"New" Cable-Based Point-to-Point Telecom Services

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For a number of years, larger multiple system operators (MSOs) within the cable industry have been exploring the possibilities of developing "new" services for subscribers. While there has been considerable press about these activities, it should be recalled that cable was experimenting with "new" services even before the era of divestiture and mega mergers within the telecommunications industries. The interactive and videotext demonstrations of the early 1980s are milestones in the cable industry's earlier attempts to establish revenue streams beyond traditional television distribution. In the early 1990s, much of cable's development activities highlighted "glitzy" new services such as video on demand and multimedia interactive services. While these services will eventually be available, it appears that many cable companies are now concentrating their efforts on developing services for which there are already established markets such as switched telephony and data distribution. This article will focus on cable's entry into these more traditional services for which there are demonstrated subscriber needs.[1]

Many cable companies have been developing their system capacities to deliver a wide assortment of point-to-point services including wired telephony, data distribution of online services, and wireless Personal Communications Services (PCS). While some problems have arisen with distributing these services over cable systems, most modern fiber-based cable plants could provide these new services. Therefore, much of the technological emphasis for these value-added services is on the development of new terminal, switching, and computer hardware and software that can be distributed over the basic infrastructures of cable delivery systems.

The Traditional Cable Paradigm

Historically, cable has been a point-to-multipoint medium distributing broadcasting, satellite originated, and locally originated video services to subscribers. A number of cable systems have also offered their subscribers audio services from radio and satellite-delivered digital audio sources. While some of the programming could be termed "narrowcasting" designed for limited audiences, cable has remained primarily a point-to-multipoint mass medium. Once cable plants were built or expanded, there were no "load factor" concerns as there are in electrical power or telephony systems, and they operated irrespective of the number of subscribers viewing or listening at any point in time. While economic forces were obviously sensitive to subscriber viewing and listening patterns, utilization did not affect the operation of cable technical plants.

These essentially passive cable systems distributing one-way services began to change as the market for pay-per-view services developed. As pay-per-view became economically attractive, cable operators began rebuilding their systems to provide upstream data for managing this new service. While some franchises were built to handle transactional services, pay-per-view has been the most prominent service using a system's two-way capabilities. However, even pay-per-view is essentially a point-to-multipoint service for distributing subscriber ordered television signals. Even the next generation of this configuration, video on

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demand, will be distributing a mass medium, or point-to-multipoint, programming product.

This traditional cable paradigm has shifted in the past few years as cable system operators have begun to develop point-to-point services. Several significant political and economic events have prompted this development.

- A series of judicial decisions since the 1984 AT&T divestiture has granted telephone companies an increasingly widening entré into the cable business. This competitive threat has stimulated the cable industry to diversify its line of services.
- Many states have modified their laws and regulations to permit competition in the local exchange carrier business. Cable companies in these states can now develop wired telephony services.
- Fortunately for the industry, the timing of the authorization to deploy point-to-point services is fortuitous, as cable companies have been looking for new sources of revenue to offset rate reductions imposed by the 1992 Cable Television Consumer Protection and Competition Act.
- Repeated Congressional attempts to rewrite the Communications Act of 1934 have also signaled the federal government's interest in a deregulated environment that would encourage cable's entry into point-to-point services. However, the cable industry is also wary of this legislation, as it will probably allow more telephone company competition in the television distribution business.

The availability of greater bandwidth also encouraged cable companies to investigate the development of point-to-point services. Upgraded systems have often been designed with excess bandwidth capacity and two-way capability greater than what is needed today for the distribution of traditional cable services. Therefore, when rebuilt systems are "overbuilt," an economic incentive often develops to tap this underdeveloped asset. Furthermore, as telcos began to position themselves as "full-service" providers, the cable companies have responded to this threat by finding ways to use their systems to offer a comparable array of services.

This convergence of regulatory, technological, and economic events is the background for the cable industry's recent commitment to develop wired switched telephony, data transmission, and PCS point-to-point businesses.

Wired Switched Telephony

The cable industry is positioning itself to become a player in the $90 billion a year local exchange carrier business. The industry is developing the necessary technical and marketing expertise in cable telephony by conducting demonstration projects on a number of cable franchises. While full tariffed service is being offered at a few selected sites, most operating cable telephony systems today are experimental or demonstration projects. For example, Time Warner is testing multiple telephony configurations on its Rochester, New York franchise. Telelabs is supplying the equipment which actually serves subscribers on this demonstration project.[2] However, Time Warner is also testing other equipment on this system to determine which hardware is best in reducing noise on a fiber/coax system and which equipment provides reliable service during power outages.[3] Uninterrupted service is essential during power outages in order to provide access to emergency numbers such as 911. The technical problem that must be resolved is that the power for continuous telephony service must be carried on the incoming telephone line, and the voltages on this line are higher than are normally permitted on a cable company's coaxial cable.

Since cable noise can be a significant problem to the widespread deployment of cable telephony, it is also being studied in several other experiments. For example, Cablevision Lightpath, Inc., the telephone subsidiary of Cablevision System Corporation, is trying to determine whether the noise in the upstream portion of a two-way cable system can be sufficiently reduced to provide telephone quality service. The upstream sub-band is located between five megahertz (MHz) and 40 MHz and is very susceptible to interference from over-the-air users of this portion of the spectrum.

After initial testing is complete, Cablevision expects to begin residential telephone service on Long Island using "Cornerstone" equipment supplied by Northern Telecom, Ltd.[4] Cablevision has also negotiated an interconnection agreement with NYNEX, the current provider of local telephone service. This agreement will allow customers to retain their existing telephone numbers when changing service providers. It also stipulates how Cablevision and NYNEX will pay one another for telephone calls between each other's customers.[5] The location of this Cablevision demonstration is significant, as the company eventually plans

to offer telephone service to its one million cable subscribers in the greater New York City area.[6]

NewChannels has also begun a telephone trial on its Syracuse, New York cable system. The company is using Telelabs equipment to connect to a few homes, but expects to expand the number of subscribing homes in the demonstration by the end of 1995. NewChannels is also focusing its development efforts on noise and other problems associated with the sub-band upstream path which have the potential of creating serious problems for an entire system. The company has vowed to resolve all the major technical problems before expanding the scope of the project from a limited demonstration to full telephony service.[7]

Teleport Communications Group (TCG) is an alternate access carrier owned by cable MSOs Comcast, Tele-Communications Inc., Cox Enterprises, and Continental Cablevision. TCG plans to initiate a small-scale technical demonstration of residential telephone service on Comcast's Baltimore franchise early in 1996. This demonstration project is especially interesting because it will test ADC Telecommunication's architecture which is capable of delivering video, telephony, and data services on a common platform.[8]

Cox Communications is also launching a technical telephony demonstration on its Hampton Roads, Virginia cable system. As with the TCG demonstration, Cox is interested in investigating the possibility of integrating voice, video, and data signals into a single data stream. The Cox experiment will use equipment developed by Northern Telecom using Asynchronous Transfer Mode (ATM) technology.[9]

As these examples suggest, the cable industry does not expect to be ready to offer extensive commercial telephone service before mid-1996. Cable Television Laboratories, Inc. has been assessing cable telephone technology on behalf of the industry and has suggested that, while many technical problems have been addressed, the demonstrations needed to prove the concepts have yet to be completed. Telephone equipment vendors are beginning to supply CableLabs with equipment for testing and evaluation. However, the tests and demonstrations may be the extent of most cable telephone activity in 1995. Along with resolving the technical problems, one of the issues that is confronting MSOs is deciding which of several competing equipment configurations to adopt for their franchises. While some configurations will allow more rapid deployment of wired telephone service, they may become outdated in a limited period of time. Cable companies may have to weigh the marketing advantages of early entry into the competitive local exchange service business versus the disadvantages of rebuilding their plants in a relatively short period of time.[10]

Even after considering the tradeoffs, a recent study by Morgan Stanley & Company concludes that a cable operator's entry into the telephone business is justified. The research suggests that, while capitalization and start-up costs for telephony are substantial, such an investment may ensure a significant increase in a cable system's value. This conclusion is interesting since that study assumed that only 15% of a cable company's customers would initially subscribe to telephone service.[11]

In contrast to the U.S. experience, it should be noted that cable telephony has been more widely developed in the United Kingdom. In early 1995, the Independent Television Commission reported that there were more than 700,000 cable phone lines there. These lines were deployed on 65 different franchises around the country.[12] U.S. cable MSOs which have built cable systems in Britain with telephony capability include Cox, Comcast, and TCI.[13]

Data Delivery

Several cable companies are planning to offer data delivery for the Internet and other online computer services as their first point-to-point subscriber service. These companies are anticipating that data will provide the necessary revenue for later development of telephony and other services. Technology and market research appear to be supporting this assessment.

Information providers and cable companies are interested in utilizing the wider bandwidth of cable to deliver interactive data services to subscribers at faster speeds than are possible through conventional computer telephone modems. Data transmission via cable has become much more feasible in the past several years, as there have been recent improvements in the RF cable modems needed to tie cable into home computers. Unlike selling cable telephone services, which is almost duplicative of telco offerings, cable companies can sell data transmission as a faster data service than is provided by conventional residential telephone lines. While telcos could offer ISDN and specialized data services, the cable industry believes subscribers will perceive value in cable data transmission.

Recently, there have been several key tests that have studied the technology of cable-based data distribution systems, as well as a number of demonstrations which have focused on cable delivery of selected online services. In the technology area, Com21 Inc. is focusing on developing cable-based ATM switching delivery systems without having to employ expensive ATM switches. This technology would move data at a bidirectional speed of 1.5 megabits, but would only consume 700 kilohertz of bandwidth. Such a data transport system would be useful for interactive data, and even cable telephony applications. While this technology may not be rolled out on a wide scale for several years, a number of MSOs are considering adopting it on their franchises. Com21 expects to test this high-speed system on a cable system in Palo Alto, California.[14] Rogers Cablesystems is also testing high-speed data transmissions on cable systems.

Software developers are also anticipating high-speed cable access into the residential market. Novell, Inc. is developing software called NEST which will connect personal computers to high-speed data servers over cable and telephone networks. General Instrument Corporation is developing some of the hardware to facilitate use of the Novell data transport system.[15]

In Phoenix, Cox is also testing the use of high-speed data transmission for the commercial market. The company is offering 10 megabit Ethernet connectivity to businesses. Cox hopes that the necessary hardware will be available for commercial deployment of this service in 1996.[16]

TCI is also planning to test high-speed data transmission in an experiment with Microsoft in the Seattle area. This demonstration will focus on providing connectivity for a wide variety of applications that require high-speed data rates.[17]

A number of cable systems are now demonstrating their capacities for providing Internet, Prodigy, and other online services. For example, the Glasgow, Kentucky Electric Plant Board has launched a project with MCI Communications which will deliver Internet service to that city's cable subscribers. This project will provide two Megabit Internet services to cable customers at no additional charge.

Other MSOs including Comcast, Continental Cablevision, Jones Intercable, and TCI are also introducing Internet service over some of their systems.[18] TCI plans to launch Internet services to subscribers in Boulder, Colorado and Sunnyvale, California in 1996.[19]

For the past several years, Cox has been offering the Prodigy online service to some of its San Diego franchise subscribers. For this pilot project, Cox is using RF modems developed by Zenith. Research on the usage patterns of the 150 participants in the study indicate that cable connected subscribers to Prodigy use the online service for longer periods of time than telephone connected subscribers.[20] Other MSOs are also offering Prodigy on some of their franchises.

Time Warner plans to wire 500 homes and offices in Elmira, New York with cable modems to test a local online service. News content for this service will be provided by a local newspaper. Subscribers in the test will also also have access to national online service providers.[21]

Personal Communications Services

The distribution grids of many cable systems are ideal foundations for Personal Communications Services (PCS). For example, much of the fiber and coaxial cable of a distribution system is strung on utility poles. The mini-transmitters and antennas needed for PCS cells can often be mounted on these same poles and tied into the existing fiber. Since cable operators have already negotiated rights-of-way and have wired their physical systems, they are able to reduce the capitalization costs of adding PCS. Therefore, it is not surprising that the cable industry has shown significant interest in the development of PCS. However, unlike wired telephone and data services, a cable company cannot just add PCS as a new product. Since PCS is a wireless medium, a PCS provider must acquire a license from the FCC. Therefore, cable companies have to compete for licenses before offering PCS.

In 1992, Cox Enterprises first demonstrated PCS on a cable system. As a reward for its developmental activities, the FCC awarded the company a "Pioneer's preference" license in October of that year. This grant would have given the company a free PCS license without having to participate in the Commission's PCS auction.[22] However, it was later determined that the PCS Pioneer's preference license violated the terms of GATT, and Cox and the two other companies awarded this preference were required to pay 85% of the value of their licenses to retain their authorizations. Even though Cox was required to pay for its license, the company acquired a very lucrative southern California PCS license at a discounted price and avoided having to compete in the auction.[23]

The PCS license auctions have generated a lot of interest and money from the cable industry. Sprint has formed a joint venture with three MSOs—TCI, Comcast, and Cox—to acquire PCS licenses and establish service in major markets. This venture bid $2.1 billion to acquire PCS licenses in 29 major markets. The three partners in this venture also plan on offering a combination of video, wired and wireless telephony, and data services in the markets in which they have individual franchises.[24] It should be noted, however, that the high bidding prices have forced some cable companies to withdraw from participation in the emerging PCS business.[25]

Current State of Development

A number of cable companies are currently testing wired telephony. However, some technical issues, equipment supply problems, and regulatory issues must be resolved before there will be large-scale deployment of local exchange service. The joint venture of Sprint, Comcast, TCI, and Cox expects to begin commercial telephone service to residential customers by 1997.[26] This prediction agrees with most industry forecasters who do not see regular cable telephone services before mid-1996.

In 1995, data transmission services have also been demonstrated and tested on cable systems, and the results appear promising for data to become the first real point-to-point revenue generating cable service. As with wired telephony service, some problems need to be resolved regarding equipment standardization and availability. Many electronics manufacturers have developed RF modems for the cable market. However, price sensitivity and compatibility issues have retarded full-scale production of these products. While some cable operators are now offering the Internet, Prodigy, and other online services, 1996 may be the earliest date for widespread marketing and deployment of these services. Likewise, experiments with transmitting very high-speed data (10 megabits or greater) to business and residential cable customers will also continue, but will probably not serve a large customer base for several years.

The PCS license auction may have set the schedule for the cable industry's roll-out of this technology. The FCC requires that successful bidders be able to serve at least one-third of their potential customers within five years of acquiring their licenses and have their systems completely built within 10 years. Successful bidders may shorten this implementation timetable in order to begin receiving revenues to offset their high costs of licenses and system capitalization. The cable industry is now heavily financially committed to PCS and should begin offering this service in a few years.

The Future for Cable's "New" Telecom Services

Several factors will significantly determine when wireline telephony, data services, and PCS will be available from cable companies.

Deregulation of Telecommunications

Much of the current state and federal legislation never envisioned a competitive telecommunications environment. Therefore, there have been many legal prohibitions against cable's entry into the telephone business and vice versa. At the federal level, Congress is considering a rewrite of the Communications Act of 1934 which would promote inter-industry competition. This proposed legislation should be watched, as it probably will permit much more telephone industry access into cable's video distribution business. This, in turn, may spur cable operators to invest in other revenue generating businesses such as telephony.

However, traditional state regulations have been mainly responsible for retarding competition in the local telephone business. These prohibitions are now being discarded as a majority of the states have already approved open competition in the local exchange carrier business, and a number of others are considering such a relaxation.[27] The extent to which states deregulate the local telephone business may be the most important factor in determining when cable telephony will be widely available.

Deployment of the Technology

Many hardware and software manufacturers have been providing equipment for the cable industry's various telephony, data, and PCS demonstrations. However, there is only a limited amount of the necessary hardware and software actually in production. Therefore, economies of scale have yet to be reached, which often keeps equipment prices higher than can be justified in business plans. As some of the remaining technical and standardization problems are resolved, cable companies should begin to place equipment orders in sufficient quantities to prompt manufacturers to launch wide-scale production operations at substantially lower per unit costs.

COMPETITION

Other providers of telephony, data, and wireless services should also be watched. Changes in services and/or rates by local exchange carriers will have a direct effect on the market potential for new cable wired services. Similarly, the rate at which competitive PCS licensees build their systems may affect the timetables for the construction of cable-owned PCS systems.

The cable industry seems poised to begin offering "new" point-to-point services. Unlike cable's attempts to launch videotext or interactive media services, these point-to-point services would appear to fulfill demonstrated subscriber needs with practical deliverable services. The technology for cable telephony, data, and PCS is essentially developed and will soon be ready for wide-scale deployment. Data services will probably be the first deployed, as they have the potential to generate revenues with the smallest capital investment. Wired telephony and PCS may not be far behind as the cable companies seek additional revenue from their fiber-based infrastructure and recently-acquired PCS licenses. The next several years will be a challenge for the industry as it seeks to cost-effectively deploy, market, and deliver these services in the emerging competitive telecommunications environment. ntq

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