

Protocols and Data Transmission

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In a large network, the efficient management of communication is difficult due to the high volume of data traffic in the network. The network administrator can work around this problem by dividing a large network into network segments. Network segments are smaller networks that, when combined, form a large network.

Within a network, data can be transferred from one network segment to another using any of the different paths available. The transfer of data between network segments is called routing. However, routing is not supported by every protocol. Protocols are categorized as routable or non-routable based on their ability or inability to support routing.

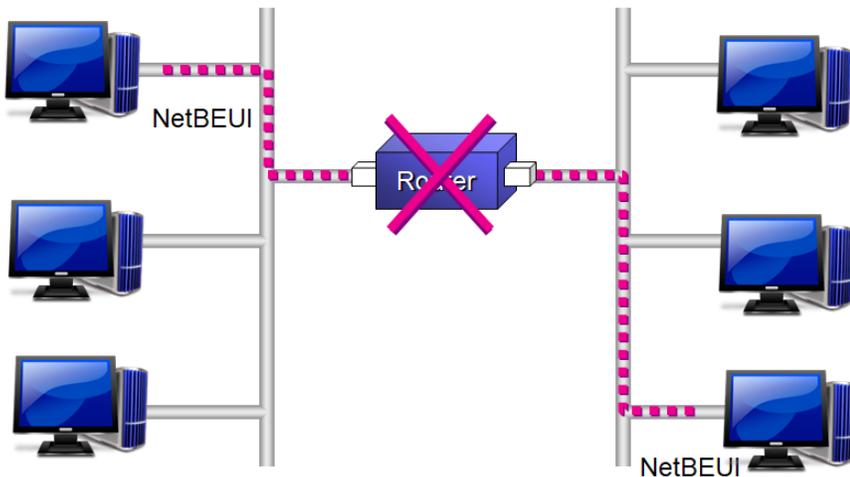
The ability of protocols to support routing allows data to be transferred between computers on different network segments.

There are different types of data transmission. The type of data transmission determines which computers in a network receive the transmitted data. Since not all computers on the network need to receive the transmitted data, you can control to some extent which computer receives and processes the transmitted data by controlling the type of transmission.

i Depending on whether they support routing, protocols can be categorized as routable or non-routable.

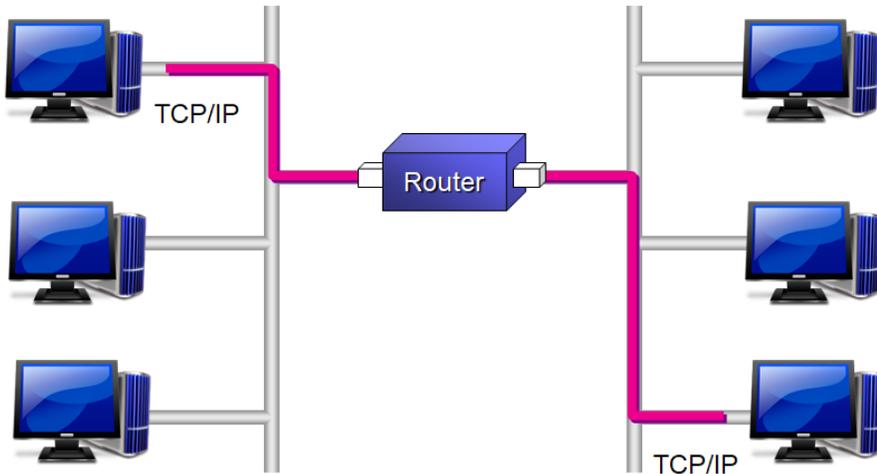
Non-routable Protocols

- Unlike routable protocols, non-routable protocols do not support the transfer of data from one network segment to another. Computers that use non-routable protocols can only communicate with other computers on the same network segment.
- NetBEUI and DLC (Data Link Control) are examples of non-routable protocols.



Routing-capable protocols

- Routing-capable protocols support communication between LANs or network segments, which can be spread over a building or a small geographical area, such as the campus of a university, or over the whole world, such as the Internet.
- Routable protocols support the transfer of data from one network segment to another via one of the different paths that connect the two network segments. Examples of routable protocols are TCP/IP and IPX/SPX.



Types of data transmission

Routing-capable protocols enable data transmission between computers in different network segments. However, a high volume of certain types of network traffic, such as the provision of multimedia applications, can affect the efficiency of the network by reducing transmission speed.

The amount of network traffic generated varies and depends on the three types of data transmission: **Unicast**, **Broadcast** or **Multicast**. To understand the impact of each type of transmission on network traffic, you need to be familiar with the characteristics of each type of transmission.

Unicast

- In a unicast transmission, a separate copy of the data is sent from the source to each client computer requesting the data. No other computer on the network needs to process the traffic. However, unicast transmissions are not as efficient when multiple computers request the same data, because the source then sends multiple copies of the data. Unicast transfers are best when the data is requested from only a small number of client computers.
- Unicast transmission is also known as directional transmission. Much of today's network traffic is unicast.



Broadcast

- When data is broadcast, a single copy of the data is sent to all clients on the same network segment as the sending computer.
- However, if the data only needs to be sent to a portion of the network segment, broadcast transmission is not an efficient transmission method because the data is sent to the entire segment whether it is needed or not. This unnecessarily reduces network performance because each client must process the broadcast data.



Multicast

In a multicast transmission, a single copy of the data is sent only to the client computers that request it. Multiple copies are not sent over the network. This reduces network traffic and allows multimedia applications to be deployed on the network without unnecessarily burdening the network. Many Internet services use multicasting to communicate with client computers.



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