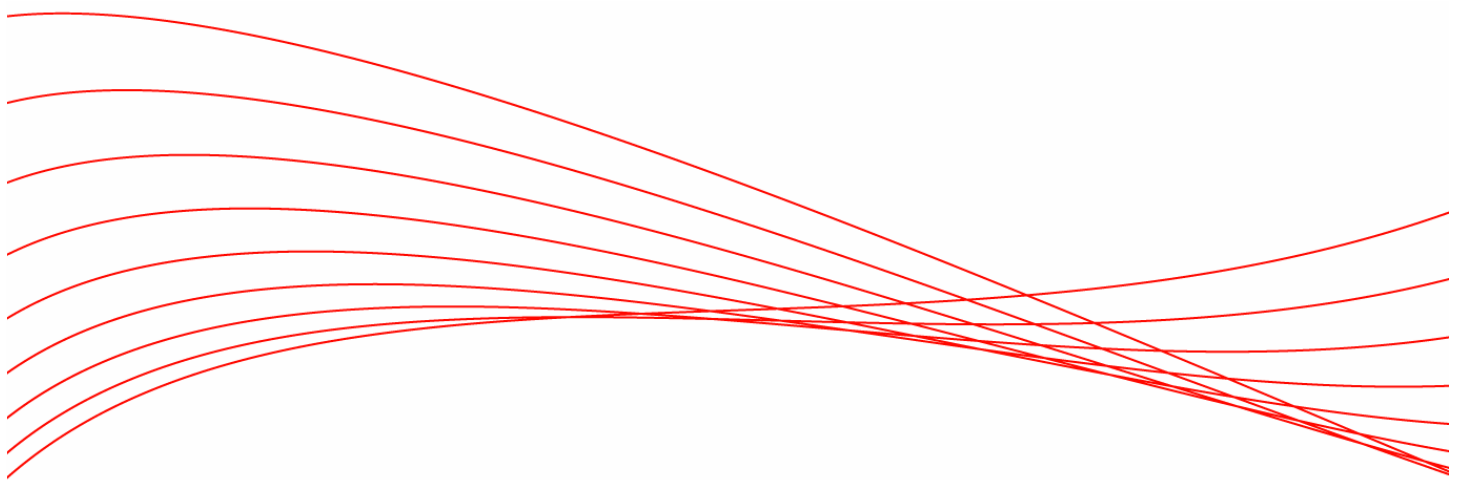


Convergence: Preparing the Enterprise Network



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Introduction

One network. Today more and more companies are implementing voice, video and data over a single network to simplify and streamline their communication systems. Converged, or multi-service, networks are widely used to support business environments where users are seeking to gain a competitive edge by implementing advanced applications, new services and enhanced ways of collaborating. To fully realize the benefits of a multi-service network, enterprises need to evaluate and align their business needs with their current and future communication system and reliability requirements.

Until recently, enterprise companies invested in multiple communication infrastructures and operated separate telephone, data, video and video conferencing networks (see figure 1). As applications have become more dynamic, companies are discovering that their 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.

ProCurve Networking solutions offer standards-based 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 for current and future voice, video and content delivery applications. Equally important, ProCurve Networking delivers data, voice and video connectivity over one of the industry's most cost-effective and easy-to-manage infrastructures.

Traditional Network
-Separate Network Infrastructures
-Non Integrated

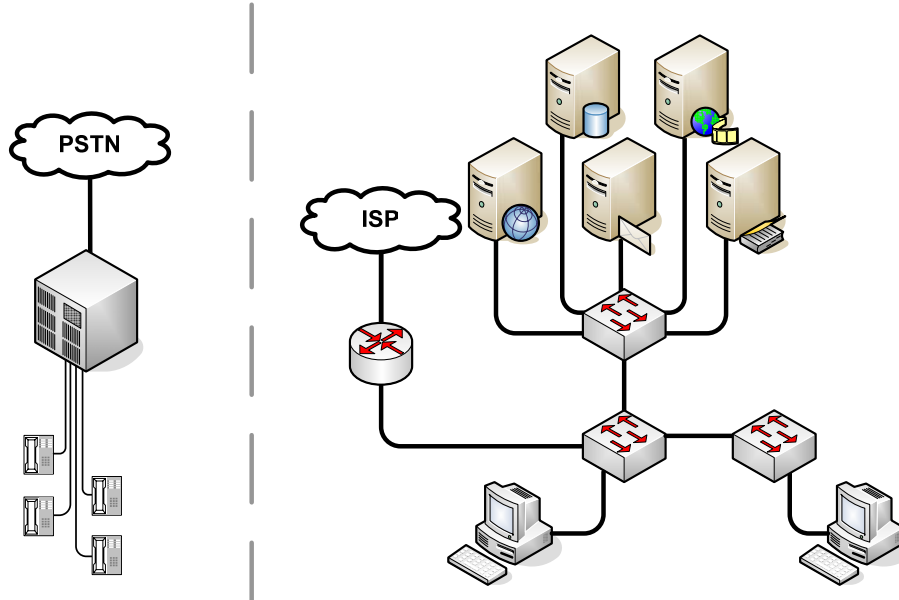


Figure 1. An example implementation of typical enterprise data and voice systems

What is convergence?

Network convergence is defined as the integration of all traffic types – 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
- Increased productivity levels overall

As a result, enterprises that embrace convergence can experience increased profits and grow revenue to gain a competitive advantage.

Convergence deployments have yielded encouraging results in such areas 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 the multi-service network

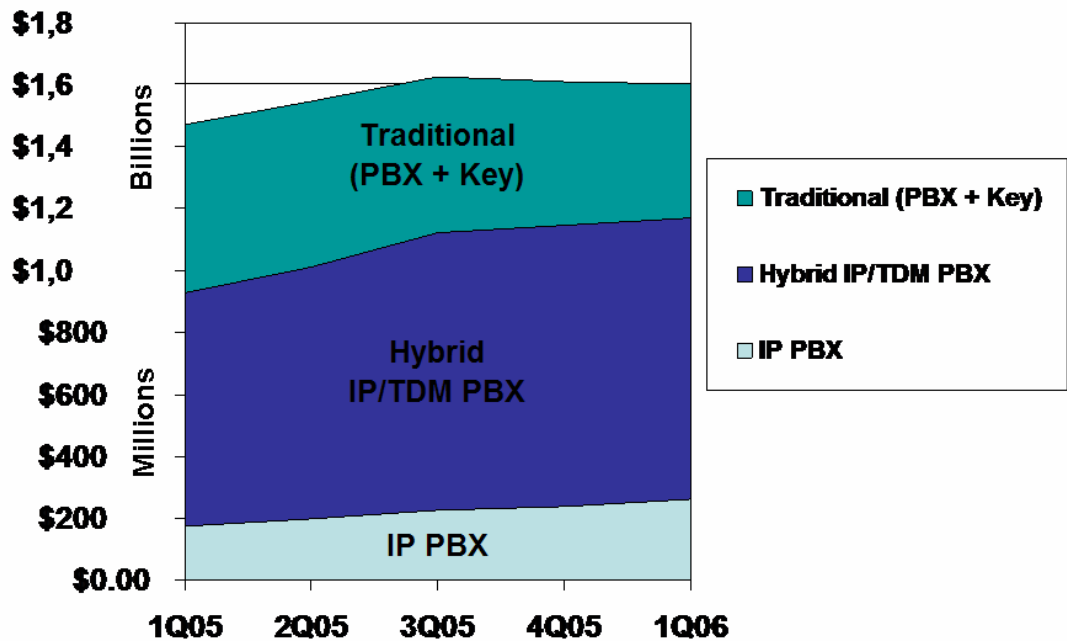
With the convergence of data, voice, video and other digital technologies, the separate enterprise networks that previously hosted those data types are no longer adequate to handle today's more complex traffic. Instead, those networks have converged into a single multi-service network that must support a broad range of applications.

For example, the worldwide PBX market continues to evolve steadily toward IP-based telephony, with the biggest portion of this market made up of "hybrid" systems, along with a simultaneous decline in traditional telephone systems (see figure 2).

Traditional solutions are based on one-dimensional architectures that address only one area of network design at a time, such as voice, video or data. Design rules and product features for voice, video and data were sufficient to supply quality of service (QoS) for these applications, but were too rigid and insufficient to address mobility or security at the same time.

These new and emerging requirements need solutions that are based on a fundamental, multi-dimensional architecture that addresses the complexity and flexibility required to handle all solution areas at the same time.

Worldwide PBX Market



Source: DELL'ORO GROUP

Figure 2. The evolution of the IP telephony market

An increasingly mobile workforce

One of the most significant current trends is an increasingly mobile, 24 x 7 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. Supporting a broad range of applications will be a key element in the future of enterprise networks. VoIP applications provide such benefits as 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.

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 (LANs), to the Internet Engineering Task Force's (IETF) Session Initiation Protocol (SIP), to IEEE's 802.3af Power over Ethernet standard for IP networking equipment, much of the industry has made a significant commitment to supporting open, standards-based systems.

The ProCurve Networking by HP 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

A multi-service network allows enterprises to rapidly deploy next-generation applications to meet business demands. Each newly deployed technology brings new traffic types that require different network responses and behaviors so that the applications can work reliably. For example, emerging multimedia applications such as IP TV, collaboration, media streaming and video conferencing depend on the ability to send the same information from one host to many, or from many hosts to many hosts. Multipoint services facilitate the delivery of content for distance learning applications, live TV video feeds to multiple systems across the network, or multipoint video conferencing (see figure 3).

ProCurve switches and routers provide integral support for multicast by implementing IGMP v2 and v3, which ensures proper management of multicast traffic and prevents unnecessary flooding of multicast traffic. Without this support, a Layer 2 switch would treat multicast traffic like broadcast traffic and flood it out all ports, causing the overall network performance to degrade.

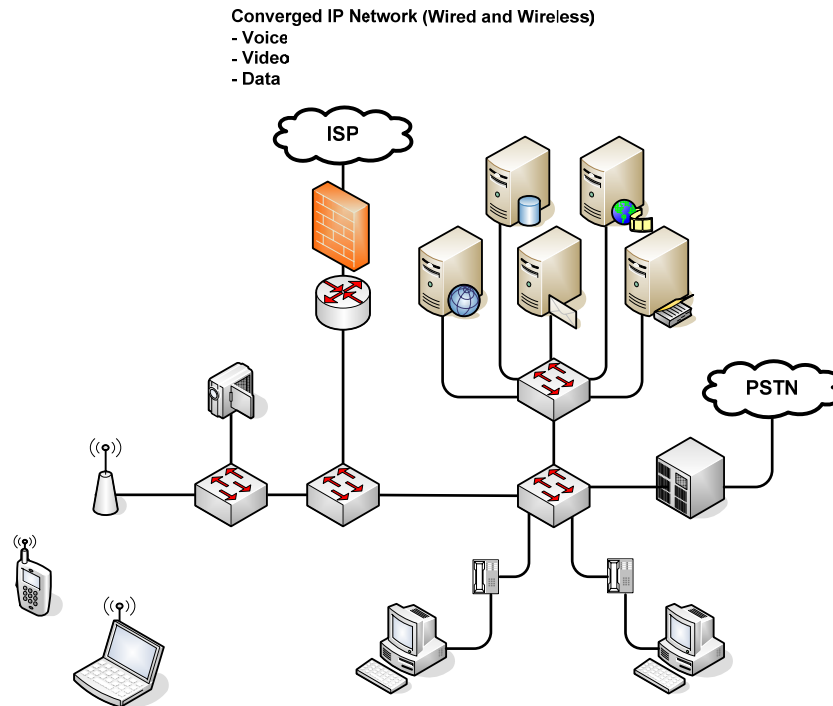


Figure 3. An example implementation of a converged network: voice, video, and data

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.

Key customer needs

In preparing for a converged network solution, customers must address these key considerations:

1. **Security:** To ensure proper security for voice, video, and data transmissions, customers should add voice virtual local area network (VLAN) encryption that does not affect the quality of the transmission. In addition, customers should deploy security technology that adds protection and prevents denial of service attacks, which could bring down a network.

2. **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.
3. **QoS:** Since voice, video, and delay-sensitive data (such as financial transactions) represent real-time traffic, delay, jitter, and packet loss can adversely affect the quality of the transmission. A high-quality converged network must be properly designed, configured and managed with QoS as a critical building block. A proper quality of service methodology ensures that voice quality is maintained, video runs smoothly, and applications satisfy near real-time and other timing requirements.
4. **Reliability/resiliency:** Customers should review the reliability of their current LAN and WAN to ensure that the converged network is designed properly and that there is adequate network redundancy when making the transition to a converged network.
5. **Standards:** Interoperability brings compatibility opportunities and investment protection to customers who choose standards-based solutions. Customers should avoid being locked in by single-vendor solutions that limit their ability to address future business needs.

ProCurve Networking convergence readiness

The 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.

ProCurve Networking 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, ProCurve provides the foundation for multi-service network solutions from any vendor.

The ProCurve Networking approach to convergence aligns directly to customer needs and includes the following capabilities:

1. Security:

ProCurve Networking solutions have several layers of built-in security:

- Access security controls which users are able to connect, and how they are allowed to do so 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.

ProCurve Networking security solutions are comprehensive, easy to manage, and built on industry standards to ensure the highest security in the industry. In fact, HP leads the establishment of many of these standards, such as IEEE 802.1X.

Based on the Adaptive EDGE Architecture, ProCurve security solutions enable the creation of intelligence throughout the enterprise network to the edge where the user connects. This approach enables enterprises to mitigate risks more effectively as they protect their digital assets. Furthermore, it allows cost-effective partitioning of the network to create zones of similar users with similar access needs.

Mitel telephony systems provide enhanced security through these measures:

- The use of SSL to secure management sessions.
- The ability to encrypt the signaling and media path, thereby preventing your conversations from being snooped.
- Encrypting the TFTP images used to boot Mitel IP phones, thus preventing unauthorized code from being loaded onto the phone.

2. 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 ProCurve 5300xl 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. What's more, the ProCurve 5300xl chassis is upgradeable to 802.af Power over Ethernet. ProCurve Networking price/performance leadership means that HP consistently delivers the performance and functionality that enterprise companies require to meet today and tomorrow's network and business needs.

3. QoS:

ProCurve Networking by HP provides provisioning, traffic control services, and prioritization policies that work together to maintain the health of the network. ProCurve solutions also easily integrate QoS features that scale to meet future needs, and offer standards-based features including:

- **Provisioning:** ProCurve switches provision the network so that congestion is eliminated in all but the most extreme instances.
- **Prioritization:** 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:** ProCurve switches provide networking technologies such as VLANs to eliminate unwanted traffic.
- **Class of service:** ProCurve 5300xl switches offer a weighted fair queuing (WFQ) mechanism that limits delay and improves QoS by scheduling packets for 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, ProCurve Networking 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). ProCurve also uses flexible DiffServ Code Point (DSCP) policies for IP prioritization.
- **Power over Ethernet:** ProCurve Networking supports Power over Ethernet (PoE) that is fully compliant to the IEEE 802.3af specification. ProCurve products offer customers the flexibility to deploy the right solution to meet the demands for inline power over the Ethernet connection to IP phones, wireless access points, video cameras, and other equipment.

4. Reliability/resiliency:

ProCurve Networking solutions are highly reliable. This reliability is based on the legendary HP quality that customers have come to expect, and includes fault-tolerant designs, high 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. ProCurve Networking phone support (during business hours) and Web support (all the time) are included in the purchase price of the product.

With a highly reliable infrastructure, enterprises can avoid costly and potentially detrimental downtime, improve internal performance, and enhance external service levels.

5. Standards:

Because ProCurve Networking solutions are based on industry standards, and not proprietary, you can easily integrate them into your existing heterogeneous networks while protecting your infrastructure investments. ProCurve provides you with a convergence-ready IP infrastructure that is interoperable with a wide range of IP telephony vendor solutions. This interoperability also ensures that your solution can easily accommodate new technologies as they emerge.

To ensure cross-vendor interoperability, ProCurve performs voice quality testing with leading IP telephony solutions. Independent, third-party testing shows that ProCurve multi-service networks deliver voice quality with Mitel on par or better than Cisco and 3Com VoIP solutions.¹

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

ProCurve enables interoperability by supporting and driving open industry standards, such as IEEE 802.3af Power over Ethernet. ProCurve Networking spearheaded the recent adoption of the IEEE 802.3ab (link layer discovery protocol) standard. This open standard will be supported by all major vendors, greatly enhancing interoperability in a multi-service/multi-vendor network.

By using a non-proprietary architecture that does not require expensive service agreements, ProCurve eliminates the cycle of continual network redesigns to keep up with changing business needs and emerging applications. And because the architecture is based on industry standards,

¹ Fostering Interoperability with VoIP Solutions via HP ProCurve Networking. January 2004, The Tolly Group.

customers can be confident their infrastructure will grow across all areas of their business, including client devices and applications.

As a company, HP has built its business on interoperability, and supports cross-compatible, open industry standards to protect its customers' investments. ProCurve Networking by HP is committed to continuously updating their products as new standards become final and available to implement. This strategy is focused on the customer's future, enabling easy network scalability for increased performance and functionality.

ProCurve Networking and Mitel strategic partnership

ProCurve Networking by HP and Mitel have worked together for more than five years to provide customers with advanced converged voice and data communications solutions. This strategic partnership is aimed at delivering business driven, customer-focused, converged communications solutions to the emerging IP telephony market.

ProCurve Elite Partners and Mitel Platinum partners are factory trained and certified to seamlessly integrate ProCurve convergence and Mitel IP telephony into new and existing infrastructures. Our joint partners are backed by factory support centers that are cross-trained to provide end-to-end support on solutions from ProCurve Networking and Mitel. The teaming of ProCurve Networking and Mitel gives customers the ability to effectively deploy a comprehensive, converged communications solution from partners they can trust.

Value proposition

ProCurve Networking by HP enhances support for the multi-service network by consistently delivering on its value propositions of affordability, ease-of-use, security, reliability, and choice and flexibility. The ProCurve Networking business is recognized for its leadership role in the adoption of open industry standards that allow scalable growth with a choice of solutions and vendors. This multi-vendor interoperability gives customers the freedom to deploy the applications that suit their business needs without having to worry about being locked in to a single vendor.

Summary

One network that is flexible and easy to manage. ProCurve Networking 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. The ProCurve network architecture enables companies to preserve their networking investments while readying their networks for the future to support business needs and priorities.

ProCurve Networking by HP provides the robust functionality needed to deliver data, voice and video connectivity over one of the industry's most affordable and easy-to-manage infrastructures. With unparalleled traffic prioritization, enhanced bandwidth control, reliable traffic type coexistence, and robust QoS functions, the ProCurve network architecture *virtually eliminates the need for custom network design architectures* for convergence. And because ProCurve switches are interoperable and standards-based, enterprises can choose multi-service network solutions from any vendor.

For more information

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

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