10SPE - Study Group :
Reflections of AdHoc Chair - September 2016

Peter Jones - Cisco

Some areas the SG has covered

Application overviews:

Industrial Automation and Emerging Single-pair Ethernet (Discrete, Process, Batch/Hybrid)

Use cases for the Process Automation/Process Industry Requirements

Automotive Requirements for 10SPE

10BASE-T1 for Connected Lighting

Consideration of requirements for Link Segment definition

Some areas the SG has covered (cont.)

Total system cost thoughts

Goal from Auto Industry - < 50% of 100BASE-T1 system.

Need to consider switch, endpoint, cabling, etc.

What are cost needs from other Application Areas. Can we quantify this (apart from "low cost").

Installed base cable vs new systems – media and topology

Re-use of installed industrial cable base means targeting some subset of installed base.

Reusing currently defined cabling/connectors in auto imposes some limitations.

Some areas the SG has covered (cont.)

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Areas with emerging consensus.

- BER

  Industrial says 10^-9 meets need and is consistent with existing 10/100M Ethernet (Aug 24th).

  Automotive wants 10^-10.

  Settle on 10^-10 ☺

- Duplex - Full duplex meets needs, half duplex not required.

- Inline connectors, common need, number varies by application from 4 (Automotive) to 9 (Industrial).

- Fast link up time – How fast? With Power? Cold start vs failure recovery?

Areas with clear consensus.

- Support a speed of 10Mbit/s at the MAC/PLS service interface.

- Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface.

- Preserve minimum and maximum frame size of the current IEEE 802.3 standard.
    - Current Ethernet min/max frame size meets 10SPE needs (Aug 24th).

- Optional Autoneg between 10/100/1000 BASE-T1 required for some applications.

- Optional provision of power over the media. By application:

    - power level

    - classification/negotiation

Areas with open questions

- ## Media Topology & services

  Point to Point is required.

  What about multipoint/multidrop (bus, ring, star, tree, etc) at the MAC/PHY layer?

  > Above the MAC/PHY, this can be assembled from PtP links and relay functions
  >
  > If MAC/PHY is not PtP, then we need protocols to deal with media contention

  Redundancy/Resiliency - handle in MAC/PHY or above MAC?

  > 802.1 TSN & similar protocols already address this above the MAC, why should we redo this?

  Deterministic Transmission control - handle in MAC/PHY or above MAC?

  > 802.1 TSN & similar protocols already address this above the MAC, why should we redo this?

  Interworking with other Ethernet media (e.g. across standard MMF/SMF links)

Areas with open questions (cont)

- ## Reach objectives

  We have seen presentations for reaches including 15m, 40m and 1200m. These all seem to be "compound links" , what do we put in our objectives?

  - List only the lowest and the highest and let the TF figure out the right divisions?
  - Define one or more PHYs to support link segments that range from "up to at least 15 m reach" to "up to at least 1200 m reach".

- ## How many PARs/PHYs/TFs

  I see many overlaps in the application space, and history shows that reusing technology for adjacent applications can be very successful (e.g. 100BASE-TX).

  The smaller the number of PARs/PHYs/TFs we have, the more leverage and efficiency we can get as an industry.

Areas with open questions (cont)

- Coding vs channel considerations – SG needs to understand key requirements and basic feasibility, not chose the coding.

  Latency for PHY vs full system.

  Latency vs cost & channel

  EMI environmental

- Network construction and life cycle – not explicitly discussed

  Auto – life of network == life of car -> *no* inplace upgrades

  Industrial – has both:

  life of network == life of equipment -> *no* inplace upgrades – e.g., Process Automation "Skids"

  life of network << life of equipment -> inplace upgrades over life of equipment

- Optional MDI definition?

  The need for a standard MDI is related to network construction and life cycle

  Highly desirable in many environment to enable mix & match in converged networks that serve more than one need. RJ45 has served us well!!.

  Maybe a couple of options for different environmentals (like RJ45 and IP67/M12)

Thank You!

IEEE 802.3 10SPE Study Group – September 2016, Fort Worth, Texas

Backup

Areas for the SG

Area	Topic	Status
Application overviews:	Industrial Automation and Emerging Single-pair Ethernet	Discussed, more needed?
	Use cases for the Process Automation/Process Industry Requirements	Discussed, more needed?
	Auto Industry	More needed?
	Building Automation	Needed.
	Lighting Control	Discussed, more needed?
Power Requirements	Low power devices (<2w)	Discussed
	Mid Power Devices (<30w)	Needed
	High Power Devices (>30w)	Discussed, more needed.
Reach and Cable basics	Long Reach Industrial, installed base, new installs – 1200m	Discussed, more needed.
	Auto/Transport (15/40 m)	Discussed, more needed.
	Building Automation reach, installed base, new installs	Discussed, more needed.
	Lighting – 1000 ft	Discussed, more needed.

Areas for the SG

Area	Topic	Status
Application Cross Overs	15m Automotive & Industrial In-cabinet	Open
	40m Transport and Industrial Work Cells	Open
	Topologies – Star, ring, linear, trunk/spur, etc	Open
	10BASE-T1 to 100/1000 BASE-T1 autoneg?	Discussed.

End

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