GraCaSI Standards Advisors

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The case for removing half duplex.

Insert objectives here

IEEE P802.3de Objectives

- Enable use of the 10BASE-T1L point-to-point full-duplex PHY with Clause 99 MACMERGE
- Require no changes to PHYs, Clause 4/ Annex 4A MAC, or MAC/PLS Interface
- Enable use of the 10BASE-T1S PHY with Clause 99 MAC Merge in both half-duplex and full-duplex point-to-point modes.

What is Half Duplex Ethernet?

By definition: CSMA/CD

A Statistical Multiplexer

The revolution driven by Ethernet was replacing the low speed dedicated point-to-point channel With:

A single high speed multipoint shared bandwidth channel that has GEOGRAPHICALLY DISTRIBUTED statistically shared access with NO central controller.

What is Full Duplex Ethernet?

Two separate and independent dedicated bandwidth packetized channels, one transmit, one receive .

All multiplexing (statistical, round robin or ??) is done above the MAC in the MAC Client (e.g/ a bridge/switch) There are 2 limited exceptions to this: MAC Flow Control (seldom used, not considered) -and-MAC MERGE aka Interspersing Express Traffic (IEEE Std 802.3br-2016)

Half Duplex vs TSN & MAC Merge

So the question on the table is: Should we include HALF DUPLEX in our project?

Since our project is a Point-to-Point Link (formally a "Link Segment") AND We don't have REPEATERS any more. The only possible reason for a half duplex point-to-point link is economy of implementation.

Half Duplex vs TSN & MAC Merge

Should we include HALF DUPLEX in our project?

The issue that I have been asked to address here is what effect a half duplex link will have on TIME SENSITIVE NETWORKING especially in a MAC MERGE context

What is MAC MERGE?

MAC MERGE provides the ability to interrupt a packet while its bits are being transmitted to insert a higher priority packet on the wire.

(i.e., the high priority packet is SO IMPORTANT that it can't wait for the other packet to finish.)

What is MAC MERGE? (2)

The high priority packet is SO IMPORTANT that it can't wait for the other packet to finish.

That means:

If the link itself won't support that requirement: i.e. Start xmission in less than 1 packet time, then there is no point to having a MAC MERGE next layer.

How does MAC MERGE work?

There is a special "Y" shaped MAC with 2 Upper Layer interfaces (Normal & Hi Priority).

Loading the Hi Priority MAC interrupts and suspends the current transmission if the normal MAC is transmitting in order to transmit the Hi Priority packet.

If the link is full duplex then packets coming the other way have no effect.

How does MAC MERGE work?

There is a special "Y" shaped MAC with 2 Upper Layer interfaces (Normal & Hi Priority). Loading the Hi Priority MAC interrupts the current transmission if the normal MAC is active.

If the link is half duplex, packets coming the other way CAN block any xmission w/o regard to priority resulting in CSMA/CD delays possibly longer than Td-mac merge max Packets coming the other way are not interruptable under the rules of Ethernet (late coll.)

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