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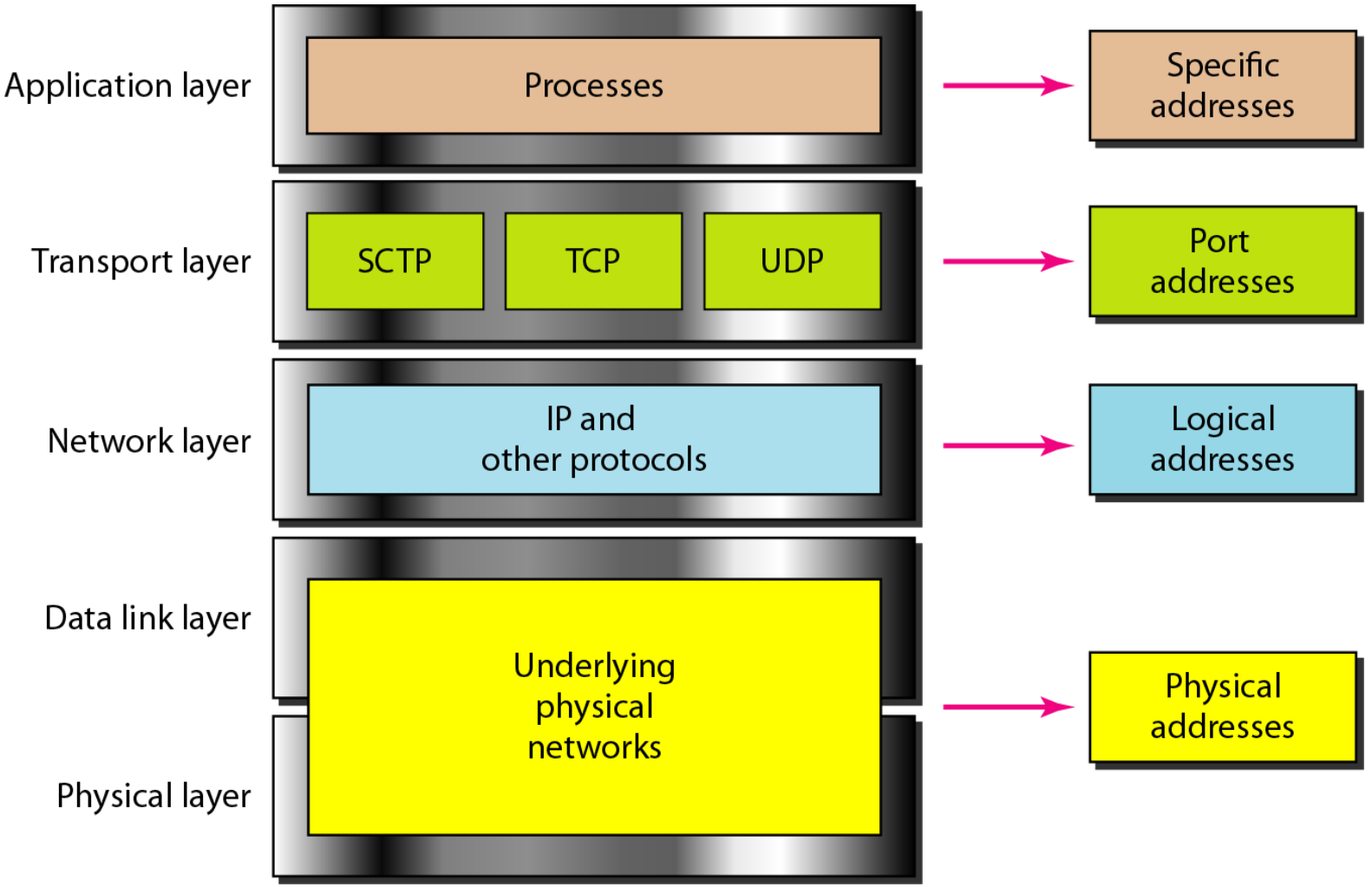
Addresses Used at different Layers in TCP/IP Protocol Suite

Relationship of layers and addresses in TCP/IP



SCTP: Stream Control Transmission Protocol
TCP: Transmission Control Protocol
UDP: User Datagram Protocol

Physical address

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- Also known as MAC (Media Access Control) address
- It is included in the frame used by the data link layer.
- Ethernet uses a **6 byte (48 bits)** physical address that is imprinted on the Network Interface Card (NIC).

07:01:02:01:2C:4B

A 6-byte (12 hexadecimal digits) physical address.

Physical address

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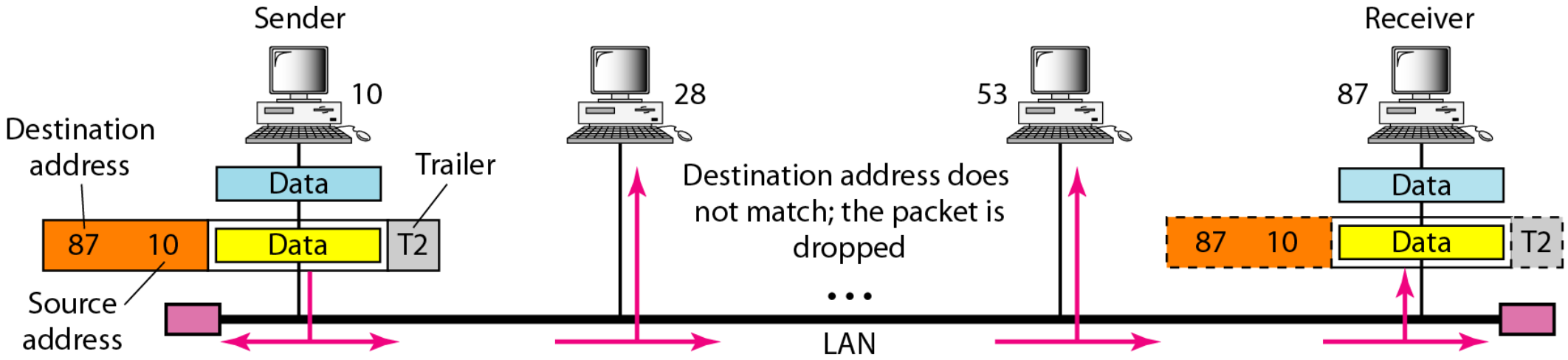
- First 3 bytes uniquely identify the manufacturer and are known as Organisationally Unique Identifier (OUI). The remaining 3 bytes identify the device itself and called as universal LAN MAC address.

Physical address example

- A node with physical address 10 sends a frame to a node with physical address 87. The two nodes are connected by a link

- As the figure shows, the computer with physical address 10 is the sender, and the computer with physical address 87 is the receiver.



Logical address

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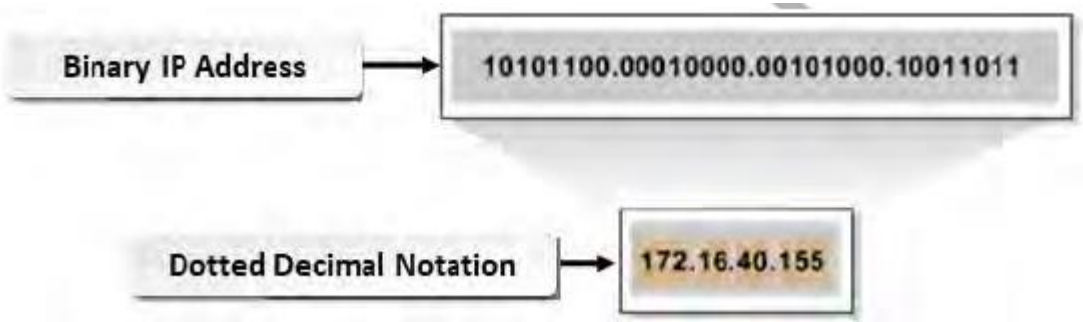
- Physical addresses are not adequate in an internetwork environment where different networks have different address formats.
- A universal addressing system is needed in which each host can be identified uniquely, regardless of the type of physical network.
- A logical address in the internet is currently 32 bit address that can uniquely define a host connected to internet.



Logical address

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IP Address Settings:- Whether you configure an IP address manually or it is automatically assigned, you need to configure the three settings

- IP address- A dotted decimal number that is unique to a network (e.g.- 192.168.1.10)
- Subnet Mask- A dotted decimal number that identifies the host and network portions of the IP address (e.g. 255.255.255.0)
- Default Gateway- A dotted decimal number of a network device that connects a host on the current network to another network (e.g. 192.168.1.1)

Port address

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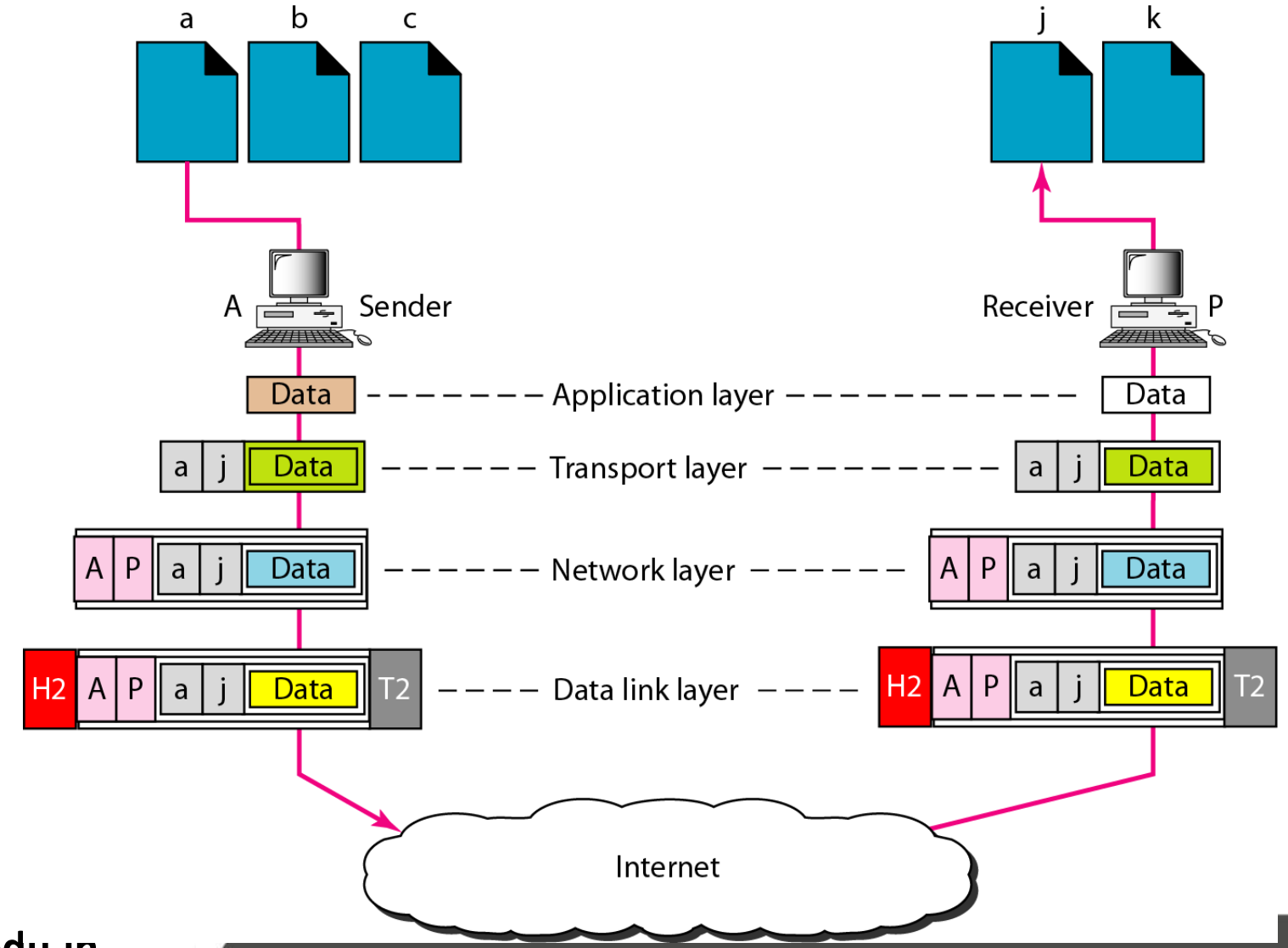
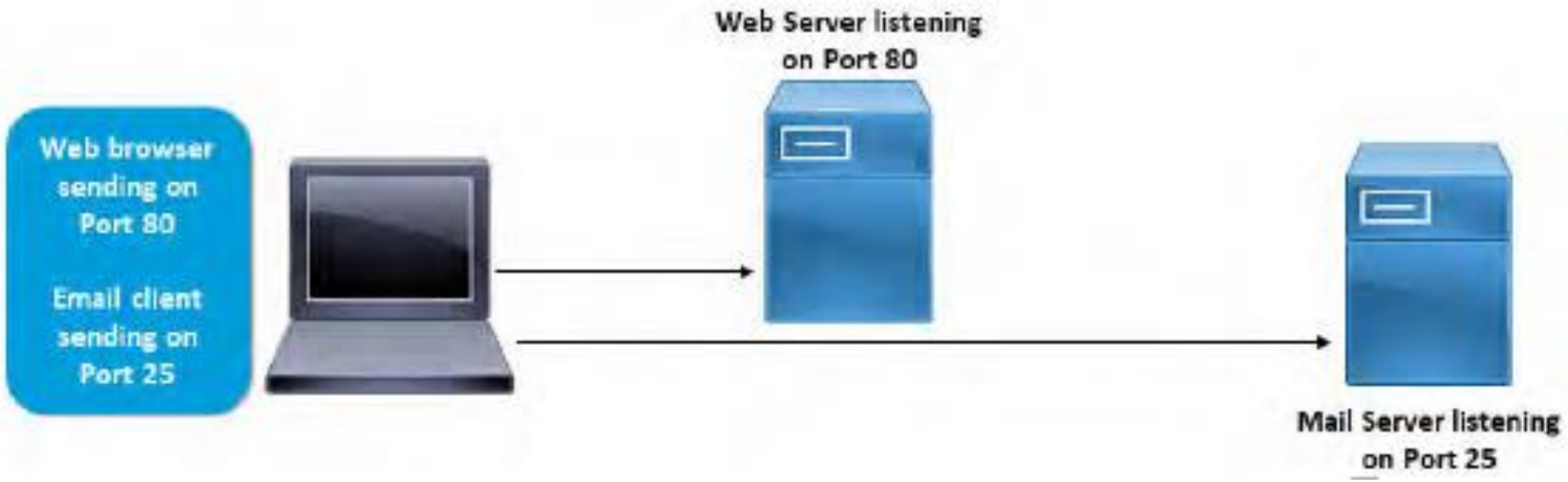
- The IP Address and the physical address are necessary for a quantity of data to travel from a source to the destination host.
- Computers are devices that can run multiple processes at the same time. For these processes to receive data simultaneously, there is need of method to label the different process.
- Function of addressing a particular process is called as port addressing.
- A port address in TCP/IP is 16 bits in length.

Port addresses example



Port addresses example



Application Specific address

- Some applications have user friendly addresses that are designed for that specific address.
- The example includes the email address (for eg. abc@xyz.com) and the universal resource locator (URL) (for eg. http://www.google.com).
- The first defines the recipient of an email and the second is used to find the information on the world wide web.