Memory Is The New Disk, Say Hello To Redis

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Agenda

- The Background

- Concept of NoSQL and some projects

- What is Redis?

- Redis Data Types

- Clients

- Supported datatypes and operations

- Performance

- Adopters

The Background

- Advancement of Web 2.0, the read/write web

- Exponential data growth in social networks

- With very high magnitude of data, IO become very costly.

Memory is the new disk, disk is the new tape.
— Jim Gray

Why Memory?

- Relative latency for SSD is 1000x than memory

- Relative latency for disk is 100x than SSD

Concept of NoSQL

An informal, loosely-defined term for non-relational, structured data storage systems.

Examples:

Hbase, Cassandra, Tokyo Tyrant, MongoDB, memcached, CouchDB, and Redis

Memcached

- Everything is a string

- Set or Get data

- Non-persistence

An Italian solution

- Main developer Salvatore 'antirez' Sanfilippo with Pieter Noordhuis

- Key-value store

- In memory

- Data structure server

  – *Redis is a collection of data structures exposed over the network*

Redis comes with

- Memcached like simplicity

- More datatypes

- More commands

- Persistence with non-blocking I/O

- Publish-subscribe channels

Installation

- Current version is 2.2.8

- Clone https://github.com/antirez/redis.git or

- wget http://redis.googlecode.com/files/redis-2.2.8.tar.gz

- tar xzf redis-2.2.8.tar.gz

- cd redis-2.2.8

- make

Redis Data Types

- Strings

- Lists

- Sets

- Sorted Sets

- Hashes

Clients

- src/redis-cli

- Full list of clients at http://redis.io/clients

- For Ruby there's *redis-rb*

  - Pure Ruby

    - require 'redis'

  - Can work with C client HiRedis as a C extension

    - require 'redis/connection/hiredis'

    - Use hiredis when you have large array replies and/or large pipelines of commands.

Keys

- EXPIRE / EXPIREAT
- PERSIST
- TTL
- TYPE
- RENAME
- KEYS
- etc...

Strings

- SET
- GET
- INCR
- DECR
- etc...

Lists

- LLEN

- LPOP / RPOP

- LPUSH / RPUSH

- RPOPLPUSH

- etc...

- Implementation of Queue

  - Not a native type, but can easily be implemented

    - RPUSH
    - LPOP

Sets

- SADD
- SPOP
- SINTER
- SDIFF
- SUNION
- etc...

Sorted Sets (zsets)

Commands are almost similar to *set* commands, except a *score* is needed for sorting.

- ZADD
- ZREM
- ZRANGE
- ZRANGEBYSCORE
- etc...

Hashes

- HLEN
- HGETALL
- HKEYS
- HGET
- HINCRBY
- etc...

Pub/Sub

- Implement the Publish/Subscribe messaging paradigm

- **SUBSCRIBE**, **UNSUBSCRIBE** and **PUBLISH** commands

Persistence

- Snapshotting
    - *save N M* in configuration file
        - Save the dataset every N seconds if there are at least M changes in the dataset
    - *BGSAVE* commands

- Append-only file
    - *appendonly yes* in configuration file

- Log rewriting
    - *BGREWRITEAOF*

Performance

- src/redis-benchmark -q -n 1000000

  PING: 62167.10 requests per second

  SET: 62774.89 requests per second

  GET: 61993.86 requests per second

  INCR: 63360.45 requests per second

  LPUSH: 62849.98 requests per second

  LPOP: 59762.75 requests per second

Into the wild

- Big names using Redis:
  - Github
  - EngineYard
  - Digg
  - StackOverflow
  - and many more...

Future Ideas

- Redis Cluster

- Redis Disk Store

- Redis Scripting

References

- A CONVERSATION WITH JIM GRAY
  - http://queue.acm.org/detail.cfm?id=864078
- redis.io

Thank you

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Questions...