Reddit Clone REST API and Client Implementation

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Introduction

This project implemented a Reddit-like platform with a RESTful API backend and a client application. Key functionalities included user registration, subreddit management, posting, commenting, private messaging, and voting. The project also had one bonus feature: digital signatures for post verification using public-key infrastructure.

System Design

1. **REST API Architecture**
    - **Framework:** Server implemented using Gorilla Mux for HTTP request routing.
    - **Data Models:** User, Subreddit, Post, Comment, and Message managed in memory with mutex locks for concurrency.
    - **Endpoints:**
        - /users: User registration.
        - /subreddits: Subreddit management (create, list, join).
        - /posts: Post creation and retrieval with signature validation.
        - /comments: Commenting and replies on posts.
        - /messages: Messaging functionality.
        - /votes: Upvoting and downvoting posts.

2. **Public Key Infrastructure (PKI)**
    - Users register with RSA-2048 public keys.
    - Posts are signed with private keys, and the server verifies the signature with stored public keys.

3. **Client Application**
    - The client facilitates user interaction with the REST API for all supported operations.
    - Provides a menu-based interface for various features: account management, subreddit operations, posting, commenting, messaging, voting, and content verification.

Implementation Details

Core Functionalities:

1. **User Registration:**
    - Users register by providing a unique username and their RSA public key.
    - Example Output:
        - *sreeya* and *hemanth* successfully registered.

2. **Subreddit Management:**
    - Users can create, join, and list subreddits.
    - Example Output:
        - *sreeya* created subreddit *channel1*.
        - *hemanth* created subreddit *channel2* and joined *channel1*.

3. **Posting and Signature Verification:**
    - Posts are signed using RSA private keys and verified upon retrieval.
    - Example Output:
        - *sreeya* authored post *p1* in *channel1* with verified signature.

4. **Commenting and Replying:**
    - Hierarchical comments and replies on posts.
    - Example Output:
        - *sreeya* added comment *c1*.
        - *hemanth* replied with comment *c2*.

5. **Voting:**
    - Posts can be upvoted or downvoted.
    - Example Output:
        - Post *p1* received 2 upvotes and 1 downvote.

6. **Messaging:**
    - Users can send private messages.
    - Example Output:
        - *sreeya* sent the message "hello hemanth" to *hemanth*.
        - *hemanth* successfully retrieved the message.

7. **Subreddit and Post Listing:**
    - Clients can view all subreddits and posts in specific subreddits.
    - Example Output:
        - *channel1* and *channel2* were listed.
        - Post *p1* was displayed in *channel1*.

Execution Logs

Client 1 (sreeya):

- Registered user *sreeya*.
- Created and joined subreddit *channel1*.
- Authored a post (*p1*) in *channel1*.
- Added a comment (*c1*) to *p1*.
- Upvoted post *p1*.
- Sent a message to *hemanth*.

Client 2 (hemanth):

- Registered user *hemanth*.
- Created subreddit *channel2* and joined *channel1*.
- Replied to comment *c1* with *c2*.
- Upvoted and downvoted post *p1*.
- Retrieved messages, including one from *sreeya*.

Server Logs:

- Successfully handled user registration, subreddit management, post creation, voting, and messaging.
- Validated all digital signatures during post creation and retrieval.

Execution Results

1. **Multi-client Interaction:**
    - Verified concurrent client actions such as subreddit creation, joining, posting, and messaging.

2. **Digital Signature Validation:**
    - Successfully implemented and validated the digital signature for posts.

3. **Scalability:**
    - Demonstrated the ability to handle multiple users and subreddits.

Conclusion

This project successfully replicated major features concerning a Reddit-like platform. Besides, it includes a digital signature mechanism that enhances the authenticity of contents.

Youtube Link to Demo Video:

https://youtu.be/O0KDmSr2BcM