MIP vs IPv4

The Minimal Interconnection Protocol (MIP) and the widely-used Internet Protocol (IPv4) have distinct characteristics. MIP is designed to be straightforward and efficient. Unlike IPv4, which has many features and processes built over years, MIP focuses on the essentials. This streamlined design means MIP can operate faster because it avoids complex tasks, such as error-checking mechanisms known as checksums.

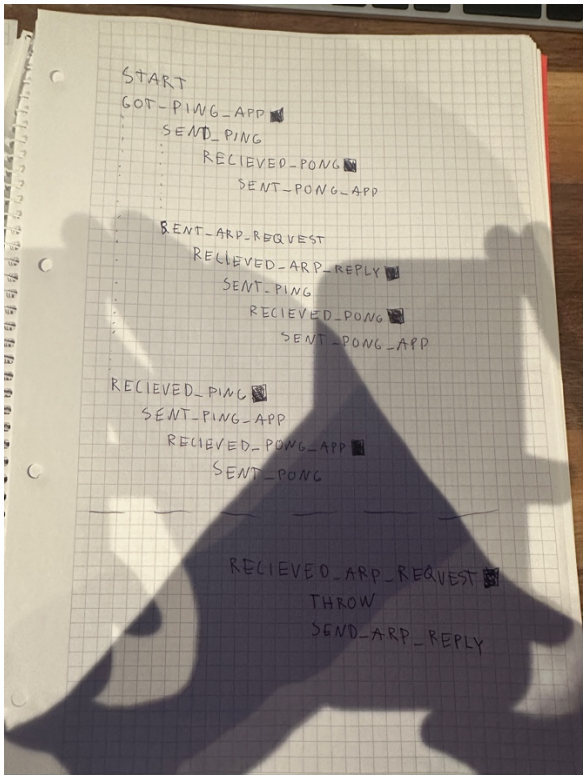
While IPv4 uses a more detailed system to assign addresses to devices, MIP employs a simpler method, using a flat 8-bit address space. This approach allows MIP to support up to 255 devices in a single network. The lack of additional features in MIP can be both an advantage and a limitation. On the one hand, it can lead to quicker data transmission due to reduced overhead; on the other, it might not be as versatile as IPv4 in handling diverse networking challenges.

MIP protocol as special case

The MIP-ARP (Minimal Interconnection Protocol - Address Resolution Protocol) is essential because it provides a mechanism for mapping MIP addresses to lower-level addresses, a fundamental requirement for efficient data transmission in any network. Without a reliable system to correlate these addresses, data wouldn't know where to go once it reaches its destination network. MIP-ARP is treated as a special case primarily because of its broadcast nature. When a node needs to find out the MAC address corresponding to a specific MIP address, it broadcasts a request to all nodes in its immediate network. While this ensures that the target node receives the request and responds, it also means that all other nodes process this request unnecessarily. This broadcasting can lead to network congestion, especially in densely populated networks.

An alternative design choice to broadcasting would be to implement a caching mechanism. Once a node has resolved a MIP address to a MAC address, it could store this information for future use. By caching previously resolved addresses, the need for frequent broadcasting could be reduced, leading to more efficient network operations. Such a mechanism, often referred to as ARP caching in traditional networks, can significantly reduce network chatter.

Another potential design improvement would be the introduction of a centralized address resolution server or directory. Instead of nodes broadcasting requests, they could directly query this central server whenever they need to resolve an address. This approach would eliminate broadcast storms and make the resolution process more predictable. However, it would introduce a single point of failure and potential performance bottlenecks, so redundancy measures would be crucial. The choice between a decentralized (broadcast) vs. centralized (server-based) system would largely depend on the specific requirements and scale of the network in question.



FLOW CHART
The black boxes indicates if we have incoming packets. (I an out of time, sorry for bad quality and hand drawing)