Rust-Go WebSocket Chat System

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1 Abstract

This project implements a real-time chat system using a WebSocket server written in Rust and clients written in Go. The server supports multiple concurrent clients and broadcasts messages between them.

Contents

2 Architecture

- **Rust Server:** Handles WebSocket connections, message broadcasting, and client management.
- **Go Clients:** Connect to the server, send user input, and display incoming messages.
- **Communication:** Full-duplex WebSocket protocol over TCP.

3 Setup Instructions

3.1 Repository

1. Clone the repository: https://github.com/BogdanSavianu/websockets_example.git

3.2 Rust Server

1. Install Rust: `https://rustup.rs`
2. Run the server:

```
cargo run
```

3.3 Go Client

1. Install Go: `https://go.dev/dl`
2. Navigate to the client directory.
3. Initialize the module and install dependencies:

```
go mod init go_ws_client
go get github.com/gorilla/websocket
```

4. Run the client:

```
go run .
```

4 How It Works

The system is composed of a Rust-based WebSocket server and multiple Go clients. The server listens for incoming WebSocket connections and spawns a dedicated task for each client. Each task handles reading messages from the client and broadcasting them to all other connected clients using a shared broadcast channel.

Detailed Flow

1. The Rust server starts and listens on a specified TCP port.
2. A Go client connects to the server using the WebSocket protocol.
3. The server accepts the connection and spawns a task to manage it.
4. The client sends a message (e.g., user input).
5. The server receives the message and broadcasts it to all connected clients.
6. Each client receives the message and displays it in the terminal.

Sequence Diagram

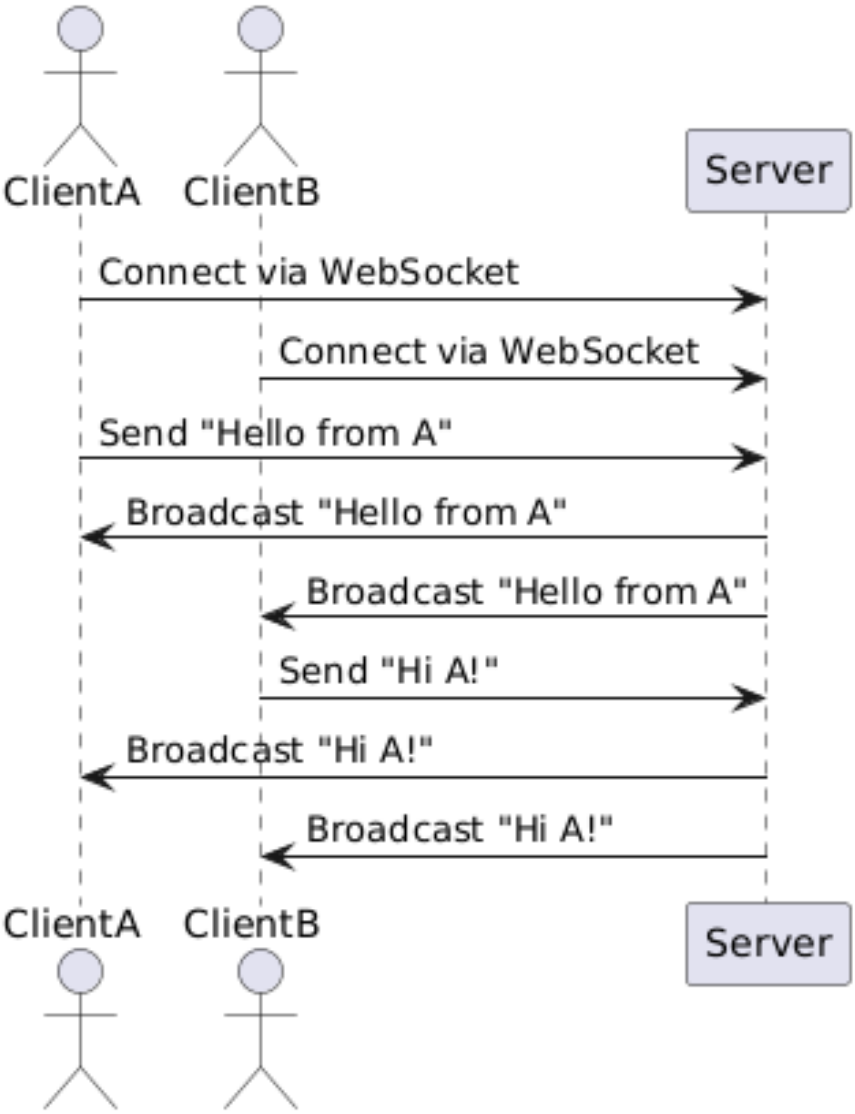
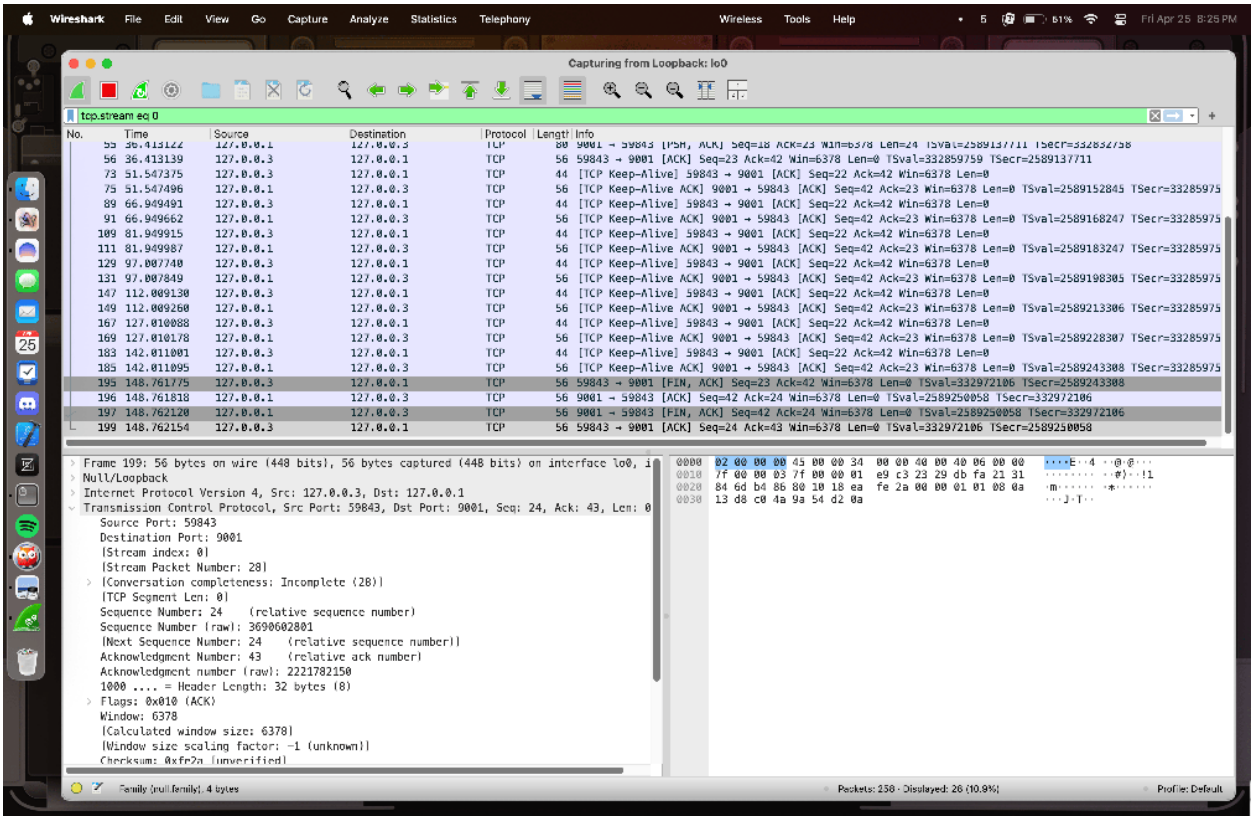
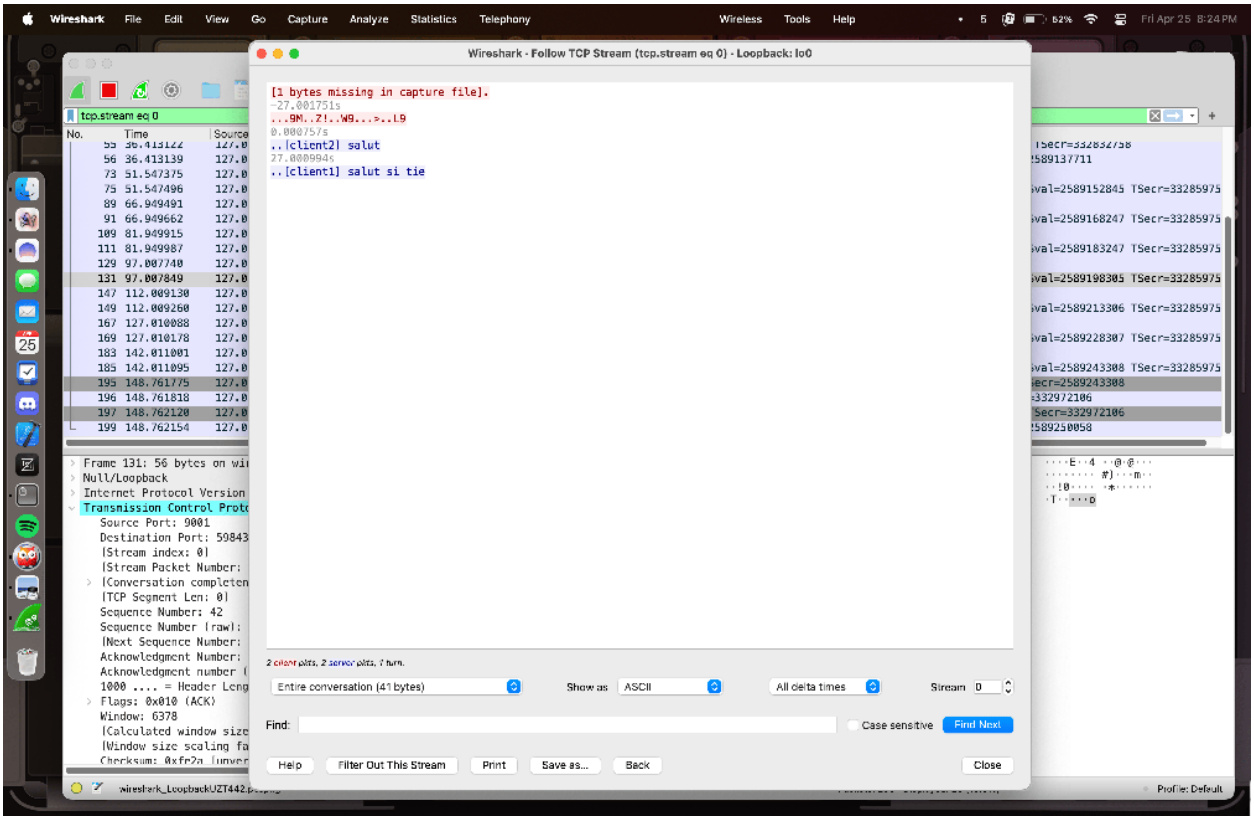


Figure 1: Sequence Diagram

5 Wireshark Captures




Wireshark · Follow TCP Stream (tcp.stream eq 0) · Loopback: lo0
[1 bytes missing in capture file].
-27.001751s
...9M..Z!..W9...>...L9
0.000757s
..[client2] salut
27.000994s
..[client1] salut si tie
Entire conversation (41 bytes)
Show as
ASCII
All delta times
Stream
0
Find:
Case sensitive
Find Next
Help
Filter Out This Stream
Print
Save as...
Back
Close