Design of Sender and Receiver

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Functional Description

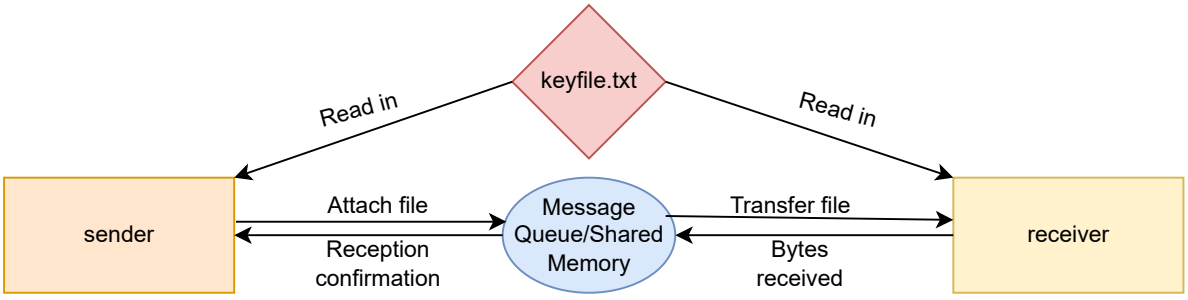
Application which applies shared memory and message queues to implement file transfers between two separate systems. Split between two programs: sender and receiver.

sender.cpp

1. init()
    - Generate key using "keyfile.txt"
    - Attach to shared memory and message queue
2. cleanup()
    - Detach pointer from the shared memory
3. sendFile()
    - Open and read the entire file
    - Count the size of the message sent to the receiver
    - Wait on receiver to confirm
4. sendFileName()
    - Use "msgsnd" to send file name and size of name
5. main()
    - Shared memory and message queue: init(shmid, msqid, sharedMemPtr);
    - Send the name of file: sendFileName(argv[1]);
    - Send the file: fprintf(stderr, "The number of bytes sent is %lu\n", sendFile(argv[1]));
    - Cleanup process: cleanUp(shmid, msqid, sharedMemPtr);

recv.cpp

1. recvFileName()
    - Get the file name from the sender program using "mgrcv"
2. init()
    - Use "ftok" to generate a key from "keyfile.txt"
    - Allocate and attach shared memory, create message queue
3. mainLoop()
    - Open file for transfer using "fopen"
    - Loop until "msgSize" = 0 then use "fclose" to close file once completed.
4. cleanUp()
    - Detach and deallocate shared memory and message queue
5. ctrlCSignal()
    - Free resources by calling cleanUp function
6. main()
    - Install a signal handler: signal(SIGINT, ctrlCSignal);
    - Set up shared memory and queue: init(shmid, msqid, sharedMemPtr);
    - Receive file name from sender: string fileName = `recvFileName();`
    - `Go to mainLoop:` fprintf(stderr, "The number of bytes received is: %lu\n", mainLoop(fileName.c_str()));
    - Call cleanup: cleanUp(shmid, msqid, sharedMemPtr);



Goals and Milestones

- Implement and understand IPC principals
- Utilize shared memory and messaging queues for efficient transfer of data between multiple programs (Sender & Receiver).
- Sender sends all information in file to receiver and signals end.
- Receiver receives information until it receives a field size of 0 bytes from the sender program.
- Both sender and receiver programs are able to deallocate shared memory and message queues.