

# ClubConnect Redis Implementation

## Functionalities Using Redis as In-Memory Key-Value Storage:

- **Caching University Details:** Redis uses **hashes** to store details for each university.
  - Key: **university:<university\_id>**
- **Quick Lookup by Association:** Redis uses **lists** to store club IDs of clubs which are associated with a specific university
  - Key: **university:<university\_id>:clubs**
- **Caching Club Details:** Redis uses **hashes** to store club details.
  - Key: **club:<club\_id>**
- **Tracking Counts and Metadata:** Redis uses **strings** to track counts and timestamps using:
  - **universityCount,**
  - **clubCount,**
  - **last\_updated**

## Redis Data Structures Used:

1. Universities: Hash
  - a. Key: **university:<university\_id>**
  - b. Fields: {**name, email\_domain, address, city, state, zip\_code, website**}
2. List for clubs associated with each university:
  - a. Key: **university:<university\_id>:clubs**
  - b. Value: List of **club\_ids**
3. Clubs: Hash
  - a. Key: **club:<club\_id>**
  - b. Fields: {**name, description, email, start\_date, logo, category**}
4. Global Metadata:
  - a. String for tracking counts:
    - i. **universityCount:** Total number of universities.
    - ii. **clubCount:** Total number of clubs.
  - b. String for tracking last update time:
    - i. **last\_updated.**

### Advantages of These Structures:

- Fast lookups with HGETALL or HGET for specific attributes.
- Easy associations using List for university-club relationships.
- Global metadata updates via SET for simple operations.

## Redis Commands for CRUD Operations

### 1. Initialize Cache

- Clear cache:
  - **FLUSHALL**
- Load Cache with Initial Data:
  - Use **HSET** to add universities and clubs.
  - Use **RPUSh** to add club associations for universities.

### 2. Read Operations

- Get all Universities:
  - **KEYS university\***
- Get Details of a Specific University:
  - **HGETALL university:<university\_id>**
- Get All Clubs Associated with a University:
  - **LRANGE university:<university\_id>:clubs 0 -1**
- Get Details of a Specific Club:
  - **HGETALL club:<club\_id>**
- Get Metadata:
  - **GET universityCount**
  - **GET clubCount**
  - **GET last\_updated**

### 3. Create/Update Operations

- Add or Update a University:
  - **HSET university:<university\_id> name <value> email\_domain <value> address <value> ...**
- Add or Update a Club:
  - **HSET club:<club\_id> name <value> description <value> email <value> ...**
- Add a Club to a University List:
  - **RPUSh university:<university\_id>:clubs <club\_id>**
- Update Metadata:

- SET universityCount <new\_count>
- SET last\_updated <timestamp>

#### **4. Delete Operations**

- Delete a University:
  - DEL university:<university\_id>
  - DEL university:<university\_id>:clubs
- Delete a Club:
  - DEL club:<club\_id>

### **UML Class Diagram and Redis ERD Link**

[ClubConnect\\_UML-ERD](#)