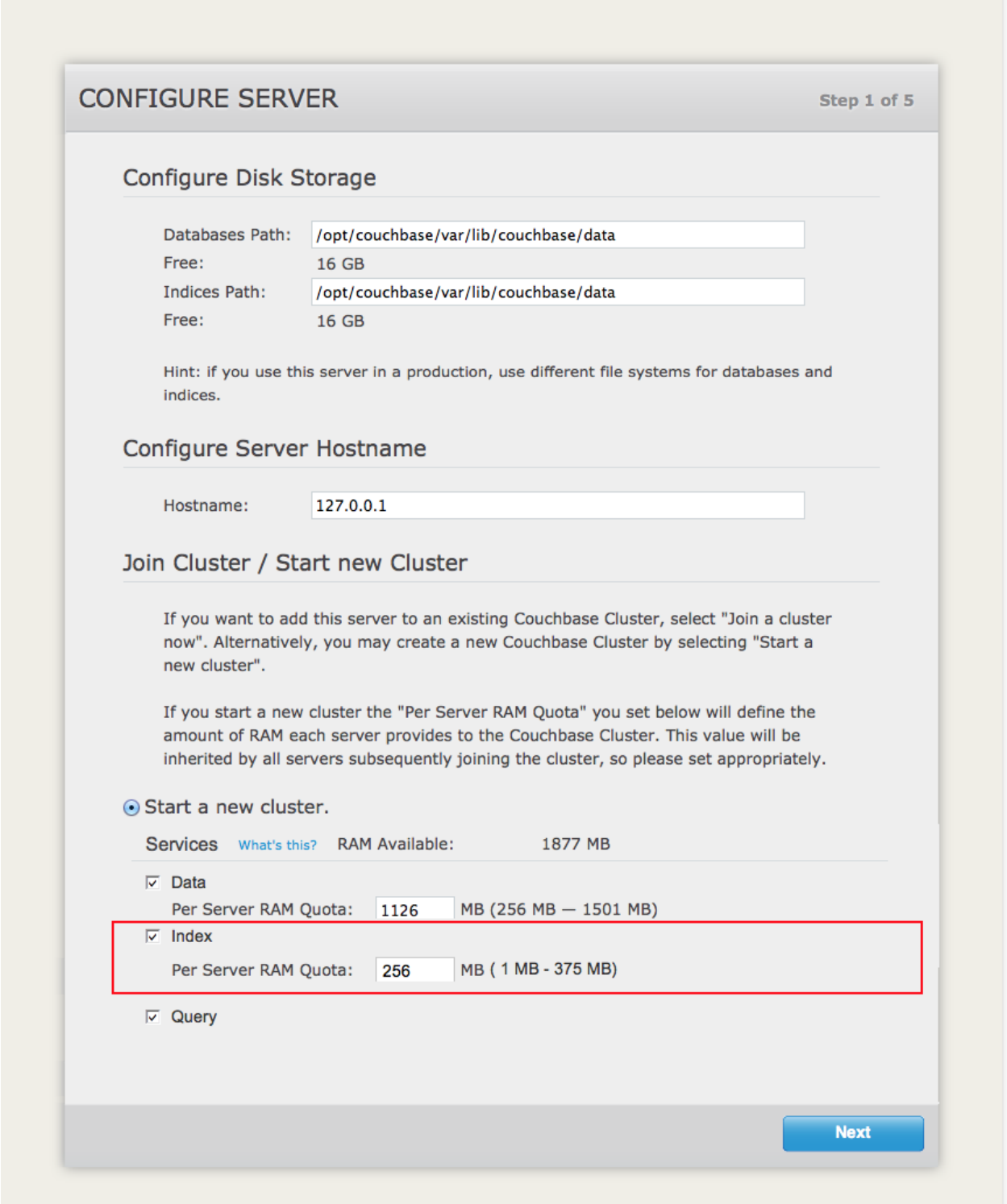
1.1.1. CPU Utilization % (top)
1.1.2. # Index Connections (bottom section)
1.1.3. Indexes in RAM (bottom section)
1.1.4. Free Index RAM - Difference between allocated RAM vs used RAM (bottom)
1.1.5. Index on Disk (bottom)
1.1.6. Index Data (bottom)
1.1.7. Index Fragmentation % (bottom)
1.1.8. Index Scans/sec (bottom)
1.1.9. Total DIsk Size (Should we add index to pre-existing metric)
1.1.10. Index writes/sec

Index Stats

1.1.11. Index Scans/sec
1.1.12. Total Size - Disk GB
1.1.13. Total Size – Data GB
1.1.14. Total Items Remaining Count – items pending to be indexed
1.1.15. Drain Rate Items/sec – items being indexed per sec
1.1.16. Total Items Count
1.1.17. Avg Item Size
1.1.18. % Fragmentation
1.1.19. Requests/sec
1.1.20. Bytes returned/sec
1.1.21. Minor/Major page faults
1.1.22. 8091 port requests/sec
1.1.23. Avg Scan Latency
1.1.24. Avg Working Set

2. Index RAM Quota and Compaction and Internal Settings

2.1. Ability to set RAM Quota for Index service type



2.1.1. RAM Quota is Required if designate node to serve as Index node.

2.1.2. Recommended setting

(1MB - 375 MB) section is dynamic. It computed

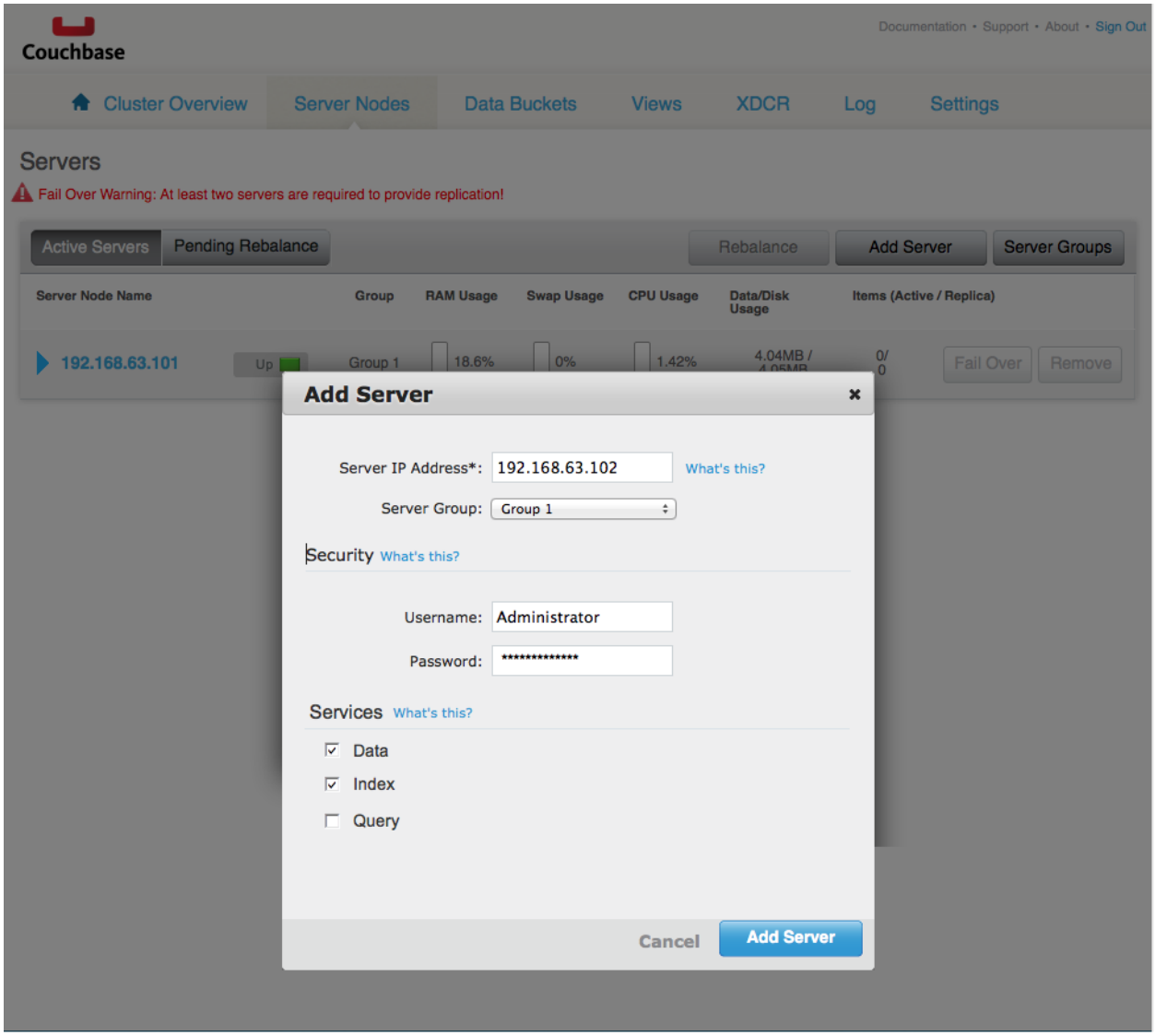
Data assigned 1126 of 1501.

375 RAM is available for Index. The label to the right will change to reflect 1MB-375MB.

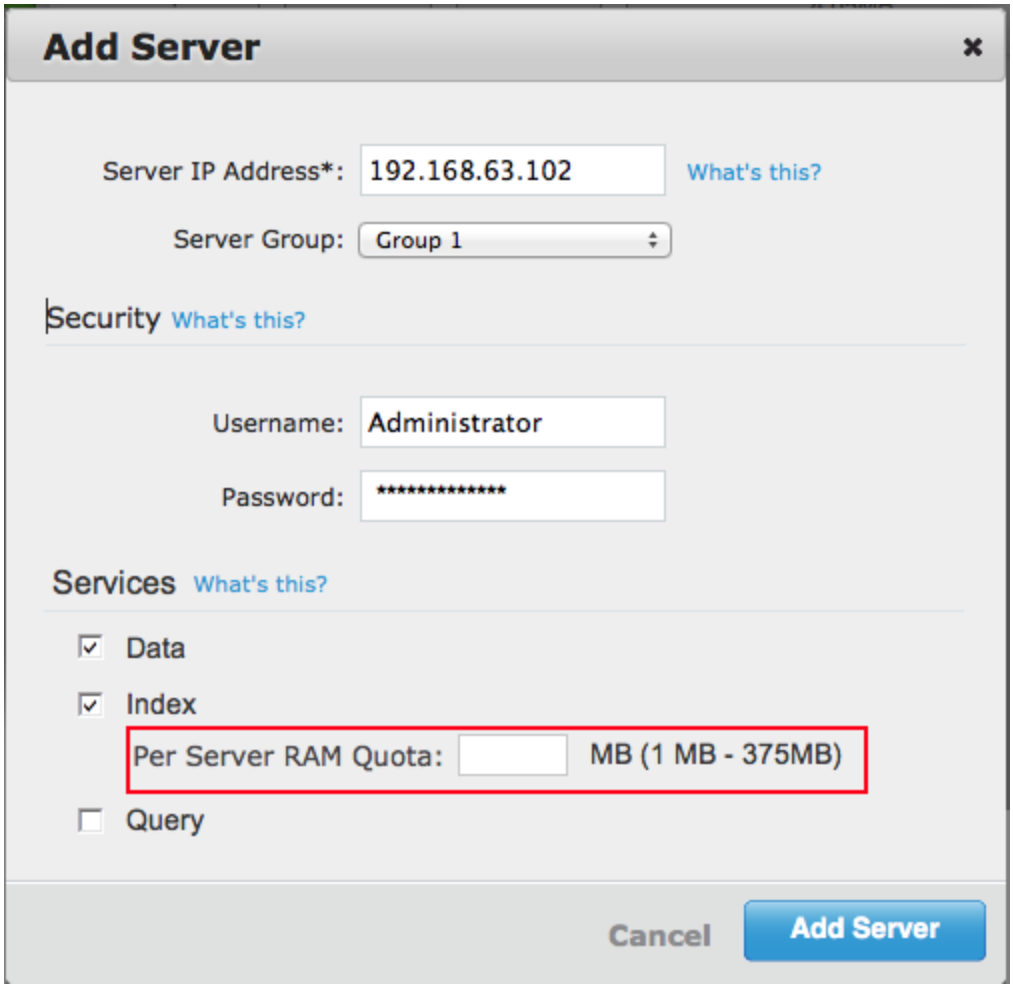
2.1.3. Validation Requirements

2.1.3.1. If Recommend setting is not possible if the user enters a value too low or too high will receive an Error. Error: The available RAM is >0 and <= 375. This is dues

2.1.4. If during initial setup the Administrator does not add an Index Server type the Admin will need to assign for adding the first Index Service Type.



When choosing Index (If this is there first Index Service Type) A region will expand to allow the Admin to set RAM Quota.

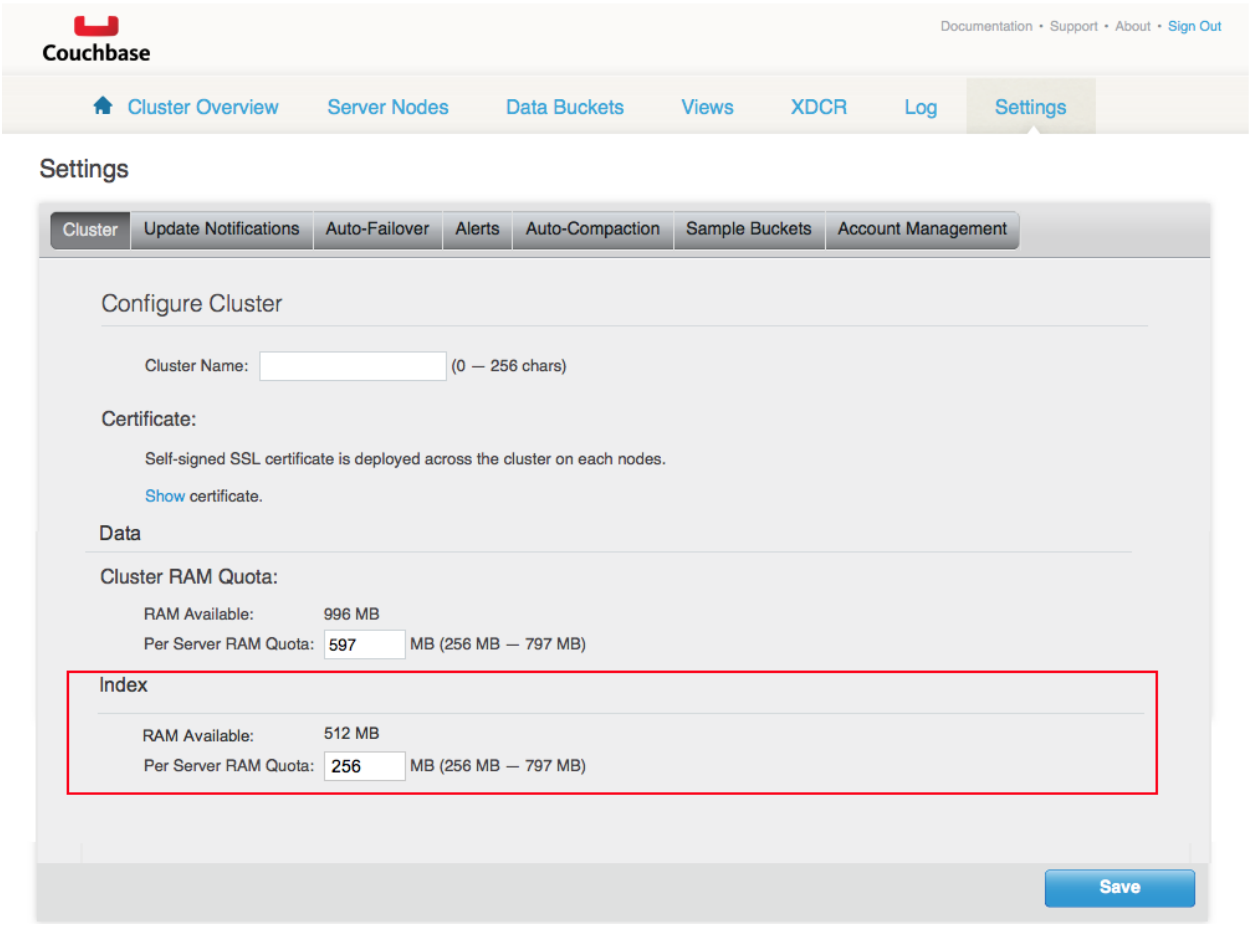


If say the KV Quota was assigned 1126 of 1501.

375 RAM is available for Index. The label to the right will change to reflect 1MB-375MB.

2.1.5. Asking for Index RAM Quota will only be prompted once during Add Server flow for subsequent Index nodes. (i.e. If assign 256 MB this would be used all nodes unless changed in Cluster Settings covered in 2.2.

2.2. Cluster Settings

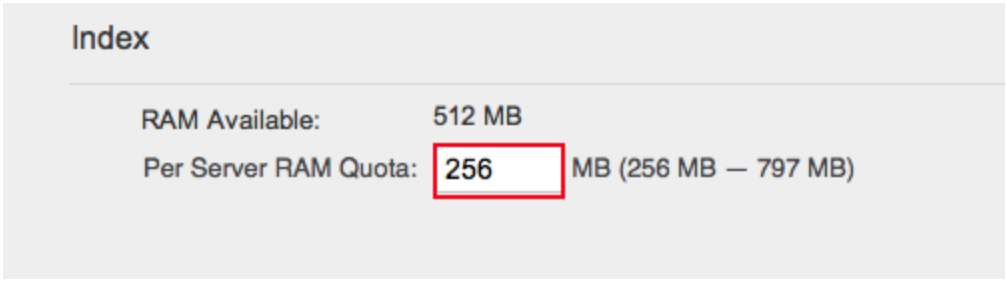


2.2.1. RAM Available

2.2.1.1. Shows physical resources of machines with Index Service type associated minus the aggregate quota.

2.2.2. RAM Quota as Changed. Warning will let use know to navigate to the Index visualizer and will need to restart servers.

Step A. User Changes RAM Quota

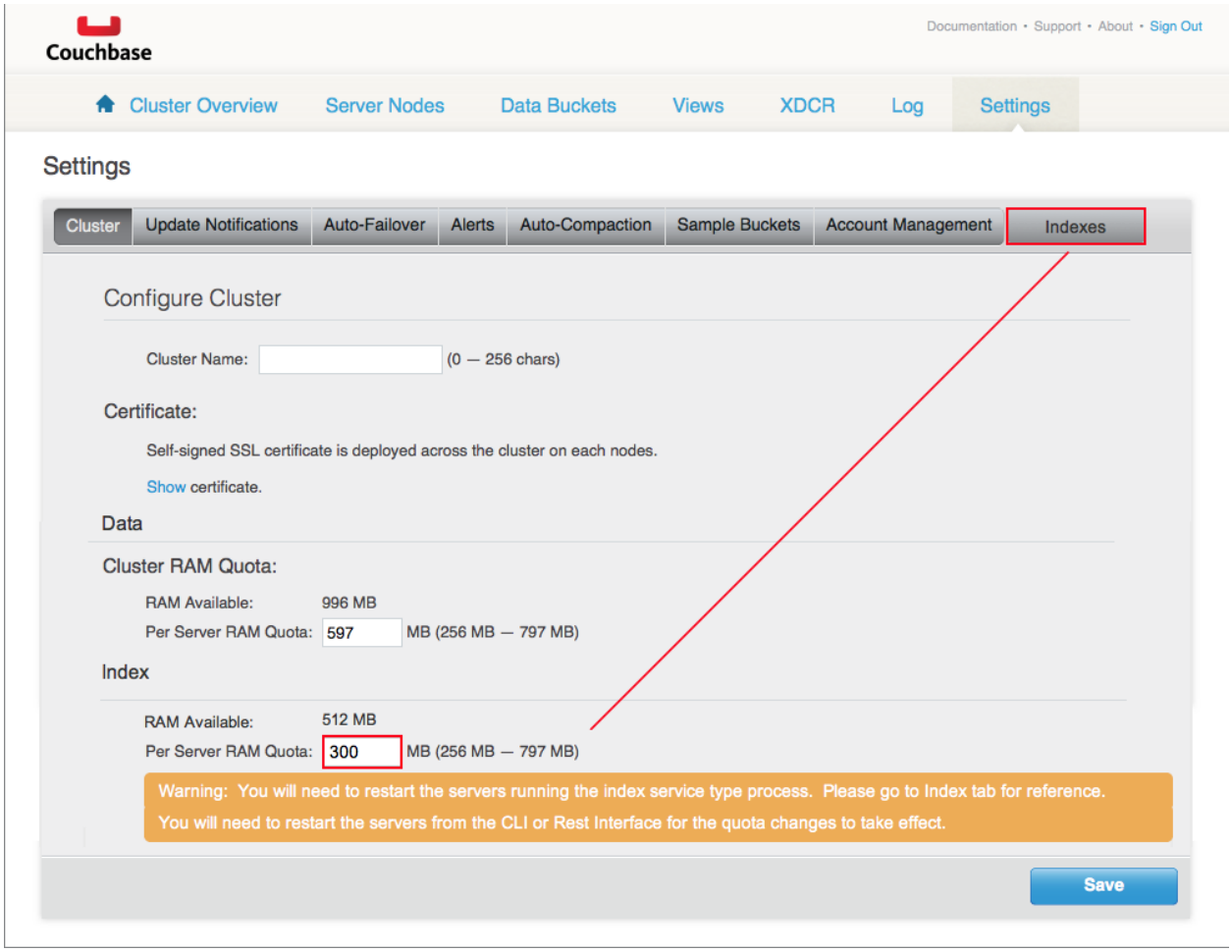


Step B. User Changes the value

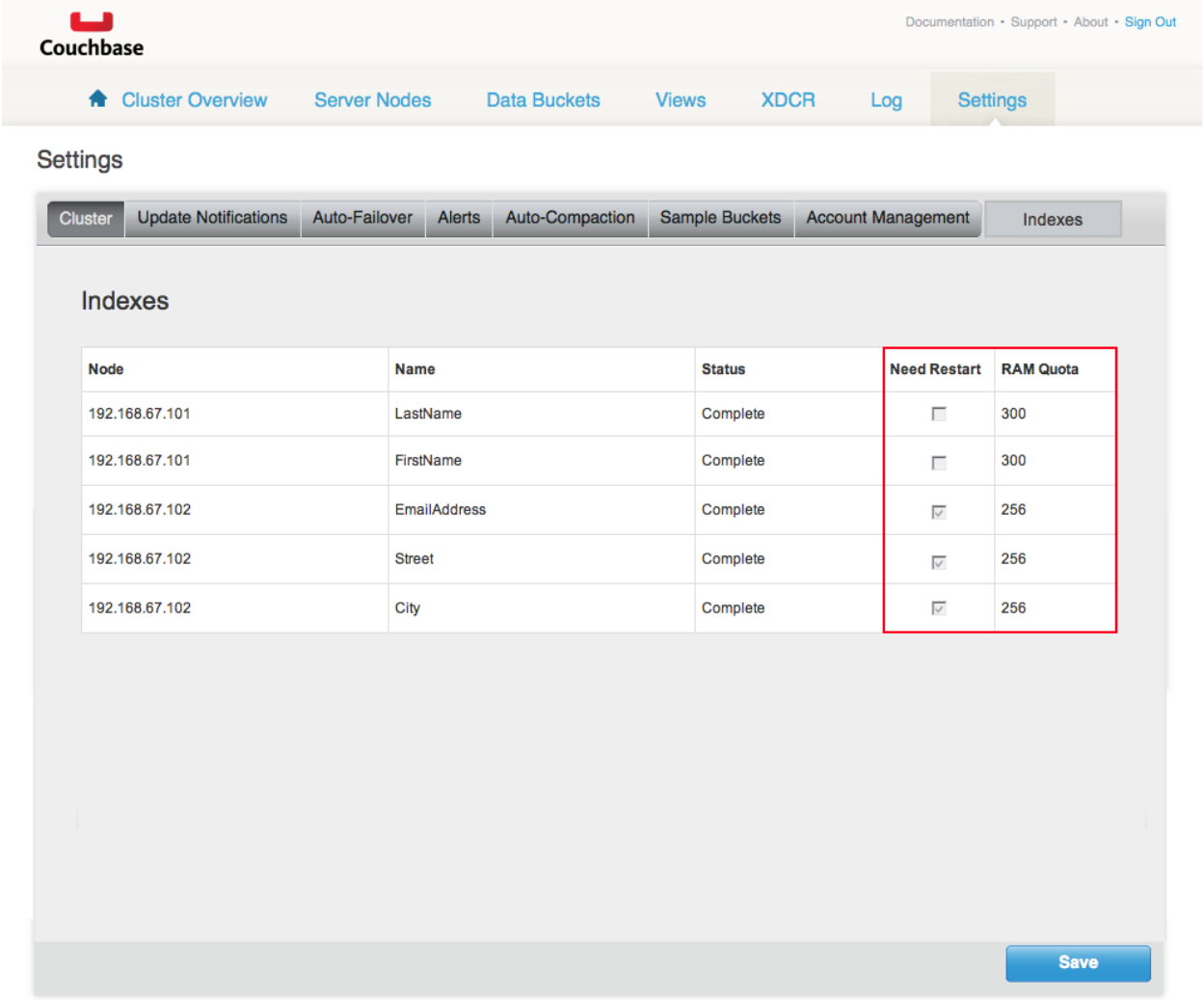
2.2.3. Warning Message

2.2.3.1. Warning: You will need to restart the servers running the index service type process. Please go to the Index tab for reference. You will need to restart the servers from the CLI or Rest Interface for the quota changes to take effect.

Step C. Index Tab



Step D. Index

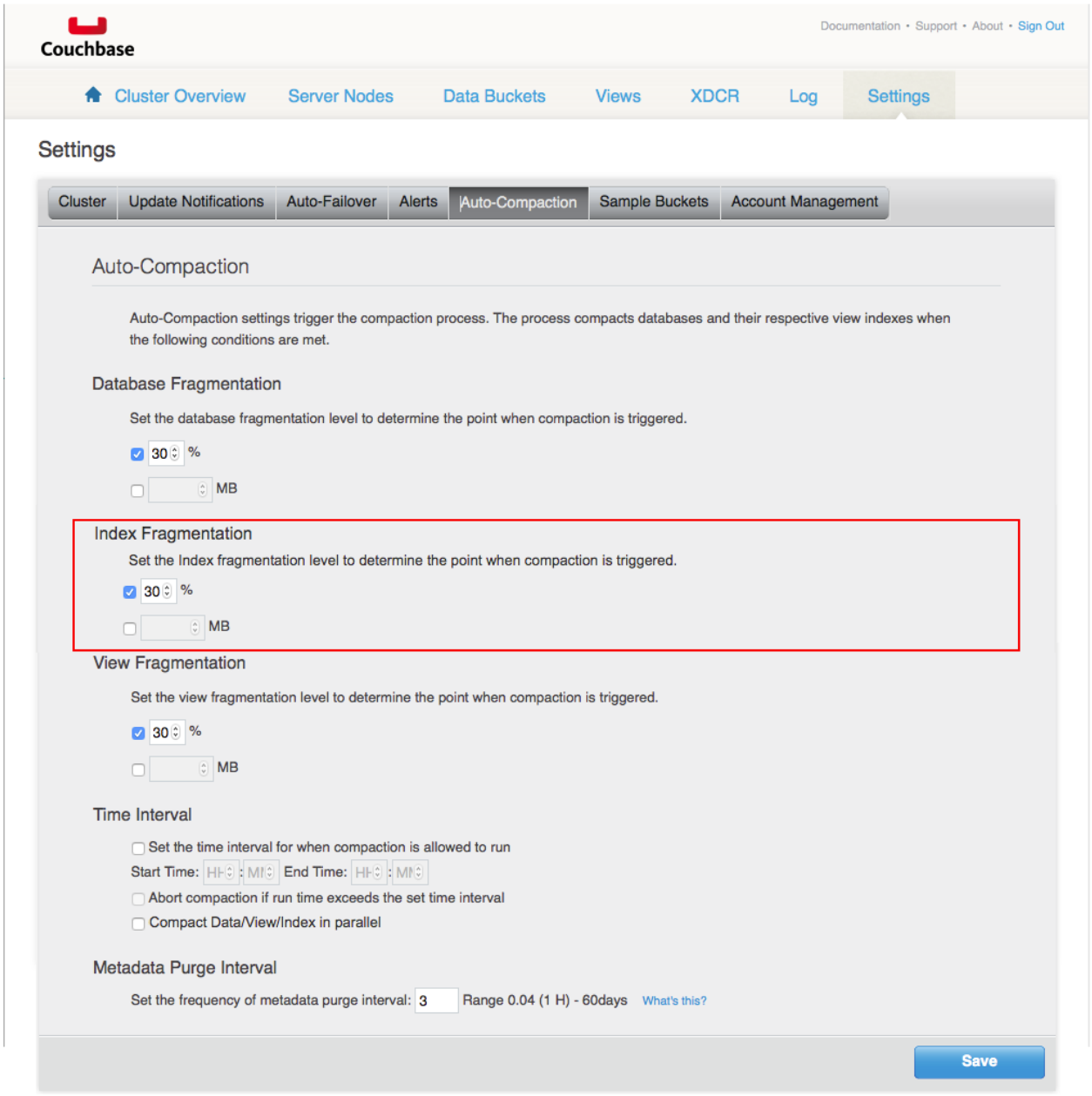


2.2.4. Column to show whether there is a mismatch to the current RAM Quota and if a change has been made and the server needs a restart to incorporate the change.

2.2.4.1. Need Restart - Boolean value of Y or N.

2.2.4.2. RAM Quota - Numeric Value expressing the current RAM Quota for the servers with the index service type.

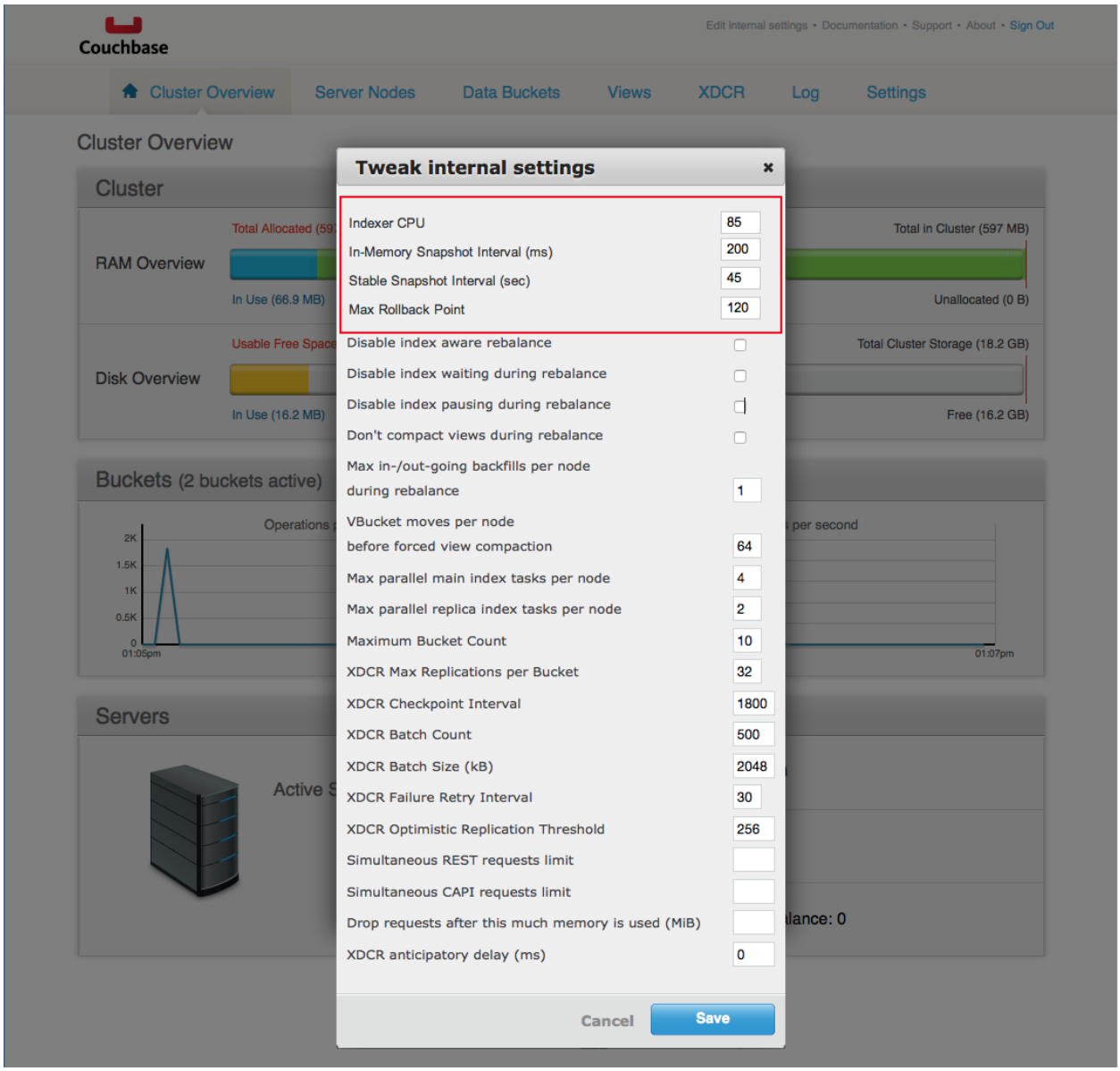
2.3. Auto-Compaction Settings



2.4. New Section with divider for Index Fragmentation
    2.4.1. Defaults to 30%
    2.4.2. Can assign a MB threshold to start compacting
2.5. Time Interval

2.6. Can compact Data/View and Index in parallel

2.7. Advanced Internal Settings



Exposed with ?enableInternalSettings=true

2.8. Indexer CPU

2.8.1. Specifies how much CPU indexer can use. If Indexer is co-located with KV, adjusting this value to a lower number would help in better resources for KV.
Lifecycle: Default All. Changes require restart of all indexers.

2.9. In Memory Snapshot Interval (ms)

2.9.1. Specifies the frequency of InMemory Snapshots for Scanning. This determines the earliest possibility of a scan seeing the KV data. If rate of mutations is not high,
increasing this value may allow better batching for forestdb.
Lifecycle: Default 100ms. Changes require restart of all indexers.

2.10. Stable Snapshot Interval (sec)

Description: Specifies the frequency of Persisted Snapshots for Recovery.
Lifecycle: Default 30sec. Changes require restart of all indexers.

2.11. Max Rollback Point

Description: Specifies the earliest point where rollback can be done. If KV requires
a rollback beyond this point, indexes will rollback to 0.
Lifecycle: Default TBD. Changes require restart of all indexers.

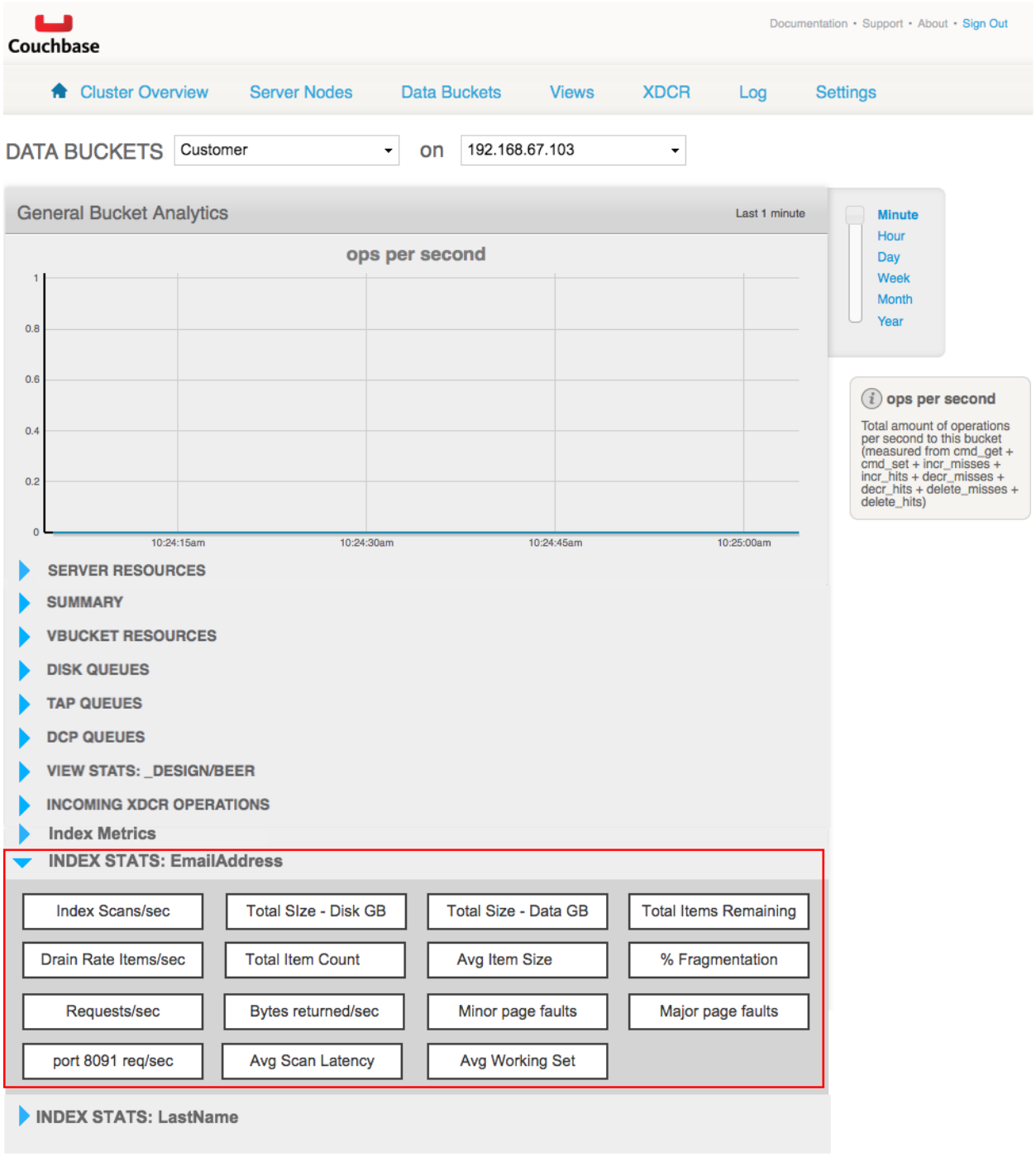
3. Index Level Metrics

3.1. Show Metrics per section 1

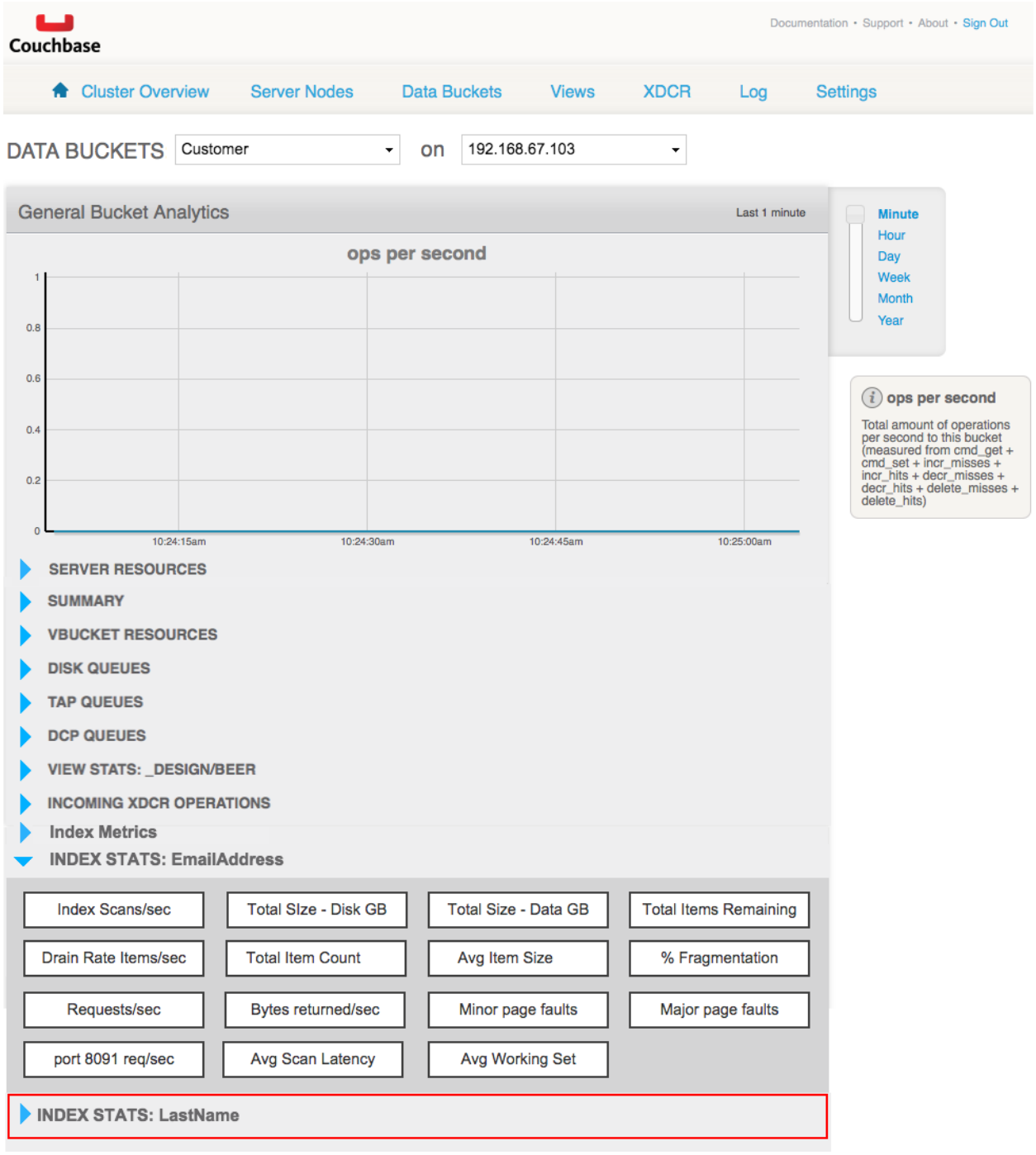
3.2. Available only for per bucket and per server. Need to be tied to bucker and server.

3.2.1. Will only show indexes metrics tied the the bucket and server you are viewing.

3.3. When Indexes are added to a server via N1QL in the command line. In the console an admin will see the following.



3.4. New Indexes will get new Chevron

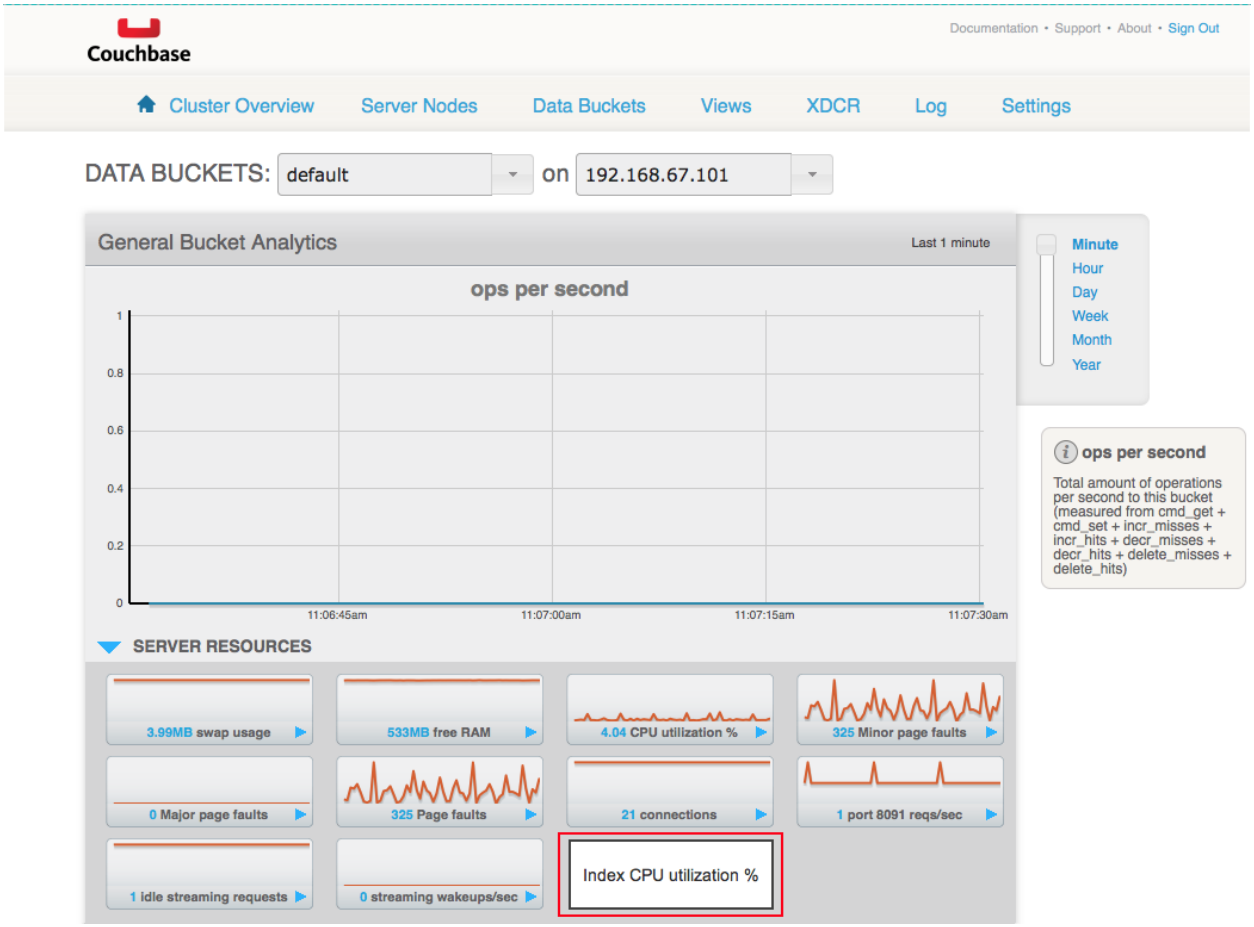


3.4.1. Deleted Index will remove

Note, adding, altering and deleting indexes will be done from CLI not the admin console.

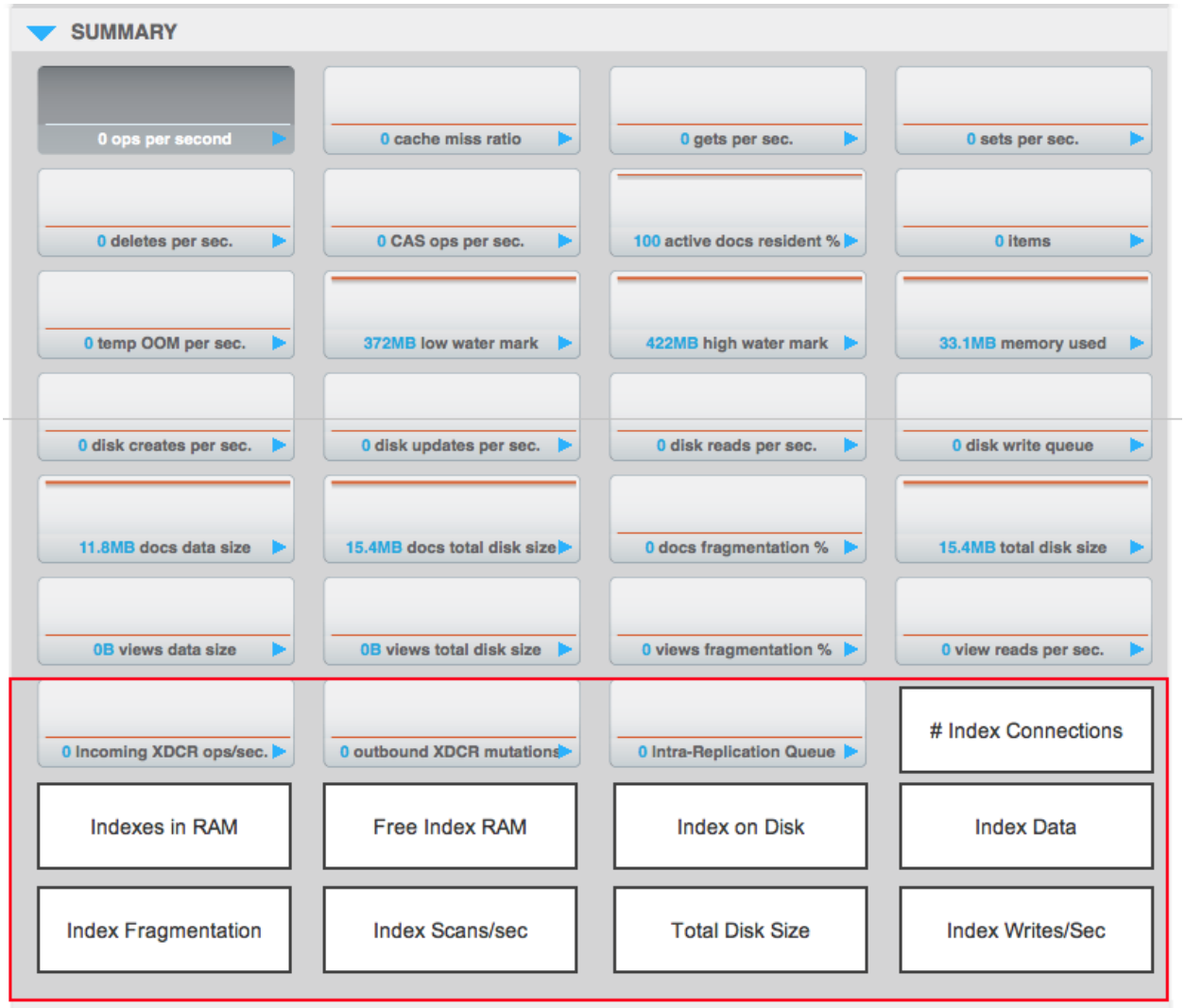
4. Index Metrics added to Server Resources and Summary Chevrons

4.1. Server Resources Chevron



4.1.1. Metric - Index CPU utilization % (Gauge Metric)

4.2. Summary Chevron



4.3. Metrics

4.3.1. # Index Connections (Counter)

4.3.2. Indexes in RAM (Gauge Metric)

4.3.3. Free Index RAM (Counter)

4.3.4. Index on Disk (Counter)

4.3.5. Index Data (Counter)

4.3.6. Index Fragmentation (Gauge Metric)

4.3.7. Index/Scans/sec (Gauge Metric)

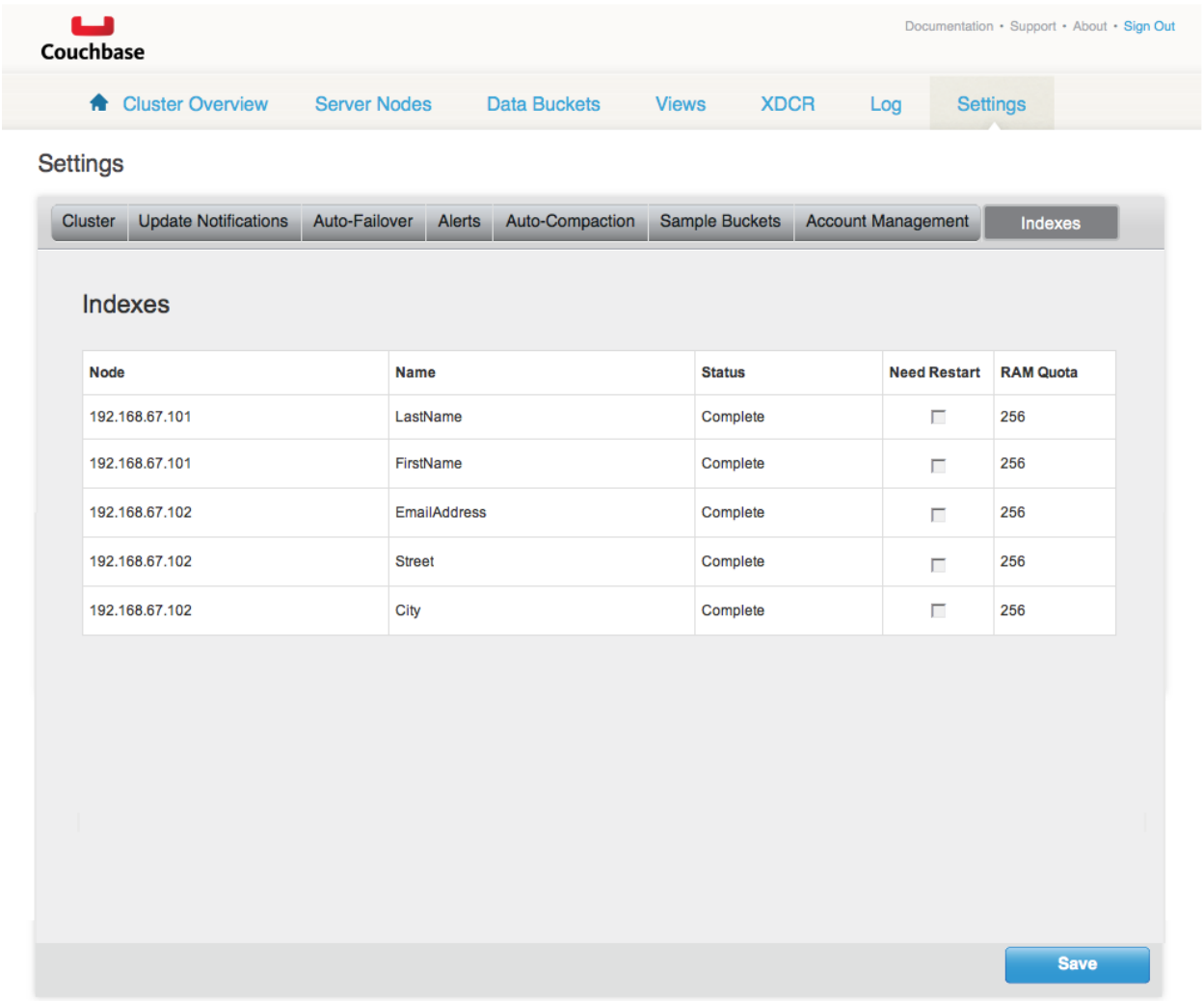
4.3.8. Total Disk Size (Counter)

4.3.9. Index Writes/Sec (Gauge Metric)

5. Index Visualizer

5.1. Read Only View available from the Cluster Settings

5.2. Shows all indexes tied to buckets and nodes in cluster.



5.3. Columns

5.3.1. Node - Logical Name of the Server Node

5.3.2. Name - Name assigned to Index

5.3.3. Status - Status of the Index

5.3.3.1. Complete - Index Built and Available for use

5.3.3.2. Building - Index is being built

5.3.4. Need Restart - If changed RAM Quota in cluster settings. Visual indicator that the Server needs a restart for the Index Service type to pick up the change

5.3.5. RAM Quota - Shows the RAM Quota value assigned to the server in which the index resides.

6. Query Metrics (Included from Colms McHughs document)

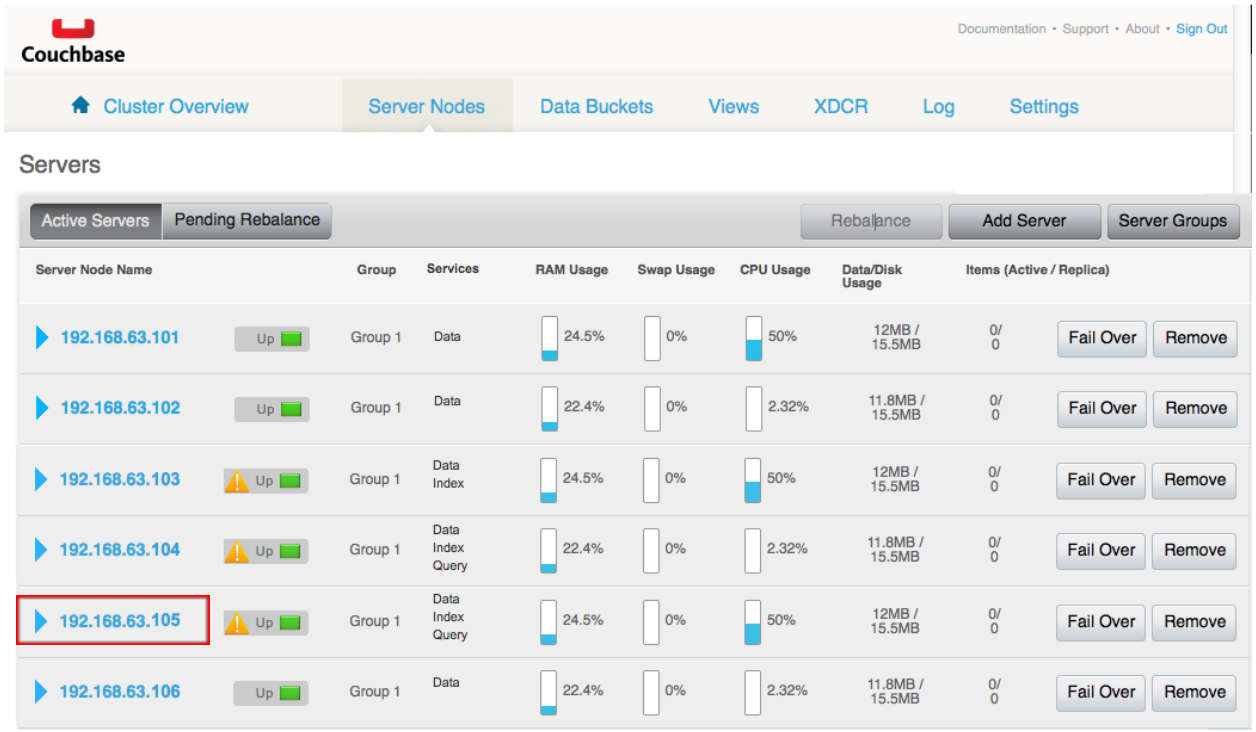
https://docs.google.com/document/d/1_MP5pd5ywBaJw4ZoVnQYOYVVtD-0hPVSInDd2rAgFJI/edit?pli=1#heading=h.r2gyn7tzec5q

6.1. Support Following Query Metrics in Administrative Console.

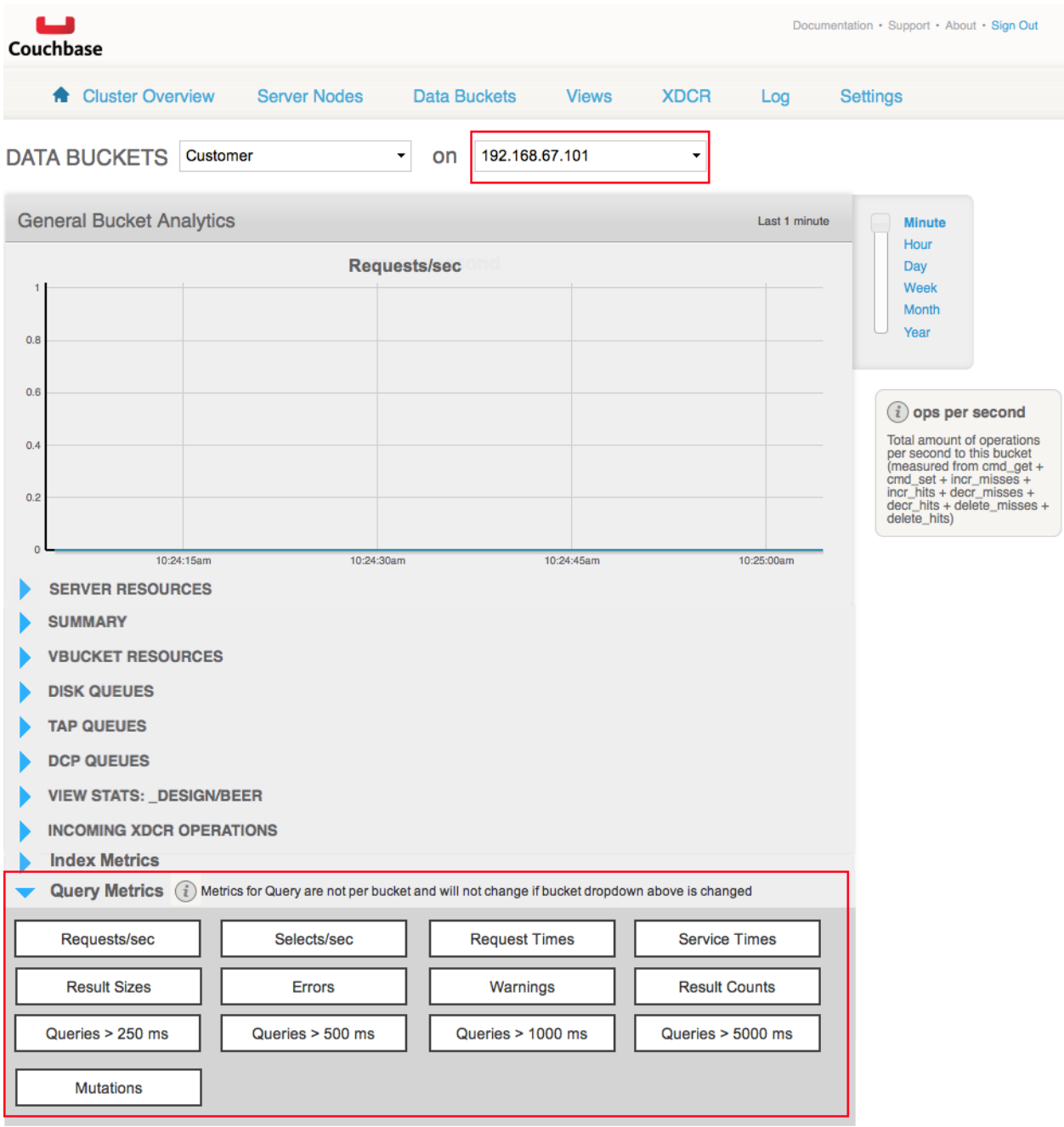
6.1.1. Requests - Number of requests processed per second
6.1.2. Selects - Number of select statements processed per second
6.1.3. Request Time - End to End time to process a query
6.1.4. Service Time - The time taken to execute a query
6.1.5. Result Count - The number of results (documents) returned by a query
6.1.6. Result Size - The size (in byte) of the data returned by a query
6.1.7. Errors - The number of errors returned by a query
6.1.8. Warnings - The number of warnings returned by a query
6.1.9. Mutations - The number of mutations made by a query
6.1.10. Queries taking longer than 250 millisecond
6.1.11. Queries that take longer than 500 milliseconds
6.1.12. Queries that take more than 1000 milliseconds
6.1.13. Queries that take more than 5000 milliseconds

7. Node Level Query Metrics in console

Drill into a node this will show you Query stats for this node. This is not performing aggregates and counters per bucket.



7.1. If the node has Query Type you will see the Query Metric Chevron

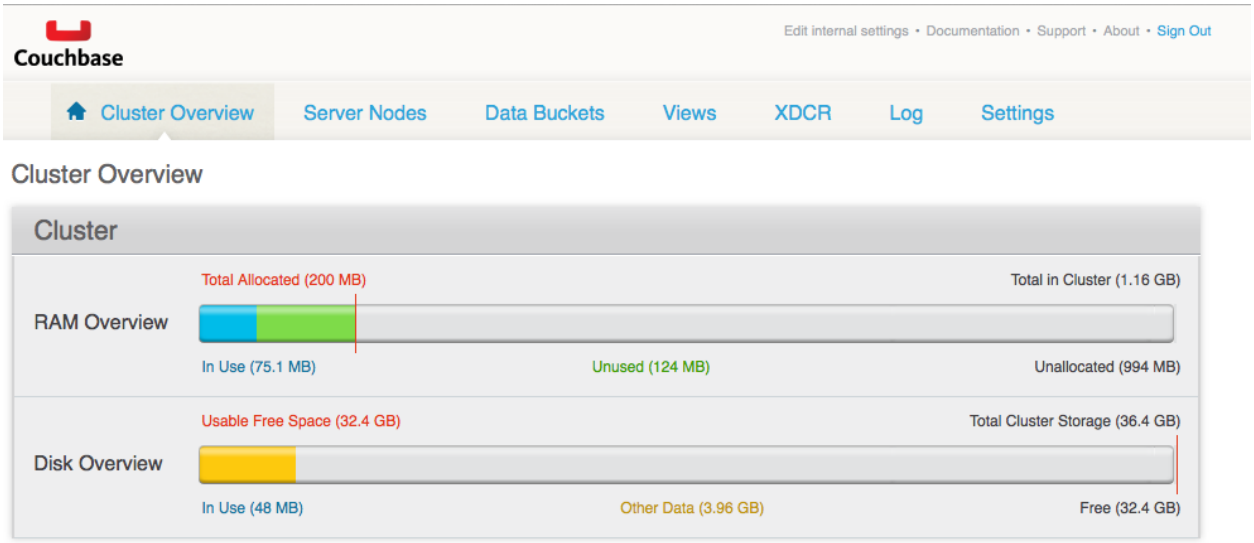


7.2. If the server has Query Service Type the chevron will show so can examine the metrics.

7.3. Information to explain Query Metrics are not per bucket.

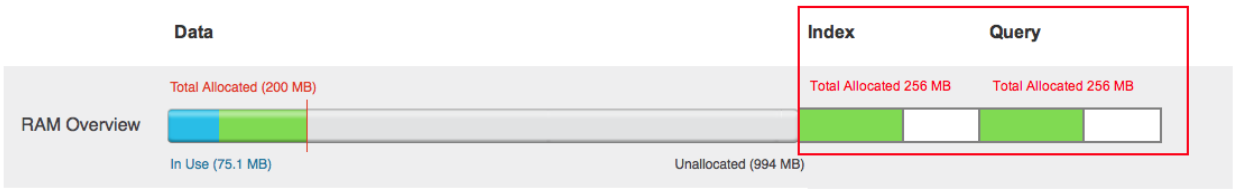
8. RAM Availability usage graphic

8.1. Todays Cluster Overview page shows KV RAM availability and usage.



8.2. With Service Types Index and Query would be good to show RAM allocation for their service types within the cluster.

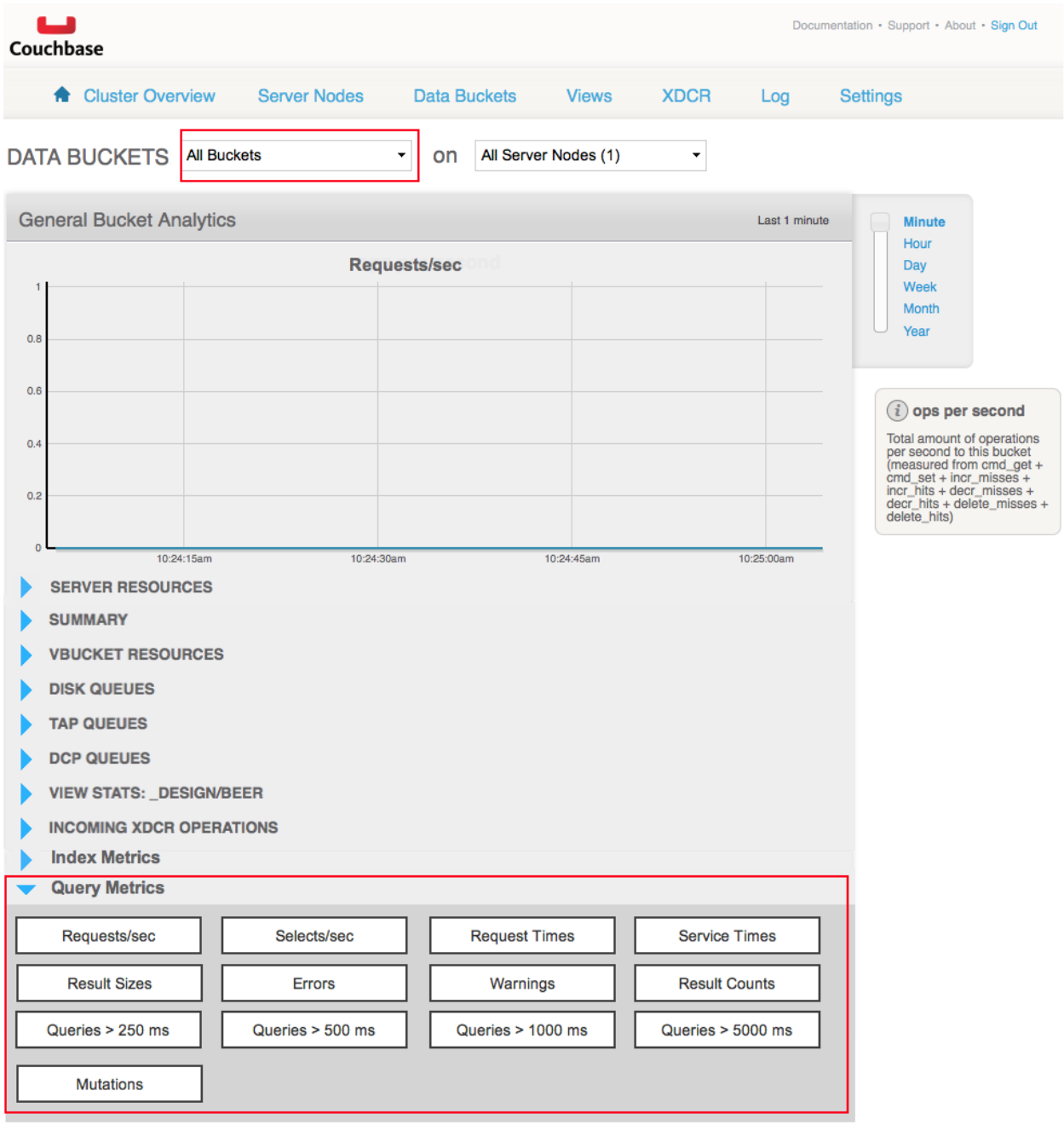
8.3. Add visual for Index and Query in same graph



9. Cluster Wide Query Metrics

9.1. Ability to choose ‘All Buckets’

9.2. Will aggregate Query metrics for all buckets in the cluster.


Couchbase
Documentation • Support • About • Sign Out
Cluster Overview
Server Nodes
Data Buckets
Views
XDCR
Log
Settings
DATA BUCKETS
All Buckets
on
All Server Nodes (1)
General Bucket Analytics
Last 1 minute
Requests/sec
1
0.8
0.6
0.4
0.2
0
10:24:15am
10:24:30am
10:24:45am
10:25:00am
Minute
Hour
Day
Week
Month
Year
ops per second
Total amount of operations per second to this bucket (measured from cmd_get + cmd_set + incr_misses + incr_hits + decr_misses + decr_hits + delete_misses + delete_hits)
SERVER RESOURCES
SUMMARY
VBUCKET RESOURCES
DISK QUEUES
TAP QUEUES
DCP QUEUES
VIEW STATS: _DESIGN/BEER
INCOMING XDCR OPERATIONS
Index Metrics
Query Metrics
Requests/sec
Selects/sec
Request Times
Service Times
Result Sizes
Errors
Warnings
Result Counts
Queries > 250 ms
Queries > 500 ms
Queries > 1000 ms
Queries > 5000 ms
Mutations

Open Issues

ID #	Date Entered	Entered By	Issue	Status

Future Enhancement Log

ID #	Date Entered	Entered By	Issue	Enhancement Request#	Status