

# A Managerial Analysis of Fiber Optic Communications

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## INTRODUCTION

A form of fiber-optic communication delivery in which an optical fiber is run directly onto the customers' premises is called Fiber to the Premises (FTTP). This contrasts with other fiber-optic communication delivery strategies such as Fiber to the Node (FTTN), Fiber to the Curb (FTTC), or Hybrid Fiber-Coaxial (HFC), all of which depend upon more traditional methods such as copper wires or coaxial cable for "last mile" delivery (Fiber to the Premises, 2007).

While high-speed fiber-optic cables are more often used to provide the primary links, the "last mile" to each home still plays an important role in the quality of service and bringing high-speed broadband to an area that is largely dependent on this last-mile connection.

FTTP involves laying optical fiber from a central location (switch) to a termination point (the home or business), and could potentially deliver broadband at speeds of up to 100Mbps. The actual speed is determined by the size of the Passive Optical Network (PON). The technology is capable of transmitting data at speeds of up to 2.5Gbps; this amount is divided by the number of termination points on the PON to determine the actual bandwidth to each end point.

Replacing copper infrastructures with fiber to every home in an area is an expensive proposition, but the rewards could be great for telecom providers. An FTTP infrastructure would enable those providers to not only provide high-speed broadband; they could also expand into other areas such as cable programming. The Baby Bells have another incentive to roll out FTTP as well; the FCC requires them to share their copper wires with their competitors, but that requirement would not apply to new FTTP infrastructures. This ruling gives providers a major incentive to roll out FTTP, despite the large initial investment that is required.

Copper, the predominant connection to the home used today, has inherent limitations both in terms of length from home to switch, and amount of bandwidth that is provided. FTTP also has a great advantage over Digital Subscriber Line (DSL), which provides broadband over existing copper, because DSL infrastructures must have more central relay points due to distance limitations. DSL is limited to only a few thousand feet between the switch and the home; FTTP allows for up to 49.6 miles (80 kilometers) between the home and the central switch.

Cable broadband already has a head start, but FTTP offers some advantages, in that cable has a limited upstream bandwidth. FTTP, while still very new, holds great promise. It will enable providers to easily provide customers with a single bundle of services that comprise voice, data, and video. Ultimately, FTTP will deliver higher bandwidth to the home, and a wider range of services at an affordable price. While some FTTP projects focus on replacing existing copper cable, new "greenfield" areas such as new housing developments are likely to see FTTP from the very beginning (WiseGeek, 2007).

Fiber to the premises can be further categorized according to where the optical fiber ends:

- FTTH (Fiber to the Home) is a form of fiber-optic communication delivery in which the optical signal reaches the end user's living or office space; or
- An optical signal is distributed from the central office over an optical distribution network (ODN). At the endpoints of this network, devices called optical network terminals (ONTs) convert the optical signal into an electrical signal. For FTTP architectures, these ONTs are located on private property. The signal usually travels electrically between the ONT and the end-users' devices (Fiber to the Premises, 2007).

The Regional Bell Operating Carriers (RBOCs), AT&T/BellSouth and Verizon, that serve 123,000,000 of the 180,000,000 access lines (68%) in the U.S., to greater or lesser extents, are now in the process of rolling out FTTP (FTTP Equipment & Fiber Cable Requirements, 2007).

RBC Capital Markets has reported good numbers on the interrelated issues of FTTH and IPTV growth, according to this report. RBC says that there are 6 million fiber homes worldwide, an increase of 140 percent compared to 2005. The majority are in Japan. Other deployments, RBC says, are earlier in development. China Telecom and China Netcom are doing trials. Hong Kong Broadband has passed almost one-third of the homes that it serves with fiber. Municipalities are active, while telecommunication companies (telcos) in Scandinavia, the Netherlands, and Ireland — via Magnet Networks — are FTTH players. In the U.S., RBC reports, Verizon has embarked on a FTTH deployment, while AT&T is mixing fiber-to-the-node (FTTN) for overbuilds and fiber to the premises (FTTP) for new builds. BellSouth is creating a fiber-to-the-curb (FTTC) infrastructure (IT Business Edge, 2006).

Subscribers had never thought of cable operators as providers of voice services, or telephone companies as providers of television and entertainment services. However, the strategies of multiple system operators (MSOs) and telecommunication companies (telcos) are changing, and they are expanding their services into each other's territory. The competition between the MSOs and the telcos is just brewing up.

Many factors influence communications carriers' future and strategies. Among these factors are Internet growth, new Internet Protocol (IP) services such as Voice over IP (VoIP), regulatory factors, and strong competition between the carriers. In the past, RBOC's have centered their competition among each other and ignored the threat of the cable MSOs. The cable modem service has a bigger market share than the digital subscriber line (DSL) service, and as the concept of the VoIP technology is being refined and validated, the cable companies will become major players in providing this service at a cheaper price than the regular telephone service and will compete with the RBOCs. Incumbent carriers are seeking ways to encounter the cable MSOs' threat.

## **BACKGROUND**

RBOCs are concerned about the VoIP technology, since this concept will pose a serious threat to their voice market. Vonage, a leader in VoIP over Broadband (VoB), has about 50,000 subscribers, compared to 187.5 million access lines that the RBOCs have. Cable operators can move into the telcos' territory and offer VoB as they did with Internet access. The cable companies could do this by offering this service through a partnership or by building their own services.

The VoB service is offered to broadband subscribers whether they are cable modem or DSL users. VoB providers do not have their own networks; they simply use the cable MSOs' or the telcos' broadband networks to carry their services. The appeal of the VoB services is the result of its cheaper packages. VoB companies such as Vonage and Packet8 are targeting cable MSOs as partners. For cable companies, this would create a bundle that includes cable modem services and VoB, which will provide a great appeal to the subscriber. Cable MSOs already are in the lead in providing broadband services to subscribers; by adding VoIP via broadband, they will be able to offer telephony at lower prices and have another advantage over the telcos.

Major cable operators have announced their interest in VoIP technology. Time Warner Cable has formed an alliance with MCI and Sprint, and the group has announced that by the end of 2004, it will offer VoIP to 18 million subscribers. Comcast is another cable operator already in the process of testing VoIP in many states, and will offer this service in the nation's largest 100 cities (Perrin, Stofega, & Valovic, 2003b). The MSOs have continued to upgrade their networks to have a bigger share of Internet access and to enter the lucrative voice market. On the other hand, the telcos have continued to develop their networks around DSL and voice service, ignoring television and video services (Jopling & Winogradoff, 2002).

## **FIBER TO THE PREMISES (FTTP)**

To deal with the threat of VoB providers, telcos have to upgrade their networks to compete with the cable MSOs. FTTP is a potential alternative to DSL. It is a great initiative to meet the growing demand of consumers and business to a faster Internet connection and reliable

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