

UMD DATA605 - Big Data Systems

MongoDB and CouchDB



Instructor: Dr. GP Saggese - gsaggese@umd.edu

- All concepts in slides
- MongoDB tutorial
- Web
 - https://www.mongodb.com/
 - Official docs
 - pymongo
- Book
 - Seven Databases in Seven Weeks, 2e

Seven Databases in Seven Weeks

Second Edition

A Guide to Modern Databases and the NoSQL Movement



Series editor: Bruce A. Tate Development editor: Jacquelyn Carter

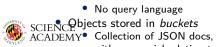


• Couchbase

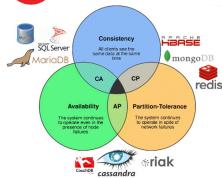


Couchbase

- NoSQL document-oriented DB (like MongoDB)
- Couchbase = merge of CouchDB and membase
 - CouchDB
 - Open source document store
 - HTTP RESTful API to add, update, delete documents
 - Support all 4 ACID properties
 - membase
 - Distributed key-value store (like Redis)
 - Designed to scale both up and down
 - Highly available and partition tolerant
 - Uses HTTP protocol to query and interact with objects in the DB

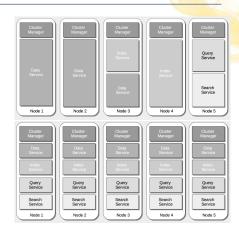






Architecture

- Every Couchbase node consists of different services:
 - Data service
 - Index service
 - Query service
 - Cluster manager component
- Services can run on separate nodes of the cluster, if needed
- Data replication
 - Across nodes of a cluster
 - Across data centers
- Data service
 - Writes data asynchronously to disk after acknowledging to the client
 - Optionally synchronous: ensure data is written to more than one server before acknowledging a write





Queries

Can create multiple views over documents

- Views are optimized / indexed by Couchbase for fast queries
- Re-indexed when underlying documents changes
- Can do full-text searches using the indexes

Perform well when:

- There are infrequent changes to the structure of documents
- Know in advance what kinds of queries you want to execute

Query

- Uses a custom query language called N1QL ("nickel")
- Extends SQL to JSON documents
- Queries over multiple documents using (server-side) joins

Map-reduce support

- (Map) First define a view with the columns of the document your are interested in
- (Reduce) Optionally define aggregate functions over the data

