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Broadband Technology Selection Frame Work

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January 2006

The selection of an appropriate broadband technology for your municipality can be a daunting task. It is tempting to use technology as a goal, rather than a strategy to meet identified needs. This paper provides a selection framework for you consideration in development of broadband technology selection and strategy development.

The types of connection for broadband technologies for Wide-Area-Network (WAN) deployment are:

1. Fiber-to-the-Premises
2. Wireless
3. Broadband Over Power Lines (BPL)

Each of these technologies has different performance characteristics, and selection is based upon:

- Type of user being served
- Required band width
- Type of services/applications being supported
- Geographic density of customers

Technology Comparison

We believe no single technology will serve the full set of municipal needs. In Table 1, we present the advantages and disadvantages of the three core technologies discussed for municipalities.



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Table 1: Technology Comparison

Technology	Advantages	Disadvantages
Fiber-to-the-Premises (FTTP)	Highest bandwidth Quality signal Standards (user interfaces)	Cost Proprietary networks
Broadband Over Power Line (BPL)	Ubiquitous deployment No terrain or foliage limits	Limited standards Still in pilot stage Proprietary networks Interference questions Repeater spacing requirements
Wireless	Mobility Standards (CPE device & interface for Wi-Fi) Cost Ease of Deployment	Terrain and foliage limits Proprietary networks (for meshed Wi-Fi)

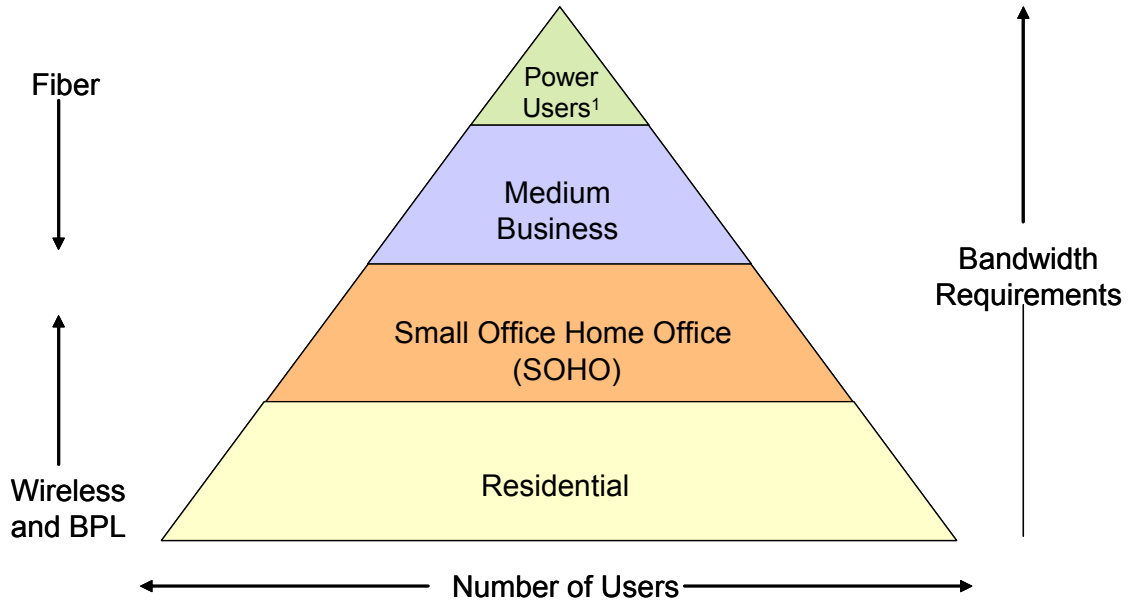
Please note that the above technology comparison is for Wide Area Network (WAN) deployment. For multi dwelling unit buildings, there are a variety of wireless, BPL, fiber, and copper optics available.

In Figure 1, we present what technologies might be appropriate for a given user. As seen, fiber is most appropriate for large bandwidth users. As deployment costs decline, fiber can be extended closer and closer to the residents. Wireless, however, is cost effective alternative for business and residential users. As technology advances occur, wireless will support higher bandwidth uses.

BPL is listed in this and the following figures as a placeholder only if the vendors are able to advance the status of BPL development.

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¹ Includes Institutions, Education Facilities, and Large Offices

Figure 1: Hierarchy of User Needs and Technology

The type of service (or application) will also affect the type of media. To deliver broadcast cable television, switched telephone, and data services - fiber is the most appropriate. Wireless is well suited for data, VoIP, and some video-over IP applications. As wireless performance advances, support of advanced video-over IP will be possible. BPL may be limited to data and VoIP applications for some time.

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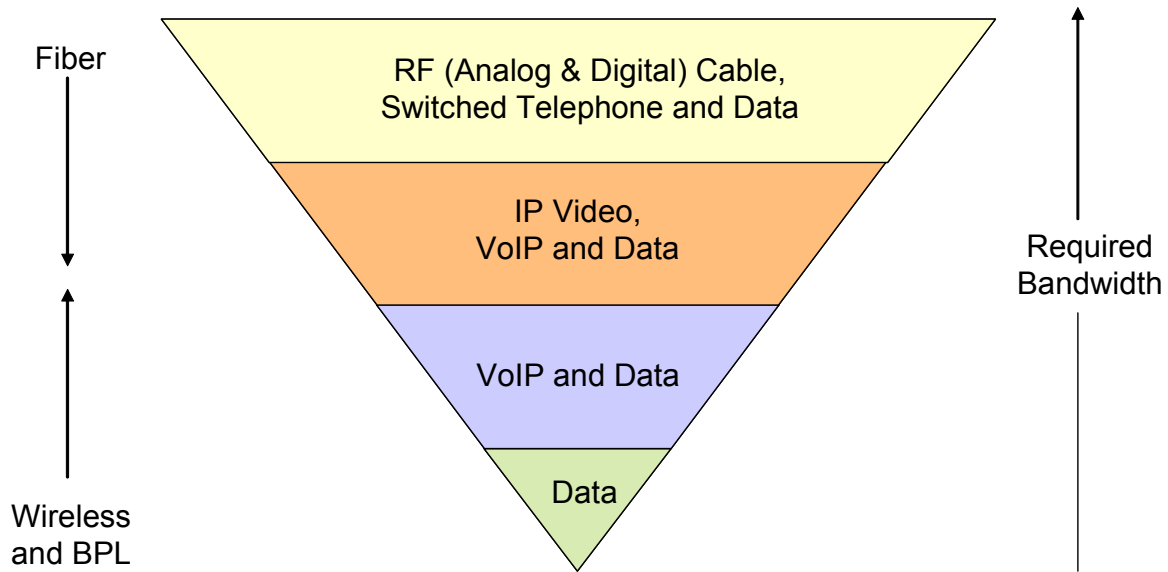
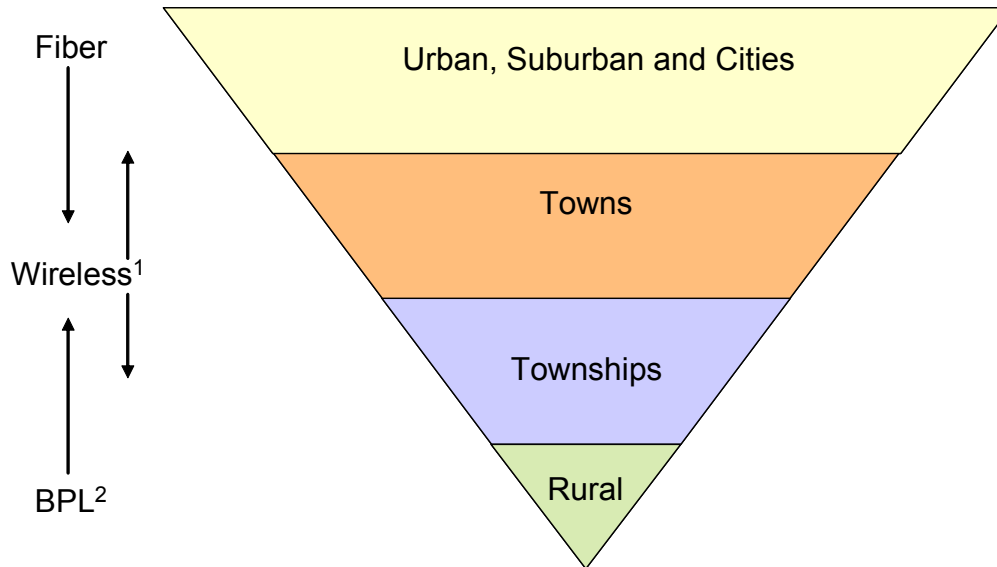


Figure 2: Hierarchy of Services and Technologies

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The geographic density of customers also impacts the technology choices. Fiber-to-the-Premises is best suited for cities; as densities decline, fiber becomes more cost prohibitive. Wireless, depending upon terrain and foliage, may serve a wide range of customer densities (WiFi for more dense areas; WiMax for less dense areas). The hope for BPL is to fill a rural gap. This, however, may be years away – if ever.



¹Terrain, foliage and other objects impacts the viability of wireless.

²In theory

Figure 3: Hierarchy of Population Densities and Technologies

When ever considering a technology, we recommend that you start with developing your vision, objectives, and measurements of success. These steps are essential to help ensure your investment will deliver anticipated benefits.

If you have any questions or would like additional information on broadband technologies and applications, please contact Thomas Asp at 410.964.5700, or at tasp@internetCTC.com.

About the author: Thomas Asp has been serving public power systems for over 20 years. Tom is recognized as an expert in evaluating and offering recommendations regarding municipal broadband communications systems. He has been actively involved with telecommunication market research and feasibility analysis for over a decade.

About CTC: CTC is a public interest communications consulting firm. We provide engineering and financial analysis for public sector and non-profit clients throughout the United States.

