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Marketplace Requirements

802.3ah P2P Copper Solution



Co-Sponsors of This Presentation

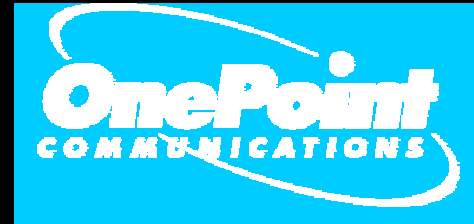
To Be Updated



Introducing Verizon Avenue a combination of Verizon, and OnePoint Communications



+



Verizon Avenue

A Fortune 10 company, Verizon Communications is the largest provider of wireline and wireless communications in the United States. Verizon Avenue, a wholly owned subsidiary of Verizon Communications, focuses exclusively on the multi-housing and multi-tenant office markets.



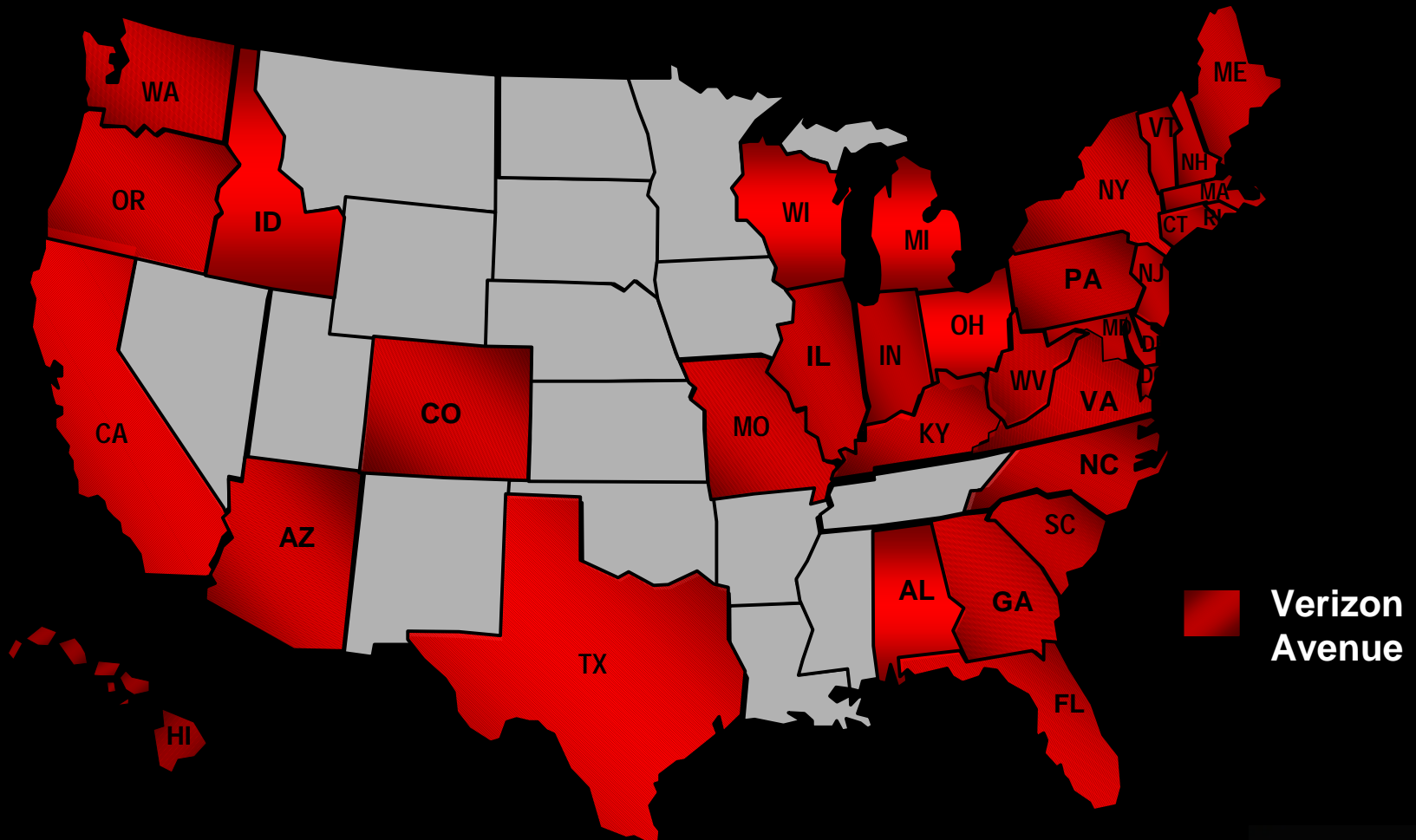
Verizon Avenue is the industry MDU leader serving over 690,000 units today

We offer a superior bundle of services to residents in apartments, condos, and co-ops

- Voice
- DSL
- IP Services
- VOD (Future)



Verizon Avenue's national reach includes 34 states



Verizon Avenue HSIS Service Model

Residential MDU Service Only

- Provide Service Using Today's Technology
- Use Existing Infrastructure Wherever Possible
- Allow For Feature Expansion

Minimize Cost

- Facilities (Ongoing Cost)
- Equipment (At Property)
- Provisioning
- Installation

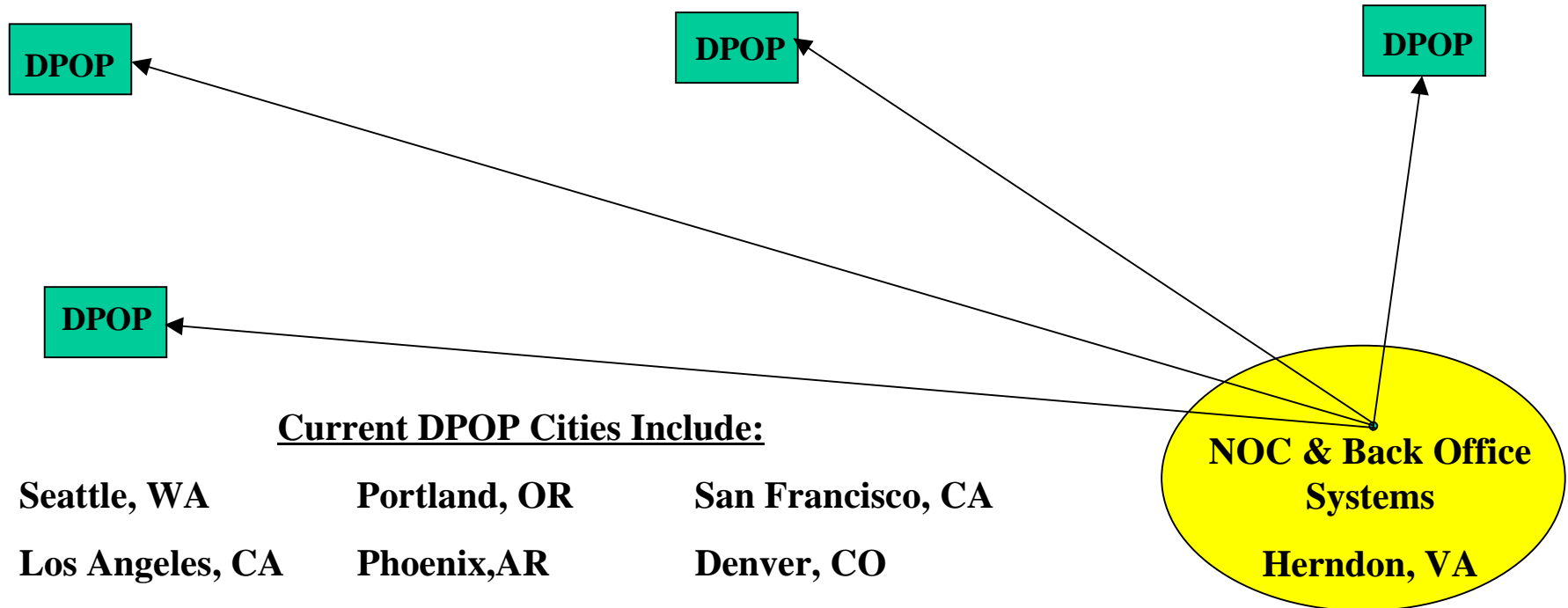


Verizon Avenue Challenges & Concerns

- MDU Property Size (<200 to >1200 units)
- MDU Property Type (Garden or High Rise)
- MDU Property Location (Distance from POP)
- Telephone Infrastructure?
- Centralized or Distributed Construction
- Data Infrastructure?
- Facility (T1) availability and cost



VA Centralized Management Network (Frame Relay with Internet Fallback)

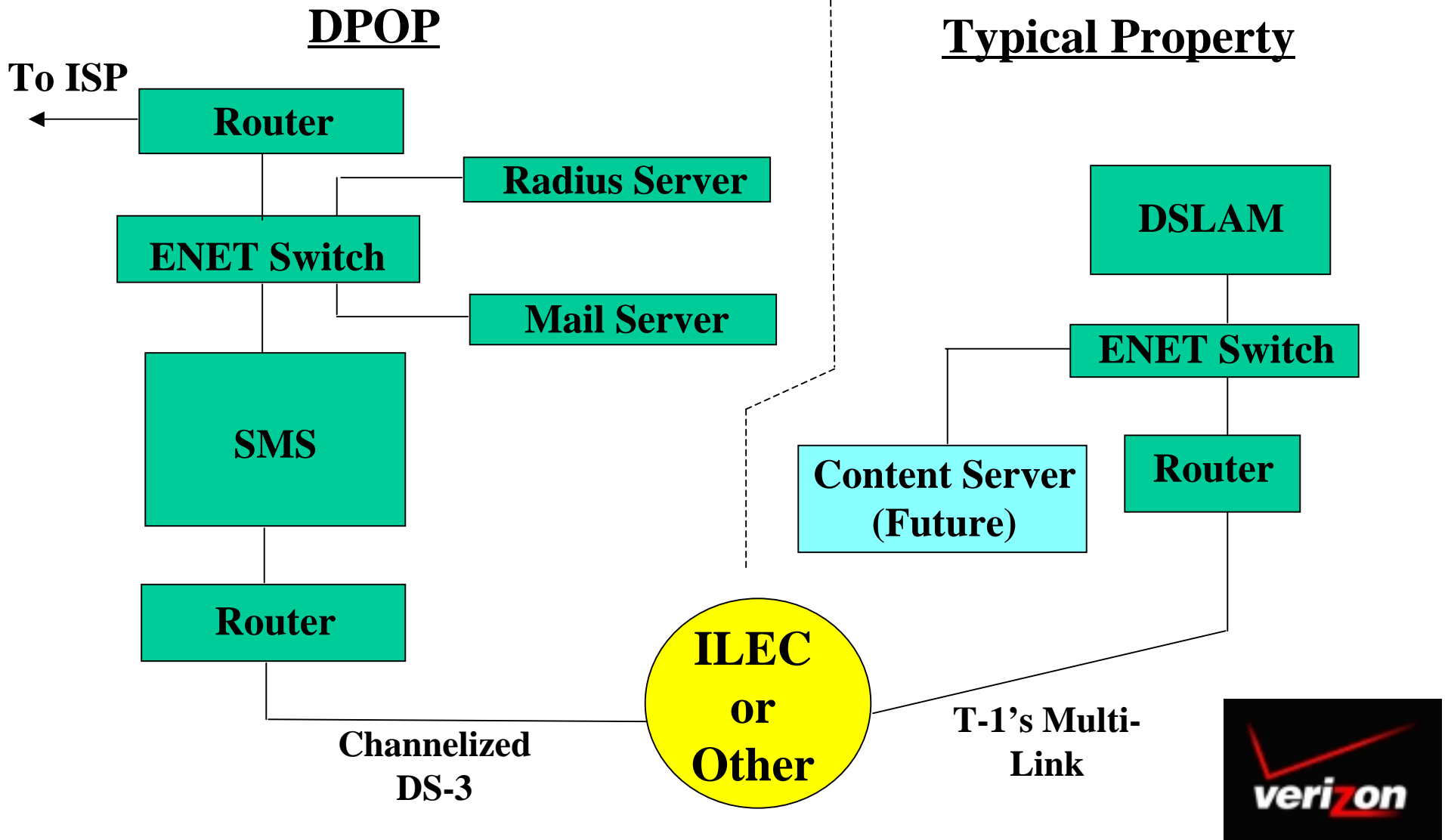


Current DPOP Cities Include:

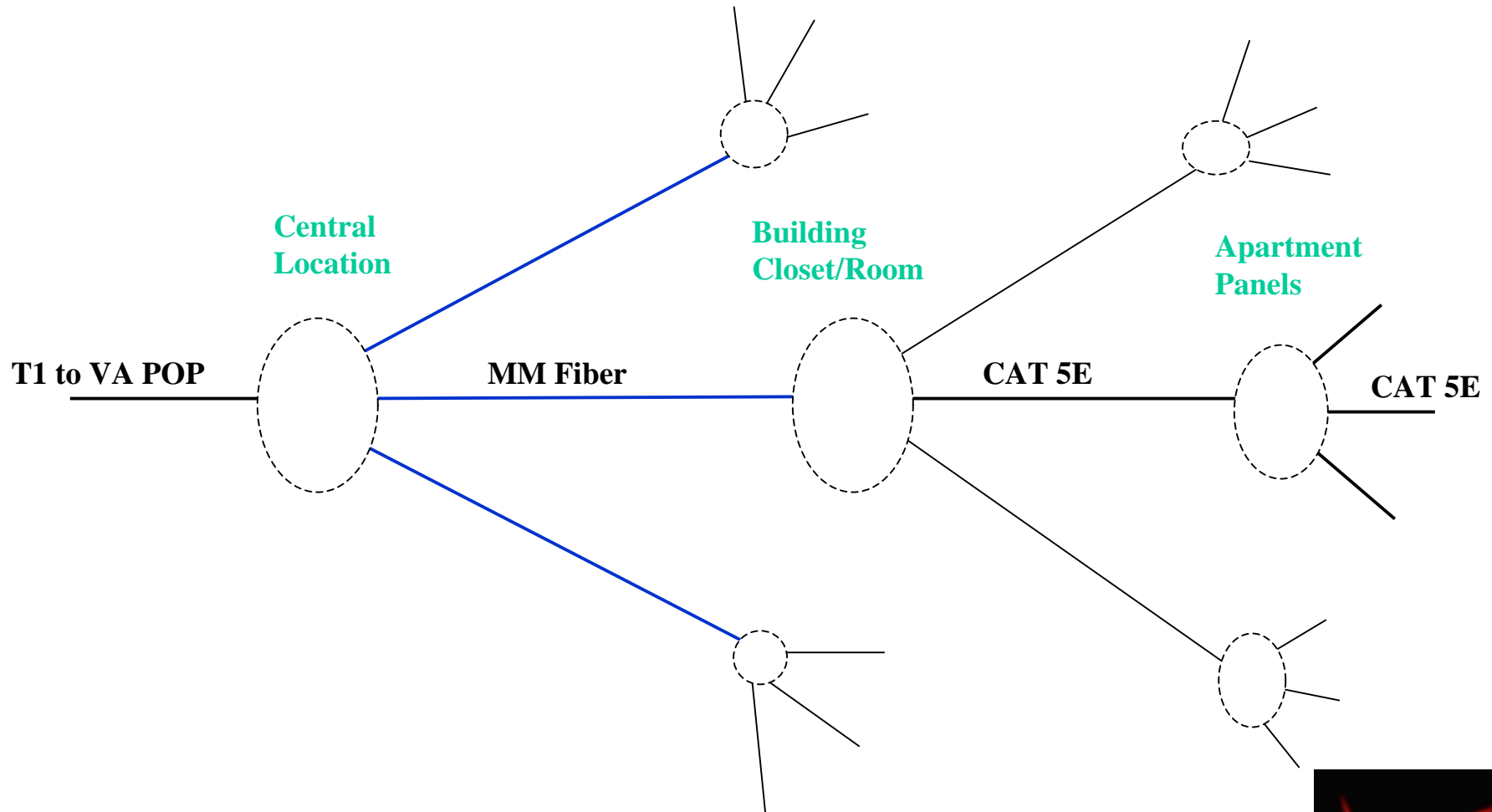
- | | | |
|------------------|-------------------|-------------------|
| Seattle, WA | Portland, OR | San Francisco, CA |
| Los Angeles, CA | Phoenix, AR | Denver, CO |
| Dallas, TX | Chicago, IL | Cincinnati, OH |
| Cleveland, OH | Vienna, VA | Ashburn, VA |
| Baltimore, MD | Atlanta, GA | Tampa, FL |
| Philadelphia, PA | New York City, NY | Boston, MA |
| Manchester, NH | | |



VA City Network Architecture



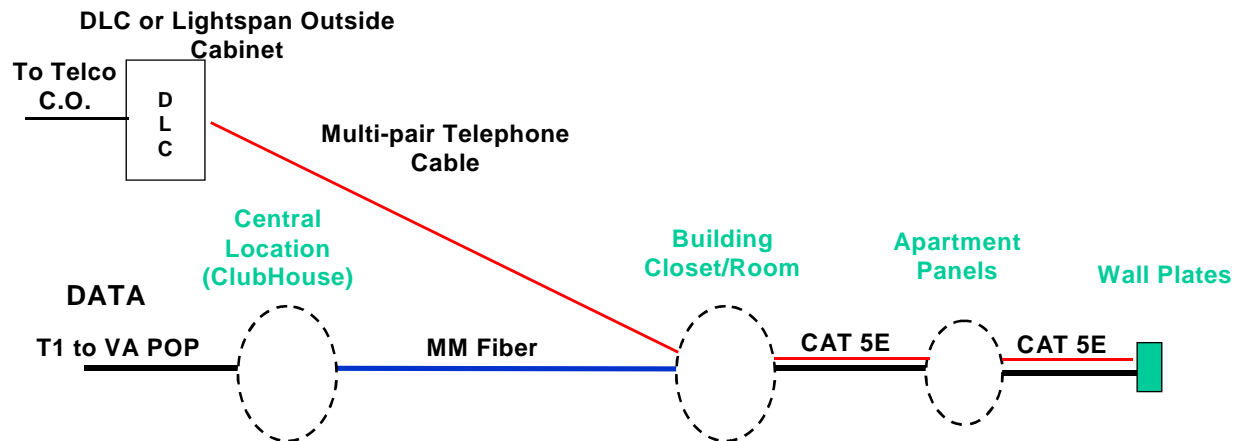
Star - Star - Star Data Infrastructure Configuration



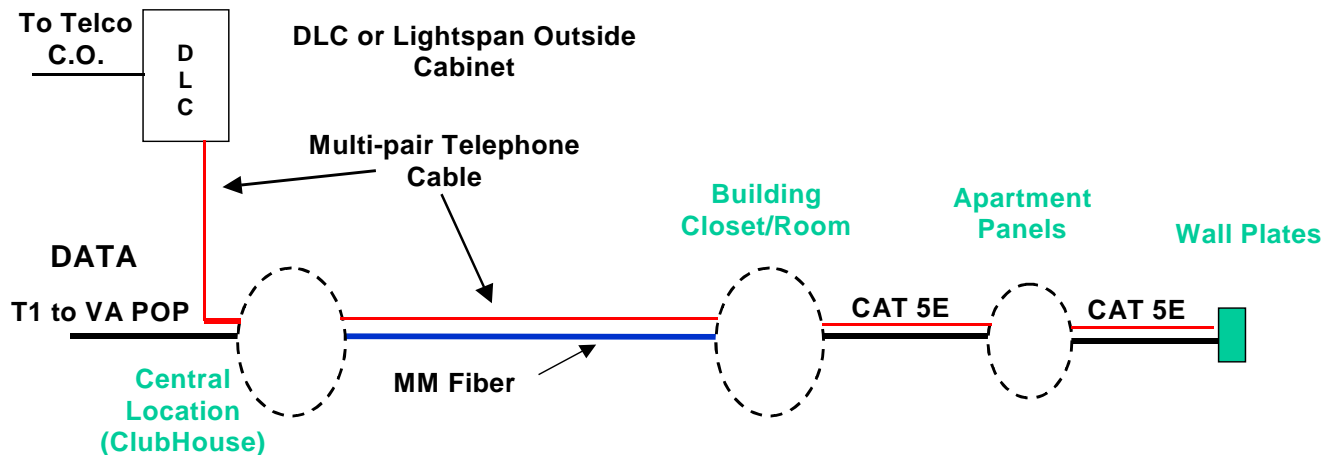
Wired Infrastructure Examples

Structured (CAT5) Data Wiring

- **Structured Wiring – Example 1 ‘Distributed’**



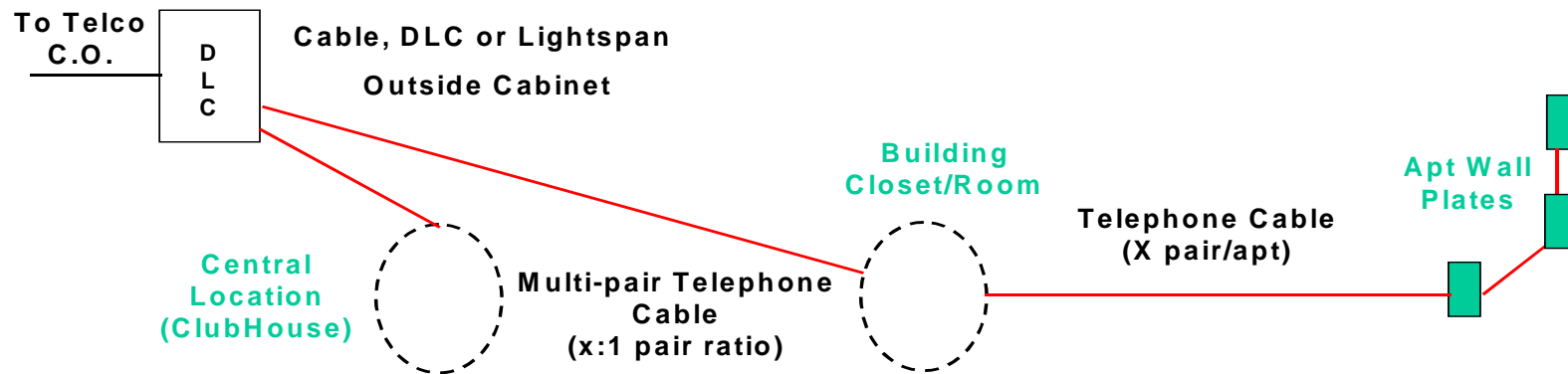
- **Structured Wiring – Example 2 ‘Centralized’**



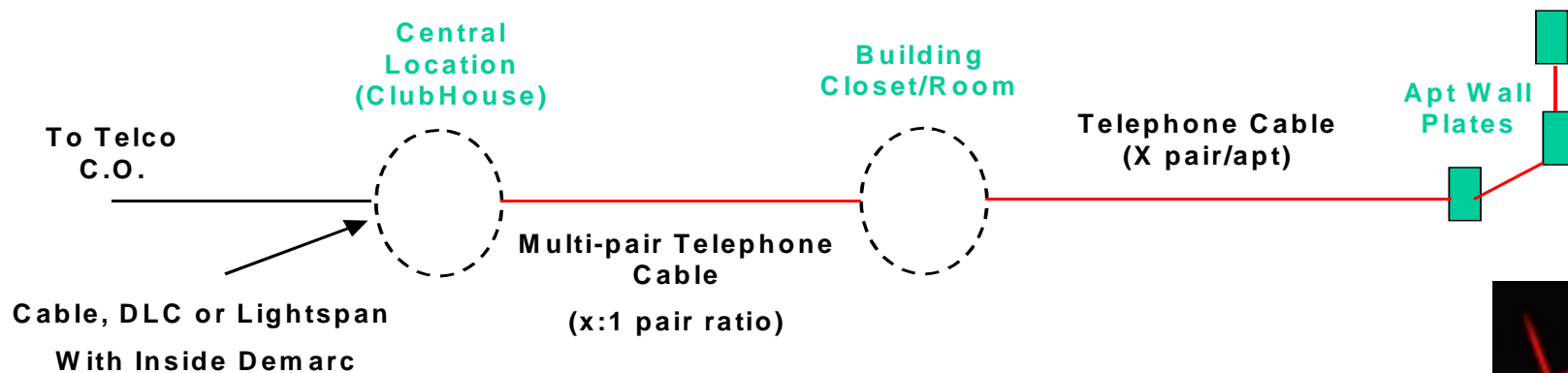
Wired Infrastructure Examples

Copper Telephone Cable (CAT3)

- Telephone Plant – Example 1 ‘Distributed’



- Telephone Plant – Example 2 ‘Centralized’



Advantages of Ethernet Architecture

- **Separate, centralized access to property.**
- **Simple to configure and provision.**
- **Plug and Play addition of new customers. (Self install)**
- **Resident or developer can easily add a HUB in the apartment to provide service from a number of faceplates within the unit or allow local networking.**
- **Fewer truck rolls required for adding customers.**
- **No modem required.**



Disadvantages of Ethernet Architecture

- **Electronic equipment (switches) located in more than one location on property.**
- **Closet equipment locations must be environmentally controlled and have power available.**
- **Only works with expensive fiber/CAT 5 infrastructure.**
- **May require multiple switches per building if CAT 5 distance limitation (~ 100 meters) is exceeded.**
- **Infrastructure Cost \$\$.**



Advantages of Telephone Architecture (Using Ethernet-DSL Technology)

- **Plant already in place or least expensive construction.**
- **Presence of 'dial tone' assures connectivity.**
- **Ethernet-DSL technology can be centrally located.**
- **Appearances at all telephone wall plates.**
- **Equipment can be located in outdoor enclosure.**
- **Equipment has good problem diagnostics and problem isolation capability.**



Disadvantages of Telephone Architecture (Using Ethernet-DSL Technology)

- **Requires central telephone room or outside plant construction to create a central feed point.**
- **More central space required.**
- **Splitters and telephone filters needed.**
- **Modem required.**
- **More difficult to provision and install than Ethernet.**
- **Generates heat in telephone room. (ventilation)**



Existing Copper In, And To, The MDU

Still Reigns

**Hence EFM
and the
802.3ah P2P Copper Solution**



Precursors in the EFM

- The P2P Copper Portion of the 802.3ah Standard must provide Ethernet over Voice Grade Copper [1] as presented by Hugh Barrass of Cisco at the July EFM meeting
- “Long Reach Requirements for Service Providers” [2], Presented at the July EFM by Frank Miller of Oregon Trail Internet, Outlined the market needs for reach beyond 4,500 ft.
- In “Carrier Grade Ethernet ,” [3] presented in May 2001, By Patrick Stanley of Elastic Networks, Reviewed Telcordia Loop Length vs. Coverage Statistics [4], indicating the relationship between reach and addressable market.



Market Perspective on Copper

The 802.3ah Task Force Must Determine:

- **The scope of the marketplace which the P2P Copper Standard Will Address**
- **Who Will Use This Standard (Who Will Deploy This Technology)?**
 - **Service Providers Whose Customers Can Be Accessed Via Their Existing Phone Lines**
 - **RBOC's, ILEC's, CLEC's, BLEC's, Property Owners**
- **The Needs of Their Respective Markets**
- **What Technologies Can the 802.3ah Task Force Offer to Maximize the Addressable Market While Ensuring Technical Success?**



The Voice of the Customer: EFM Reflector Traffic

- **EFM Requirements: Summary of the Copper P2P Dialogue 2nd Half of August...**
- **Service Providers and Equipment Manufacturers Shared Views on the Topic**
 - **Qwest, National Rural Telephone Cooperative, Oregon Trail Internet, GWI, Cisco, Mitel, *Among Others...***
- **Delivery of Broadcast TV, VoD Drive the Emerging Business Model**
 - **2-3 Channels of Standard TV Require 10 – 15 Mbps**
 - **1 Ch Standard, Plus 1 Ch HDTV Require 20 Mbps**



The Voice of the Customer: EFM Reflector Traffic

Core Messages:

- 1. Reach...Reach...Reach...Reach...Reach...Reach...Reach...Reach...
Reach Is Paramount to Broad Economic Feasibility
Service Radius Should Meet/exceed 10 Kft***
- 2. Unbundled Loop Spectral Compatibility. (70%+ Binder Fills)**
- 3. No Plant Re-engineering, i.e. Bridge Tap Removals, Etc.**
- 4. Bandwidth Symmetry Should Not Be Fixed. Full Bandwidth Should Be Available in Either Direction for Next Generation Applications.**
- 5. Self Install by an Untrained Consumer Is a Must. Residential Demarc Should Not Require a Truck Roll.**
- 6. Compatibility With HPNA and Other Home Networking Line Codes Is Needed.**



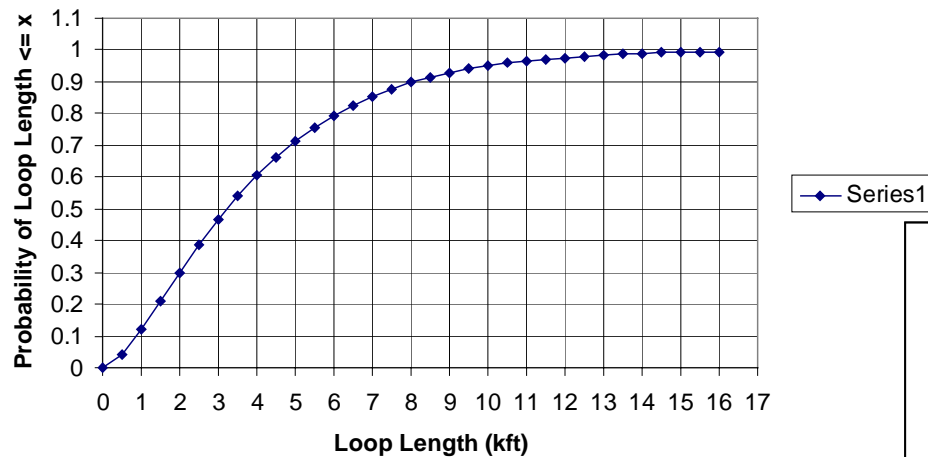
The Voice of the Customer: EFM Reflector Traffic

- “Picking the technology with the longest reach possible will make the difference between financial success and failure for the service provider.” *Sherman Ackley, National Rural Telephone Cooperative*
- “I need a technology that I can stay profitable with .. I need reach.” *Frank Miller, Oregon Trail Internet*
- “What we need is the ability to provide VDSL data rates from a CSA rather than a DA. [If] EFM is unable to provide this kind of reach, it will miss a major piece of the market.” *Charles Cook, Qwest*
- “If we are to support all service providers in a given market we need to be able to support longer distances to ensure the maximum possible coverage from a given area, hence a maximum potential subscriber area and thus the maximum possible revenues for that carrier to sustain its business.” *Andy Lough, Mitel*



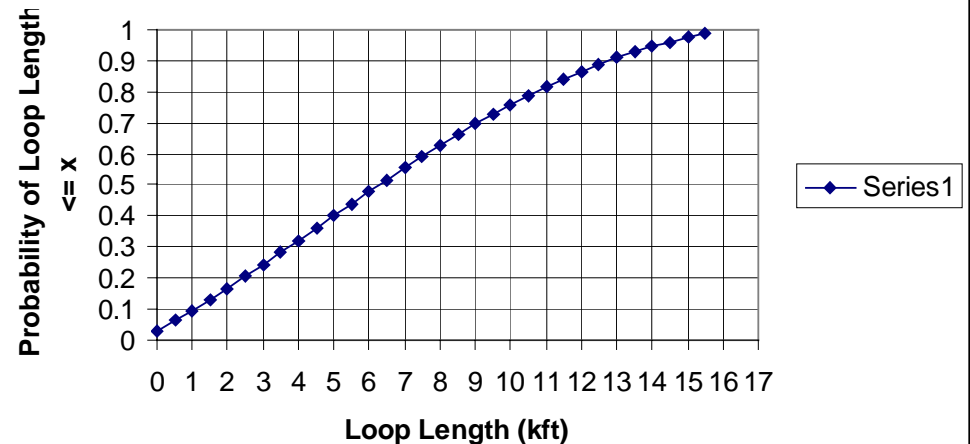
Loop Length Distribution Graphs

Distribution of 26 AWG Loop Lengths from 1990
DLC Loop Survey



“Statistical Variables for Evaluating
Compatibility of Remote Deployments ,”
Telcordia Technologies, pursuant to work
supported by BellSouth, SBC, and Verizon,
T1E1.4/2001-132, May 2001

Distribution of Non-Loaded 26 AWG Loop
Lengths From 1983 Loop Survey



Copper Bridge for Optical MAN

- **FTTuser:**
 - **YANKEE Group estimates 5-7% of buildings served by fiber**
- **Even with FTTB, need bridge In Building:**
 - **Even by 2003, approximately 60% of in building market will require use of unstructured Cat 3 wiring to reach tenants**
- **Buildings that could be reached by copper bridge from optical MAN:**
 - **Chicago: 42%-67% of buildings within 1-5 miles of fiber**
 - **LA: 40%-73% of buildings within 1-5 miles of fiber**



Summary

- **The Service Provider is the Customer for The Technology Behind This Standard**
- **The Standard Must Support a Profitable Business Case to be Meaningful (and to be Deployed)**
- **We are Asking for Technology Standard Which Addresses the Broadest Possible Market:**
 - **Data Rates/Symmetry for Emerging Applications**
 - **Reach to access the Subscriber on Existing Copper Plant**
 - **Compatibility to Scale**
 - **Ease of Deployment to Scale**



Addendum

- **Perspective on Recent EFM Copper Proposals**
 - **ADSL**
 - ADSL is a 15+ year-old technology. The EFM should not re-standardize a standard that has, in many cases, failed the marketplace. The EFM has a unique opportunity for technology evolution.
 - **Multiple Pair Solutions (10BASE-T4)**
 - Standardize a single pair solution
 - Let individual companies productize bonded solutions, based on the standard, for niche market applications
 - **Shannon Capacity**
 - Let Shannon bound the opportunity, but let's not use him as a crutch to stay in-building. Less than 10Mbps beyond 6Kft is still a BIG market for Ethernet.



References

- [1] “Voice Grade Copper,” Cisco, IEEE 802.3 EFM Study Group, Interim Meeting July, 2001
- [2] “Long Reach Requirements for Service Providers,” OTI, IEEE 802.3 EFM Study Group, Interim Meeting July, 2001
- [3] “Carrier Grade Ethernet ,” Elastic Networks, IEEE 802.3 EFM Study Group, Interim Meeting, May 2001
- [4] “Statistical Variables for Evaluating Compatibility of Remote Deployments ,” Telcordia Technologies, pursuant to work supported by BellSouth, SBC, and Verizon, T1E1.4/2001-132, May 2001



A large Verizon logo is centered on a black background. It features a red checkmark symbol above the word "verizon" in a white, lowercase, sans-serif font. The letter "z" is highlighted with a red shadow effect.

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A smaller version of the Verizon logo is located in the bottom right corner. It consists of the red checkmark symbol and the word "verizon" in white lowercase letters, with the "z" having a red shadow.

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