

COMPARISON OF ATM AND IP

The success of Asynchronous Transfer Mode (ATM) lies largely in its ability to transport legacy data traffic, mostly IP, over its network infrastructure. The complexity of interoperating IP with ATM originates from following two major differences between them.

- Connection-oriented vs. Connectionless

ATM is connection-oriented, that is, a connection need to establish between two parties before they can send data to each other. Once the connection is set up, all data between them is sent along the connection path. On the contrary, IP is connectionless so that no connection is needed and each IP packet is forwarded by routers independently on a hop-by-hop basis. When we need to transport IP traffic over an ATM network, we have two options. Either a new connection is established on demand between two parties or the data is forwarded through preconfigured connection or connections. With the first approach, when the amount of data to be transferred is small, the expensive cost of setting up and tearing down a connection is not justified. On the other hand, with the second approach the preconfigured path(s) may not be an optimal path and may become overwhelmed by the amount of data being transferred.

- QoS-aware vs. Best Effort

Quality of Service is an important concept in ATM networks. It includes the parameters like the bandwidth and delay requirements of a connection. Such requirements are included in the signaling messages used to establish a connection. Current IP (IPv4) has no such concepts and each packet is forwarded on a best effort basis by the routers. To take advantage of the QoS guarantees of the ATM networks, the IP protocol need to be modified to include that information.

- Changed order vs. Same order

If consecutive IP datagrams travel different routes, they may arrive at their destination in a different order from the order in which they were transmitted. Therefore IP cannot guarantee order, and higher layers may need to reorder packets as they arrive. Conversely, as cells on a given connection travel by the same path, there is no reason for them to arrive out of order, and thus ATM guarantees that cells, if they arrive, will arrive in order.