Final project: Peer to peer file transfer

You have done well in your previous project and the employer, while having some extra money to waste, wants you to do another one for him. He proposes a few features that he can think of and pays good money for each. You need 100 bucks to pay the rent, and you are free to choose which ones you would like to implement. Though it's always wise to save some more money just in case you are in financial difficulties. ;)

The new project is mainly a peer to peer file transfer service.
Let's hear him out:

Product Backlog:

As a user: (The compulsory parts: 80 bucks)

- I would like to have a website that enables my employees to enter and pick a username. (or even better, log in with given credentials for extra security)
- When two users are online (or logged in) at the same time in the firm, the sender can select a file and write down the destination's username (who is waiting on the other side) and hit the send button to transfer the file directly to the co-worker. (within a Local Area Network)
    - TA's Notes:
    - The website has two main sections, one for sending and the other for receiving. they could either be handled in two distinct pages or a single page. It's up to you.
    - The transmission itself has to be done directly from a peer to the other one (or the destination) without any third parties (servers).
    - Of course, you are free to use a server for other means (i.e. the initial handshake).
- I would like the destination coworker to see a list of received files from his/her co-workers and save them on his/her computer.
    - TA's Notes:
    - No need to save the transmission log into a database. Keeping them in the browser session would be enough.
- Some of my employees work remotely from their homes, so I would be happy if they could also transfer files to each other as well.
    - TA's Notes:
    - You will be needing a Stun server or a Turn server for this part.
- It would be nice if both peers could see a progress bar while transferring files. (no pressure)

To earn a few more bucks (other features: 70+ bucks)**:**

- Some of the files are too big to be transferred in one session. So I would like them to be paused and resumed later.
- A File Catalog section, so you can view a list of files available on network and download these files on demand, everybody can add Their archive to this catalog.

    TA's Notes:

    - Every employee could add a list of shared files on the service, (which doesn't have to be uploaded anywhere) and everyone in the firm (or registered in the service) could see the list of all shared files and folders, search in them and download any files if needed.
    - Of course, this feature is completely different from the original p2p file transfer. Yet files if being downloaded should be transferred just like the original feature directly from a peer to the other one.
    - Tip: you will be needing somewhere to keep the location of each shared file (like a server). Though it could be handled distributedly.
- A Distributed File-Sharing system, Which You can receive desired file chunks from multiple sources then save completed file to my computer

    TA's Notes:

    - This feature is like a distributed storage service
    - In this feature, if you upload a file, there is no destination. When you hit the send button the files are sliced into many chunks and those chunks are saved into different computers that are in the network (are online at the same time).
    - Everyone can see the list of uploaded files and download each one. When downloading, every chunk related to a file has to be retrieved and attached to each other and served as a single file.
    - Of course, this feature is completely different from the original p2p file transfer. Yet **chunks** if being downloaded should be transferred just like the original feature directly from a peer to the other one.
    - Tip: you will be needing somewhere (not necessarily distributed, like a server) to keep the location of each chunk related to each file.
- Of course, I would prefer the website to be user-friendly and well designed if possible.

Final TA notes:
You can find almost everything needed in the course lectures. Be creative on how to use what you've learned in the class.

Submission instructions

You are free to choose your own technology of choice for all the parts (client, server, etc).
There should be a number of particles In your submitted assignment :

1- A well documented and commented **source code**.

- The clients and the server.
- Along with step by step instructions to run the project (for testing purposes)

2- A **document** explaining the process of transferring the file, step by step

- I.e. how you handled the signaling system (or established the initial handshake).
- Please do note if you have implemented a Stun or Turn server on your own.
- Please do make a list of what features you have implemented so we could test each one and calculate your salary.