

# Enabling Triple Play: Voice, Video, and Data Services for Increased Subscriber Revenues

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## The Need for the Triple Play

As triple play voice, video, and data services delivered over IP networks start to take hold in European and Asian markets, service providers realize that being able to offer triple play themselves will not only increase subscriber revenues, but is a necessity to remain competitive. Heavy Reading's July 2004 report, *Telco Triple Play: the DSL Imperative*<sup>1</sup>, finds that triple play is a must for the long-term survival of every local service provider, and is within reach using IP networks.

While delivery of combined voice and data has become widespread in recent years, the successful addition of video has been a barrier to completion of the true triple play for a variety of reasons. First, outdated, inefficient video compression algorithms greatly exceed available bandwidth; second, bandwidth in the access networks has been insufficient for even compressed video; and third, the vast majority of today's millions upon millions of customer premises equipment (CPE) are simply unable to handle the service segmentation and quality of service (QoS) requirements that are crucial for voice and video services.

*Advances in video compression.* Significant advances in video compression technology make IPTV-based video services including video-on-demand (VOD) and digital video recording (DVR) not only practical, but desirable as broadband service provider offerings.

IPTV holds the promise of offering subscribers more choices and features than their current TV services, including improved content selection and navigation, no-delay channel changes, VOD and promotions tailored to a subscriber's viewing habits and preferences, and connection to other IP devices and content, such as photos, music, games, or videos located anywhere on the subscriber's network.

Market researcher In-stat/MDR expects over 100% growth in telco TV subscribers in 2004, with subscribers nearing 15 million by 2008<sup>2</sup>, further supporting the belief that consumers will willingly embrace IP-based video services.

*Sufficient bandwidth.* To open the historical last-mile bottleneck and to meet the need for multimedia service delivery, many large network operators are investing heavily in building out fiber and higher-speed DSL access networks. The growth of VDSL, ADSL2+, and fiber to the premises and to the neighborhood (FTTP and FTTN) is finally providing a "pipe" that is big enough to allocate sufficient bandwidth for delivery of multiple simultaneous broadband services.

*Broadband gateway improvements.* The enormous numbers of installed broadband access equipment were originally designed as low-cost, data-only devices, and are not equipped with the necessary technology to support services like video that mandate broadcast-quality picture and sound. As outlined in this paper, Netopia has made significant advances in delivering the technology needed for quality-sensitive triple play service delivery in a broadband gateway designed for mass deployments.

<sup>1</sup> "Telco Triple Play: The DSL Imperative," Heavy Reading, July 2004

<sup>2</sup> "Telco TV Take Off," In-stat/MDR, May 2004

## Delivering Triple Play

While market research and consumer acceptance are positive indicators of the ultimate success of the triple play, service providers must evaluate how to best deliver these services to their subscribers, using their existing networks and ensuring toll-quality voice and broadcast-quality video.

Some of the more challenging issues facing service providers can be broken down as follows:

- How to ensure individual service quality and priority, especially quality-sensitive voice and video services
- How to provision the unique requirements of each service; specifically, video and voice require high QoS and significant user interaction, data is simply an “always on” state
- How to integrate new customer-located triple play devices like set-top boxes and voice-over-IP (VoIP) phone systems with existing systems
- How to manage and support the individual services once they are provisioned

These issues may seem daunting, but when approached using Netopia’s service-oriented solutions, can be overcome and result in network architectures that will dramatically improve the service provider’s ability to deliver revenue-generating triple play services. In fact, the solutions outlined below are highly flexible and standards-based, enabling the addition of future services beyond triple play.

## Netopia’s Enabling Technologies

With over 10 years of experience helping service providers provision, manage, and support broadband services, Netopia understands and resolves service delivery issues like few other companies. Recent technology implementations within Netopia’s award-winning subscriber gateway products paired with Netopia’s device and service management applications create a highly flexible and powerful, yet easy-to-use service delivery system that enables the delivery of quality-sensitive triple play and future services. The keys to Netopia’s solution are:

- Customer-located broadband gateways equipped with Netopia’s VGx Virtual Gateway technology allow individual service channels to be delivered and managed independently, applying appropriate QoS and prioritization parameters to each service.
- Netopia Broadband Server (NBBS)–based device and service management applications help simplify delivery of triple play services, generate additional service revenues, and reduce costs.
- True multi-vendor solution – Compliant with the DSL Forum’s TR-069 remote device management specification, NBBS device and service management applications enable service deployment using any vendor’s IP-based equipment, using HTTP, proxy applet, command line interface (CLI), or a TR-069 interface.

## Netopia VGx Virtual Gateway Technology

Two major requirements for successful delivery of triple play voice, video, and data are the availability of sufficient bandwidth combined with segmentation, routing, and QoS controls of the individual services. While the increasing availability of fiber to the premises and curb delivers the necessary bandwidth, Netopia has developed its VGx Virtual Gateway technology to address the second requirement of service segmentation and routing. VGx enables successful management and distribution of multiple broadband services to the subscriber's home or office.

Netopia's VGx technology allows individual services to be treated as separate and distinct "channels." When data is passed to a Netopia VGx-enabled broadband gateway, specific policies, routing and prioritization parameters can be applied to each individual service, ensuring delivery of that service to the appropriate peripheral device with the requisite level of QoS. In effect, a single Netopia gateway acts as separate virtual gateways for each distinct service being delivered. This application of individual policies such as QoS is critical for TV and VoIP in order to meet the levels of quality subscribers have come to expect from their existing voice and TV services.

### How VGx Works

At its core, Netopia's VGx technology maps multiple local virtual local area networks (VLANs) to one or more specific permanent virtual circuits (PVCs) for DSL, or wide area network VLANs for a fiber network. Using the Institute of Electrical Engineering (IEEE) standard 802.1p, which specifies QoS algorithms,

traffic is prioritized based on protocol and source. This ensures that each service receives the QoS treatment it requires; for example, video is free from latency, VoIP service is prioritized to insure aural quality, and data is securely and efficiently routed.

Figure 1 shows triple play service delivery of a variety of voice, video, and data services that are handled according to service type and each service's QoS requirements:

- Voice over IP traffic arrives from voice servers, is given the highest priority to ensure excellent voice quality, and can be routed on separate gateway channels depending on the type of VoIP equipment: a Wi-Fi channel connects to Wi-Fi VoIP handsets, and an Ethernet channel connects to a wired VoIP telephone system.
- IPTV video traffic is sourced from network-located video servers, routed through the service provider's NOC, and upon being received by the Netopia VGx-enabled gateway, given high priority and appropriated necessary bandwidth, then routed via an Ethernet port dedicated as a video "channel" to an IPTV set-top box.

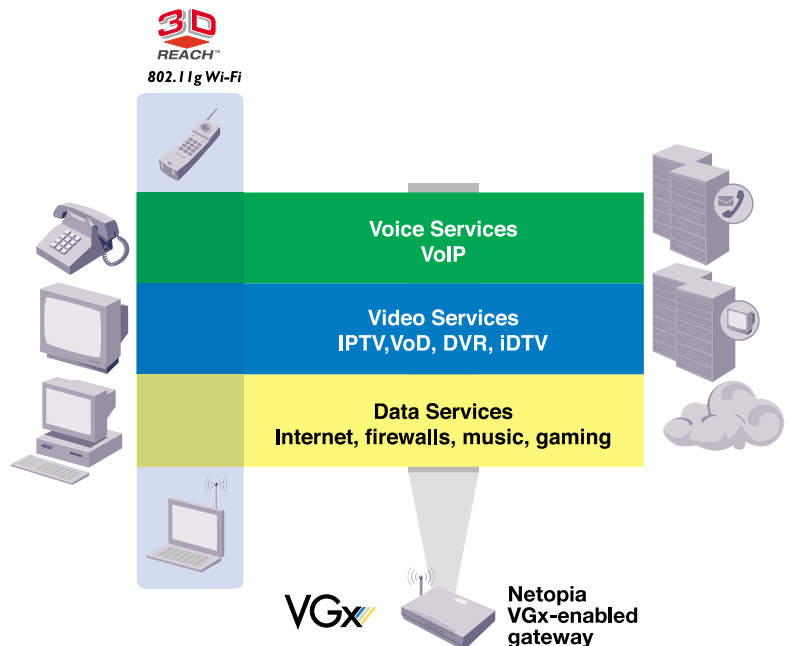


Figure 1: Netopia VGx Technology Delivering Triple Play Services

- Data traffic can be segmented into separate channels depending on priority and security requirements.

Internet access can be assigned two or more channels; for example, an Ethernet channel to support wired PCs, PDAs, or game consoles, and a Wi-Fi channel for wireless devices or for a retail business with a Wi-Fi Hot Spot.

For more detailed technical information on VGx, refer to Netopia’s white paper entitled *VGx: Virtual Gateway Technology for Broadband Service Segmentation*.

In addition to individual service channel management at the subscriber premises, a crucial component of triple play service delivery is a comprehensive device and service management solution. Netopia’s NBBS applications provide this element.

- Powerful device management for simplified, reliable management of all configurable devices at the network edge
- Sophisticated policy management for consistent policy implementation across multiple locations
- Scalable and secure architecture for management of IP-based devices, scaling from a few to hundreds of thousands of devices using highly secure administration
- Multi-vendor network and customer premises equipment (CPE) device support allows management of third-party devices that use TR-069, CLI, HTTP, or proxy applet interfaces
- Interfaces to providers' existing OSS systems for seamless integration into billing, settlement, customer support, or other established systems

## Netopia Device and Service Management

Netopia’s suite of device and service management applications allows service providers to deliver and manage a variety of residential and business services with improved efficiency and reduced operational costs. Each of Netopia’s device and service management applications is based on Netopia Broadband Server (NBBS), a powerful, scalable TR-069 device management platform.

For purposes of this paper, the following discussion will focus on four NBBS applications that play a key role in residential triple play service delivery – Zero-Touch Manager, Element Management System, Support Visibility, and Home Subscriber Visibility. More information on the entire suite of NBBS applications, which includes Hot Spot Manager, Parental Controls, and Business Subscriber Visibility, can be found in Netopia’s white paper entitled *Netopia Broadband Server (NBBS) Device and Service Management*.

Netopia’s NBBS device and service management applications have important features that allow service providers to offer competitive differentiation, improve customer satisfaction, and streamline operations.

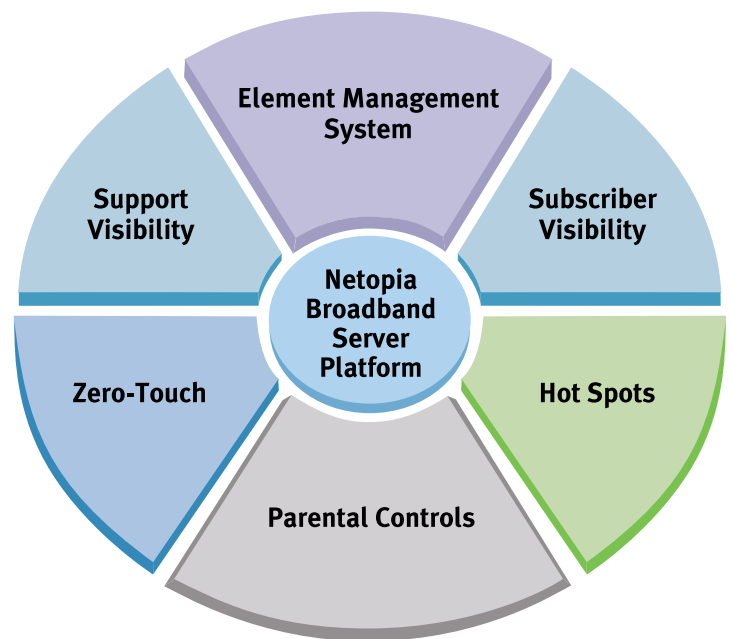


Figure 2: Netopia Broadband Server Platform

**Zero-Touch Manager.** The Zero-Touch Manager significantly reduces service providers' operational expenses by enabling automatic connection, configuration, and provisioning of initial broadband services, as well as allowing subscriber self-provisioning for adding new services or changing existing services once they have become a broadband customer.

For initial service provisioning, a Netopia gateway is shipped to the subscriber, who attaches it to the DSL or other broadband connection. The gateway connects to the Zero-Touch Manager, which contains configuration and service information specific to that gateway, identified by the gateway's serial number. The gateway-specific information is then downloaded to the gateway, including firmware updates, and the subscriber's service is activated.

For existing broadband subscribers who want to add or change services, Zero-Touch Manager allows subscriber self-provisioning by presenting a user-friendly Web page where subscribers can make desired changes. The changes are automatically applied to the gateway by the Zero-Touch Manager and the subscriber's bill is updated to reflect the new services.

**Element Management System (EMS).** Using Netopia VGx-enabled gateways to ensure quality of service, Netopia's EMS allows provider staff at a central location to provision and manage quality-sensitive triple play services such as VoIP and video that require provisioning not only to the Netopia gateway, but beyond the gateway to the customer-located equipment for each service. For example, many voice services require some type of VoIP system and may also include Wi-Fi handsets or analog telephone adapters (ATAs). Video services like IPTV and video-on-



Figure 3: Netopia Element Management System

demand require equipment from set-top boxes to digital video recorders (DVRs) that also require provisioning beyond the gateway. Netopia's EMS leverages a range of device management interfaces, including TR-069, command line interface (CLI), HTTP interpreter, and proxy applets, to support all types of IP-based devices.

From service provisioning to providing system-wide firmware updates, Netopia's EMS automates a variety of tasks that, without it, would require significant amounts of staff hours and carry a high risk of error, including:

- Centralized VPN, firewall, firmware, and configuration administration
- Real time single-device management and automated tasks for mass CPE
- New service provisioning and integration with provider billing systems

Netopia's EMS features scalable scripting and device management functions that let provider staff automatically provision services to millions of subscribers, or just an individual subscriber. Service-specific settings, including firmware updates, can be applied to gateways as well as other any other Web-enabled device, including VoIP systems, video equipment, PCs, Macs, PDAs, and game consoles. Some of these functions include:

- Bulk firmware updates
- Bulk configuration changes
- Real-time CPE access, configuration, and troubleshooting
- Diagnostic and correction automation

When combined with Netopia's Zero-Touch Manager, the EMS provides a highly automated, reliable means for mass deployment of new services, plus key features necessary to ensure ongoing error prevention and cost savings.

**Support Visibility.** Service provider staff can use Support Visibility to remotely view a network map of all IP-based devices connected to the home network, and then configure or manage selected devices to provision, change, or remove services, or provide device updates.

Support Visibility allows service provider support organizations to:

- View a graphical map of subscriber LAN devices and their status
- Manage any Web UI-enabled device for faster resolution of support issues
- Provision, configure, manage, perform diagnostics on, troubleshoot, and support quality-sensitive services behind the broadband gateway, including voice and video

Support Visibility leverages technology from Netopia's award-winning Timbuktu® remote control software,

which gives provider support staff a powerful tool for supporting and troubleshooting a wide range of networked devices, from gateway configuration all the way to PC desktop support, with an optional PC Remote Control module. Because a significant number of support issues can be resolved quickly with remote control capabilities, Support Visibility significantly reduces operational expenses associated with truck rolls and time-intensive support calls.

**Home Subscriber Visibility.** To augment revenues in addition to the triple play service bundle, Netopia offers a unique value-added service for residential subscribers – Home Subscriber Visibility. This service for carriers and service providers gives subscribers remote access to their home local area network (LAN).

Home Subscriber Visibility extends LAN services to any remote location, so that subscribers can remotely view and control any Web-enabled networked device on their LAN, including remote control of Windows or Mac computers. For example, subscribers can:

- Access digital video recorders and set-top boxes to set, change, or view video programming options
- Access VoIP systems to check voicemail, change greetings, or set reminder messages for the family
- Control Windows and Macintosh computers to retrieve files, remotely run applications, or collaborate with other family members from the office or on the road

As more devices become Web-enabled, Home Subscriber Visibility will allow subscribers to remotely access, manage, set, monitor, and program all types of devices, from surveillance cameras to lighting, heating and cooling systems, programmable ovens and stoves, sprinkler systems, security, and more.

### **Powered by NBBS**

The NBBS engine that powers Netopia's device and service management applications delivers superior device and policies management based on a scalable, secure, industry-standard platform. Because NBBS can

manage virtually any IP-based device that supports HTTP, proxy applet, CLI, or DSL Forum TR-069 interface, NBBS applications can support both network and CPE devices from multiple vendors. This is of increasing importance for triple play services that require a variety of subscriber-located equipment and have a wide range of configuration options.

### **Triple Play Powered by Netopia**

The combination of Netopia's VGx-enabled gateways supported by Netopia's Zero-Touch Manager, EMS, and Support Visibility is a straightforward solution for providers that enables delivery of the triple play using today's network infrastructure. In addition, Netopia's unique Home Subscriber Visibility service gives providers an additional opportunity for incremental service revenues.

The Netopia solution addresses the issues most often faced by providers attempting to deliver the triple play:

- VGx ensures individual service quality, especially quality-sensitive voice and video services.
- VGx allows independent provisioning of each unique service and its related equipment, whether voice, video, or data.
- Zero-Touch Manager and EMS support integration of new triple play network elements, such as VoIP phone systems and IPTV set top boxes, within the provider's existing network.

- EMS simplifies provisioning and management of all IP-based services and devices at the customer premises for reduced errors and lower operational costs
- Support Visibility optimizes and shortens support calls
- Home Subscriber Visibility helps generate additional revenues

Service providers who partner with Netopia can move forward with the rollout of the triple play of voice, video, and data services now, and begin reaping the rewards of new incremental monthly revenues – as well as improving customer satisfaction to reduce churn.

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