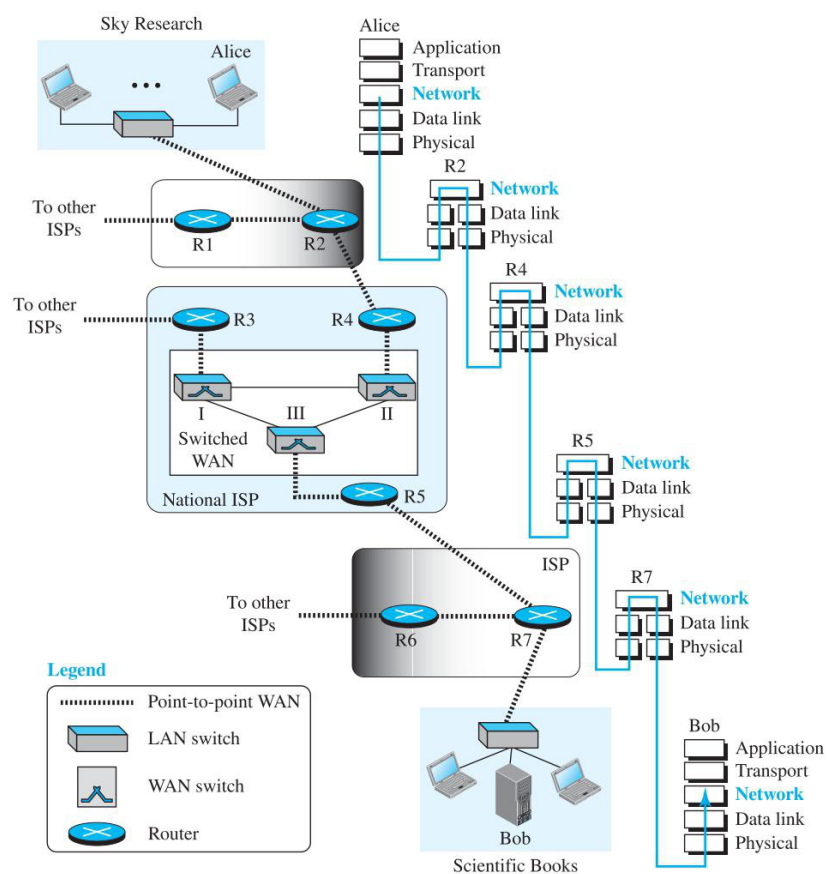


(*) Network Layer: Data Transfer

^ The NETWORK layer in the TCP/IP protocol suite is responsible for the HOST-TO-HOST delivery of PACKETS.

Figure 7.1 Communication at the network layer



The MAXIMUM TRANSMISSION UNIT (MTU) of ETHERNET is 1500 bytes.

max packet size ipv4 ...

At the source host,

1. The APPLICATION layer will give MESSAGES to the TRANSPORT layer one by one.
2. The TRANSPORT layer will take MESSAGES from the APPLICATION layer one by one.

For every MESSAGE,

- a. If the protocol is TCP (TRANSMISSION CONTROL PROTOCOL), then the MESSAGE can be arbitrarily LARGE. So, if the size larger blah blah ..

the TRANSPORT layer will split the MESSAGE into multiple

PIECES if required and attach the necessary HEADER to each PIECE.
else blah blah

Such a PIECE

along with its HEADER is known as a SEGMENT.

- b. If the protocol is UDP (USER DATAGRAM PROTOCOL), then the MAXIMUM size of the MESSAGE is fixed. So, the TRANSPORT layer will simply attach the necessary HEADER to the MESSAGE without splitting it. Such a MESSAGE along with its HEADER is known as a USER DATAGRAM.

Finally, the TRANSPORT layer will give SEGMENTS / USER DATAGRAMS to the NETWORK layer one by one.

3. The NETWORK layer will take SEGMENTS / USER DATAGRAMS from the TRANSPORT layer one by one.

At the source host (Alice),

1. The NETWORK layer accepts SEGMENTS of data (for TCP) / USER DATAGRAMS of data (for UDP) from the TRANSPORT layer one by one, ENCAPSULATES each SEGMENT / USER DATAGRAM into a PACKET by adding the necessary HEADER, and delivers the PACKETS one by one to the DATA LINK layer.
2. The DATA LINK layer accepts PACKETS of data from the NETWORK layer one by one, ENCAPSULATES each PACKET into a FRAME by adding the necessary HEADER and TRAILER, and delivers the FRAMES one by one to the PHYSICAL layer.

The MAXIMUM size of an IPv4 (INTERNET PROTOCOL VERSION 4) PACKET is $2^{16} - 1$ bytes, i.e. 65,535 bytes.

Network layer takes a segment / user datagram and directly encapsulates it into a packet WITHOUT breaking it down.

Fragmentation of a packet may happen.

The fragments are themselves packets.

So, it can be said that a segment is broken down into packets, but using the term 'fragment' avoids confusion.

Max. packet size = 2^{16} bytes.

In practice, the packet size is much less, as TCP tries to keep segments small enough so that even after adding the IP headers, the total size doesn't need fragmentation.

UDP doesn't care.

<https://networkengineering.stackexchange.com/q/83806>