Design Documentation

Protocol between proxy and server

There is an interface called RMIInterface which is used to communicate with the proxy and the server. In the RMIInterface, there are two methods: check(CommunicationInfo) and push(CommunicationInfo). check(CommunicationInfo) will check whether the file on the Proxy is up to date, if yes, it simply sends the yes information back, if not, the server will send the file to the Proxy and the Proxy will update the file in the cache. The push(CommunicationInfo) method simply pushes the file from the Proxy to the server, and the server will update the file version number.

Consistency Model

Check-on-use is used to guarantee the one-copy semantics. When the Proxy invokes the open method for a file's pathname, it will first send the file's information to the server to check whether the file is the same with the one in the server. If not, the server will send back a new version to the Proxy. By doing this, the system makes sure that when a file is open again, the proxy will open the latest version, thus guaranteeing one copy semantics.

How to implement LRU

A doubly linked list is used to implement LRU. There is a Node data structure representing a file in the doubly linked list. Every time the file is used, the node representing the file will be deleted in the list and then put in the head of the list. If the size of the file exceeds the cache size, the file in the end of the doubly linked list will be deleted.

Technique to ensure freshness

Check-on-use is used to ensure freshness. Every time the Proxy opens a file, it will check with the server whether the copy of the file on the local cache is up to date, if not, the lasted file will be brought from the server to the Proxy.