DEVICES AND COMMUNICATION BUSES FOR DEVICES NETWORK–
Lesson-3: Exemplary Protocol —HDLC

Exemplary Protocol – HDLC

- HDLC (High-level Data Link Control) is a standard protocol for the data link network.

- For synchronous communication between two data link layers on a network.

Formats of bits in a HDLC frame

There are two formats Standard HDLC and Extended HDLC for 2^8 and 2^{16} destination devices or systems, respectively .

Sequence of bits in a HDLC frame

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- Frame start signaling flag bits; Compulsory- Flag bits at start are (01111110)

- Address bits for destination compulsory; 8 bits in Standard HDLC Header format and 16 bits in extended format

- Control bits Case 1: Information Frame; Compulsory as per case 1 or 2 or 3First bit 0, next 3-bits N(S), next bit $^\$$P/F and last 3-bits N(R) in standard format

Note: N(R) and N(S) = 7-bits each in extended format. Explained later.

- Control bits Case 2: Supervisory Frame; First two bits (10), next 2-bits# RR or RNR or REJ or SREJ, next bit P/F and last 3-bits N(R) in standard format.

Note: N(R) and N(S) = 7-bits each in extended format

- Control bits Case 3: Un-numbered Frame; First two bits (11), next 2-bits ^M, next bit P/F and last 3-bit remaining bits for M. [8-bits are immaterial after M bits in extended format]

- Data bits; Compulsory; m frame bits transmitted; Each bit is at the serial line for time ΔT or, each frame is at the line for time $m.\Delta T$. [Note: Five consecutive 1s when present, then one additional 0 is stuffed in the data. This is to distinct the data from the start and ending bytes at the header and at the end. Number of frame bits extend.]

- FCS (Frame Check Sequence) bits; Compulsory; 16 bits in standard format and 32 in extended format

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- Frame End flag bits; Compulsory; Flag bits at end = (01111110)

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Notes

P/F when 1 then it means a primary (command) device is polling a secondary station. Polling means to detect through an acknowledgement from that; when 0 then receiving device has no data to transmit; it is just responding.

N(R) sequence number of frame received earlier from a device to which this HDLC frame is being sent

N(S) sequence number of frame sending now to that device

This facilitates indirectly an acknowledgement of the past in the new frame sending now.

RR- A message in control bits in case 2, which conveys 'Receiver Ready'

RNR - 'Receiver Not Ready'

REJ – Reject (Sent when a message rejects). Note there is no Accepted message as HDLC follows negative ACK protocol method. Like a child, who cries when milk not received, if given no need to cry!

SREJ – 'Selectively Reject' Frame received out-of-sequence, repeat suggested.

Summary

We learnt

Formats and sequences of bits

In HDLC protocol

End of Lesson 3 of Chapter 3