

About length

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Length is easy to market with!

- Everyone understands a measuring tape!
- Length often is used in “distinct identity” statements
- BUT... for any length, reach varies with:
 - Gauge – insertion loss & resistance (for powering)
 - Construction (twist & insulation) – propagation delay
 - Construction (balance & shielding) - noise levels

Length in IEEE Std 802.3

- In objectives:
 - “Define performance characteristics of a mixing segment for 10Mb/s multidrop single balanced pair networks supporting up to at least 16 nodes, for up to at least 50m reach.”
 - ***NOT PART OF THE STANDARD!***
 - Used by experts as part of the 802.3 WG ballot process to see if the project is meeting its goals
- In general descriptive text:
 - “Additionally, the 10BASE-T1S PHY may operate using half-duplex communications on a mixing segment using a single balanced pair of conductors, interconnecting up to at least 8 PHYs to a trunk up to at least 25 m. PHYs may be attached in-line with the trunk or at the end of stubs with a length of up to 10 cm.”
 - **OFTEN INTRODUCTORY, NOT A REQUIREMENT OR A LIMITATION!**
- Or specific example text:
 - “The example trunk comprises TBD m of 1.02 mm (18 AWG) 100 Ω cabling”
 - **HAS ADDITIONAL INFORMATION TO WHICH MEETS SPECIFIC REQUIREMENTS**

NOT in Requirements Text – WHY NOT?

- PHY operation depends on electrical parameters
 - For example: we specify Insertion loss, Loop resistance and Delay
- Requirements specify when a compliant PHY **MUST** work
 - By definition, a compliant PHY **MAY** work in other conditions
- Dependency of electrical parameters on length of cabling means a detailed specification of the cabling components (i.e., gauge, twist, propagation velocity)
 - Physically specifying the cable in 802.3 limits the application of 802.3
 - Lengths associated with Ethernet (e.g., 100m) are often the result of cabling standards specifying these parameters...

Why mention length at all?

PRO

- It is easy to understand
- It can be related to a physical floorplan
- Specific length examples can be related to physical to electrical requirements
 - Length shows a relatable application example

CON

- It is easy to misunderstand
 - The non-expert reader doesn't understand what is descriptive and what is required
- Supported length may vary
 - Floorplanning is more complex than just distance – gauge, construction, cable type matters
 - What length matters? Delay? Insertion Loss? Resistance? Linear feet?
- Specific topologies confuse more
 - Leads to misunderstanding that those topologies are the requirements

Recommendation

- Avoid any reference to reach, except in SPECIFIC examples, clearly called out as examples.
- If reach is mentioned, make it clear that it is not a requirement, only an application example.

THANK YOU!