

Redis

Wednesday, February 05, 2025 9:27 AM

- Redis DB (Remote Directory Server)
 - Open source, in-memory database
 - Sometimes called a data structure store
 - Primarily a KV store, but can be used with other models: Graph, Spatial, Full Text Search, Vector, Time Series

Rank			DBMS	Database Model	Score		
Oct 2024	Sep 2024	Oct 2023			Oct 2024	Sep 2024	Oct 2023
1.	1.	1.	Redis	Key-value, Multi-model	149.63	+0.20	-13.33
2.	2.	2.	Amazon DynamoDB	Multi-model	71.85	+1.78	-9.07
3.	3.	3.	Microsoft Azure Cosmos DB	Multi-model	24.50	-0.47	-9.80
4.	4.	4.	Memcached	Key-value	17.79	+0.95	-3.05
5.	5.	5.	etcd	Key-value	7.17	+0.12	-1.57
6.	7.	8.	Aerospike	Multi-model	5.57	+0.41	-0.86
7.	6.	6.	Hazelcast	Key-value, Multi-model	5.57	-0.16	-2.60
8.	8.	7.	Fhirache	Key-value	4.76	-0.03	-1.79

- It is considered an in-memory database system, but...
 - Supports durability of data by:
 - essentially saving snapshots to disk at specific intervals or
 - append-only file which is a journal of changes that can be used for roll-forward if there is a failure
- Originally developed in 2009 in C++
- Can be very fast ... > 100,000 SET ops / second
- Rich collection of commands
- Does NOT handle complex data. No secondary indexes. Only supports lookup by Key.
Keys:
 - Usually strings but can be any binary sequence
- Values:
 - Strings
 - Lists (linked lists)
 - Sets (unique unsorted string elements)
 - Sorted sets
 - Hashes (String -> String)
 - Geospatial data
- Redis provides 16 databases by default
 - They are numbered 0 to 15
 - There is no other name associated
- Direct interaction with Redis is through a set of commands related to setting and getting k/v pairs (and variations)
- Many language libraries available as well.

Initial Basic Commands

- SET /path/to/resource 0
SET user:1 "John Doe"
GET /path/to/resource
EXISTS user:1
DEL user:1
KEYS user*
- SELECT 5
 - select a different database
- SET someValue 0
INCR someValue #increment by 1
INCRBY someValue 10 #increment by 10
DECR someValue #decrement by 1
DECRBY someValue 5 #decrement by 5
 - INCR parses the value as int and increments (or adds to value)
- SETNX key value
 - only sets value to key if key does not already exist

Hash Commands

HSET bike:1 model Demios brand Ergonom price 1971
HGET bike:1 model
HGET bike:1 price
HGETALL bike:1
HMGET bike:1 model price weight
HINCRBY bike:1 price 100

Queue-like Ops

LPUSH bikes:repairs bike:1
LPUSH bikes:repairs bike:2
RPOP bikes:repairs
RPOP bikes:repairs

Stack-like Ops

LPUSH bikes:repairs bike:1
LPUSH bikes:repairs bike:2
LPOP bikes:repairs
LPOP bikes:repairs

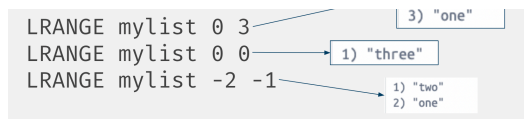
Other List Ops

LLEN mylist

LRange <key> <start> <stop>

LPUSH mylist "one"
LPUSH mylist "two"
LPUSH mylist "three"

1) "three"
2) "two"



JSON Type

- Full support of the JSON standard
- Uses JSONPath syntax for parsing/navigating a JSON document
- Internally, stored in binary in a tree-structure → fast access to sub elements

SET Type

- Unordered collection of unique strings (members)
- Use Cases:
 - track unique items (IP addresses visiting a site, page, screen)
 - primitive relation (set of all students in DS4300)
 - access control lists for users and permission structures
 - social network friends lists and/or group membership
- Supports set operations!!

SADD ds4300 "Mark"
SADD ds4300 "Sam"
SADD cs3200 "Nick"
SADD cs3200 "Sam"

SCARD ds4300 # Cardinality
SINTER ds4300 cs3200
SDIFF ds4300 cs3200
SREM ds4300 "Mark"
SRANDMEMBER ds4300

