

IN3230-Oblig1-Design Doc.

1. MIP vs IPv4

MIP differs from IPv4 in several ways that prioritize simplicity over having many functionality. MIP uses an 8-bit address space (255 addresses) while IPv4 has 32-bit addressing.

The MIP header is minimal at 32 bits total, while IPv4 has 160-bit minimum header, which is a huge advantage of MIP.

MIP lacks some of the important functionality of IPv4 such as fragmentation or checksums, as well as any routing capability beyond direct-connected neighbors. This simplicity means MIP datagrams cannot traverse multiple hops, very limited network scale.

In regards of performance, MIP's minimal header and simple processing logic result in lower overhead and faster forwarding decisions in Daemon. However, not to forget that this comes at the cost of functionality. Pv4's performance overhead allows it build internet-scale networks. MIP is suitable only for small, flat networks where minimal latency.

2. MIP Special Case

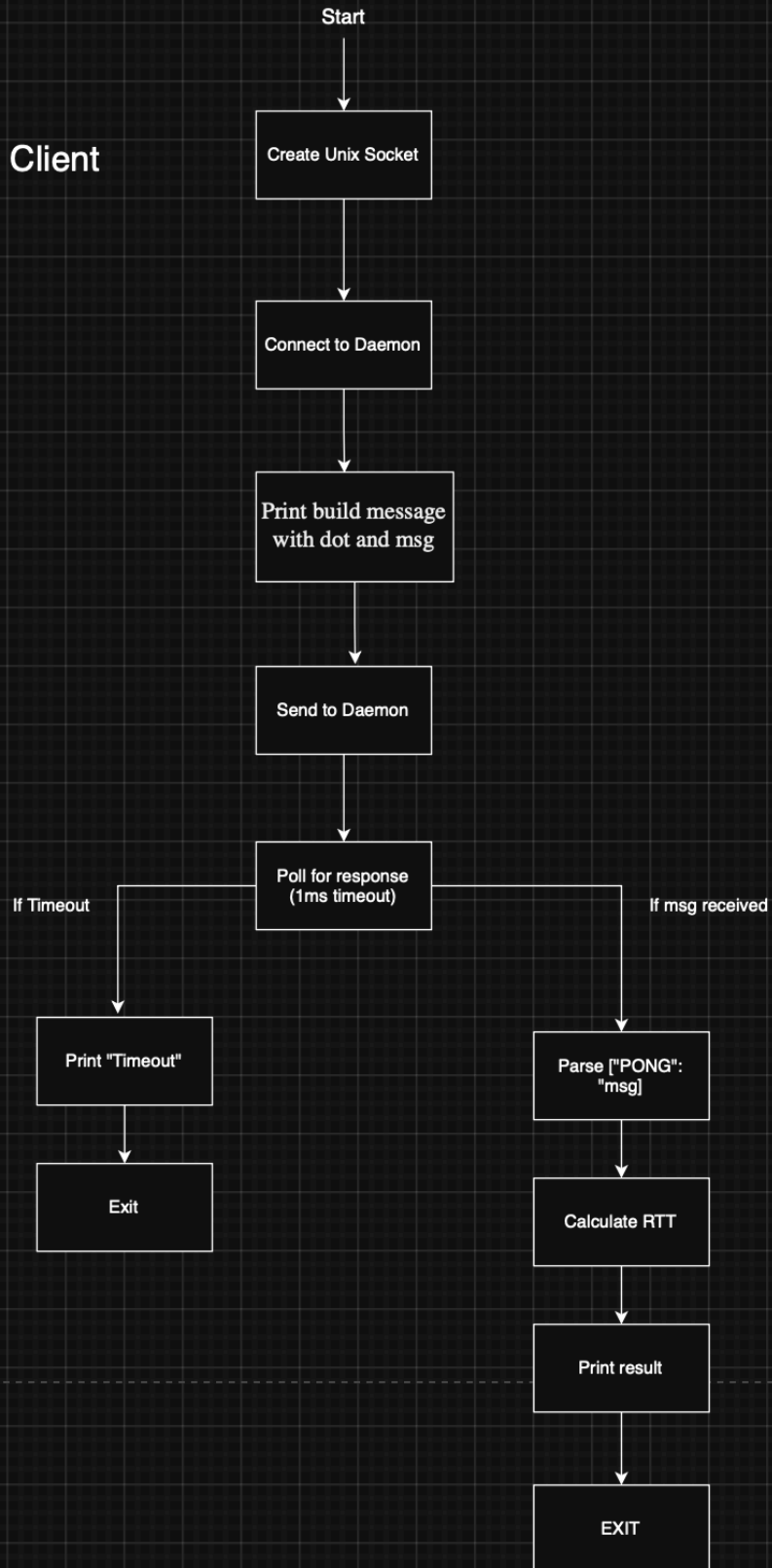
MIP-ARP requires a special handling because it got an unusual position in the network stack. It actually functions both as an application layer and as a service for the network layer - providing mappings and packet transmissions. The daemon itself must intercept MIP-ARP messages, PING message, maintain a caching table, and handle the request-response logic.

An alternative design approaches could be that the one which provides a cleaner separation of concerns. One option would be to implement MIP-ARP as a separate daemon process that communicates with the MIP daemon via IPC, similar to how the ping client and server work with the Daemon. However, one should not forget that this would introduce additional overhead and complexity.

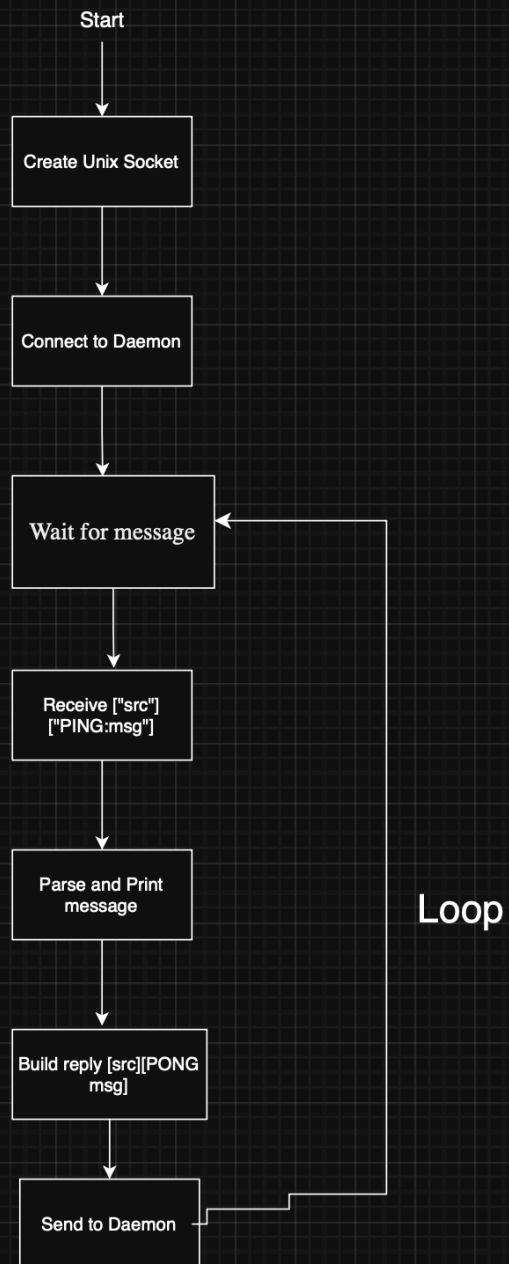
Another approach could be to implement MIP-ARP entirely at the link layer, thus making it independent of MIP itself - similar to how real ARP operates below IP in real life. This would require the link layer to automatically resolve addresses before the MIP layer becomes involved, which in turn could provide a cleaner abstraction.

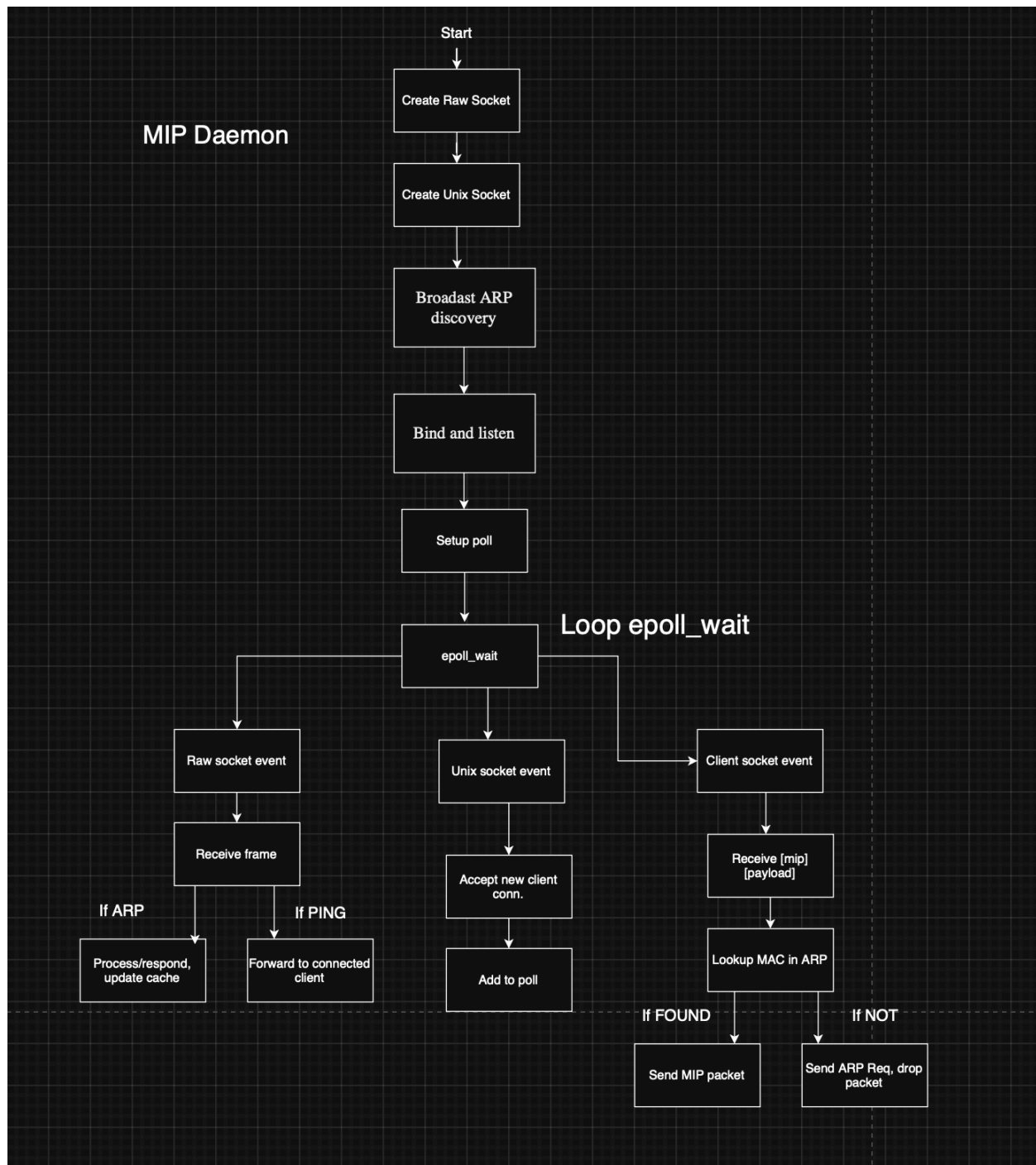
3. Flow Chart

PING Client



PING Server





4. Use of AI In the Assignment

- I used AI purely to debug the problems I encountered while implementing the MIP Daemon.

- It was mainly helping me to find a way for correct usage of `bind()` and `listen()` commands, as well using the `epoll` in the while loop.
- I have also received help from AI while commenting my code and simplifying the assignment text, which would allow me to attack the problems with simpler definitions.
- Besides that, all debugging and written code by AI is understood by me, and AI serving as a debugging assistant and/or a technical manual rather than generating giving complete solutions.