This project is sharing and caching in P2P file system. This project uses five peers and two fog servers and their replication: two standby servers. Fog server 01 is close to peer 0 and peer 1. Fog server 234 is close to peer 234. There are two *.cpp* files: *p2p.cpp* and *server.cpp*.

Graphical user interface, application

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Every peer has its user folder and three system folders. Initially, all files are in the user folder. Peer can share its file to shared hard disk. At the same time, system can store the file into a faster NVRAM. For searching, system also stores the popular files into NVRAM. I use a LFU Cache and corresponding file operation to implement this feature. Log file is for caching data recovery of peer.

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When a peer requests a searching, system send the file name to its corresponding two servers first. I use threads to process every request. When the thread finish processing that request, it detached. Using this way to hand multiple requests. But if multiple requests received at exact same time, I still need to implement a queue. I did not implement that queue in this project. These two servers also use the LFU Cache to do caching base on the popularity. Fog server and standby server do almost same thing.

If the server did not find the file, server multicasts the file name to all peers. For each peer, it searches its NVRAM cache first, then search its shared hard disk. The peer who has the file will send the popular file to the peer who requests and two servers.

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If servers have the file, server send the file to the peer who requested. And update the file’s frequency.

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Fog server keeps sending heartbeat to its standby server. If the fog server crash, standby server takes over the sending task. Using this way to make peer has no feeling about the crash of fog server. Every server also has log file to help it to recover.

Graphical user interface, text

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If the fog server crash, standby server does not have the file. The standby server multicasts the file name to all peers.

Graphical user interface, text

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If the system knows both fog server and its standby server crashed, the system multicasts the file name to all peers.

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