Overview of Broadband Technology Platforms

Chris Moore, Deputy Chief
Wireless Telecommunications Bureau

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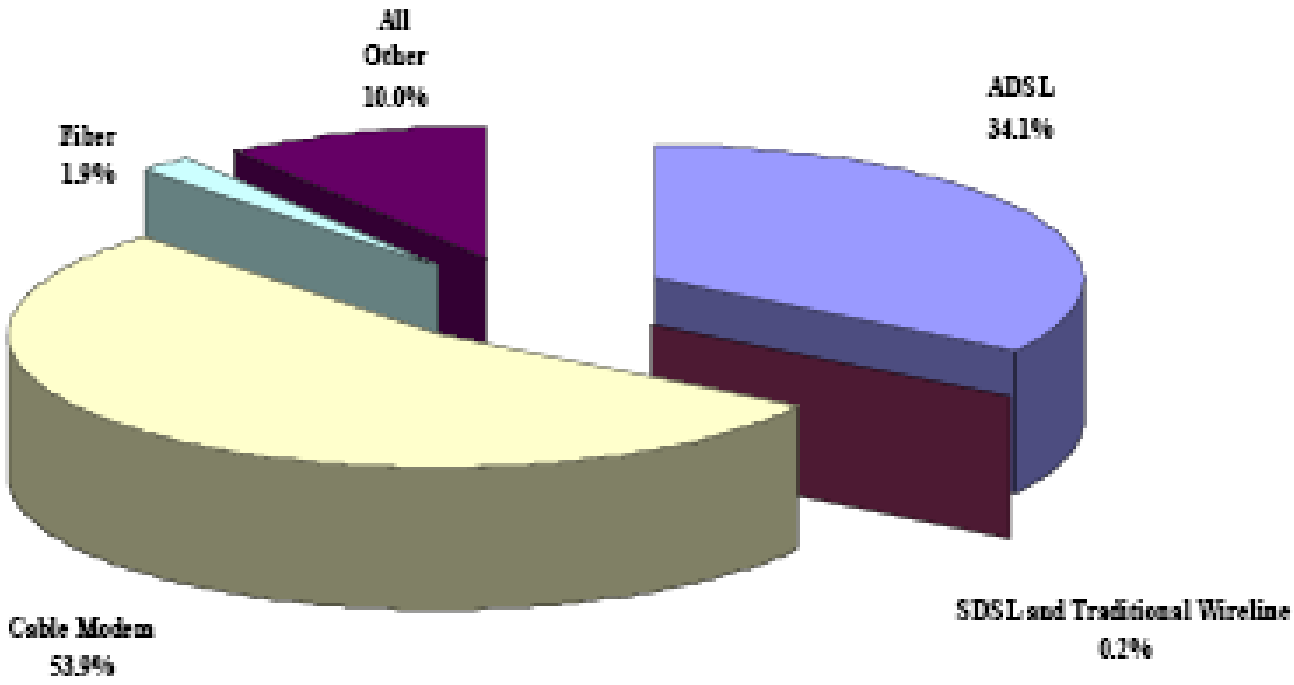
Note: The views expressed in this presentation are those of the author and may not necessarily represent the views of the Federal Communications Commission

Overview

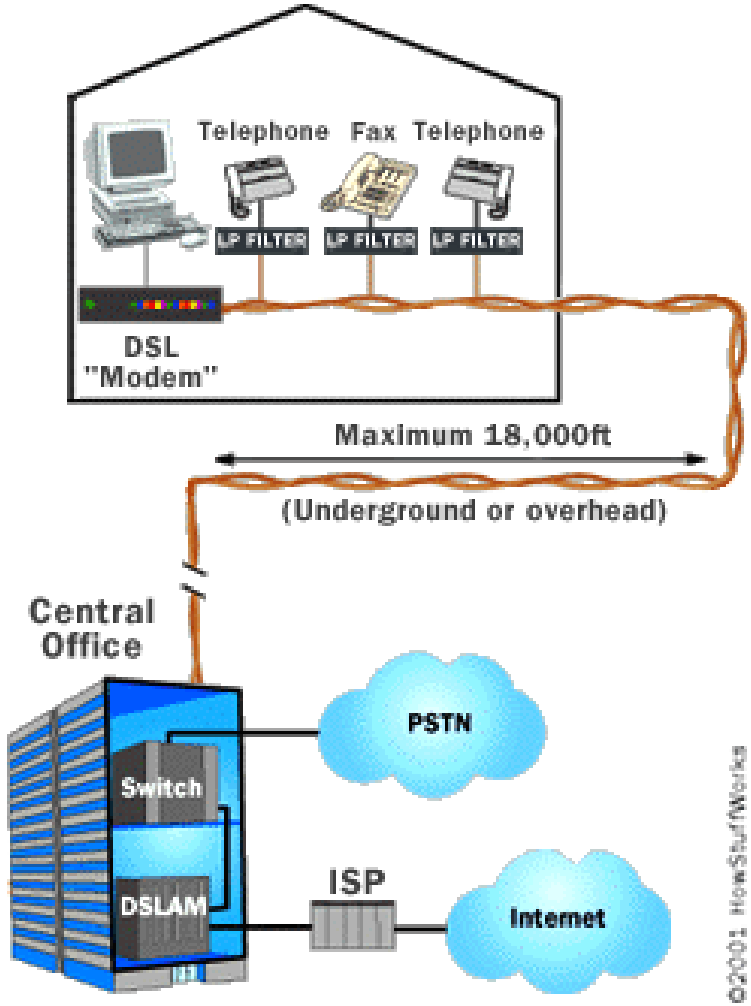
- Digital Subscriber Line (DSL)
- Cable Broadband Service
- Fiber
- Satellite
- Fixed Wireless Service - Licensed
- Mobile Wireless Service - Licensed
- Wireless Internet Service Providers (WISPs) - Unlicensed
- Broadband Over Power Lines

Residential Advanced Services Lines by Technology as of June 30, 2007



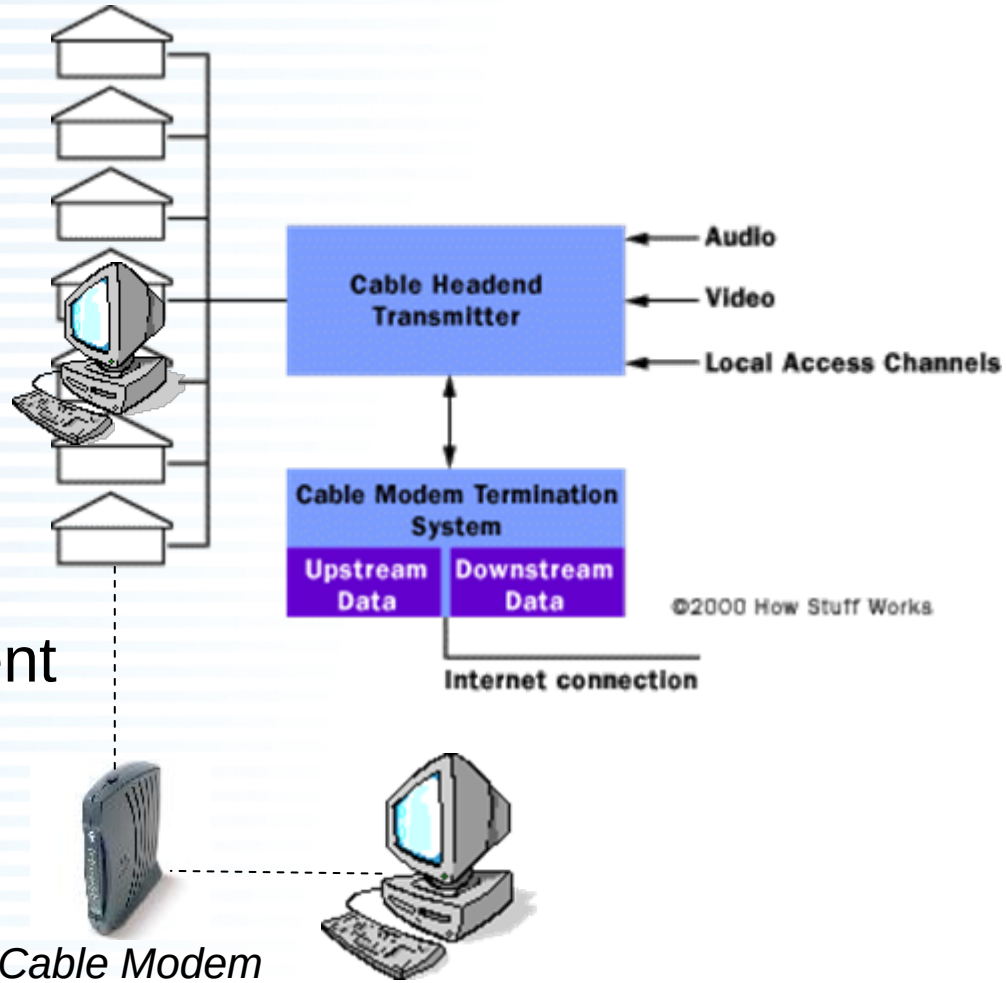
Digital Subscriber Line (DSL)

- Most commonly used by local telephone carriers
- Variations: ADSL, VDSL
- Up to 7 Mbs download; 1 Mbs upload
- Distance dependent

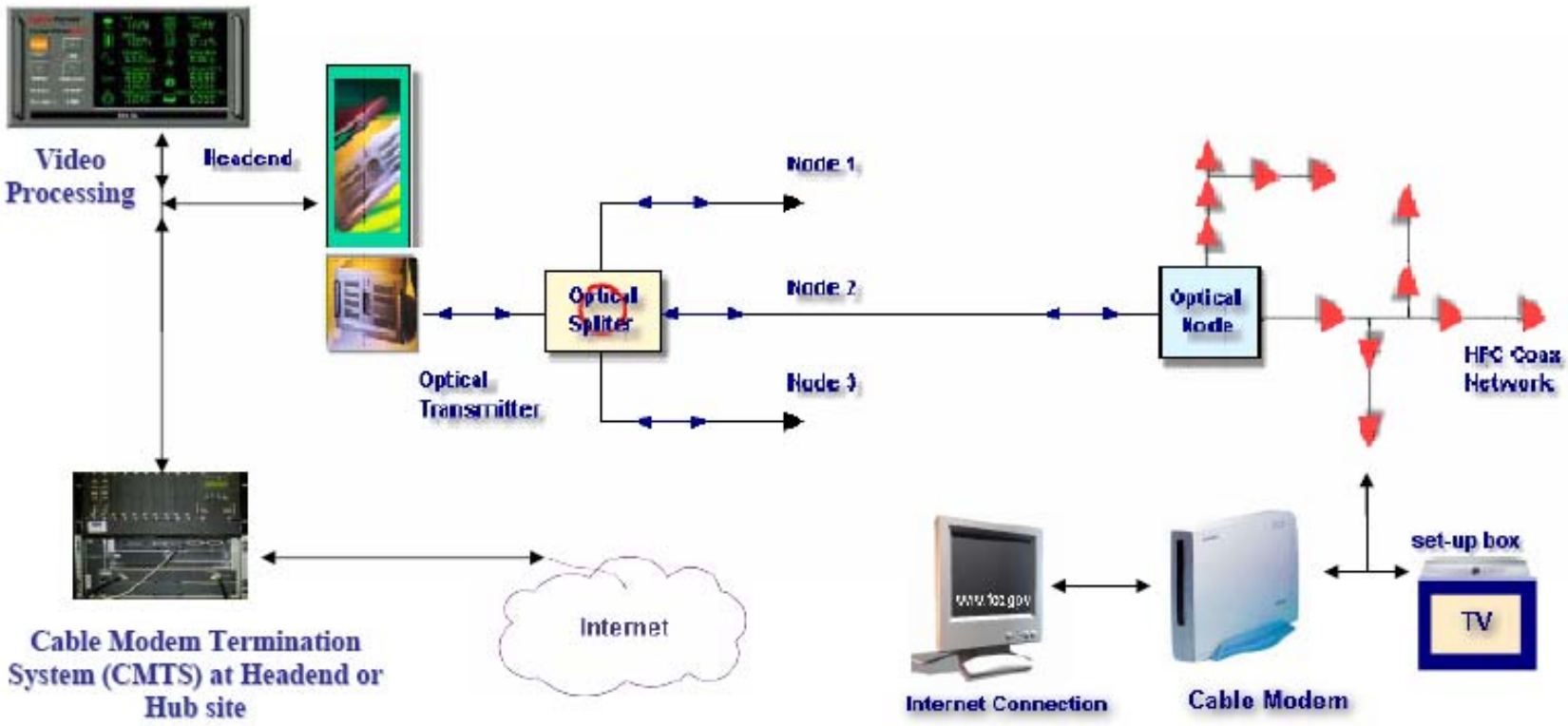


Cable Broadband Service

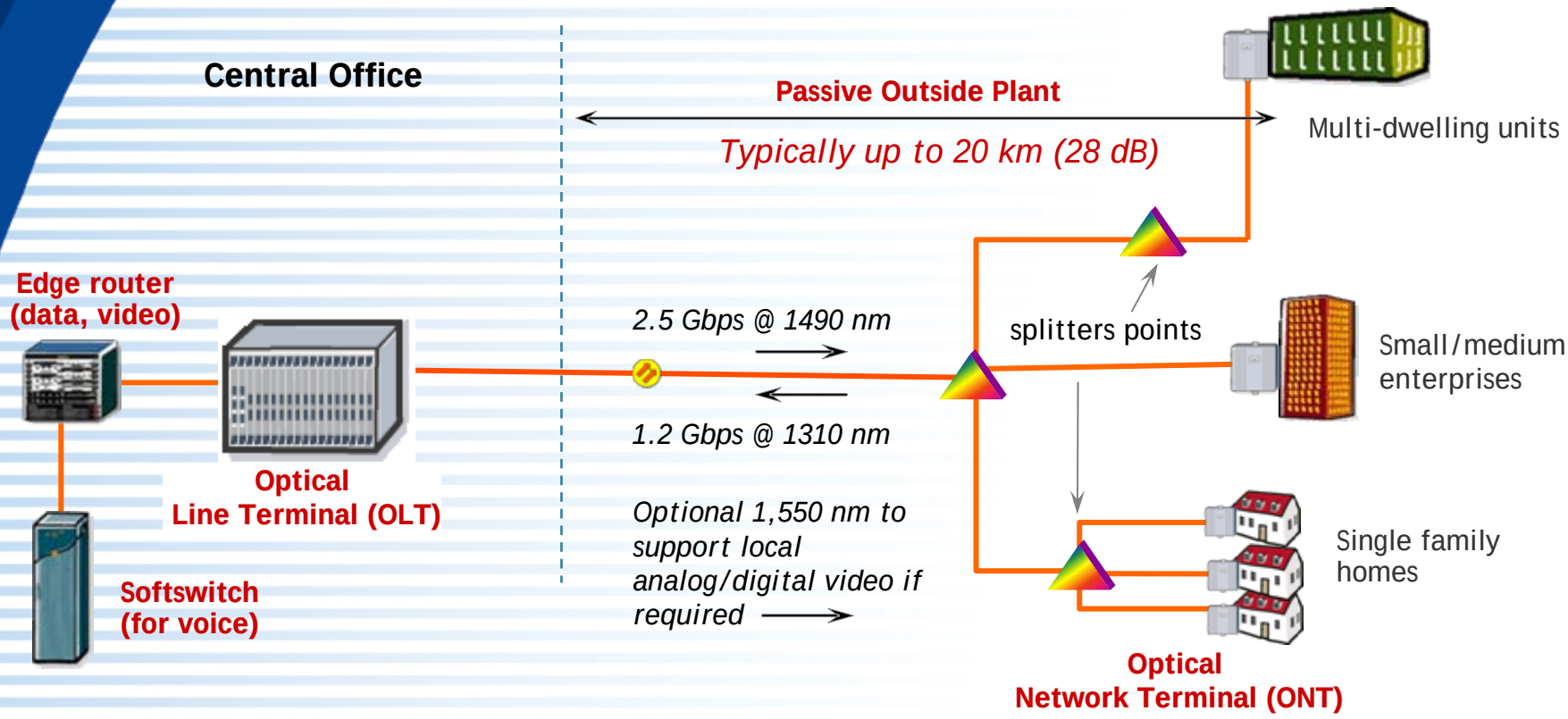
- Developed for TV distribution
- Evolved to provide TV/Data/Voice
- Up to 15 Mbs download;
  2 Mbs upload
- Distance independent
- Register w/ FCC



Hybrid Fiber/Coax (HFC) CATV Network

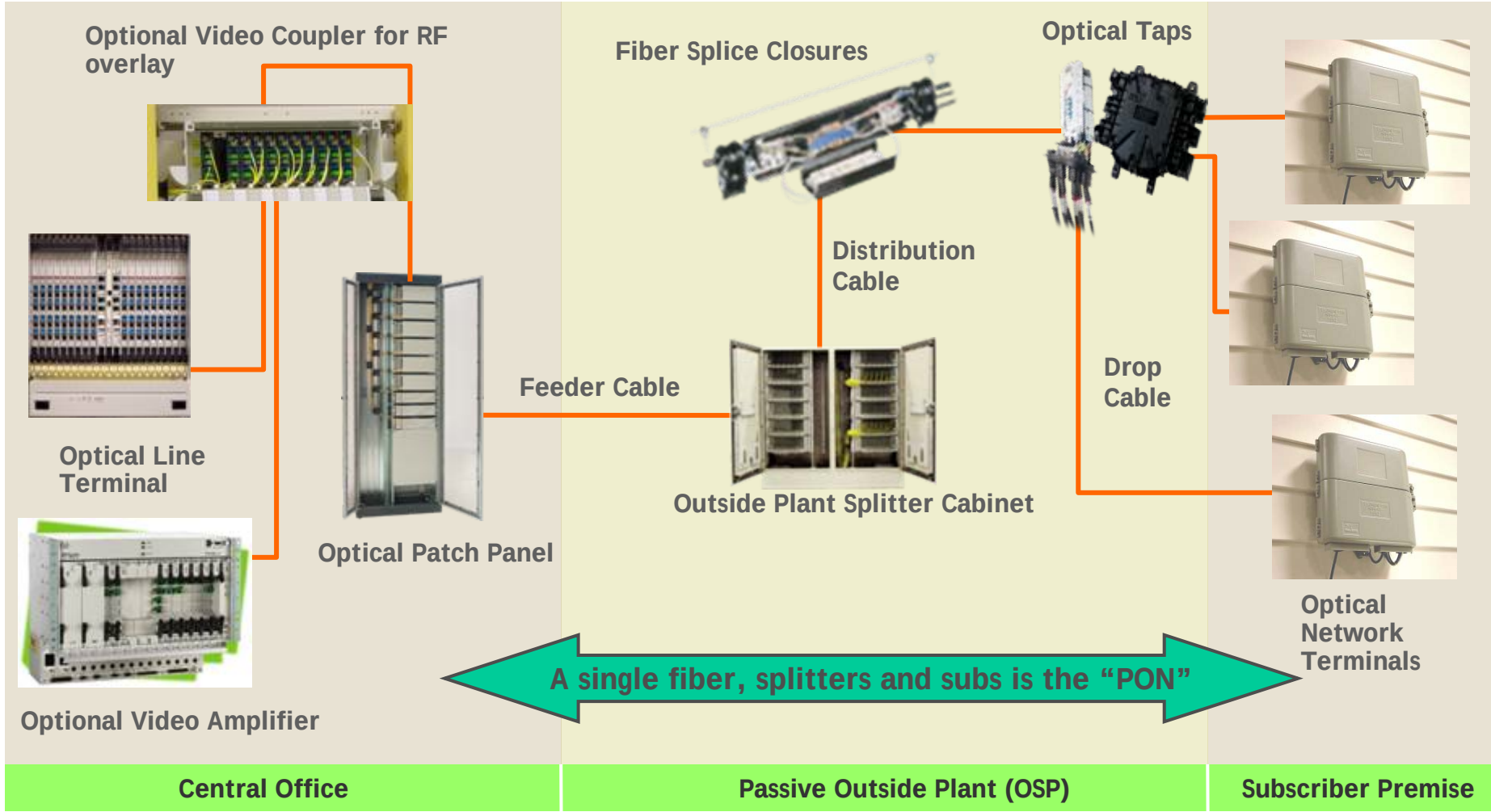


Gigabit Passive Optical Network (GPON) Fiber to the Home Architecture



Source: Fiber to the Home Council

Typical GPON Components

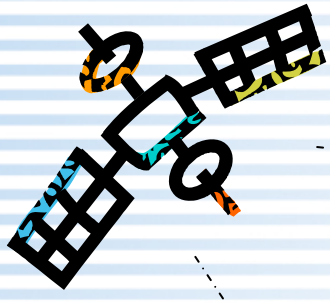


Source: Fiber to the Home Council

Satellite

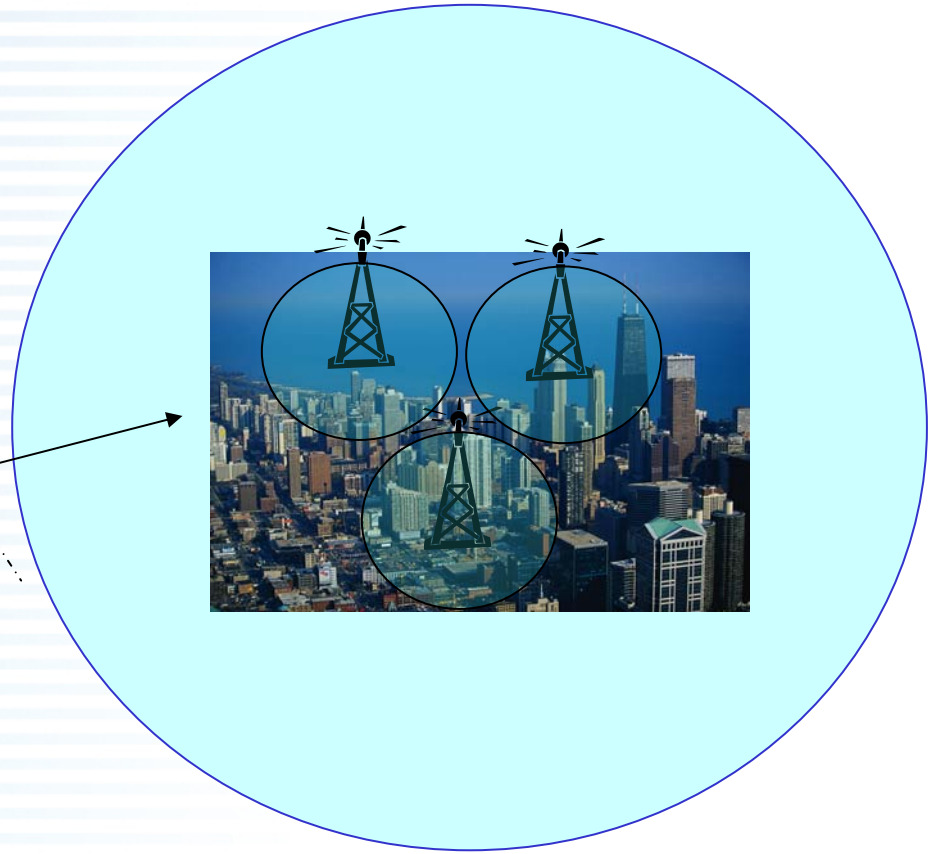
- Geos; Non-Geos; Leos
- Fixed:
  - C-band – 4 & 6 GHz
  - V-Sats – 11 & 14 GHz
- Mobile Satellite Service
- Satellite advantage: Ubiquitous coverage
- Limitation: Foliage, rain, etc. can affect availability

Mobile Satellite Service Ancillary Terrestrial Component



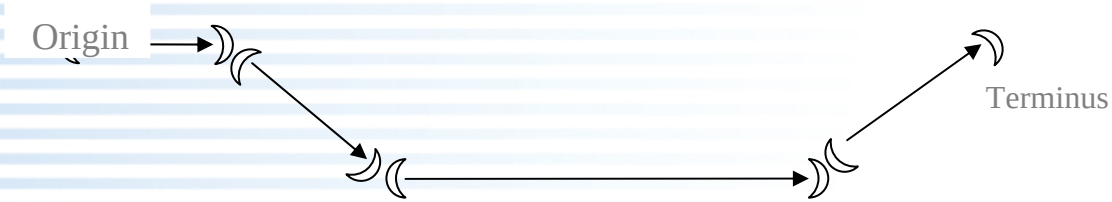
Satellite provides ubiquitous coverage, including rural areas

Terrestrial base Stations provide coverage in areas where satellite signals may be weak



Fixed Wireless Services - Licensed

- Traditional fixed point-to-point service: Microwave signals are aimed along a narrow path using high-gain antennas.
- Requires line-of-sight
- Applications: Communications backbones; studio-transmitter links; cable relay



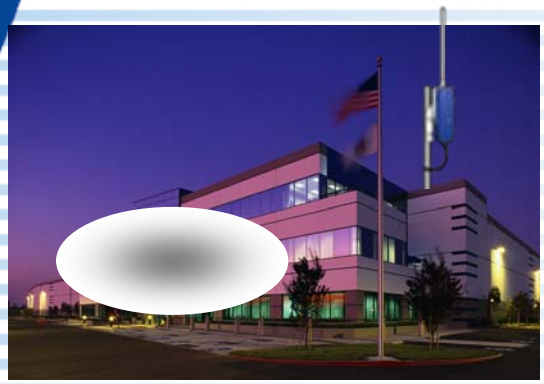
Signals can be carried over great distances by relaying them over multiple “hops”.

Fixed Wireless Services - Licensed

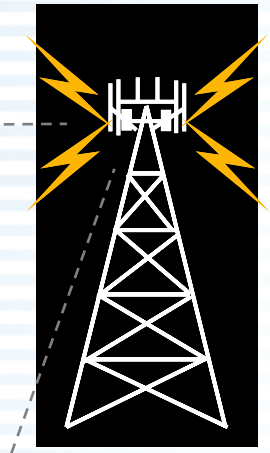
Examples:

Broadband Radio Service/
Educational Broadband Service

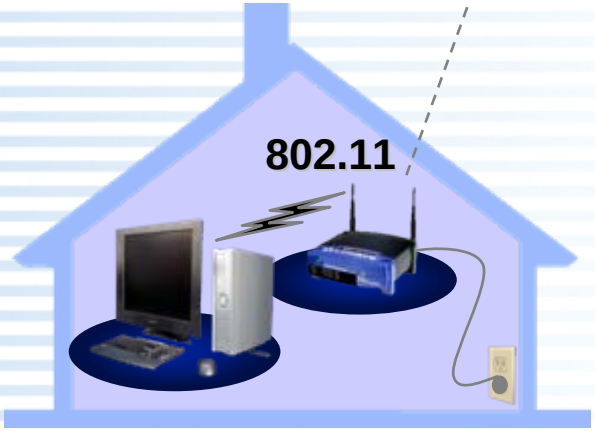
Local Multipoint
Distribution Service



W-Fi



Business
Access &
Backhaul



Directly to
Indoor Modem

Backhaul

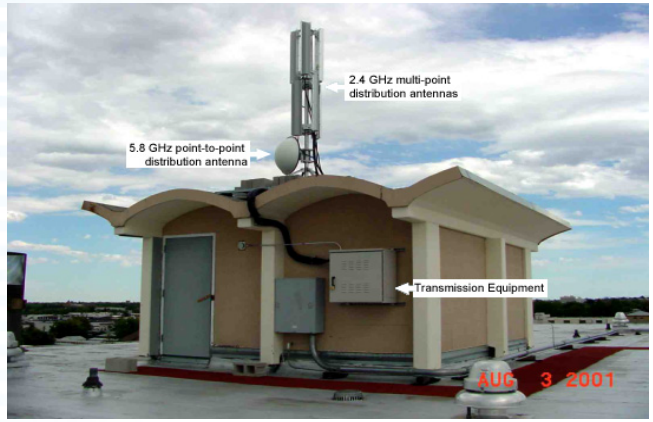
Mobile Wireless Broadband Service

- The FCC has created multiple mobile radio services suitable for broadband:
  - Cellular Service
  - Specialized Mobile Radio Service (SMRs)
  - Personal Communications Service (PCS)
  - Advanced Wireless Service (AWS)
  - 700 MHz (Recently Auctioned)

- Technologies: GSM family; CDMA family; planned WiMAX
- Various types of service, with data speeds of up to 2 Mbs
- Actual speed depends on several factors
- All of the major technologies have developed evolutionary paths to faster data rates

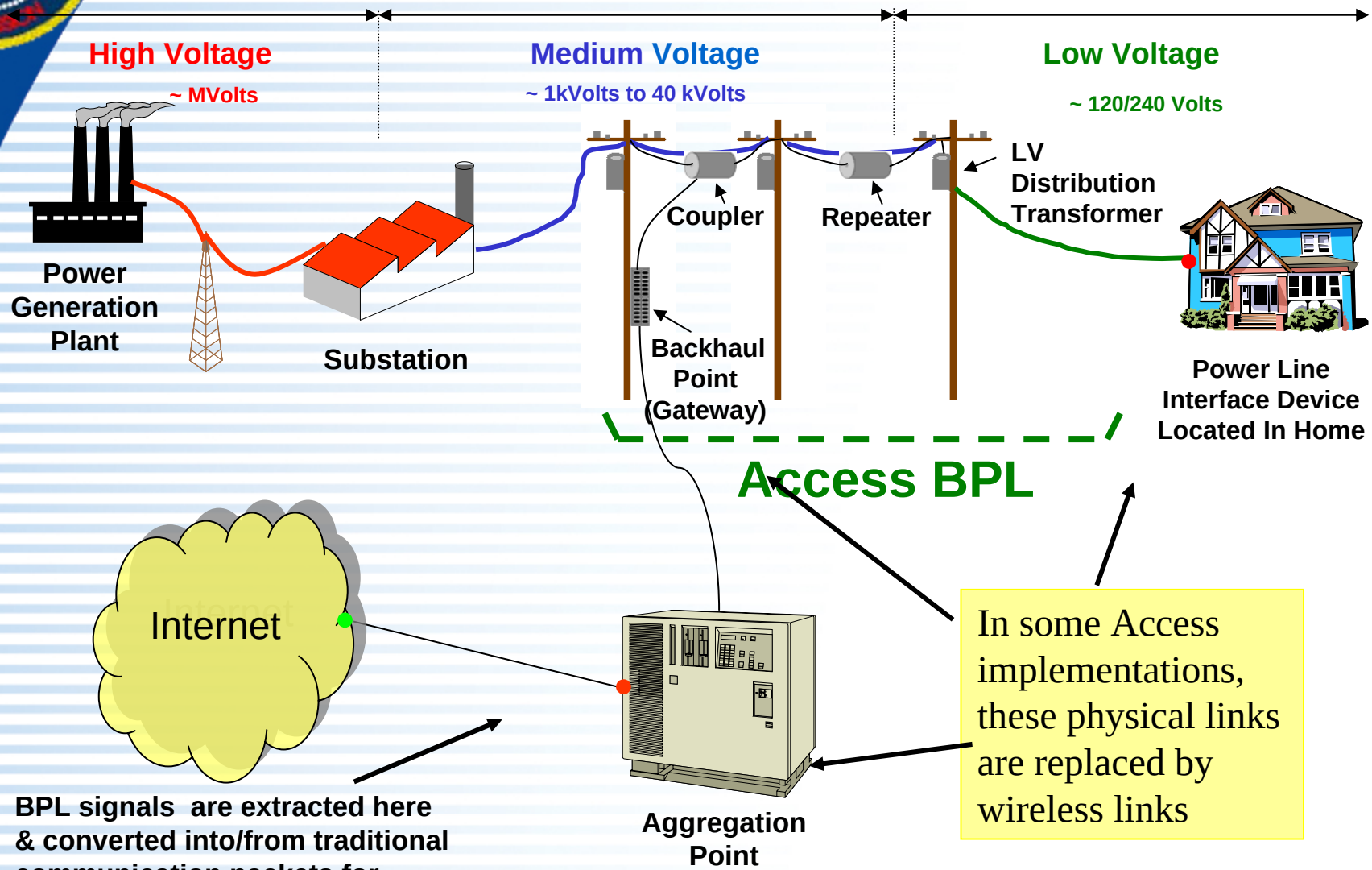
Wireless Internet Service Providers (WISPs) - Unlicensed

- Part 15 of the FCC rules provides for operation of unlicensed devices
- Many kinds of devices operate under these low power rules - Wi-Fi
- Various techniques are used to enable broadband service in rural areas
- Data speeds vary
- There are thousands of WISPs operating on an unlicensed basis around the U.S.

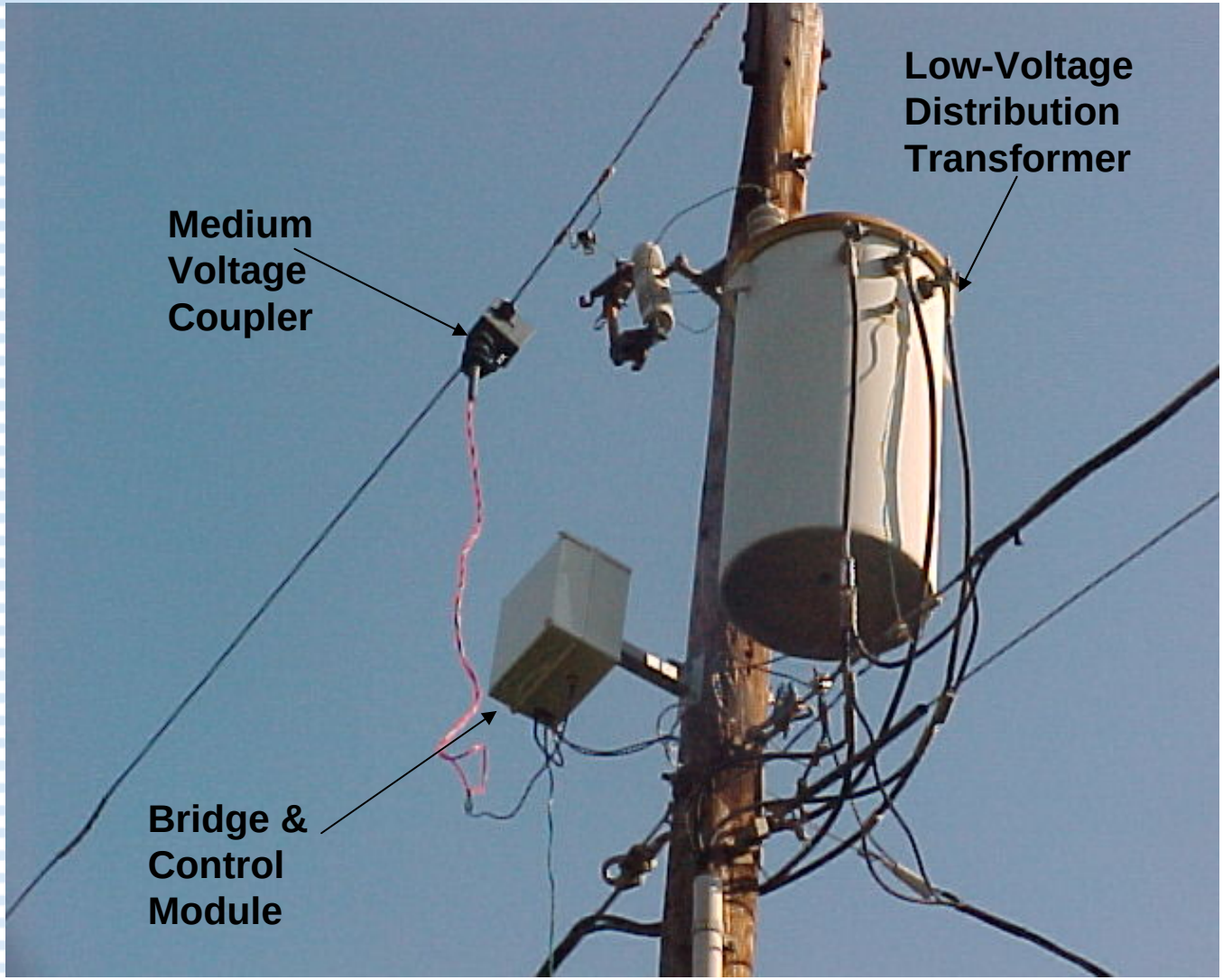


Metropolitan, Rural & Community Networks

Broadband Over Power Lines



BPL: Bypassing the Transformer



Conclusion

Thank you!