

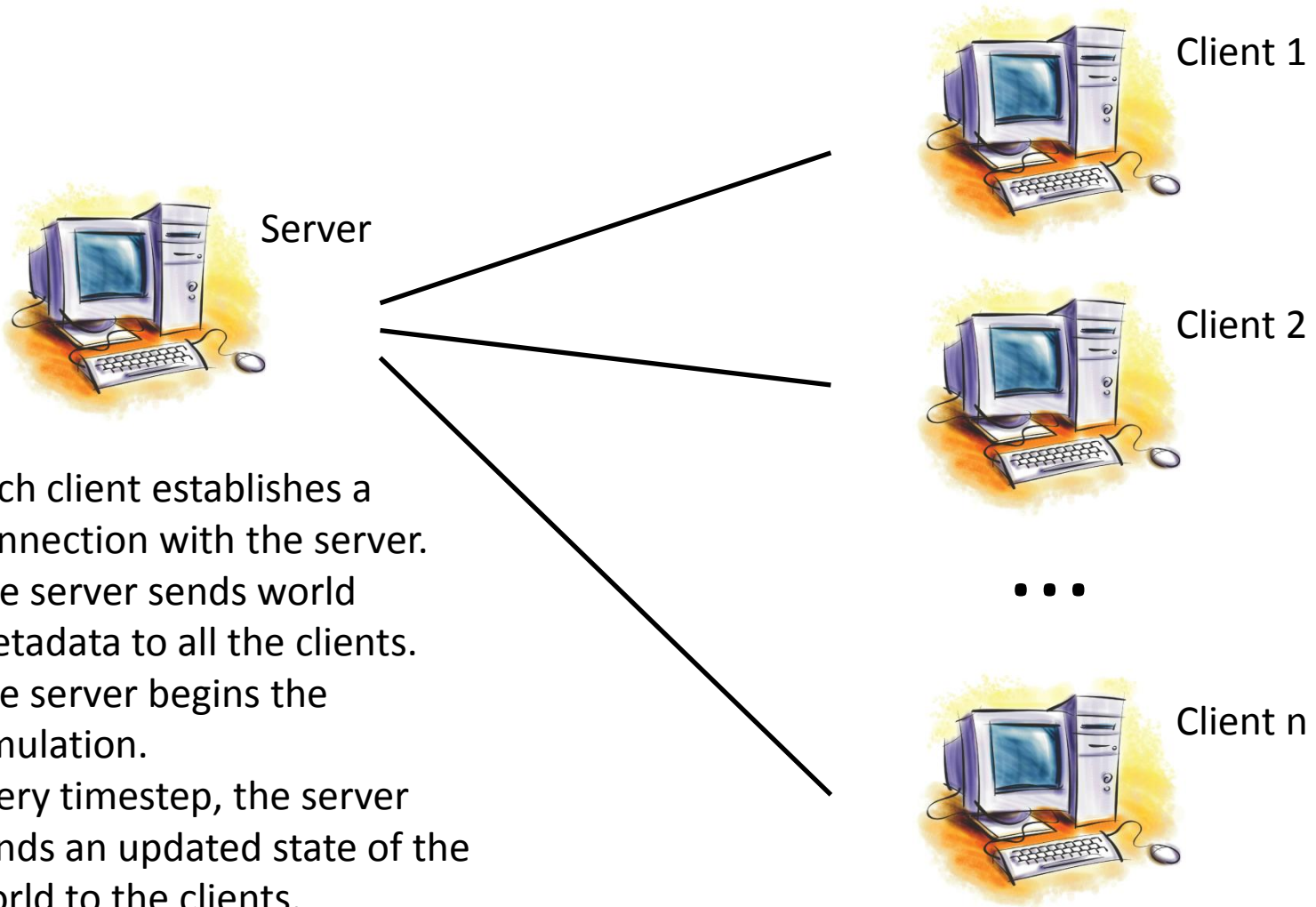
Rigid body physics in the cloud

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4/21/2011

Movie

Network layout

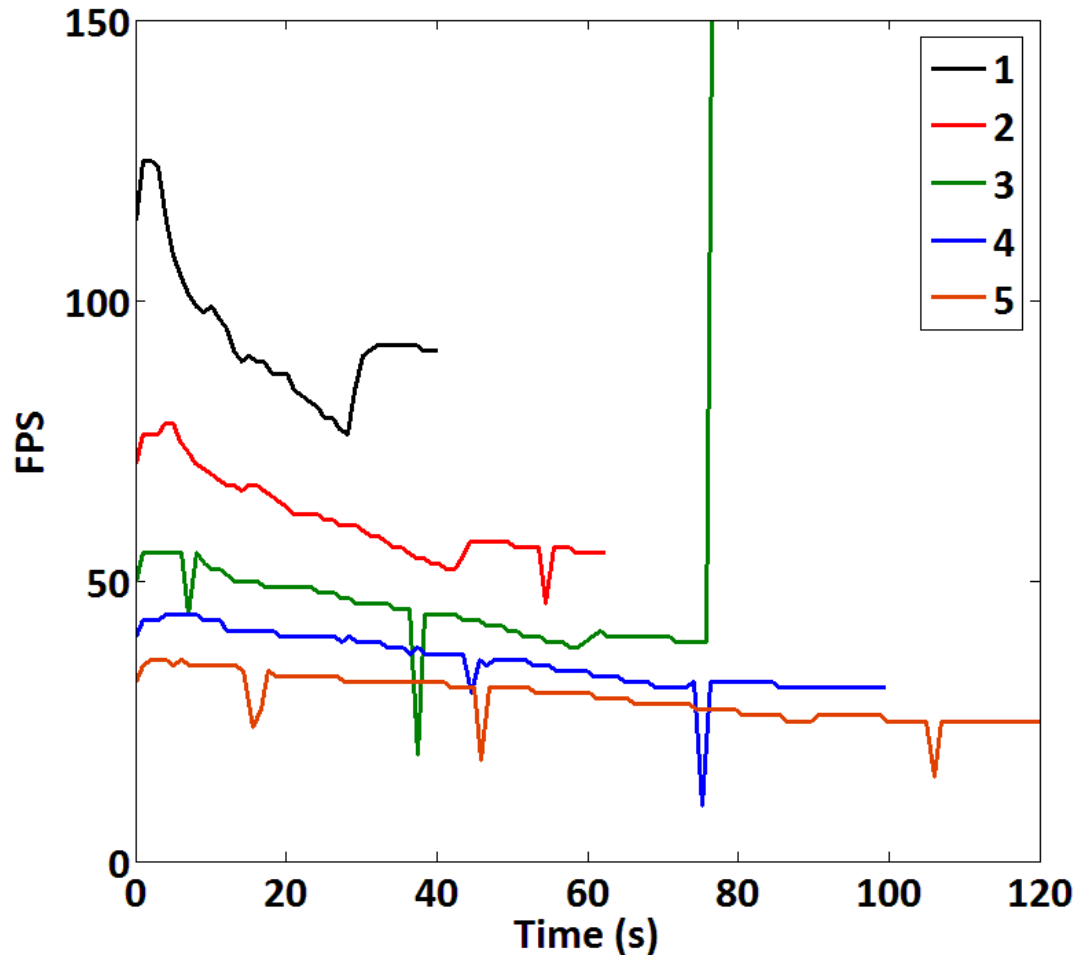


- (1) Each client establishes a connection with the server.
- (2) The server sends world metadata to all the clients.
- (3) The server begins the simulation.
- (4) Every timestep, the server sends an updated state of the world to the clients.
- (5) The clients render the world.

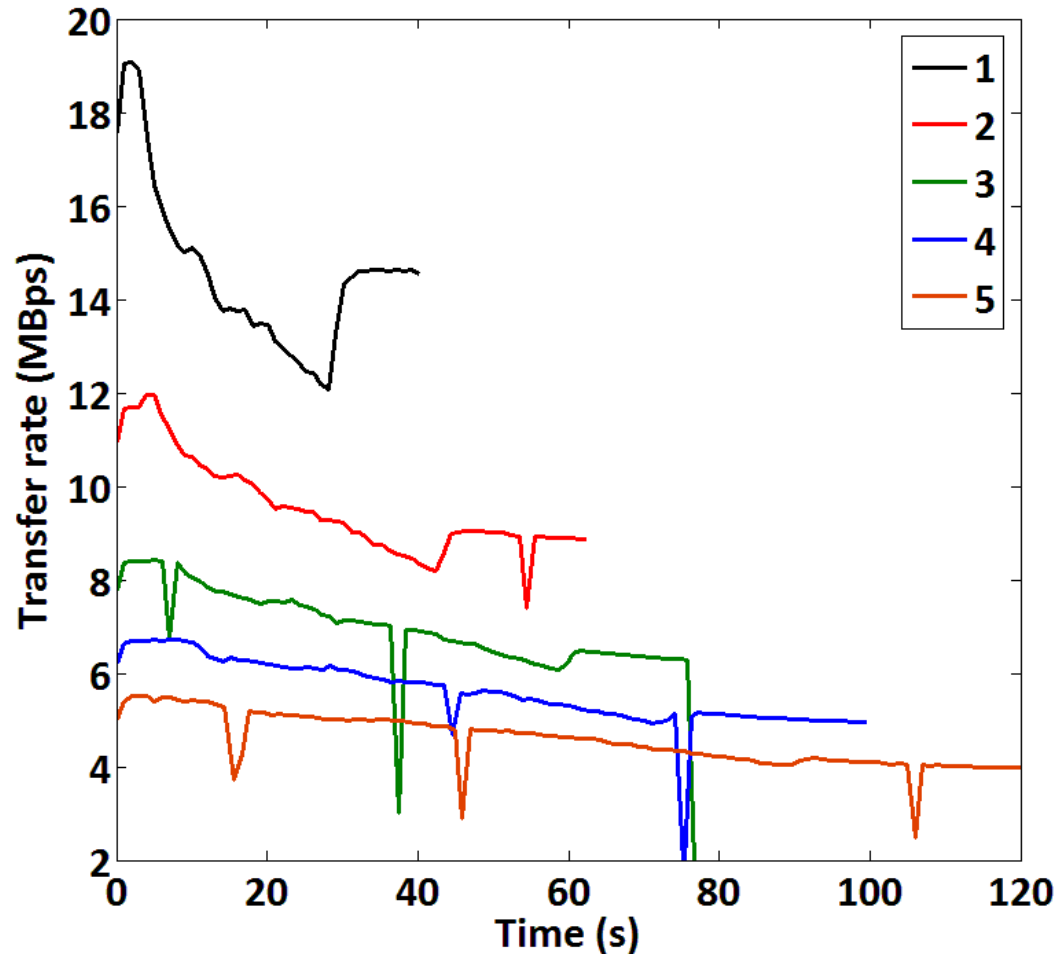
Challenges

- Manage large amounts of data.
 - 30 fps X 1000 bodies X 48 bytes (twelve for position and 36 for orientation) = 1.4 MBps.
 - Gets worse for more clients.
- Deciding whether or not to sync server and each client (i.e., the server doesn't move on until every client is up to date).
 - Would require some kind of an ACK signal.

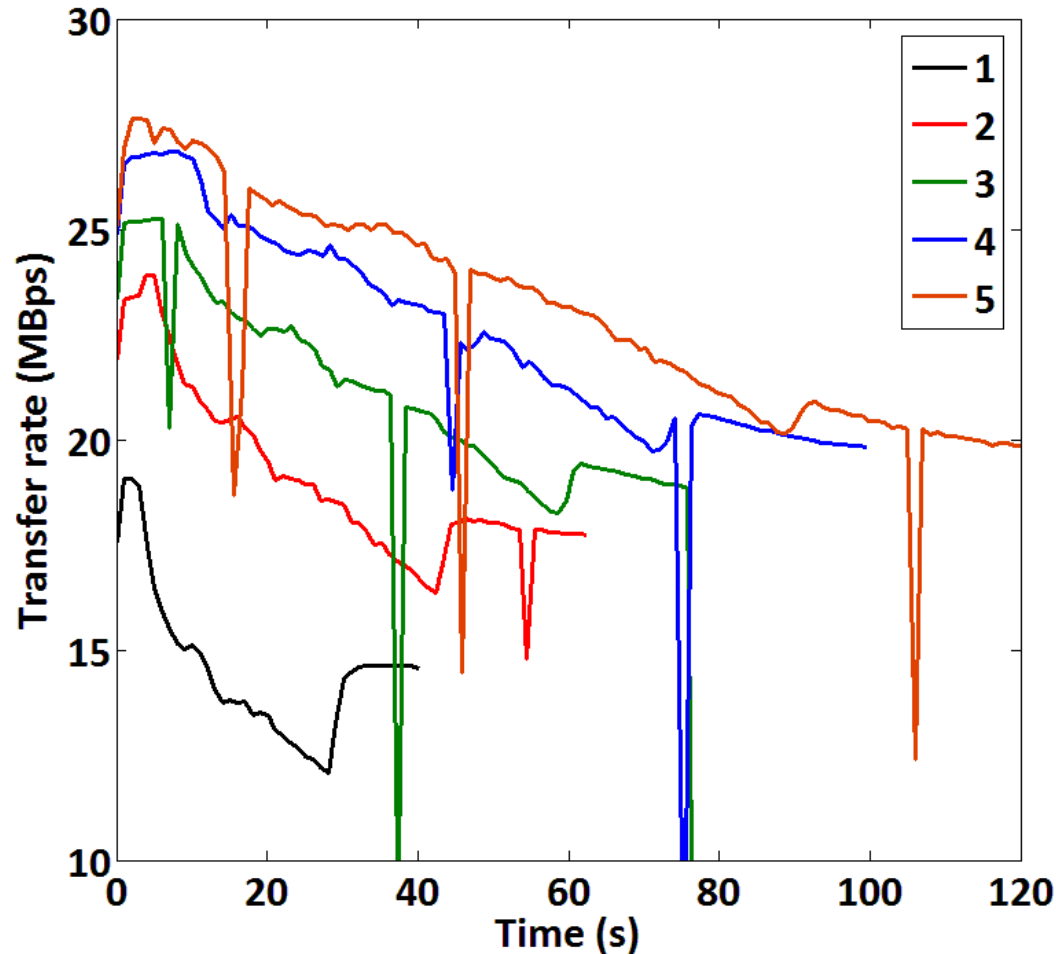
Client frame rates for different numbers of clients, ASCII encoding



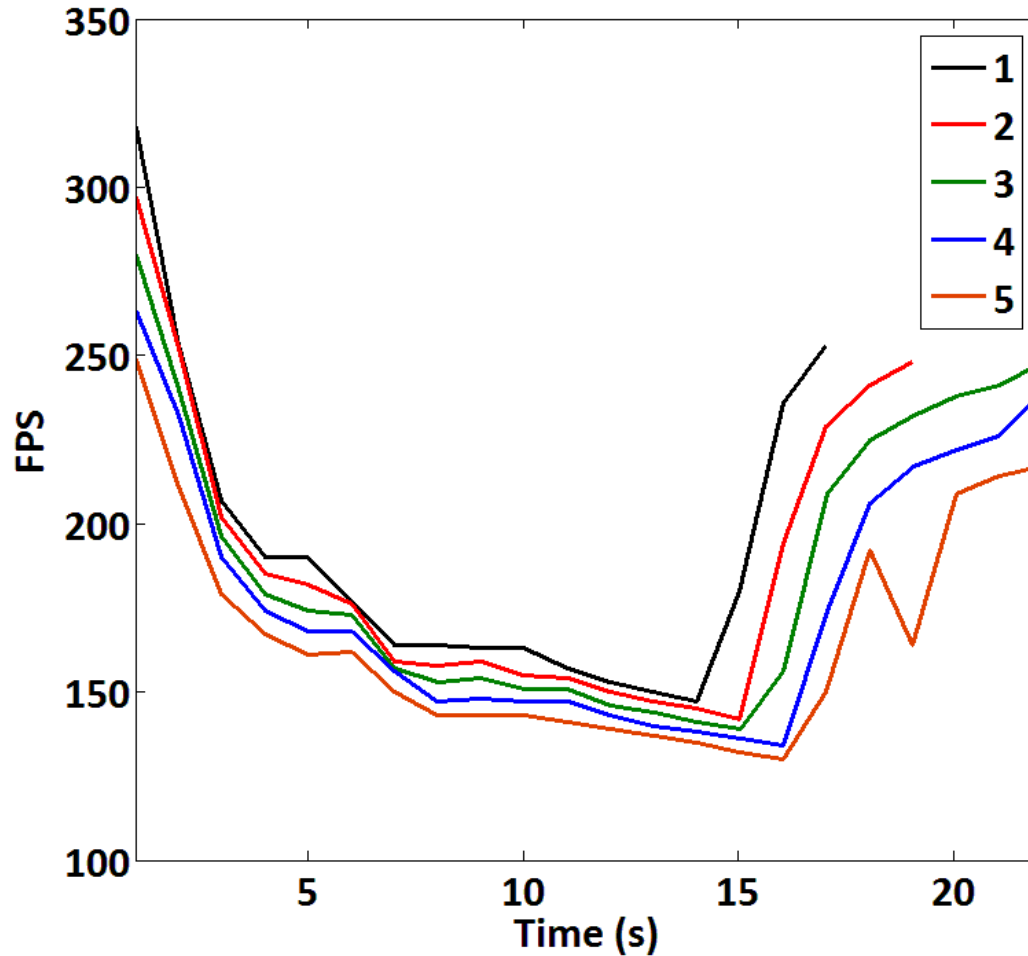
Client transfer rates for different numbers of clients, ASCII encoding



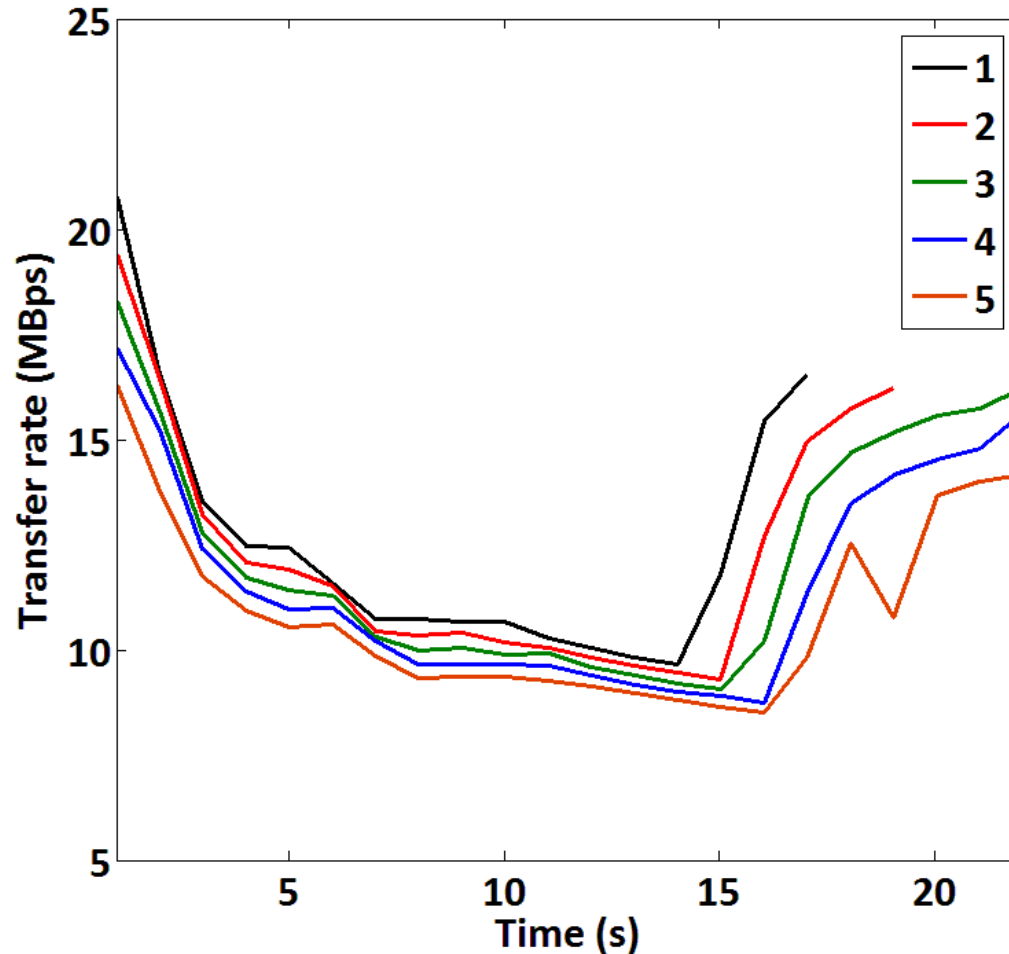
Server transfer rates for different numbers of clients, ASCII encoding



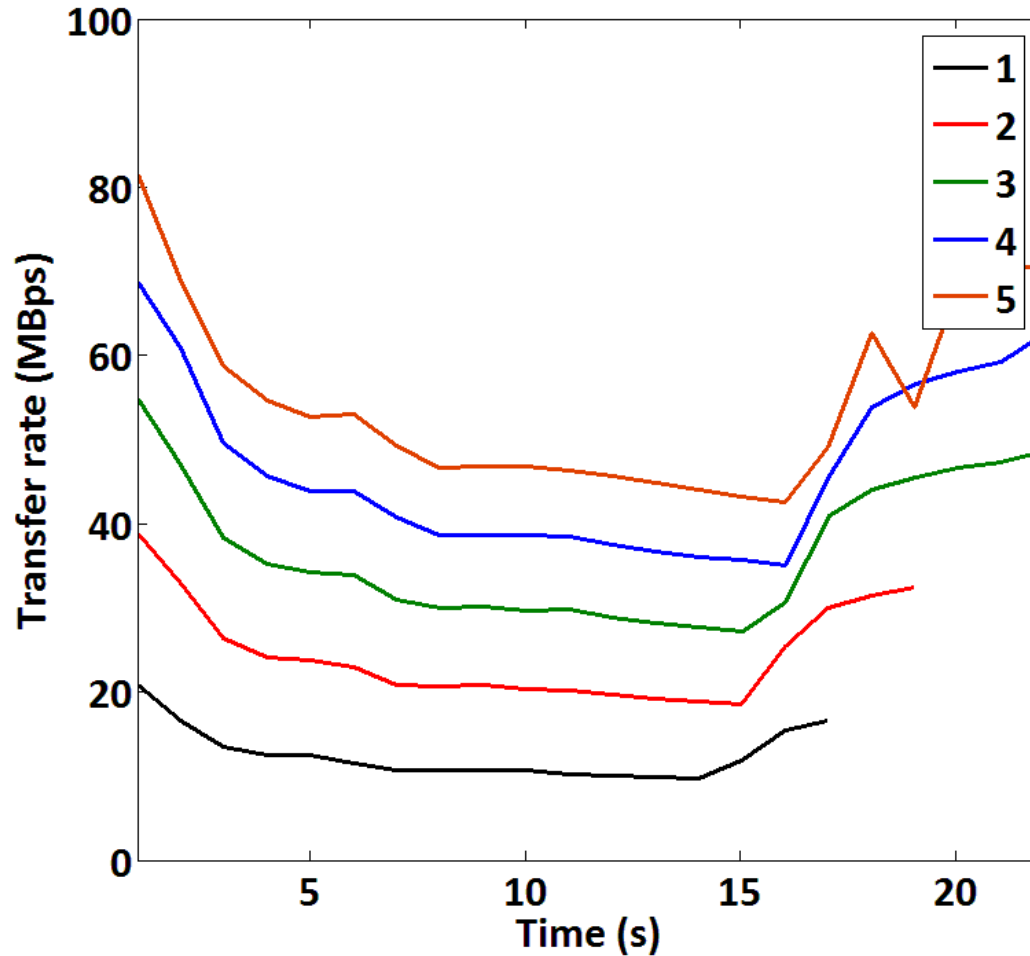
Client frame rates for different numbers of clients, binary encoding



Client transfer rates for different numbers of clients, binary encoding



Server transfer rates for different numbers of clients, binary encoding



Future work

- Find a better way to distribute updated state of the world to the clients.
 - E.g., send different parts of the update to different clients, and have them forward them to the others.
- Farm heavy calculations out to clients instead of having them centralized on server.