

## TRANSITION FROM IPv4 TO IPv6

Because of the huge number of systems in the Internet, the transition from IPv4 to IPv6 cannot happen suddenly. It will take a considerable amount of time before every system in the Internet can move from IPv4 to IPv6. The transition must be smooth to prevent any problems between IPv4 and IPv6 systems.

### Strategies

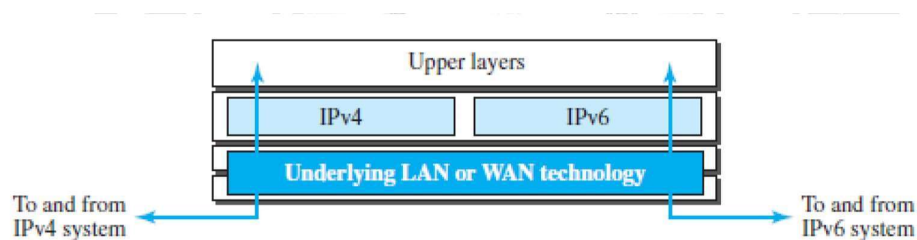
Three strategies are used for transition: dual stack, tunneling, and header translation.

One or all of these three strategies can be implemented during the transition period.

### Dual Stack

It is recommended that all hosts, before migrating completely to version 6, have a dual stack of protocols during the transition. In other words, a station must run IPv4 and IPv6 simultaneously until all the Internet uses IPv6.

Figure 3.6.1 shows the layout of a dual-stack configuration.



**Fig3.6.1: Dual stack.**

[Source : "Data Communications and Networking" by Behrouz A. Forouzan, Page-683]

To determine which version to use when sending a packet to a destination, the source host queries the DNS. If the DNS returns an IPv4 address, the source host sends an IPv4 packet. If the DNS returns an IPv6 address, the source host sends an IPv6 packet.

### Tunneling

Tunneling is a strategy used when two computers using IPv6 want to communicate with each other and the packet must pass through a region that uses IPv4.

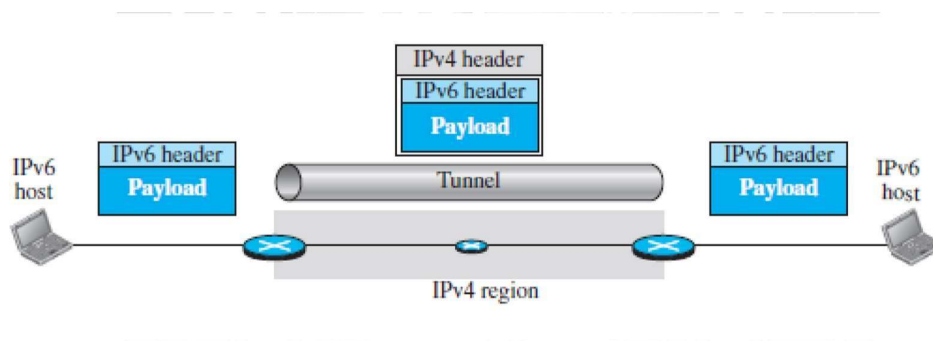
To pass through this region, the packet must have an IPv4 address. So the IPv6 packet is encapsulated in an IPv4 packet when it enters the region, and it leaves its capsule when it exits the region.

It seems as if the IPv6 packet enters a tunnel at one end and emerges at the other end. To make it clear that the IPv4 packet is carrying an IPv6 packet as data, the protocol value is set to 41. Tunneling is shown in Figure 3.6.2.

### Header Translation

Header translation is necessary when the majority of the Internet has moved to IPv6 but some systems still use IPv4.

The sender wants to use IPv6, but the receiver does not understand IPv6. Tunneling does not work in this situation because the packet must be in the IPv4 format to be understood by the receiver. In this case, the header format must be totally changed through header translation. The header of the IPv6 packet is converted to an IPv4 header.



**Fig3.6.2: Tunneling strategy.**

*[Source : "Data Communications and Networking" by Behrouz A. Forouzan, Page-684]*

### Use of IP Addresses

During the transition a host may need to use two addresses, IPv4 and IPv6. When the transition is complete, IPv4 addresses should disappear. The DNS servers need to be ready to map a host name to either address type during the transition, but the IPv4 directory will disappear after all hosts in the world have migrated to IPv6.

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