CS3217 PS/Tutorial 4 Solution

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Scan your attendance

Figure 1: Attendance

Plan for Today

In your groups, we will

1. [15 mins] Chit-Chat:
   1.1 Discuss Chp. 6
2. Discuss the tutorial, every group would discuss:
   2.1 Redis Clone
   2.2 One other design, can choose any one of the questions from 2-6.

Question from previous tutorial

Regarding the choice of class and struct.

Readings Chit-Chat - Chapter 6: Objects and Data Structures

Let's discuss:

- Data Abstraction
- Data/Object Anti-Symmetry
- The Law of Demeter
  - Train Wrecks
  - Hybrids
  - Hiding Structure
- Data Transfer Objects
  - Active Record

Tutorial Question 1

Let us design an in-memory Redis clone!

Basically, Redis is a key-value store. There is a command-line interface in which you can write, for example, `SET name "Herbert"`. If we then do `GET name`, it should return the value `"Herbert"`.

For this exercise, we shall implement a Redis CLI in the form of an iOS application. For now, the commands that we support are:

- `SET k "v"`: sets the key `k` to the value `v`
- `GET k`: gets the value of the key `k`
- `FLUSHALL`: clears the store

Show us:

- Architecture diagram and components (show dependencies).
- Object design, storage
- APIs
- User Interface description/sketch
- Design considerations and trade-offs.
- Test plan

Tutorial prompts:

1. How do we parse whatever input the user passes in? What objects will handle that? What will be its APIs?
    a. `SET hello "world"`, `GET hello`
    b. `SET world "1"`, `SET hello world`, `GET hello`
    c. `get hello`, `SET SET "world"`
    d. `SET hello "world"`, `FLUSHALL`, `GET hello`
2. How do we extend this implementation? For example, what should we do if we want this Redis clone to support having arrays as its values?
    a. Extend to integers `SET world 1` along with type checking `TYPE world`
    b. Extend with string append `APPEND mykey "Hello"`, `APPEND mykey " World"`
    c. Extend with increment and decrement `INCR world`, `DECR world`
    d. Extend with expiry `EXPIRE world 10`

Tutorial Question 1 - Actual Redis

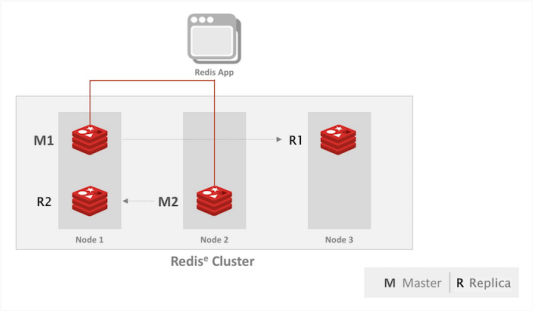

Figure 2: Redis Arch.

The ultimate Redis experience:

- Sub-millisecond data processing under any load
- Five-nines (99.999%) uptime with active-active deployment
- Efficient TCO with multi-tenancy and tiered memory access
- In the cloud, on-premises or hybrid

Tutorial Question 2

Choose any one of the questions from 2-6, show us:

- Architecture diagram and components.
- Object design, storage
- APIs