Impact of LAN Standards on Cabling Deployment

This presentation will review some recent local area network (LAN) standards and projects, and comment on their potential effects on cabling deployment in LANs listing key factors that may determine the impact deployment.

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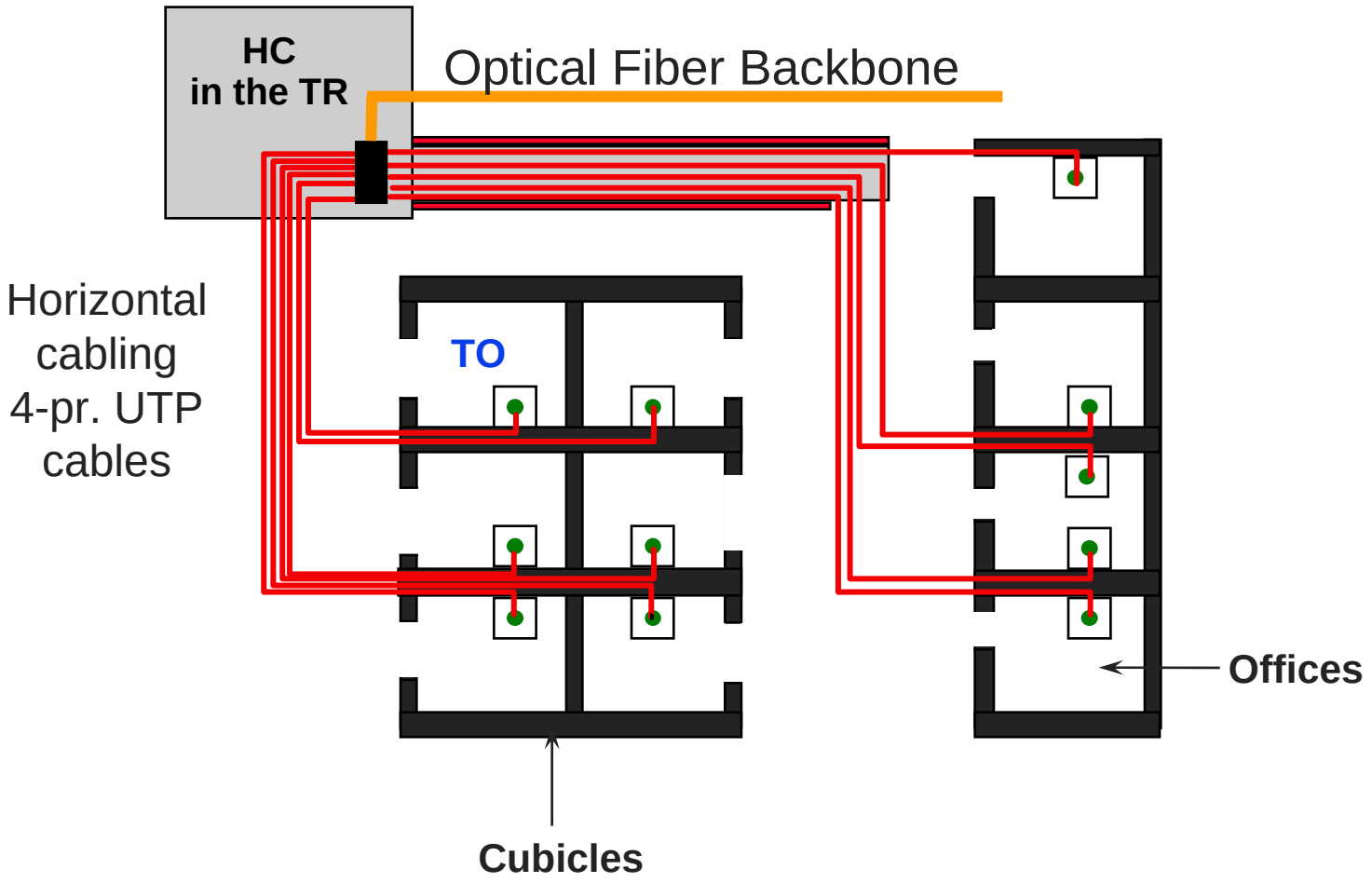
Telecom Enclosures

- **Who?**
  - TIA TR-42: User Premises Telecommunications Infrastructure
- **What?**
  - Two documents define and allow “telecommunications enclosures” (TE) or “tiny TRs”
  - 569B (Pathways and Spaces) and 568B.1 Add5 (Telecommunications Enclosures)
- **When?**
  - Addendum 5 published in February
  - 569B was released for publication, but has been held by ANSI review

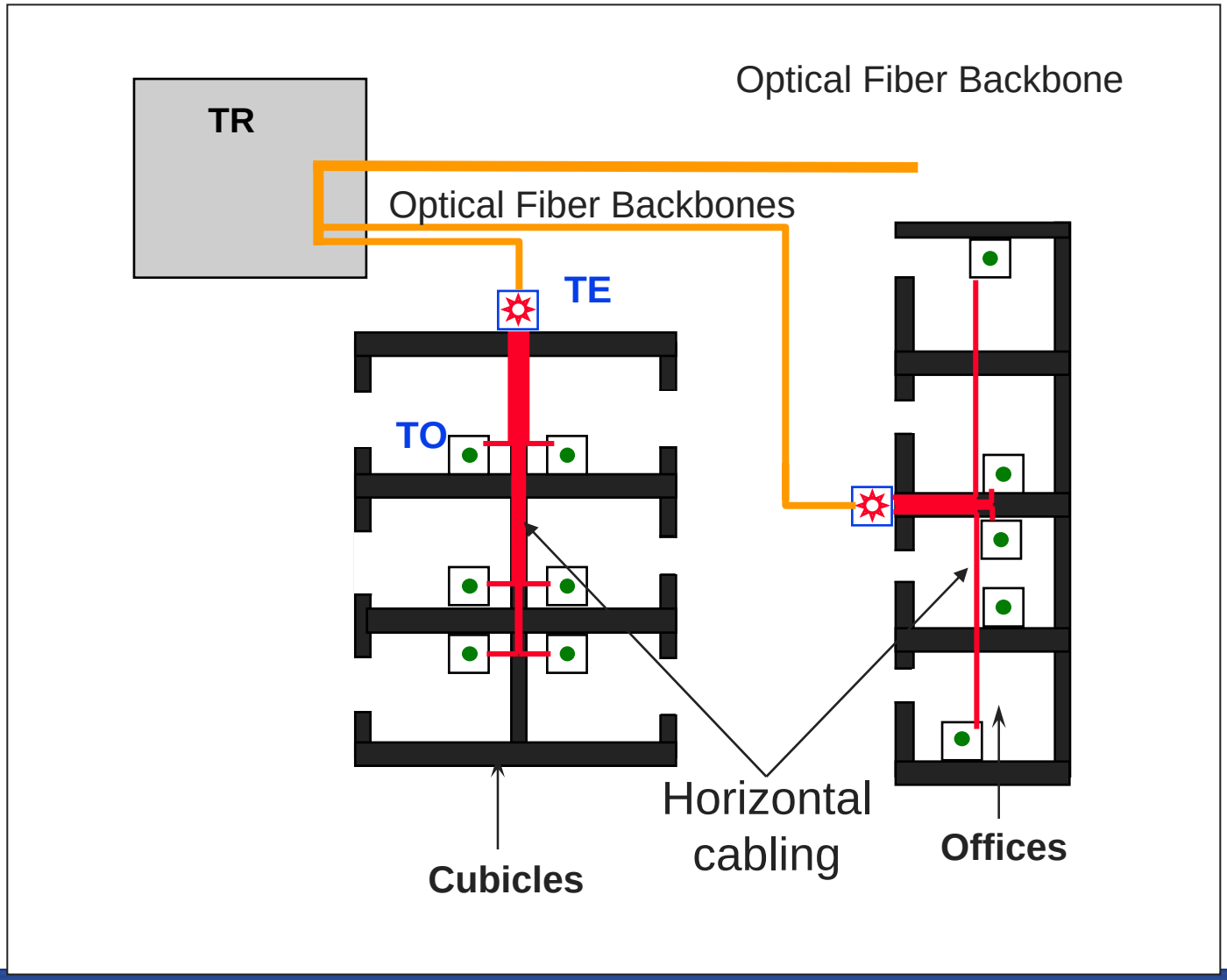
Telecom Enclosures

- **How?**
  - Enables fiber runs further into the horizontal (more fiber) and can result in shorter twisted pair cabling runs (less copper)
  - Smaller spaces instead of additional telecommunications rooms for small areas

Traditional Horizontal Cabling



TE Implementation Concept



Telecom Enclosures

- **Key Factors**
  - Not a recommended topology, but allowed for special implementations
    - Educational facilities are early adopters
  - May have larger effect on cabinet and furniture manufacturers than on cable
  - Easily and often confused with an active CP or active work area outlet implementation – neither of which are covered by the standards
  - Possible negative impact on copper deployment, positive impact on fiber depolyment

Data Centers

- **Who?**
  - TIA TR-42: User Premises Telecommunications Infrastructure
- **What?**
  - A cabling standard for data center and storage area network (SAN) types of premises (to be TIA-942)
- **When?**
  - Publication possible in October 2004, but more likely in February 2005

Data Centers

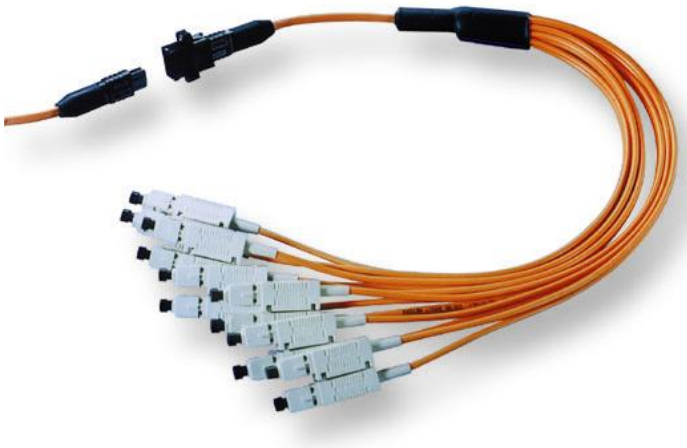
- **How?**
  - High data rates and throughput requirements have supported use of fiber
  - Allows media selection based on application and distance requirements – not on “hard” distance benchmarks
- **Key Factors**
  - Current draft:
    - Recommends 850nm LO 50-micron for fiber and Category 6 for UTP
    - Allows 300m pull-through distance for centralized fiber implementation
  - Possible positive impact on fiber deployment

Array Connector Polarity

- **Who?**
  - TIA TR-42: User Premises Telecommunications Infrastructure
- **What?**
  - 568B.1 Addendum 7
  - Explains polarity (TX→RX) for array-type connectors (ex: MPO)
- **When?**
  - Project has started with estimated completion in June 2005

Array Connector Polarity

- **How?**
  - Document would allow and describe the appropriate use of array-type connectors in LAN cabling networks
  - Promotes the use and image of fiber as a high-density solution



Array Connector Polarity

- **Key Factors**
  - Opens the door for use in other types of premises standards (ex: data center, commercial building)
  - Possible positive impact on fiber deployment

568C

- **Who?**
  - TIA TR-42: User Premises Telecommunications Infrastructure
- **What?**
  - Third revision to commercial building cabling standard
- **When?**
  - Project has started
  - Estimated completion in June 2006

568C

- **How?**
  - Three current documents to become four
    - (New) 568C.0 Generic Structured Cabling
    - 568B.1 → 568C.1 Commercial Building Cabling
    - 568B.2 → 568C.2 Copper Cabling
    - 568B.3 → 568C.3 Optical Fiber Cabling

568C

- **How? (continued)**
  - Project opens the door to debate several topics
    - Recommended connector types
    - Recommended fiber types and copper cable categories
    - New media types (coaxial, plastic fiber, etc.)

568C

- **Key Factors**
  - Changing connector types may increase the performance capabilities, but create economic concerns for manufacturers
  - Recommending new media types may increase uncertainty, elevate discomfort and reduce acceptance
  - Too early to tell – may have a net positive effect on fiber deployment and net negative impact on copper deployment

Electronic Dispersion Comp.

- **Who?**
  - IEEE 802.3aq
- **What?**
  - A project (10GBASE-LRM) to develop a 10G solution for FDDI-grade multimode fiber at a lower cost than 10GBASE-LX4
- **When?**
  - Task group has been authorized and has started working with goal to finish in 2006

Electronic Dispersion Comp.

- **How?**
  - Uses electronic dispersion compensation to overcome legacy fiber limitations
  - Empowers installed fiber - not a driver for new fiber
- **Key Factors**
  - What distances will be supported
    - Looking at 220m, but pressure to get 300m
  - How distances affect cost
  - Use of mode conditioning patch cord
  - Possible negative on new fiber deployment

10G on Twisted Pair Cable

- **Who?**
  - IEEE 802.3an
- **What?**
  - A 10G application for twisted-pair copper cables (10GBASE-T)
- **When**
  - Task group has been authorized and is working with completion projected in mid-2006

10G on Twisted Pair Cable

- **How?**
  - Until recently, 10G Ethernet was strictly a fiber application
  - 10GBASE-CX4 changed that (15m max) over coaxial cable (twinax)
  - Now 10GBASE-T getting a lot of press, development and attention
  - No current project in IEEE for higher data rates on fiber

10G on Twisted Pair Cable

- **Key Factors**
  - Distance capability
    - 100m on ISO Class F (no Category 7 in TIA)
    - 55m or more on Category 6
    - 100m on “Augmented” Category 6 (not yet defined)
  - “Treadmill”
    - Yet another copper category (Cat 6 like Cat 4?)
    - Yet another parameter: Alien Crosstalk
  - Application spaces
    - Data centers and backbones limited to 100m
    - Horizontal?
  - Too early to tell: possible initial negative impact on copper deployment

DC Power on TP Cable

- **Who?**
  - IEEE 802.3af
- **What?**
  - A published standard allowing limited power and data over twisted pair data cabling (DTE over MDI)
- **When?**
  - Published in June 2003

DC Power on TP Cable

- **How?**
  - In a toss-up between copper and FTTD, tilts the scales towards copper
  - No fiber option except composite cables
  - Ties in neatly with VOIP and wireless as well as security and remote devices
- **Key Factors**
  - Limited in data rate...for now...
  - Possible positive impact on fiber deployment, positive impact on copper deployment

Wireless

- **Who?**
  - Primarily in IEEE 802.11
  - TIA TR-42 creating TSB on cabling infrastructure to support access points (APs)
- **What?**
  - Application standards allow use of free-space radio frequency communication instead of communication via cabled media
- **When?**
  - Several wireless application standards have been created (802.11a, 802.11b, 802.11g); additional projects have started as well

Wireless

- **How?**
  - Primarily replaces horizontal cabling, which is predominately copper
  - Competing technology to fiber-to-the-desk installations
- **Key Factors**
  - For DTE power, fiber to the WAP is unlikely
  - Overlay technology could drive higher bandwidth demand in backbone – positive for fiber
  - Competes in the horizontal – negative for copper
  - If AP cabling additive, then positive for both

Limited Combustible Cable

- **Who?**
  - National Fire Protection Agency (NFPA) 70: National Electric Code®
  - NFPA-90A: Standard for Installation of Air-Conditioning and Ventilating Systems
- **What?**
  - Proposals had been made to NFPA-70 to allow “air duct cable”
  - “Limited combustible” would be allowed to be placed in any plenum space, even without sprinkler systems
  - Proposals made in NFPA-90A to allow today’s plenum cable IF the ceiling space and occupant space have sprinkler systems
  - NFPA-70 is told to accept what comes out of NFPA-90A
- **When?**
  - NFPA-90A is still up in the air (conditioning for acceptance)
  - Could end up as a Tentative Interim Agreement (TIA) and placed in the 2005 NEC as early as Late 2005 (December??)

Limited Combustible Cable

- **How?**
  - Passage of this proposal through NFPA-90A will build case for limited combustible cable
  - Balance cable and sprinkler costs
  - Could force complete development of plenum-rated fiber cables
  - Approval of limited combustible cable will cause cable cost to rise
    - understood to be 50% increase (although some estimates are up to 10 times increase)
  - Possible negative impact on copper deployment if price gets too high – empowers the installed base

Conclusion

- **Standards alone are not sufficient, but can have an impact on cabling deployment**
- **Over the past 15 years, there have been some significant strides in making optical fiber a more attractive LAN media through standards (centralized cabling, etc.)**
- **Several recent standards activities will have an impact on copper cable deployment**