Grant County PUD

IEEE 802.3 Ethernet in the First Mile Study Group

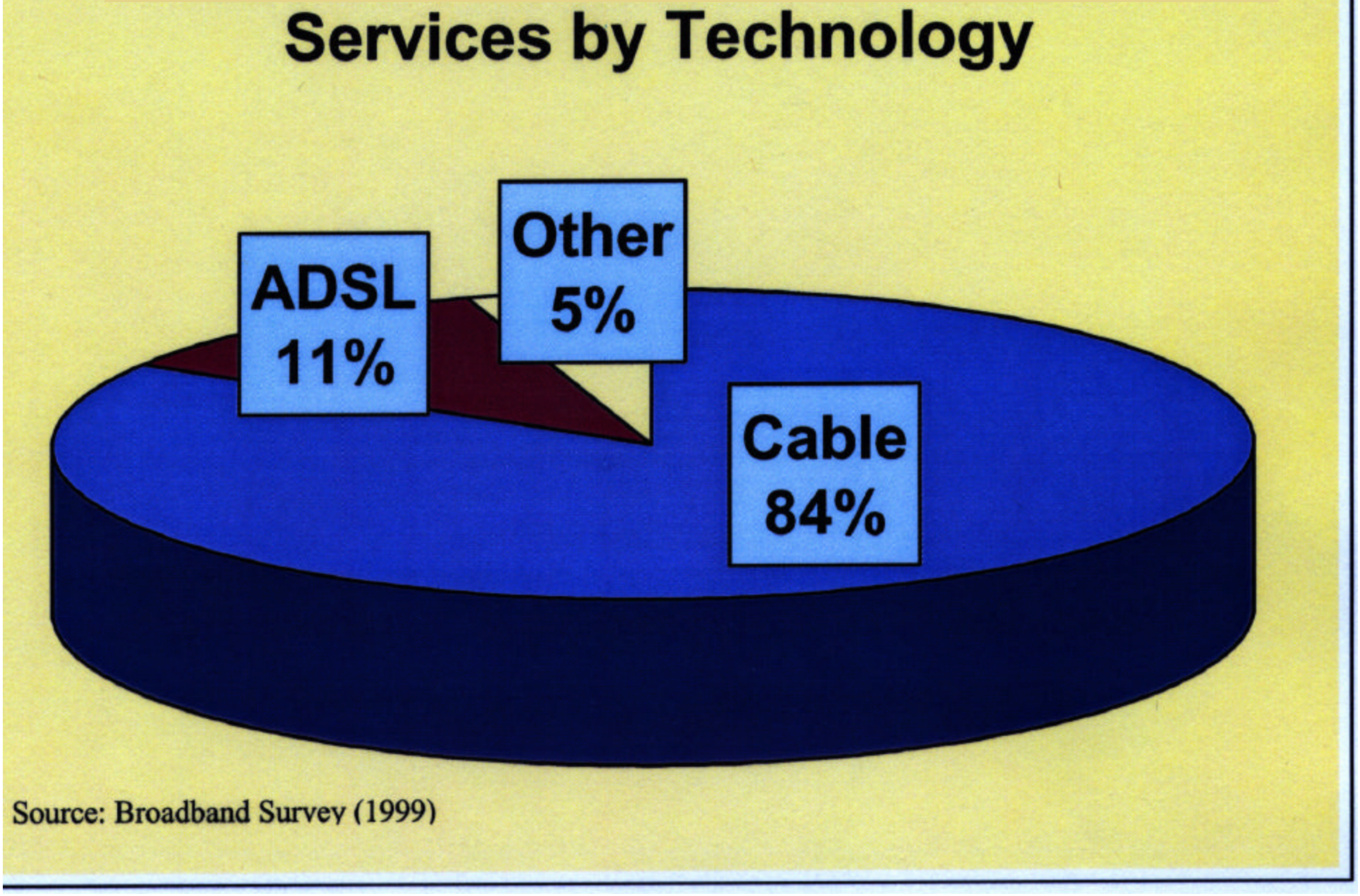
Jonathan A. Moore, PE
jonmoore@ieee.org

FCC August 2000 Broadband Report

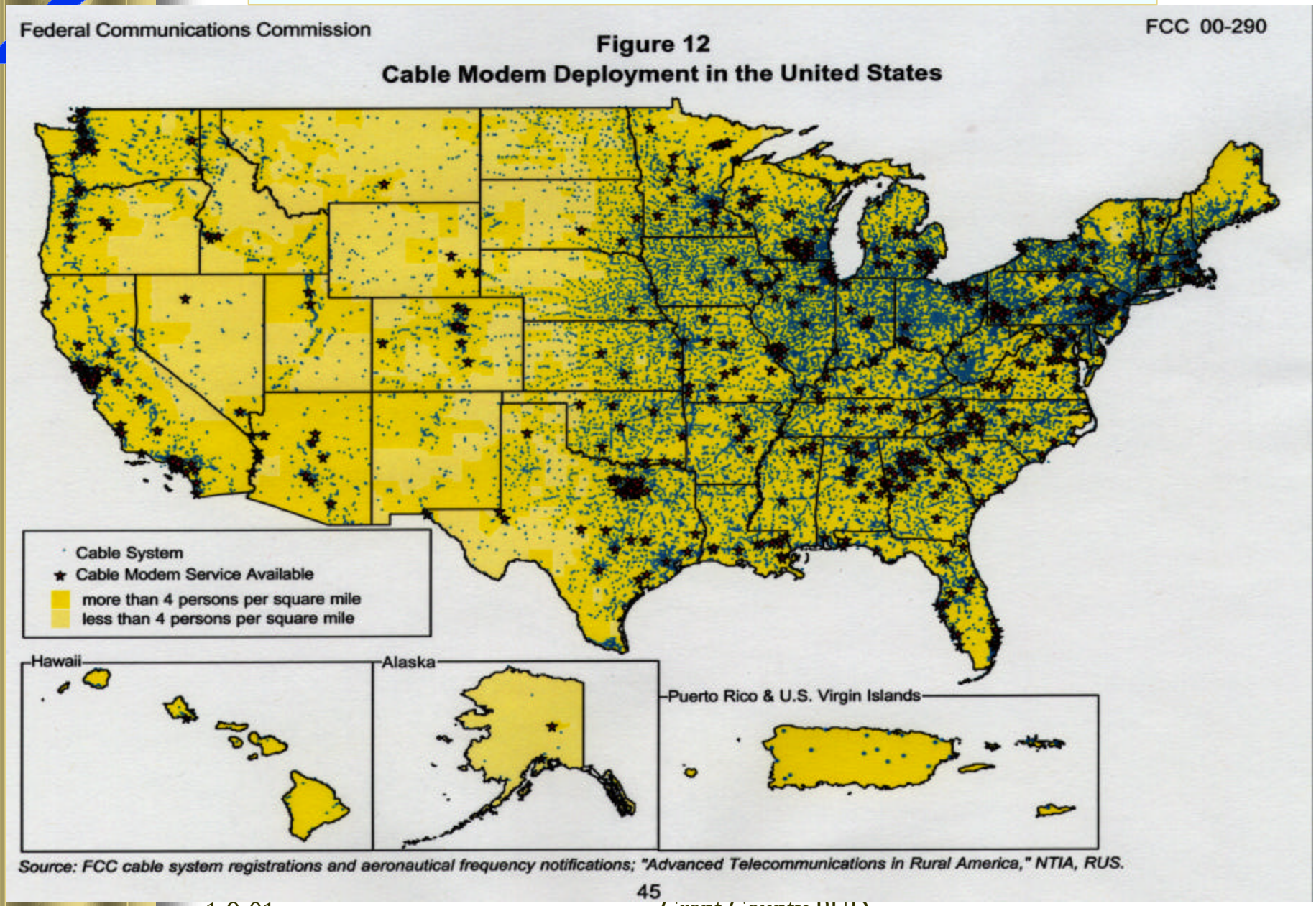
- As of December 31, 1999 there were:
  - 1.8 M "High Speed" Residential Subscribers
  - 1 M "Advanced" Large Business Customers
    - *FCC defines "Advanced Communication" capability as "infrastructure capable of delivering a speed in excess of 200kbps in each direction" and*
    - *"High-Speed" as "transmission speeds in excess of 200kbps in at least one direction"*

Only 0.65% of US is high-speed

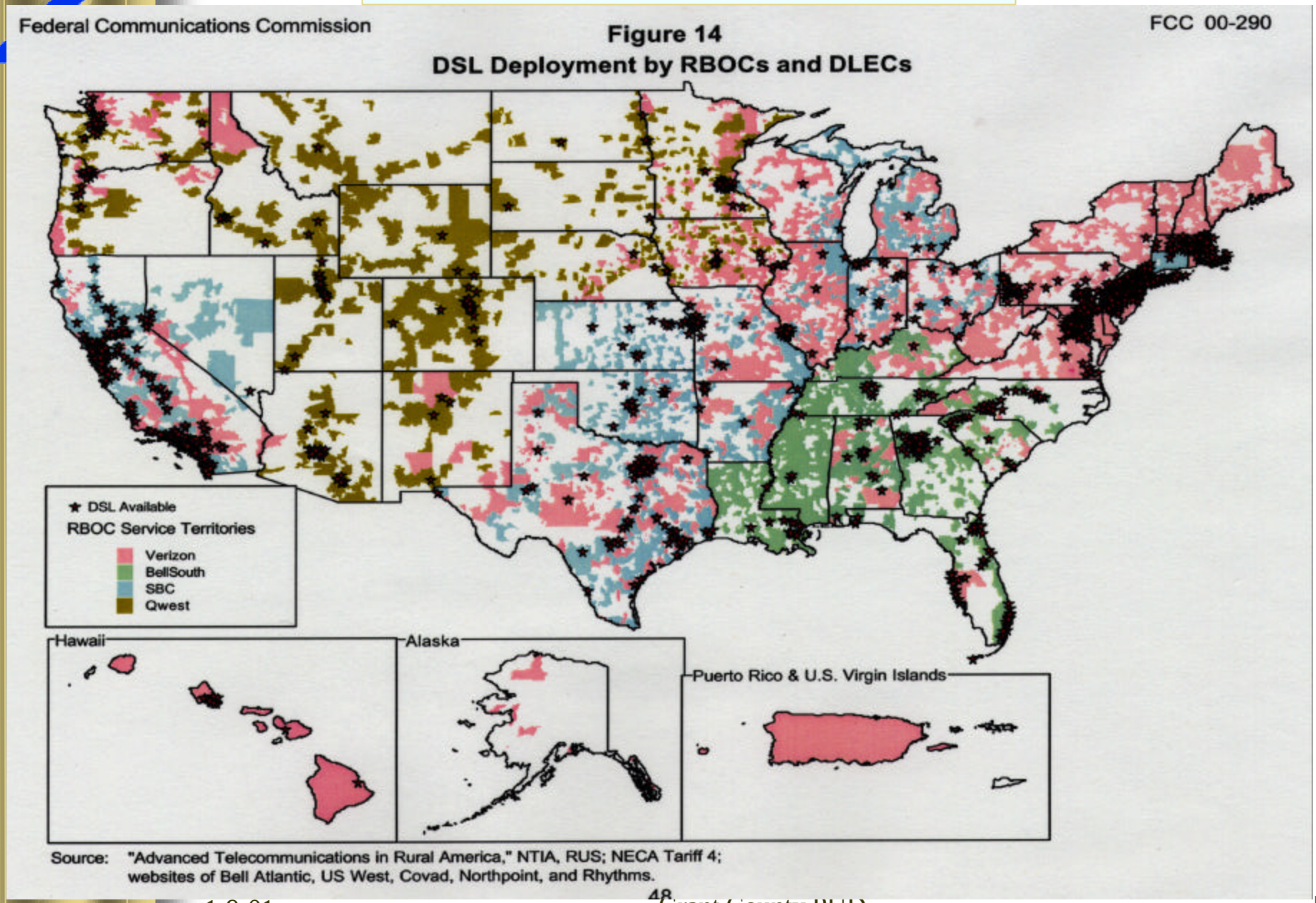
Distribution of High Speed



Cable Modem Providers



DSL Providers



Market Need / Opportunity

- Lack of Rural Communication Services
  - Grant County, like most of US, has no:
    - CLECs, DSL, or Wireless Internet Access
  - 98% of County does not have:
    - ISDN, or Cable Modem Access, and
  - 3 areas do not have:
    - basic phone service, or local dial access to internet
- Lack of Rural Competition

Grant County PUD

- GCPUD is currently installing FTTH using
  - dedicated SMF-28 glass
  - 15 year capital design
  - Gigabit-Ethernet
- "Open Access" architecture
  - port based 802.1Q tagging
  - 802.1p to manage QOS

Open Access

Enables Multiple & Competitive Services

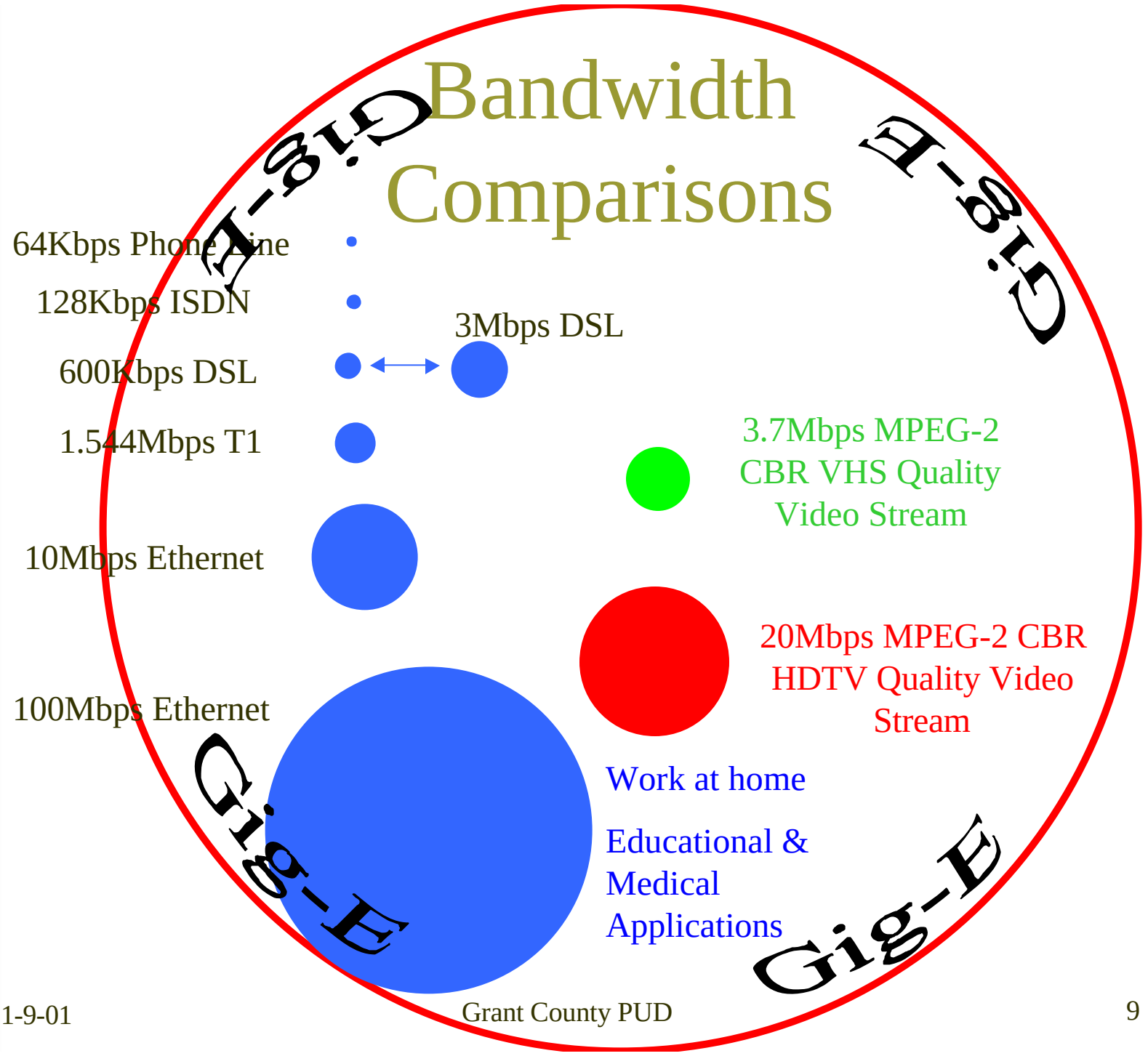
Many city franchises are now requiring "open access"

Can apply to poles, trenches, & facilities

Open Access Challenges

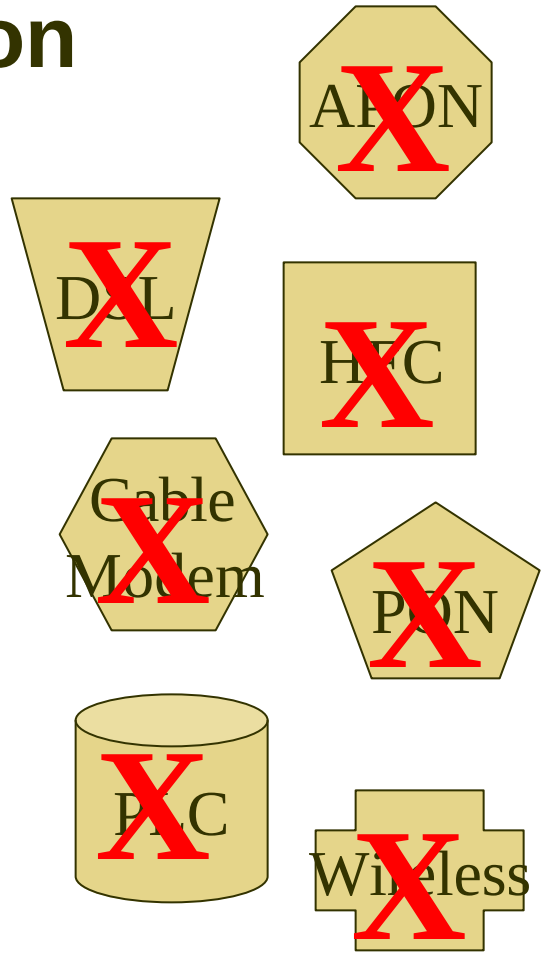
- Anyone can be a “source” or “sink”
  - network design should not dictate applications
    - *we are not all sinks*
- Bandwidth & QOS Challenges
  - Consumer originated video
  - Competing multicast video systems
  - Work at home networking
  - Educational & Medical applications
  - 15 year bandwidth forecasting

Bandwidth Comparisons



GCPUD Network Requirements

- **Symmetric Transmission**
- **Scalable Bandwidth**
- **Reliable (QOS)**
- **Low Cost**
- **Low Maintenance**
- **In-band Management**



GCPUD Network Requirements

- Symmetric Transmission
- Scalable Bandwidth
- Reliable (QOS)
- Low Cost
- Low Maintenance
- **In-band Management**
  - **Troubleshooting Assistance**
  - **Provisioning Confirmation**
  - **Nested VLANs**
- **Environmental**

Standards
1000Base-LX
802.1Q
802.1p

Topology
Dedicated Plant

Summary Request

- Optical Loopback or other diagnostics
- Link Light based on data integrity rather than signal intensity
- Nested VLANs
- Extend temperature range of optics
- Hermetic considerations