ZyXEL

Leveraging Copper & Transitioning to Fiber

"640K [storage] ought to be enough for anybody." – Bill Gates

Internet use is no longer limited to surfing web pages, download a few songs, send and receive some photographs. The web apps landscape is changing fast and so is user behavior and Internet use. Companies like Netflix, Amazon and WalMart are offering feature-length movies for download. More people are looking to upload their own home movies into emails or web pages. High-definition video is fast becoming the state-of-the-art, and one high definition movie takes up as much bandwidth as 35,000 web pages.

Cloud computing is another trend that is rapidly gaining momentum where a growing number of companies are offering "software as service" where you subscribe to applications on the net rather than install them on your own computer. These applications are now available for word processing, emailing, automated remote file backup, and a host of business and personal services. All of these applications – and many others we haven't even dreamed of yet – are going to require much greater bandwidth than what is generally available today, even from "broadband" providers.

All this adds up to consumer bandwidth demands that are growing at an enormously high rate, and are projected to grow for years to come. Can our current last-mile bandwidth capabilities handle this?

Copper's Still Got Game!

Fiber to the Home [FTTH] may be the end game but copper is definitely not done yet. Operators are leveraging their investment in existing copper for faster broadband connections for IPTV, Internet and voice services over existing copper. In addition to ADSL2+ CPE that boosts speeds up to 24Mbps, ZyXEL offers Bonded ADSL2+ and VDSL2 solutions that can double and quadruple these speeds respectively to help operators leverage existing copper infrastructure and at the same time improve connection reliability, offer premium services like IPTV with multiple HD channels while leaving bandwidth for Internet apps like online gaming and media downloads.

Bonded ADSL2+

Loop bonding technology provides the telecom industry with a revolutionary technique to combine multiple ADSL2+ connections into a single, aggregated connection. Supporting up to 48 Mbps downstream and 2 Mbps upstream data rates, as well as high-speed data and derived voice applications, service providers can offer advanced bandwidth-dependent services such as broadcast video and video-on-demand (VOD) to customers beyond the reach of central offices or digital loop carriers. Bonded ADSL2+ supports multiple high-definition television streams at significantly longer distances than other existing xDSL technologies.

ZyXEL's bonded ADSL2+ provides carriers with opportunities to target the profitable SOHO and SMB markets by differentiated and customized services. The superior downstream and upstream capabilities of bonded ADSL2+ combined with relatively low cost makes the solution particularly attractive to SOHO and SMB users.

Copper-Fiber Solutions

The significant attraction to the existing ISPs is that only part of their existing infrastructures needs to be upgraded and this can be achieved on a gradual basis as subscription to the services increases. ZyXEL's bonded ADSL2+ allows service providers to double the bandwidth over the existing copper infrastructure and thus leverage their investment to quickly deploy revenue-generating services like IPTV, VoD and other premium triple-play applications.

ZyXEL xDSL Solution

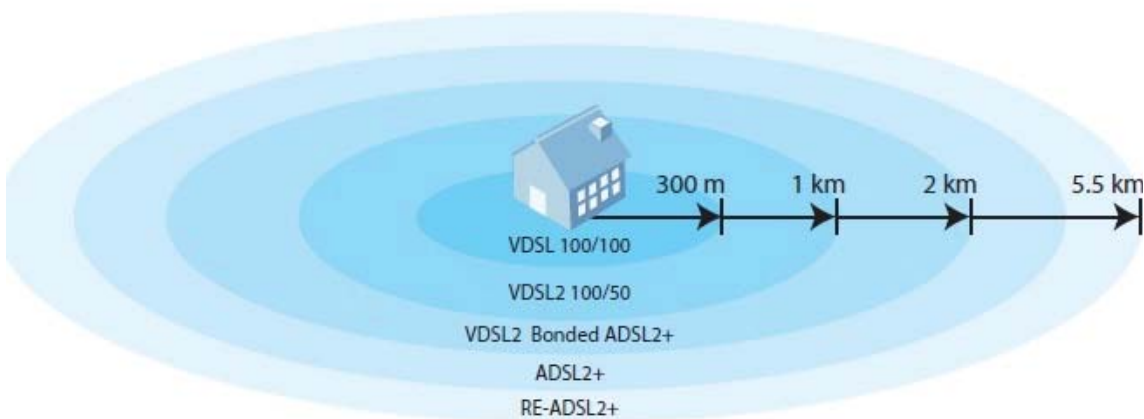|	Router with 4-Port Switch	802.11g Gateway with 4-Port	802.11n Gateway with 4-port Switch
ADSL2+	P660H	P660HW	P660HN
Bonded ADSL2+	P663H		P663HN
VDSL2	P870H	P870HW	P870HN

VDSL2

Very-High-Bit-Rate Digital Subscriber Line 2 (VDSL2), or G.993.2, is gaining popularity globally among the xDSL family of standards. VDSL2 gives consumers speeds of up to 100 Mbps upstream and downstream at 700 feet and 20-30 Mbps between 2500 to 4000 feet. So it allows telecom operators around the world to provide services such as High Definition TV (HDTV), video-on-demand, videoconferencing, high-speed Internet access and advanced voice services, including VoIP, over a standard copper telephone cable.

The VDSL2 30a profile technology is the best solution as a part of FTTB, FTTC and FTTN. It is the most effective and low-OPEX approach for integrating fiber and the last-mile legacy copper lines and boosts its bi-directional bandwidth up to 100 Mbps.

ZyXEL's VDSL2 solution serves as the ideal xDSL technology for eliminating last-mile bottlenecks, enabling mass deployment of triple-play services by TR069 for easy management and allowing carriers to efficiently compete with cable providers. ZyXEL VDSL2 gateways also offers auto ADSL2+ fallback feature to address the backward-compatibility issues of the traditional ADSL technology. This interoperability will make operator migration to VDSL2 much easier.

Distance Comparison of DSL Technologies

Copper-Fiber Solutions

Fiber Frontier

FTTx is the fastest-growing global broadband technology with significant deployment in Asia, Europe and North America. Fiber operation in Next Generation Access (NGA) services will increase ARPUs reliably by +30% above DSL (Yankee Group, 2008). Additionally, FTTx revenue is increasing thanks to the cooperation with the entertainment industry where high quality online services and content are offered, while the ultra-high bandwidth provided by FTTx also enables video conferencing and unified communications services for both commercial and residential users. ZyXEL fiber solutions include dual-WAN and Ethernet multi-service gateways that offer telcos great price performance benefit and a cost effective way of transitioning from copper to fiber without having to change the CPE.

FTTH Solutions from ZyXEL

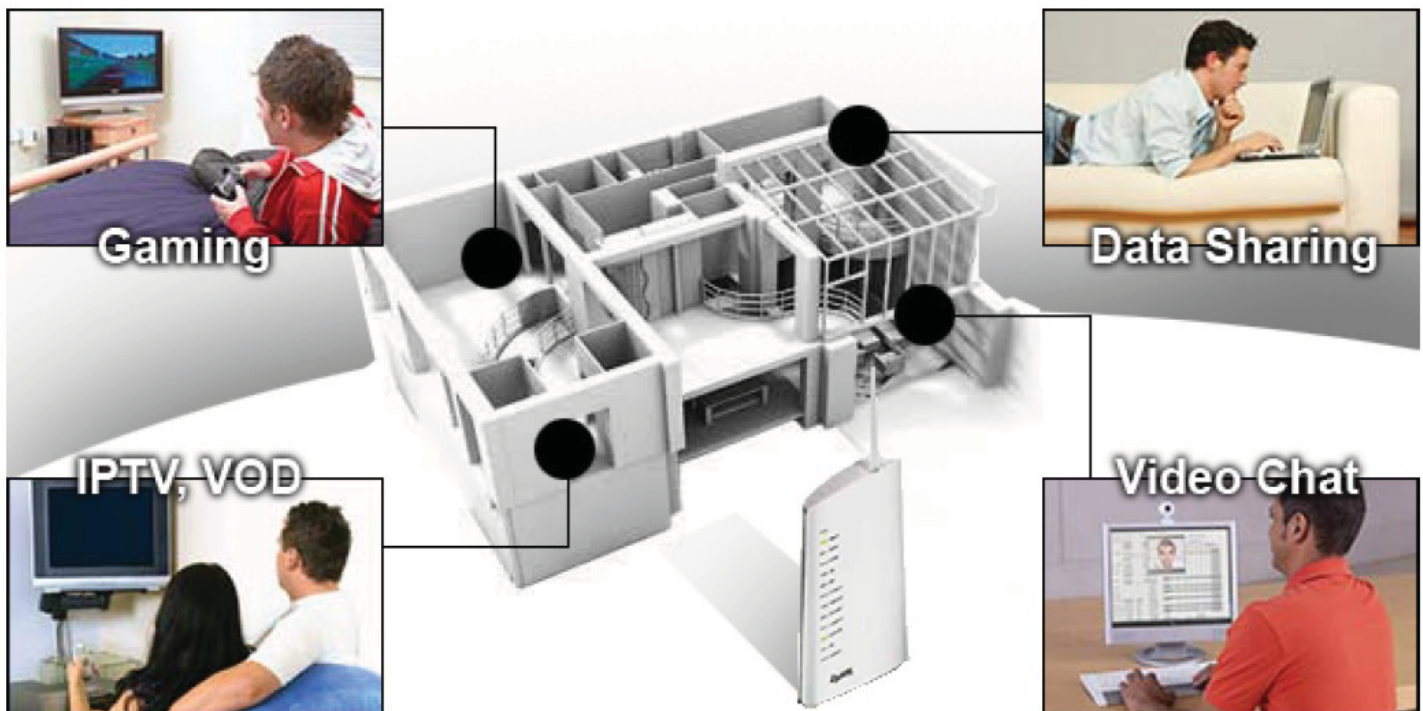| Dual WAN Multi-Service Wireless Gateway	Dual WAN Multi-Service Wireless Gateway	Ethernet WAN, Managed Wireless Router	Ethernet WAN, 802.11n Wireless Router
P2812HNU	P2612HW	NBG4604N	NBG419N
Ethernet and VDSL2 WAN Ideal for transitioning from copper to fiber without changing CPEs	Ethernet and ADSL2+ WAN Ideal for transitioning from copper to fiber without changing CPEs	802.11n Wireless router with Ethernet WAN and TR-069 support for remote management Easy set-up without truck-rolls	Ethernet WAN and high speed 802.11n wireless router. One-box complete access and home networking solution
■ VDSL2 to ADSL2+ auto fallback ■ 802.11n wireless ■ 4-port switch ■ 2-port FXS VoIP Ports ■ 2-USB ports ■ TR-o69 Support ■ Automatic traffic prioritization for QoS	■ 802.11g wireless ■ 4-port switch ■ 2-port FXS VoIP Ports ■ TR-o69 Support ■ Automatic traffic prioritization for QoS	■ 802.11n wireless ■ 4-port switch ■ TR-o69 Support ■ Automatic traffic prioritization for QoS	■ 802.11n wireless ■ 4-port switch ■ Automatic traffic prioritization for QoS

Copper-Fiber Solutions

"Wiring" the Digital Home

There has been a steady rise in Internet use, multiple computers, media downloads, sharing of user generated videos among the consumers (465 million video streams per month). The consumers need technology to manage, connect and play all this content on different devices and from different devices securely and transparently. But they don't want to deal with the headache of figuring out what to buy and how to set it up and troubleshoot it.

For the Telco who has already entered the home with traditional broadband and IPTV service, expansion into whole home connectivity is a timely opportunity. Telcos now can generate additional revenue by setting up and managing subscribers' home networks. In addition to generating new revenue from product and services, this also helps them manage the customer experience and reel in support costs, saving on resources. ZyXEL offers a variety of home networking products spanning technologies that include wireless 802.11n, Powerline, HomePlug and HPNA to help telcos take advantage of this opportunity

In Summary

ZyXEL has worked with telcos over the past 20 years to customize solutions that fit their investment, infrastructure and service needs and in the process have developed broad portfolio of products for copper, fiber and digital home. Ranked by Infonetics Research among the top 5 DSL gateway vendors and number 1 VDSL vendor for 2009, ZyXEL can leverage its experience in global deployments of FTTx powering premium services like IPTV and Vidoe-on-Demand to help telco realize revenues quickly and cost-effectively. Please call us today at 1.800.255.4101 or telco@zyxel.com for more information and a start of a rewarding partnership.

Copper-Fiber Solutions