COMPUTER COMMUNICATION NETWORKS

Department of Electronics and Communication Engineering

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TRANSPORT LAYER

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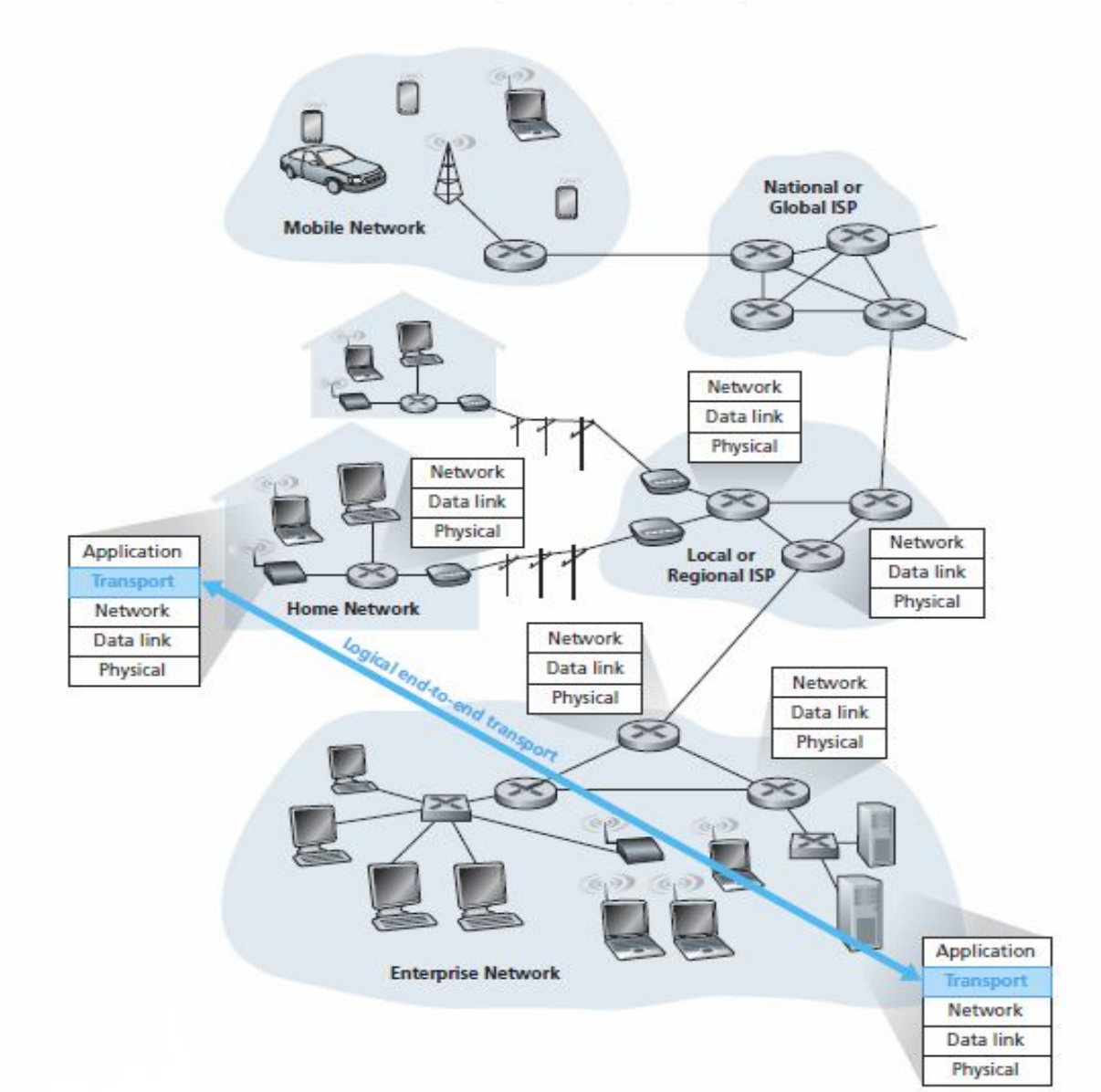
What is transport layer?

- Resides between the application and network layers
- Facilitates process communication between different hosts
- Allows multiple processes within a host to share a network interface, referred to as multiplexing and demultiplexing
- Transport layer protocols specify the format and services for an application

Transport Layer Introduction



The transport layer provides **logical communication rather than physical** communication between application processes

Relationship Between Transport and Network Layers

Transport-layer protocol - provides logical connection between processes running on different hosts

Network-layer protocol - provides logical connection between hosts

- A transport protocol can offer reliable data transfer service to an application even when the underlying network protocol is unreliable, that is, even when the network protocol loses, garbles, or duplicates packets.
- A transport protocol can use encryption to guarantee that application messages are not read by intruders, even when the network layer cannot guarantee the confidentiality of transport-layer segments.

The IP service model is a best-effort delivery service.

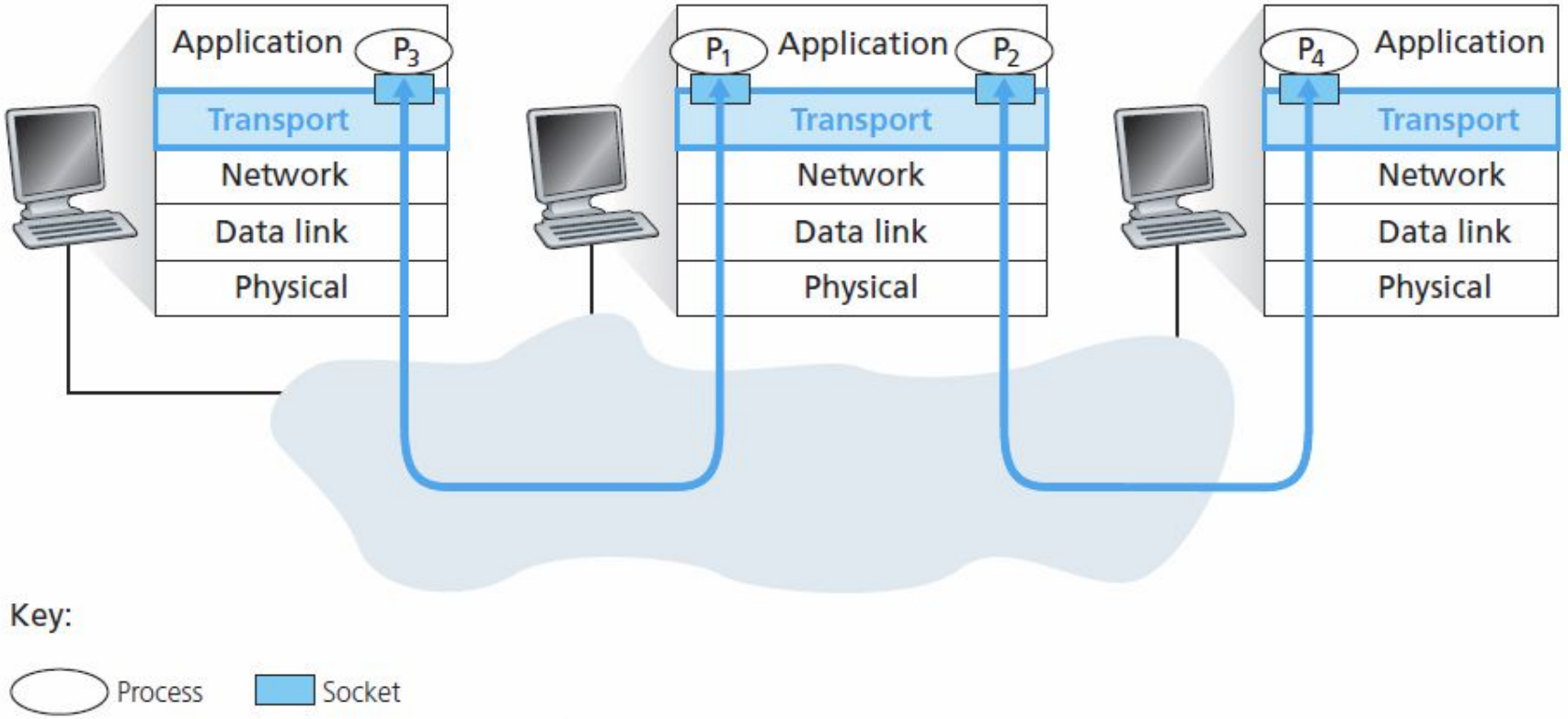
This means that IP makes its “best effort” to deliver segments between communicating hosts, but it makes no guarantees.

- It does not guarantee segment delivery
- It does not guarantee orderly delivery of segments
- It does not guarantee the integrity of the data in the segments.
- For these reasons, IP is said to be an unreliable service.

Transport-layer protocols

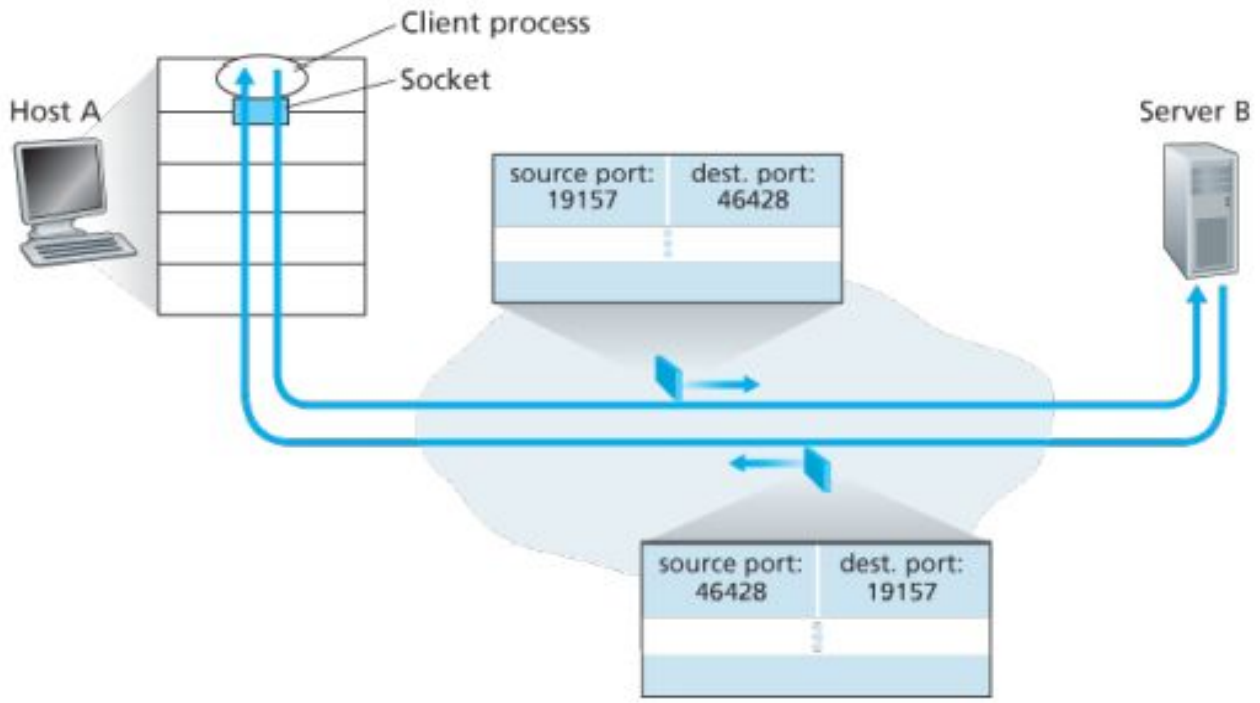
- TCP: Reliable, connection oriented service, in-order delivery
- UDP :Unreliable, connectionless service, unordered delivery

Multiplexing/demultiplexing



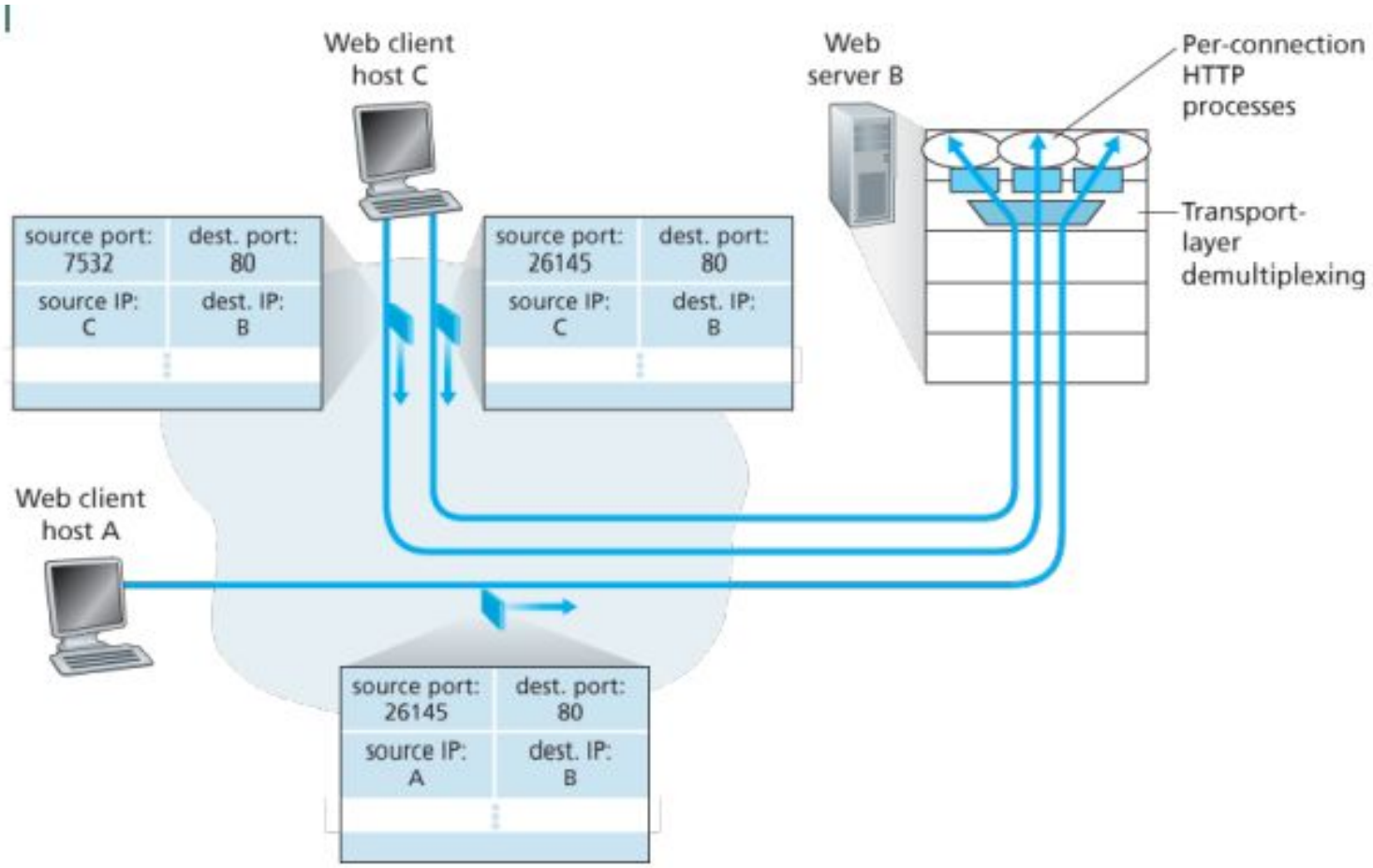
Transport-layer multiplexing and demultiplexing

Multiplexing/demultiplexing



Extending host-to-host delivery to process-to-process delivery is called **transport-layer multiplexing and demultiplexing.**

Multiplexing/demultiplexing(cont.)



Multiplexing/demultiplexing(cont.)

- At the receiving end, the transport layer examines these fields to identify the receiving socket and then directs the segment to that socket. This job of delivering the data in a transport-layer segment to the correct socket is called **demultiplexing**.

- The job of gathering data chunks at the source host from different sockets, encapsulating each data chunk with header information (that will later be used in demultiplexing) to create segments, and passing the segments to the network layer is called **multiplexing**.

Multiplexing/demultiplexing(cont.)

Transport-layer multiplexing requires

(1) that sockets have unique identifiers, and

(2) that each segment have special fields that indicate the socket to which the segment is to be delivered

Socket

- A process (as part of a network application) can have one or more **sockets**, doors through which data passes.
- Each socket has a unique identifier.
- Each port number is a 16-bit number, ranging from 0 to 65535.
- The port numbers ranging from 0 to 1023 are called well-known port numbers and are restricted, which means that they are reserved for use by well-known application protocols such as HTTP (which uses port number 80) and FTP (which uses port number 21).
- The registered ports are those from 1,024 - 49,151.
- The dynamic and/or private ports are those from 49,152 - 65,535.

THANK YOU

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