Phone Companies Get into the TV Business

Sixto Ortiz Jr.

Competition in the telecommunications industry has become fierce in the past few years, and phone companies have increasingly found themselves on the losing end.

For example, competition from wireline, cellular, and voice over IP (VoIP) services, including those from cable TV companies, has reduced telephone carriers' customer bases, prices, and profit margins.

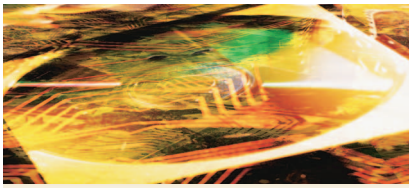
The carriers are thus looking for new products to yield income and new ways to gain entry into potential customers' homes. At stake are billions of dollars and the future of the telecommunications industry.

To accomplish their goals, phone carriers are trying to provide the "triple play" of voice, video, and data services, which cable TV companies already offer.

For example, Verizon plans to offer digital TV services via conventional broadcast technology directly to homes over an $18 billion, high-speed fiber network it is building.

However, many phone companies don't want to spend so much money and are instead building fiber only to neighborhood nodes. They then plan to provide TV services over existing copper-based DSL systems via Internet-protocol-based technology.

They hope IPTV will generate badly needed revenue via programming subscriptions and payments



for additional services such as digital video recorders, video on demand (VoD), and videoconferencing, noted Michelle Abraham, principal analyst at market research firm In-Stat.

AT&T has already spent $4.6 billion building fiber to local nodes, from which it will provide TV services via its DSL system. Other companies worldwide are undertaking similar projects, as the "IPTV Providers throughout the World" sidebar discusses.

Proponents say IPTV might attract customers from cable and satellite TV services because it will offer more interactive functionality. However, IPTV still faces technology and marketplaces challenges before it can become successful.

TV OVER IP

Serious IPTV research began with Bell Atlantic's asymmetric-DSL-based VoD trials in 1992, according to Bob Larribeau, senior analyst and IP and broadband video specialist at Multimedia Research Group (MRG), a market analysis firm.

Next Level, later acquired by Motorola, and Alcatel continued early work on IPTV, he added.

How it works

IPTV uses IP networks to deliver TV programming from a central location to a base of multiple subscribers. According to Larribeau, a large IPTV network consists of six elements.

The *super video headend* receives video signals for national programming and VoD content from content providers' satellites, processes and amplifies the signals, converts them to the appropriate channels, and rebroadcasts them to *regional headends* via an *IP-based multiprotocol label switching network*. MPLS networks improve packet-processing speeds and thereby enhance performance.

Regional headends receive material from the super headends, as well as from local content providers, and also house the servers that supply VoD to local subscribers.

Both types of headend systems include antennas, preamplifiers, frequency converters, demodulators, modulators, processors, and similar equipment.

The IP-based *aggregation network* sends video from the regional headends to the *access network*, which is the phone company's infrastructure for delivering video to viewers.

The IPTV system also runs various types of *software* for managing and administering the network and video content.

Software

In addition to software that provides basic functionality, IPTV systems run middleware and both back-office and digital rights management (DRM) software. The latter prevents unauthorized copying and usage of copyrighted content.

IPTV middleware supports the system's basic operations and other functions such as subscriber authentication, channel selection, the providing of programming guides,

Published by the IEEE Computer Society

and VoD service. The middleware interfaces with the back-office systems, which handle subscriber, device, and content management, as well as billing-related services.

In IPTV, unlike cable TV, the middleware resides on the network. Thus, IPTV boxes don't require additional processing power to run the middleware.

This also gives service providers flexibility in how they use middleware—instead of having to reprogram thousands of set-top boxes—to implement viewer interactions with content, explained MRG's Larribeau.

IPTV leverages a number of standards-based technologies to enable software-based security, including authentication, digital certificates, public-key infrastructure, and the Advanced Encryption Standard, said Derek Kuhn, Alcatel's senior director of strategic solutions.

IPTV software typically provides various features such as multiple pictures-in-a-picture. In addition, the software and IP networks' two-way communications capabilities let users interact with TV shows, such as by voting for program contestants, answering questions on game shows, betting, and videoconferencing, said In-Stat's Abraham. This would enable the approach to compete with cable and satellite TV, which already offer such capabilities, she noted.

Viewers could also choose multiple camera angles while watching sporting events and search for and view movies and TV programs from a library of digital content. And they could share pictures and home videos by uploading the content via a PC to a special Web site that others could view via their TVs.

The software also integrates with other IP-based services like VoIP and Web browsing, allowing capabilities such as TV-based Internet surfing.

Microsoft provides software called Microsoft TV IPTV Edition for various phone companies worldwide, including AT&T, Bell Canada, BT (formerly British Telecom), Deutsche Telekom, and Swisscom, noted Jim Baldwin, Microsoft TV IPTV Edition product manager.

The software handles all aspects of TV service, including content acquisition; user viewing of and interaction with programming; and integration of the software with the IPTV system, service providers' operational and business systems, and their application and content servers, he said.

Alcatel offers a set of applications—5900 Communications TV, 5900 Amigo TV, and 5900 My Own TV—that run on top of Microsoft's TV IPTV Edition platform. These applications let viewers upload features such as telephone caller ID to their TV sets and upload content to network locations via PCs so that others can watch it on their TVs.

Myrio's TotalManage application enables service-provider provisioning and management, content management, the bundling of channels for packaged offerings, transaction processing, billing, and data collection.

Other IPTV software includes Accedo Broadband's Accedo Application Provisioning Solution, Thales' SmartVision middleware, Latens' IP CAS for DRM and content-delivery security, and Orca Interactive's RIGHTv for services such as VoD and video recording.

IPTV Providers throughout the World

Telephone carriers in various parts of the world are offering or preparing to offer TV services over their IP networks.

AT&T recently moved from the experimentation phase of its Project Lightspeed to commercial deployment of its U-verse service, starting in San Antonio, Texas. The company plans to widen U-verse's availability in San Antonio and expand it to other cities by the end of this year.

BT (formerly British Telecom) plans to launch its BT Vision service in the UK later this year, using a Philips set-top box and Microsoft TV IPTV Edition software.

Hong Kong-based PCCW provides telecommunications services for its region and has over 500,000 subscribers for its NOW TV IPTV service, which offers many channels including the Discovery Channel, E!, ESPN, and HBO.

Germany's Deutsche Telekom will partner with content provider Premiere to provide Bundesliga soccer matches over IPTV services that run on Microsoft TV IPTV Edition software.

Hardware and services

Set-top boxes—which contain elements such as IPTV processors or systems-on-chip from companies like Sigma Designs and STMicroelectronics, dynamic RAM, disk storage, USB ports, and video outputs and inputs—are at the heart of IPTV service.

The Motorola and Scientific-Atlanta boxes that deliver AT&T's U-verse IPTV service, shown in Figure 1 on the next page, provide capabilities such as digital video recording and standard- and high-definition transmissions.

Other IPTV hardware includes digital video headends made by companies like Harmonic and Scientific Atlanta, servers and storage made by companies such as Hewlett-Packard and IBM, and residential gateways made by companies like 2Wire.

Because many IPTV features are software driven, systems don't require hardware to offer functionality such as picture-in-picture, said AT&T spokesperson Brad Mays.

Many IPTV systems will provide quality of service—critical to avoiding the transmission delays and interruptions that could ruin the viewing experience—via approaches such as virtual LANs, which can be isolated from the overall network and allocated bandwidth as neces-

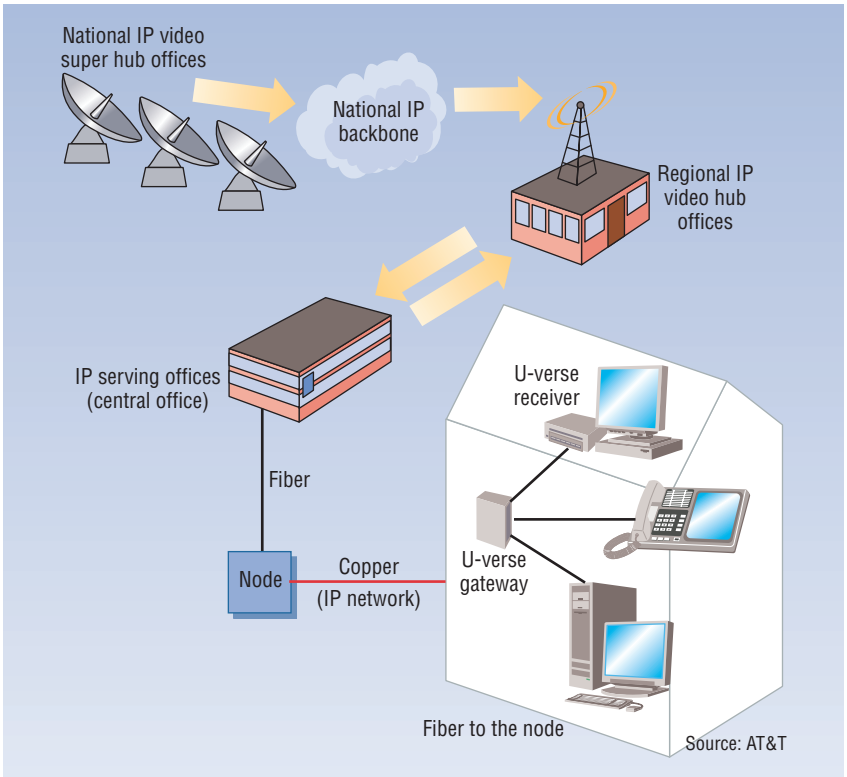


Figure 1. In AT&T's U-verse IPTV system, the national super hub receives signals for national programming and video-on-demand from content providers' satellites. The super hub then aggregates and processes the material and sends it over a national IP backbone to regional video hubs. The regional hubs store the content, provide the intelligence necessary to deliver the material, and send it to local serving offices. These facilities distribute the programming via fiber to a local node and then via DSL to subscribers.

sary. Technology based on the Internet Engineering Task Force's DiffServ (differentiated services) standard will also help provide QoS, according to MRG's Larribeau.

Eventually, though, he said, IPTV will have to get QoS via admission control technology, which allocates bandwidth and allows latency depending on traffic requirements.

Bandwidth efficiency

Phone companies must use their DSL systems' limited bandwidth efficiently to provide data-intensive IPTV services.

The carriers plan to use IP multicasting as much as possible because it minimizes the bandwidth consumed by video. With multicasting, a single copy of a program is transmitted through the network and is replicated only where necessary to send to individual subscribers. This contrasts with unicasting, in which a system transmits a separate copy of a program throughout the network to each recipient.

Moreover, AT&T's Mays said, IPTV delivers only the channel that viewers request to their set-top boxes. This uses far less bandwidth than cable TV, which delivers multiple channels to every box, he explained.

IPTV systems will also use compression technologies, such as the Society of Motion Picture and Television Engineers' VC1, to save bandwidth.

AT&T will use the advanced MPEG-4 multimedia compression codec. MPEG-4 uses a lossy compression algorithm based on MPEG-1, MPEG-2, and Apple's QuickTime. It reduces per-channel bandwidth usage for a high-definition TV signal from MPEG-2's 15 Mbits per second to 8 Mbps, said In-Stat's Abraham.

In addition to saving bandwidth, compression technology will enable set-top boxes to use smaller disk drives, Mays said.

The bonding of multiple transmission paths into a single channel may help IPTV providers increase the available throughput by up to four times.

These techniques, along with the use of fiber, enable IPTV systems to provide the 20 Mbps of bandwidth that, MRG's Larribeau said, they need to transmit sufficient data at high enough speeds to yield a smooth viewing experience.

IPTV HURDLES

One of phone carriers' biggest IPTV challenges will be having enough bandwidth for both the potential growth in data-intensive high-definition programming and what they hope will be a growing number of customers.

Also, noted Larribeau, as consumers demand more VoD content, which will require delivery of a single set of content to a single viewer, IPTV providers will have to use unicasting, which consumes more bandwidth.

According to In-Stat's Abraham, IPTV is a new technology, so consumers will resist adopting it unless they are convinced it has advantages over cable or satellite TV.

In any event, IPTV will face competition from well-established cable and satellite services, which already have many customers. For example, about 85 percent of US households subscribe to these services, according to Abraham.

IPTV providers will thus depend on lower prices and new capabilities to compete, she said.

However, added Larribeau, charging competitive rates could be difficult because, at least at first, IPTV will have far fewer subscribers than cable and satellite TV services.

Meanwhile, IPTV providers will also have to market their products effectively and figure out ways to differentiate them, noted Arjang Zadeh,

managing partner of the Global Network Service Line in consultancy with Accenture's communications and high-tech industry practice.

Moreover, IPTV carriers will need access to movies, TV programming, and other content—already available to cable and satellite providers—for distribution to subscribers. Before this happens, content providers will want to make sure carriers address their concerns about video quality, network security, and piracy, said Larribeau.

One potential roadblock could be franchise agreements that cities in most US states require from providers that want to offer TV service. Cable companies have had decades of negotiating experience with cities, but it's a new world for the telephone companies. This could slow their progress, explained Abraham.

At first, IPTV will offer few innovative services and instead will provide those already found in cable and satellite TV, Abraham predicted. Thus, she noted, the initial battle for new customers will be won largely on price.

Over time, said Zadeh, IPTV will move toward a download-and-play model—featuring VoD and other on-demand services—that will complement, rather than replace, standard broadcast TV. This will occur, he added, because increasing broadband speeds will let users more easily download and play TV content and because the interactive advertising model has matured enough to create an effective revenue stream.

Larribeau expects IPTV to do well in Europe. "There, cable and satellite are not significant factors in the market, so IPTV services will bring content that viewers cannot get in any other way." In North America, though, he added, IPTV will have to establish a position in a saturated market where cable and satellite television are very strong.

MRG predicts the number of global IPTV subscribers will grow rapidly from 4.3 million in 2005 to 36.8 million in 2009.

Zadeh, on the other hand, was not as optimistic about the technology's prospects. He predicted that growth will be slow and that "it is very possible that many [phone carriers] will give up on IPTV and invest in other services, such as wireless."

"This will be tough going," noted Larribeau, "but they have to do it to defend themselves from further encroachment by cable data and telephone services." ■

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