

Project 2 Architecture Document

Organization

Source code files (client.c, server.c, ufmymusic.h, and Makefile) are in the root directory.

The directories clientdir/ and serverdir/ contain data folders where music files are stored.

Server Design and Workflow

The server uses pthread (POSIX threads) to handle multiple clients concurrently. For every client connection, a new thread (client_handler) is spawned. We chose pthread over select due to its full concurrency, meaning that every client gets its own thread, and true parallelism.

The main thread listens for incoming connections on port 8080. It accepts new connections and creates a new thread for each client. The client handler thread enters a loop to handle messages from the client and handles List, Diff, Pull, Leave.

Directory Crawling and File Comparison

Both client and server change their working directories to data/ on startup. They use opendir() and readdir() to list files in the current directory.

Files are computed by their MD5 hash, so even if files have different names, if the content is the same, it will result in the same hash. In the diff operation, the server compares its file list with client by matching MD5 hashes.

Client Interface

The client presents a menu:

Copy code

1. List Files
2. Diff
3. Pull
4. Leave

Choose an action:

And the client remains connected to server and allows user to prompt multiple operations until they want to leave.