

Review of Monday's Discussion

In order to detect a collision in Ethernet, you must be transmitting.

Token Ring

Overview

Aside from Ethernet, token ring is the most widely used local area network protocol

IEEE Standard: 802.5

Frame Format

There are two types of frames: the token frame, and the data frame.

1 Byte	1 Byte	1 Byte	6 Bytes	6 Bytes	> 0 Bytes	4	1 Byte	1 Byte
Start Flag	Access Control	Frame Control	Dest Addr	Src Addr	Data	FCS	End Flag	Frame Status

Access Control Byte – Has a token bit in it that lets all the stations that receive it know whether the frame is an empty token or one that contains data. More concisely, *the token bit differentiates token frames from data frames.*

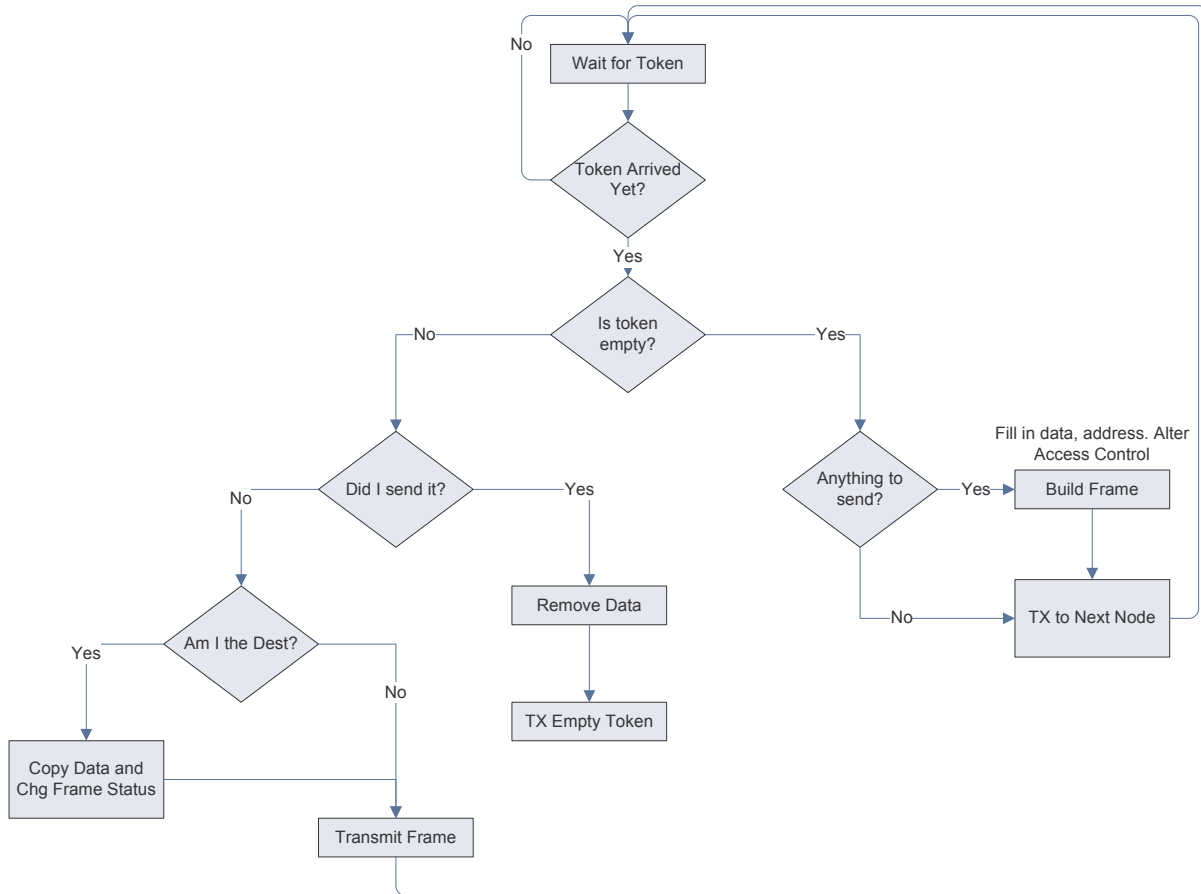
Frame Control – Specifies whether the frame's data is data or a command.

Frame Status – Tells whether or not the data was copied and the address was recognized. This is used as an ACK by the originator.

Token Frame

1 Byte	1 Byte	1 Byte
Start Flag	Access Control	End Flag

Flowchart



Utilization

Assumptions

- All nodes always have data to transmit
- Processing time at each node is negligible

The time it takes for the data frame to return to the originator is $T_{Frame} + T_{prop}$

N nodes on the Ring

All nodes are equally spaced

$$U = \frac{T_{frame}}{T_{prop} + T_{frame} + \frac{T_{prop}}{N}} = \frac{1}{1 + \frac{T_{prop}}{T_{Frame}} + \frac{1}{N} \frac{T_{prop}}{T_{frame}}}$$

$\frac{T_{prop}}{N}$ is the time to send the token to the next node.

Extending the Length of a LAN

Repeater

As you send something over a cable, the signal attenuates. A repeater simply boosts the signal back up again digitally. Noise is not amplified. It allows transmission over a greater distance. It operates only on the physical layer. It is only transmitting bits. It doesn't know what that information is.

You're gaining distance. However, when you have a longer LAN with more stations there is a greater likelihood of collisions.

5-4-3 Rule

You can have 5 segments with 4 repeaters and only 3 segments should have nodes connected to them.