454 A3 Documentation

Binder database:

- The entry class of binder database is defined in rpc_entry.h with class GlobalEntry
- Each entry contains:
    - argTypes : the argument types of this function
    - server_address : the location of the server which provides this function
    - server_port : the port of this server
    - socket : the socket descriptor that connects binder with this server
    - used : indicates whether this server has served last time
- An unordered_map with format <function_name, GlobalEntry> is used in rpc_binder.cc to store all the entry in the binder database.

Server database:

- The entry class of server database is define in rpc_entry.h with class LocalEntry
- Each entry contains:
    - argTypes : the argument types of this function
    - function: the skeleton function of this function
- AN unordered_map with format <function_name, LocalEntry> is used in rpc_server.ccto store all the entry in the server database

Function Overloading:

- If a server is trying to register a function with same name and argTypes, it will only update its local database with the new skeleton function instead of send request to binder.
- When binder receives a function registration from a server providing a function which has already been registered by another server, the new function will also be added to binder's global database.
- Two functions are considering identical only if they have the same name and argTypes
- Two functions with same name but different argTypes will be both added to the global database and local database.
- Multiple servers providing same function will serve with round-robin algorithm

Round-Robin:

- When a client requests a server from binder, binder will search from global database
- Binder will return a server to the client if it finds a server providing the right function and has flag 0
    - Then binder will set all functions provided by this server with a flag 1
- If none of the server providing the right function has flag 0, binder will reset all functions with flag 0
    - Then binder will re-search the global database and find one function with flag 0
    - Again, Then binder will set all functions provided by this server with a flag 1

Termination:

- The system can be terminated in an expected way.
    - A client may send termination massage to binder

    - Upon receiving termination message from client, binder will inform all connected server to terminate
    - Upon receiving termination message from binder, server will close all connections and terminate
    - Once all connected server is terminated, binder will terminate itself.
- Some unexpected way of termination:
    - A server lost connection with binder
    - A client lost connection with binder/server
    - Unexpected fatal errors….

Client error code :

SOCKET_OPEN_FAIL -2
SERVER_UNKNOW_HOST -3 :
SOCKET_CONNECTION_FAIL -4
FUNCTION_NAME_NOT_MATCH -5
GET_BINDERADDRESS_FAIL -6
GET_BINDERPORT_FAIL -7
SEND_MESSAGETOBINDER_FAIL -8
SEND_MESSAGETOSERVER_FAIL -9
SEND_EXECUTINGMESSAGE_FAIL -10
GET_EXECTUINGMESSAGE_FAIL -11

Server error code :

SERVER_ERROR_UNINIT -20
SERVER_ERROR_UNREG -21
SERVER_ERROR_ALREADY_INIT -22
SERVER_ERROR_BINDER_LOST -23
SERVER_ERROR_BINDER_INVALID_MESSAGE -24
SERVER_ERROR_BINDER_CONNECT -25
SERVER_ERROR_CLIENTS_SETUP -26

Binder error code :

BINDER_ERROR_SETUP -30

List of unimplemented features/functionalities:

- Bonus functionality has not been implemented due to shortage of time.
- Memory leak has not been cleaned due to shortage of time.
- Mutual exclusion was not added due to shortage of time.