



hp procurve
networking
business

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white paper

convergence: preparing the enterprise network

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introduction

One network. Today more and more companies are exploring and implementing voice, video and data over a single network to simplify and streamline their communication systems. Converged networks are commonly used to support business environments where users are demanding access to advanced applications, new services and enhanced ways of collaborating. Converged networks offer many opportunities, however to fully realize the benefits of multi-service networks, enterprises need to evaluate and align their business needs with their current and future communication system and reliability requirements.

Over the years, enterprise companies have invested heavily in multiple communication infrastructures to operate separate telephone, data, video and video conferencing networks (see figure 1). As applications become more dynamic, companies are discovering existing data networks are not ready for convergence. This is primarily because most Layer 2 switches do not include end-to-end traffic prioritization capabilities and cannot handle the additional network demands of next-generation applications. In effect, many of today's enterprise networks do not efficiently provide bandwidth optimization throughout the network grid.

HP ProCurve Networking solutions offer unparalleled traffic prioritization to provide traffic type coexistence and quality of service (QoS) functions that virtually eliminate the need for custom network design architectures while ensuring support of current and future voice, video and content delivery applications. Equally important, HP ProCurve delivers data, voice and video connectivity over one of the industry's most affordable and easy-to-manage infrastructures.

This paper is designed to help customers prepare for convergence by looking at trends, business needs and technical advantages that optimize networks to carry voice, video and data traffic over one Ethernet/Internet Protocol (IP) infrastructure.

Separate LAN and Telephony System

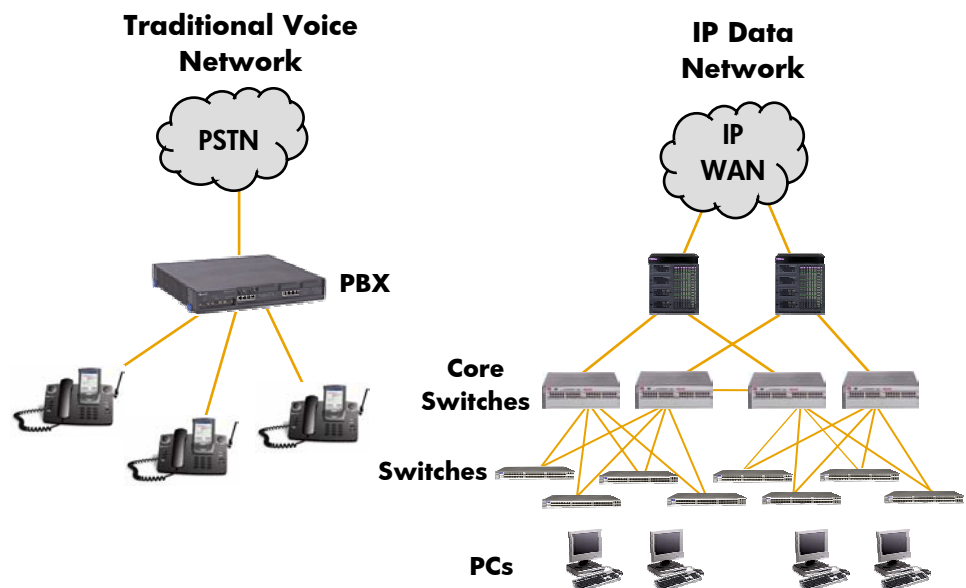


figure 1. An example implementation of typical enterprise data and voice systems

what is convergence?

Network convergence defined is one network where all traffic types co-exist. It is the integration of voice, data and video solutions onto a single IP network. Multiple data and traffic types are aggregated to coexist seamlessly. Additionally, a converged network must sufficiently handle multiple traffic types while exhibiting different behaviors to deliver consistent quality and reliability for the user. For example, with a real-time Voice over IP (VoIP) application, a converged network must reliably route voice packets with minimum delay, limited jitter and without dropping or losing packets.

Also known as multi-service networking, a converged network can reduce costs for enterprises while providing enhanced functionality and increased flexibility. Benefits of integrating all types of communications include more efficient communication services; extended access to corporate resources for mobile workers; a solid foundation for deploying more sophisticated, integrated and potentially revenue-generating applications; and increased productivity levels overall. As a result, enterprises that embrace convergence can experience increased profits and grow revenue to gain a competitive advantage.

On the downside, convergence deployments can be daunting as they are perceived as complex and expensive. The industry often concentrates on issues such as QoS, application bandwidth management, stability of vendors and their solutions, and return on investment (ROI). Since today's key solution areas — security, mobility and convergence — are all interdependent, enterprise decision makers should avoid locking into a proprietary architecture or one-dimensional solutions that cannot adapt to all application traffic needs simultaneously.

With the right strategy and an adaptive network architecture, enterprises can confidently and successfully create a powerful, standards-based multi-service network that efficiently handles a variety of traffic types simultaneously.

the evolution of convergence

Convergence is by no means a new paradigm. In fact, a look back shows asynchronous transfer mode (ATM), frame relay and high-speed optical switching all paved the way for next-generation converged networks. Coupled with the pervasiveness of the Internet, Ethernet/IP network deployments have become universal in creating a low-cost transport mechanism for data and voice traffic. Traditional "circuit-switched" voice technology is being combined with packet-switching equipment based on IP technology to deliver reliable and affordable convergence solutions.

During the Internet boom, network convergence was hyped as 'the' revolutionary technology for enterprises. However, the economic slowdown and tightened budgets shifted information technology IT spending to only essential network upgrades. This, coupled with convergence technology's perceived complexity and unreliability, has slowed the adoption of multi-service networks. Network managers no longer viewed convergence as the be-all-end-all of network advances and shifted their focus on network deployments with a quicker ROI.

Today, momentum is again building behind convergence. Companies looking to increase collaboration efficiencies and simplify network infrastructures are fueling the steady growth of multi-service network implementations.

increasingly mobile workforce

According to Giga Group, one of the top ten trends in 2003 is an increasingly mobile workforce. This long-term trend will continue, which in turn will increase the use of virtual meetings, video conferencing, instant messaging and other advanced collaboration

techniques.¹ Supporting a broad range of applications will be a key element in the future of enterprise networks.

Early adopters of convergence technologies typically deploy VoIP applications as these can provide many benefits, including the opportunity to: reduce overhead with toll bypass; future-proof the network with a relatively low investment; and add new, more powerful communication capabilities to match business requirements. According to a recent IDC survey of 101 U.S. firms, VoIP is one of few new technologies that more respondents planned to purchase in 2002 than did in 2001.¹

As with most technological advancements, standards are a key element of the convergence evolution. From the broad H.323 telephony standard which originally defined how voice, data and video are transmitted to IP-based local area networks (LAN)s, to the Internet Engineering Task Force's (IETF) Session Initiation Protocol (SIP) to IEEE's 802.3af for power over Ethernet for IP networking equipment, much of the industry has made a significant commitment to supporting open, standards-based systems.

The HP ProCurve Networking business has been a proponent of industry standards for the last 20 years and continues to support open standards and multi-vendor interoperability. By embracing standards and open systems, the industry has eased customer concerns about proprietary technologies. Interoperability brings compatibility opportunities and investment protection to customers that choose standards-based solutions.

transforming communications

Convergence is progressively becoming a key force in transforming how enterprises provide communications and information technology now and in the future. Each newly deployed technology brings new traffic types that require different network responses and behaviors so the applications work reliably (see figure 2).

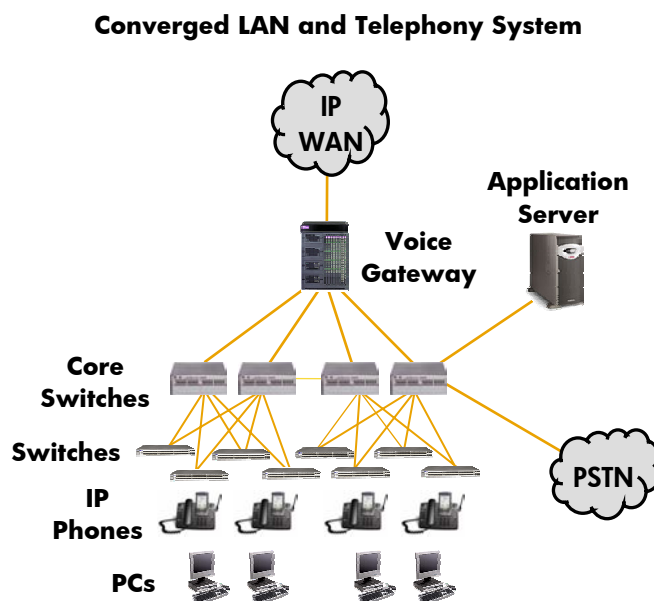


figure 2: a converged voice and data system example

¹ Giga Taps 10 Key IT Trends for 2003. CIO INSIGHT. October 10, 2002. Article.

² Key Trends in Enterprise Networks: VoIP to See Purchase Rise; Buyers Show Hostile Attitudes. IDC 2002. Bulletin.

security at the EDGE

Securely delivering the right network behavior for each application traffic type demands a new network strategy that provides more *control to the edge* where the user is identified and managed. Ethernet/IP networks with control to the edge enable enterprises to manage access and traffic flows to meet reliability and communication requirements. To that end, it is also critical to centralize command of the edge for easy implementation of user security and application policies.

In addition to leveraging key technologies with multi-service networks, enterprises can rapidly deploy next-generation applications to meet business demands. Application examples include: unified messaging, multi-casting, collaborative applications, virtual call centers, click to call, and distance learning.

key customer needs

Along with opportunities and a new communications environment, convergence brings key customer considerations including:

- 1. QoS/voice quality:** Since voice traffic is real time, delay, jitter, and packet loss can adversely affect the quality of the voice or video transmission. A high-quality converged network must be properly designed, configured and managed with QoS as a critical building block.
- 2. Standards:** Interoperability brings compatibility opportunities and investment protection to customers that choose standards-based solutions.
- 3. Investment protection:** Eliminating duplicate infrastructures creates cost savings and makes network upgrades easier to manage, allowing enterprises to maximize investment protection and take advantage of new applications, security, and mobility solutions more easily and effectively.
- 4. Security:** Customers should add voice virtual local area network (VLAN) encryption that does not affect voice quality. In addition, customers should deploy security technology that adds protection and prevents denial of service attacks, which could bring down a network.
- 5. Reliability/resiliency:** Customers should review the reliability of LAN-based solutions versus traditional telephony systems while making the converged network transition and ensure that there is adequate network redundancy.
- 6. Asset protection:** There is a tremendous opportunity for cost reductions with converged networks, including merging labor, equipment, management and administrative overhead — especially network additions, moves and changes — to minimize costs and create economies of scale. In addition, cost savings are realized with reduced network carrier costs and reduced multi-site communication costs.

HP ProCurve convergence readiness

The HP ProCurve Networking business offers an unparalleled range of traffic prioritization features to provide traffic type coexistence and QoS functions that *virtually eliminate the need for custom network design architectures* and ensures support of current and future voice, video and content delivery applications. The ProCurve network architecture has adaptability built-in, providing the ability to predict and assure the timely delivery of specific types of communication traffic across the network. In simplest terms, enterprises can manage the network to change its behavior and responses based on current and future business needs.

HP ProCurve convergence solutions are developed to deliver connectivity at the edge of the network over an easy-to-manage, standards-based infrastructure. Only control to edge securely provides the robust functionality needed to support all current and future traffic and application types. Additionally, HP ProCurve provides the foundation for

multi-service network solutions from any vendor.

HP ProCurve's approach to convergence aligns directly to customer needs and includes the following capabilities:

1. QoS /voice quality:

HP ProCurve's strategy for LAN QoS provides provisioning, traffic control and prioritization which work together to maintain the health of the network. HP ProCurve solutions also easily integrate QoS features that scale to meet future needs and offer standards-based features including:

- **Provisioning:** HP ProCurve switches provision the network so that congestion is eliminated in all but the most extreme instances.
- **Prioritization:** HP ProCurve switches prioritize critical traffic in order to provide predictable throughput even under extreme conditions using Layer 2 IEEE 802.1p and Layer 3 IP type of service (IP TOS), IP precedence and differentiated services (DiffServ). Most competing Layer 2 switches have limited traffic prioritization capabilities and if included, they cannot preserve the prioritization throughout the network end-to-end.
- **Control:** HP ProCurve switches provide networking technologies such as VLANs to eliminate unwanted traffic.
- **Class of service:** HP ProCurve 5300xl switches offer a queuing mechanism to limit delay and improve QoS via weighted fair queuing (WFQ) which is a packet scheduling technique that allows guaranteed bandwidth services. The purpose of WFQ is to allow several traffic types to share the same link and to provide fair treatment for all types of traffic.
- **Prioritize ports:** Priority can be set for untagged packets received on any given port. This functionality allows administrators to assign higher priority to specific ports helping to enable faster access and higher bandwidth for VoIP, video-on-demand, IP-TV and others.
- **Flexible traffic classification:** To give customers maximum network adaptability, HP ProCurve products support new and existing protocols including; UDP/TCP Port, Source Port, VLAN, Ethernet Protocol, IP address, and/or IP Type of Service (to update the 802.1p priority or TOS Byte). HP ProCurve also uses flexible DiffServ Code Point (DSCP) polices for IP prioritization.

2. Standards:

HP is leading the charge for interoperable, open industry standards. Recent Tolly Group testing shows HP ProCurve multi-service networks deliver voice quality with Mitel on par or better than Cisco and 3Com VoIP solutions.

A truly networked world must communicate cross-platform and cross-product. HP ProCurve solutions are interoperable and with industry-standard components, ProCurve products are ready for all types of traffic. HP ProCurve multi-vendor testing and interoperability mean universal VoIP support.

3. Security:

HP ProCurve's security to the edge solutions include a framework of access security, management security and attack resiliency .

- Access security controls who and how users are connecting in a wired and wireless world.

- Management security includes the protection of the network infrastructure itself and prevents unauthorized users from overriding other security provisions.
- Attack resiliency is about creating a more reliable and available network infrastructure designed to survive a network attack without interrupting service or going down.

In addition, HP ProCurve Networking provides Simple Network Management Protocol version 3 (SNMPv3) and 802.1X security and robust functionality to support current and future traffic and application needs at the edge where traffic enters and exits the network. ProCurve security solutions are comprehensive, easy to manage and are built on industry standards to ensure the highest security in the industry.

4. Reliability/resiliency:

HP ProCurve Networking delivers reliability and legendary HP quality. This ensures fault-tolerant designs, the highest levels of product integration and hot-swappable components. In addition to a lifetime warranty, HP's worldwide service and support teams are available 24 x 7. HP ProCurve Networking phone support (during business hours) and Web support (all the time) are included in the purchase price of the product.

5. Investment protection:

To protect IT investments, an enterprise network infrastructure must allow for the implementation of new technologies today and in the future without complete product replacements. The HP ProCurve 5300lx Switch Series protects customers' long-term capital interests by including advanced QoS features with an affordable Layer 3 price, free software updates and network management and lifetime warranties. In Fall 2003, the HP ProCurve 5300xl chassis will be upgradeable to 802.af Power over Ethernet. HP ProCurve Networking price/performance leadership means HP consistently delivers the performance and functionality that enterprise companies require to meet today and tomorrow's network and business needs.

HP and Mitel strategic partnership

HP ProCurve, the number three enterprise-switch provider, and Mitel, the number two IP-PBX provider, have a strategic partnership aimed at delivering world-class VoIP communications solutions. This team joined forces to provide customers with next-generation solutions that deliver the power of voice, data, and video to users wherever and whenever they need it. Working together, these companies were among of the first to deliver converged voice and data products that leverage LAN connectivity in voice communication systems.

Through this partnership, HP ProCurve and Mitel lead the way with easy-to-use, reliable enterprise-class solutions at an affordable price.

value proposition

HP ProCurve Networking Business meets customer needs by consistently delivering on its value propositions of high availability, affordability, security, ease-of-use and interoperability. The company has a proven track record of invention and experience that enables it to deliver an adaptive and affordable infrastructure for today's and tomorrow's convergence and network needs.

summary

One network that is flexible and easy to manage. HP ProCurve convergence-ready solutions allow an enterprise network to adapt to all communication needs and simultaneously ensure that all current and future applications will function reliably. HP ProCurve offers solutions that are convergence-ready at an affordable price without compromising functionality.

By providing centralized control of the edge for easy implementation of user security and application policies, HP ProCurve's network architecture gives network control to the IT manager. With unparalleled traffic prioritization, enhanced bandwidth control, reliable traffic type coexistence, and robust QoS functions, the HP ProCurve network architecture *virtually eliminates the need for custom network design architectures* for convergence. Moreover, ProCurve switches are interoperable and standards-based so enterprises can choose IP telephony hardware and next-generation applications from any vendor.

A flexible network design based on open standards, communication requirements and business needs will prepare enterprises for convergence when they need it.

for more information

To learn more about HP ProCurve Networking solutions, contact your local HP sales representative or visit our Web site at: www.hp.com/go/hpprocurve.

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