

THE VOICE OF BROADBAND

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Editor: Teresa Mastrangelo

Happy New Year 2007! We would like to thank each and every one of you for your continued interest and wish you the best for a prosperous new year.

2006: The Year in Review

Since this is the first newsletter for 2007, we will take a look back at some of the major events that impacted the broadband market during 2006 and will take a look at what's in store for 2007.

Mergers and Acquisitions

2006 marked a noticeable acceleration in both vendor and operator consolidation as both groups look to expand their footprint, enter new markets, enable solutions in growth areas such as IPTV and mobile-media services as well as to achieve cost synergies. Two of the most notable mergers during 2006 included AT&T-BellSouth and Alcatel-Lucent.

A comprehensive list of wireline mergers and acquisitions is located at the end of this newsletter.

What's Ahead for 2007?

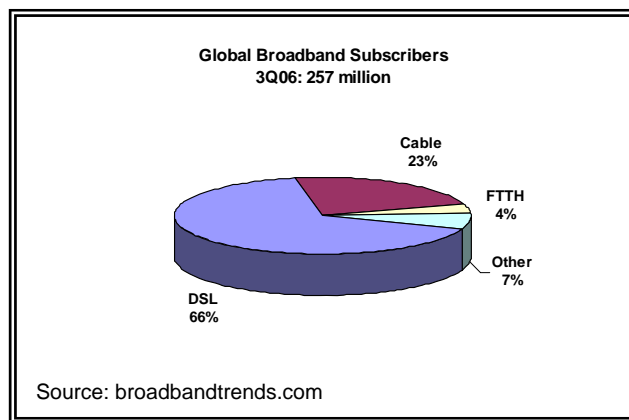
Consolidation is expected to continue during 2007 as vendors continue to fill in the gaps within their product lines and operators continue to expand their footprints into emerging growth markets such as Eastern Europe, Latin and South America as well as Southeast Asia. From a vendor perspective, we anticipate more acquisitions related to IPTV, Carrier Ethernet and FTTH.

Exploding Broadband Growth

At the end of 3Q06, global broadband subscribers reached 257 million, with Asia Pacific breaking through the 100 million mark. DSL remains the dominant broadband of choice for operators in every region but North America. Nonetheless, strong broadband demand combined with network upgrades greatly benefited most DSL equipment vendors during 2006 – leading to record level port shipments. Unfortunately, it has also resulted in a continuing drop in price per port, which is now as low as \$20 in some markets.

What's Ahead for 2007?

Broadband subscriber growth is expected to remain robust, reaching as high as 350 million, despite growing strong penetration in many Asia Pacific markets as well as Western Europe. Nonetheless, operators are now introducing new broadband-based multi-media services which are expected to encourage even higher adoption rates.



Home Networking

While home networking technologies have been around for a while, the introduction of IP-TV and other video services made this subject a high priority for many network operators. As such, industry organizations and silicon vendors renewed and intensified their marketing efforts to increase awareness and interest in their solutions. This resulted in a wave of funding as well as adoption by major operators around the world. Although solutions are available to support every medium available (phoneline, powerline, coax and Ethernet) there is no "perfect" solution that meets the needs of each operator. These include: "no new wires", easy installation, high and consistent throughput at the MAC level, full coverage, enables service portability and perhaps most importantly, makes certain that the quality of the service and the quality of the experience is guaranteed at any point and on any device connected to this network.

What's Ahead for 2007?

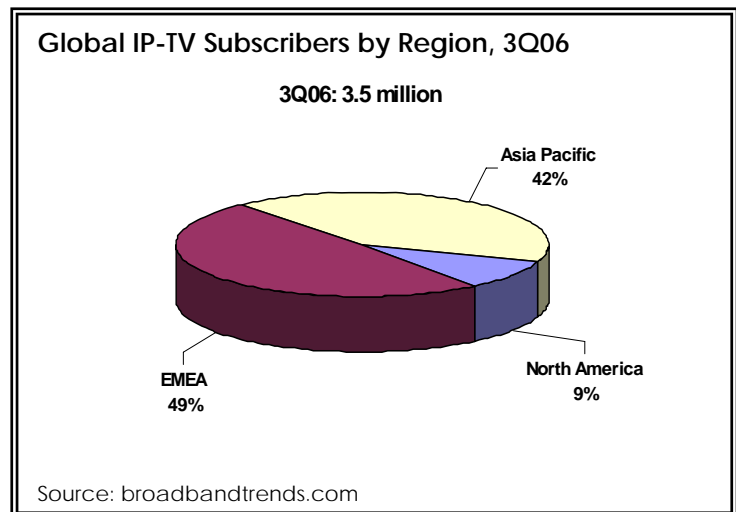
Progress will continue to be made for all wireline based home networking solutions to increase MAC Level throughput and QoS. However, wireless solutions will likely get a boost once the 802.11n specification is standardized, which is expected to occur during 2007. In addition, solutions based on UWB and Wireless HD also offers promise.

IP-TV Gains Momentum

Significant progress was made in IP-TV during 2006, as major operators across the globe formally launched service. Notable launches included those by AT&T, BT, T-Online Hungary, T-Online Germany, T-Online France, Swisscom, Elisa (Finland), and Telefonica O2 (Czech Republic), Hanaro Telecom, JazzTel, Maroc Telecom, as well as a number of Independent Operating Companies in the United States.

What's Ahead for 2007?

2007 will remain a launch year as larger operators continue to upgrade their network to support high-bandwidth video services. However, look to North America as the IP-TV proving ground, as strong cable competition will require Telcos to raise the bar to new levels by offering innovative applications that will benefit the entire industry, in order to capture customer mindshare and entertainment dollars.



Wi-MAX Enters the Mainstream

Wi-MAX kick started 2006 in a big way, as the first wave of fixed Wi-MAX certified products hit the market and the mobile Wi-MAX standard (802.16e-2005) was ratified. To date, the WiMAX Forum has granted certification to products based on the defined Frequency Division Duplexing (FDD) system profile operating in the 3.5GHz frequency spectrum and all are for Fixed WiMAX Applications. Certification for mobile WiMAX began with an Interoperability Fest in September 2006, with the first certified products expected to be available in early 2007.

Wi-MAX also got a major boost when Sprint-Nextel announced its plans to invest \$3 billion to build and deploy a 4G wireless broadband network based on the Mobile WiMAX IEEE 802.16e-2005 standard offering speeds of 2-4Mbps. Additionally, Clearwire and Intel have agreed to jointly develop, promote and market a mobile WiMAX service offering as a co-branded service available only over Clearwire's mobile WiMAX network in the United States.

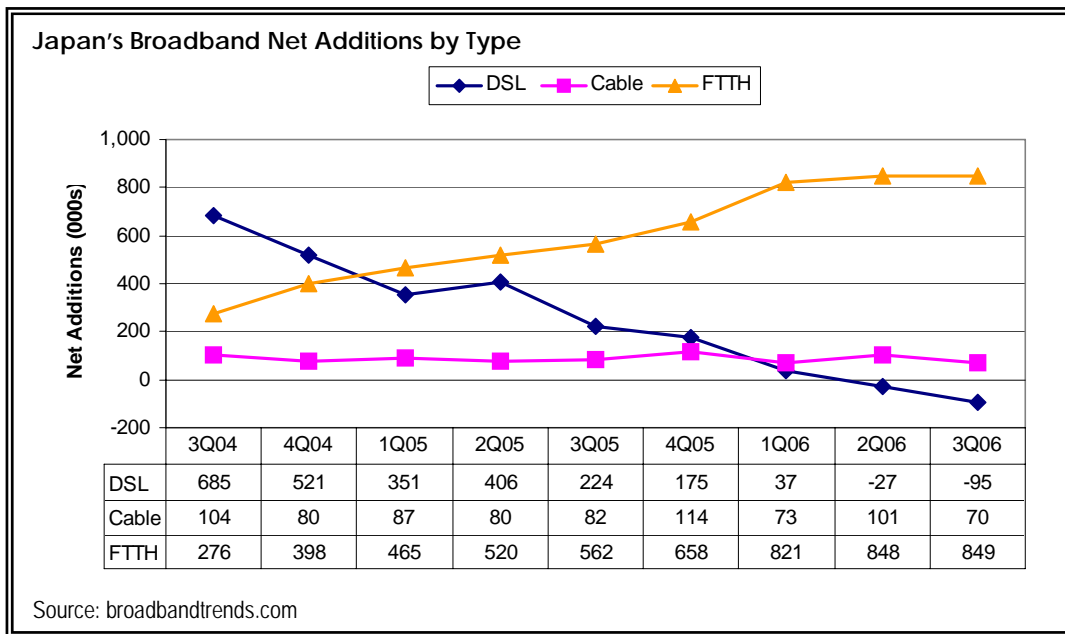
What's Ahead for 2007?

Wi-MAX, particularly mobile Wi-MAX will move from trial to commercial deployment in a number of markets. Additionally, it is expected that a number of Wi-MAX enabled devices such as notebook computers, ultramobile personal computers, PDAs, gaming consoles, MP3 players, and other handheld devices will become available to the consumer market during 2H07.

Fiber-to-the-Home - The Need for Speed

During 2006, the FTTH market has benefited from a number of events, including high profile FTTH deployments and trials by a number of Tier 1 operators, planned city-wide municipal networks in many large European cities, the Tri-BOC GPON RFP, interoperability progress and declining equipment and deployment costs. These events help to reinforce the attractiveness of FTTH, as operators begin to offer advanced broadband services, such as gaming, IP-TV, video-on-demand, and HDTV as well as address the competitive threat by cable operators as they begin to implement their own high-bandwidth solutions utilizing DOCSIS 3.0 or channel bonding.

During 2006, Verizon finally offered insight into the status of its FiOS Fiber-to-the-Home Service offering a large amount of information related to subscribers, homes passed and the cost of deployment. FiOS is now being deployed in over 1,000 communities, passing 6.0 million homes. Across the ocean in Japan, FTTH now represents nearly 29 percent (7.15 million) of all broadband subscribers, growing at nearly 900,000 subscribers per quarter and starting to replace DSL at an accelerating pace.



What's Ahead for 2007?

FTTH is expected to get a big boost during 2007, as operators such as France Telecom and Free in Europe; as well as KT, Chunghwa and SingTel in Asia Pacific begin widescale FTTH deployments. In North America, Verizon and the IOCs are expected to maintain its momentum, while anything is possible with the "new at&t". The industry will continue to argue which technology and topology makes the most sense, especially as EPON proponents look towards NG-EPON in the face of growing GPON deployments.

Cable Finds it Voice, Especially in North America

Cable operators in all regions of the world are beginning to implement and offer voice services over their cable infrastructure. However, operators have been most aggressive in North America. At the end of 3Q06, North American cable operators contributed more than 70 percent of the global Cable VoIP subscribers. The second largest region is EMEA. In North America, net additions for Cable VoIP are now exceeding one million subscribers per quarter, and make up more than 80 percent of total VoBB net additions. At the end of 3Q06, there were 6.3 million Cable VoIP subscribers in North America versus 2.8 million VoBB over other broadband technologies. Cable operators owe their success to attractive "triple-play" bundles, combined with offering a product that essentially replicates the quality and reliability of traditional phone service and makes the consumer transition seamless.

What's Ahead for 2007?

Cable operators are quickly adding new features to their voice service, which they hope will increase the value of the service, as well as attract new customers. Some of these features include Call Management, Customized Ring-Tones, Soft-Phone capability, Voice Activated Dialing, Unified Messaging, Caller-ID TV and video telephony.

In addition, Comcast, Time Warner Cable, Cox Communications and Advance/Newhouse Communications, in a joint venture with Sprint-Nextel, are expected to add not only a wireless voice component to the bundles, but also add capabilities for Fixed Mobile Convergence (FMC).

IMS/Fixed Mobile Convergence.

During 2006, IMS and Fixed Mobile Convergence (FMC) were hot topics as operators looked for new ways to leverage their network infrastructure to offer end-users Any Service over Any Device, Anywhere. FMC can be achieved through two means: Gateway-based access convergence, such as UMA or Server-based Access via IMS. During 2006, UMA found much success as UMA-based DMH service was launched by Orange/France Telecom; T-Mobile USA; TeliaSonera; Telecom Italia and BT. In addition commercial UMA products were introduced by Motorola, Nokia, Alcatel-Lucent and Ericsson, while Samsung, Motorola and Nokia, all delivered mainstream, UMA-enabled dual-mode handsets.

However, UMA has its drawbacks, such as working only with GSM networks and the fact that it cannot extend FMC services to wired handsets or other types of devices. While UMA offers an immediate solution to offering FMC, the longer term solutions will likely draw on IMS. An IMS framework allows a common control layer for the Fixed and Mobile networks and the convergence of fixed and mobile services. This becomes an escalating necessity as operators look to deploy next-generation applications and services across multiple network environments.

However, IMS is admittedly complex to deploy and unfortunately a number of vendors are implementing their own interpretations of the standards. Nonetheless, IMS is viewed by leading operators as the "best identified standardized architecture for the evolutions of fixed, mobile and convergent networks".¹

What's Ahead for 2007?

Interoperability between different vendor's IMS solutions remains a large concern for operators. Therefore, the IMS Forum will host a series of Plugfest's in order to develop a comprehensive "test plan" for vendors to achieve IMS certification and demonstrate interoperability. Additionally, more work will need to be done to flush out the business case. Nonetheless, implementation is expected to accelerate during 2007.

¹ Alain Maloberti, VP Network Architecture & Design, FT Group, IEC Broadband World Forum Europe, 2006
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2007: The Year of Competitive Transformation

Broadband has had a profound impact on the industry. Not only has it changed the way consumers utilize their services, but also the business models and practices of telecommunications service providers. Broadband is quickly evolving from a basic Internet access service to a personalized, integrated multimedia-based service. As such, 2007 will become a pivotal year in the telecommunications industry, as leading network operators will need to make some important decisions about the future of their business.

During 2006, we saw the early stages of competitive transformation at a number of larger operators such as BT, France Telecom, TeliaSonera, KPN, Swisscom, NTT, Bell Canada, Chunghwa and Telekom Malaysia. These operators are quickly realizing the need to step outside their traditional roles in order to participate in the new multimedia ecosystem. As such, many of these operators are shifting their focus from products towards customers and service. In addition, this call is being answered by the vendor side, as mergers and joint ventures transpire in order to address this changing market environment.

During 2007, success will be defined by those operators and vendors that are able to manage change while continuing to anticipate market conditions. The ability to organize, optimize and implement their vision and set strategic, yet obtainable goals will be the key to long term survival and growth.

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▶**Research Note:** *"AT&T Offers More Concession to Gain BellSouth Merger Approval"*

Published December 29, 2006

▶**Industry Perspective:** *"Broadband's Evolution Redefines More than Just the Triple Play"*

Published December 21, 2006

▶**3Q06 Broadbandtrends Report:** *"Asia Pacific Breaks Through 100 million mark, as Global Broadband Subscribers Exceed 256 million in 3Q06"*

Published December 4, 2006

▶**Research Note** *"Ericsson + Entrisphere: Potential Impact on Access Market"*

Published November 30, 2006

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**THE WINDSOR
OAKS GROUP**

The Windsor Oaks Group LLC is an independent market research and consulting firm specializing in the coverage of network transformation activity related to broadband infrastructure and services, including IP-TV, VoIP and NGN.

Vendor Merger/Acquisitions

Some notable highlights include the following:

Vendor Mergers/Acquisitions (Not Comprehensive)

Vendor	Acquired/Merged Company
ADVA Optical	Movaz
Alcatel	Lucent
Audiocodes	Netrake Nuera
Broadstream	Auroras
Cisco	Arroyo Video Solutions
Comverse	Netcentrex
Coppercom	Switchmaxx
Ericsson	Redback
GENBAND	Siemens DCO Business BayPackets Syndeo
Harmonic	Entone Video Networking Software
IP Unity	Glenayre Messaging
Lucent	Riverstone
Motorola	Tut Systems Kreatel Broadbus Netopia Vertasent
NDS	Jungo Software
Nokia	Siemens
Oracle	MetaSolv
PacketFront	42Networks
PMC-Sierra	Passave
RadiSys	Convidia
TANDBERG TV	Skystream
Telco Systems	Critical Telecom

Source: broadbandtrends.com

Operator Consolidation

Some notable highlights include the following:

Fixed Line Operator Mergers/Acquisitions (Not Comprehensive)

Operator	Acquired/Merged Company
Altice & Cinven	UPC France
AT&T	BellSouth
Axtel	Avantel
Carlyle Group & Providence Equity	UPC Sweden
Cavalier Telephone	TalkAmerica
Century Telephone	Madison River
Cinven & Warburg	Essent Kablecom Casema
Citizens	Commonwealth Telephone
Clearwire	Winbeam
Cogeco	Cabovisao
Comstar	DGTEL Tehnologic Systems
CTC, Choice One	Conversent
ewt	Tele Columbus Kabel
Golden Telecom	Telcom LLC Kubltelcom
Google	YouTube
Iliad	CiteFibre
Internet Gold	012-Golden Lines
KPN	Tiscali (Netherlands) Enertel
Level 3	Broadwing Looking Glass Networks Telcove
Liberty Global	Karavel - Romania
Neuf Cegetel	AOL France
NTL	Virgin Mobile
PAETEC	US LEC
Pipex	Bulldog Communications
Qwest	OnFiber
Tele2	QSC
Telecom Italia	AOL Germany
Telefonica O2	Be
Telenet	UPC Belgium
TelePacific	Mpower
Time Warner Telecom	Xpedius
Tiscali UK	Video Networks LTD
VipelCom	Armentel
WideOpenWest	SIGECOM

Source: broadbandtrends.com