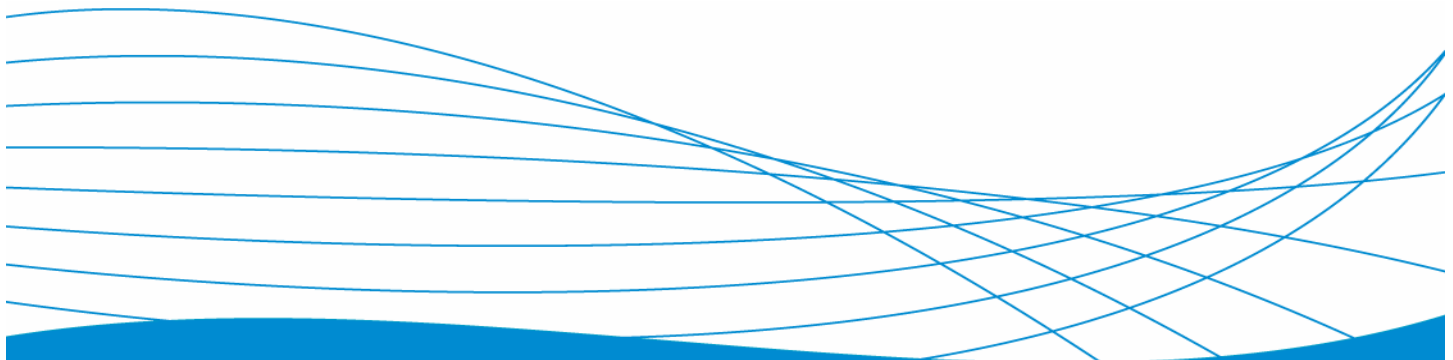


Making Adaptive Networks a Reality



Technical White Paper

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The technology behind ProCurve Networking by HP's adaptive networks:

Building adaptive networks today that will become strategic assets

ProCurve Networking by HP recently announced a [vision for adaptive networks](#): a future of networks that are customized and open, that establish a comprehensive network view and that adapt to the needs of users, applications and organizations. This adaptive network vision extends and enhances the ProCurve Adaptive EDGE Architecture™ (AEA) foundation established nearly five years ago.

In this paper, ProCurve Networking by HP will give you insights into the technologies that let you start building an adaptive network today, as well as key strategies and technologies for the future of truly adaptive networks. Our goal is to help you harness the full potential of your existing network infrastructure and better prepare for the technologies you will need to respond effectively to inevitable change.

Why networks matter

The right network infrastructure can help you meet your business goals, enabling your organization to compete effectively by fortifying security, reducing complexity across your organization and increasing productivity.

In an era of change, organizations must be concerned about managing complexity, countering security threats that accompany open and wireless networks, making information and resources accessible to those that need them, handling the burdens associated with regulatory compliance, and supporting current and future applications.

Many organizations underestimate the importance of the right network infrastructure in IT's role of making the organization nimble and effective. Too often, even IT-savvy executives make the mistake of treating a network as simply "plumbing" for moving data around. In an era of fast-paced global competition, this mistaken approach to networking can be disastrous.

An ideal network is an adaptive network

The ideal network infrastructure ensures that your information assets remain secure from internal and external attacks, helps your organization become both internally and externally productive, and is easy to configure, operate and maintain. The network infrastructure must be built to flex and change with your organization and application needs. In a word, you must have a network that can adapt.

What is an adaptive network? It is a cohesive, flexible network infrastructure that enables your organization to:

- fortify security,
- reduce complexity and
- increase productivity.

Importantly, an adaptive network is:

- **Adaptive to users**, which means personalization. Each user enjoys a personalized network experience, for the benefit of both the user and the organization. At the same time, personalization enables organizations to protect information and assets by controlling users' access, thus strengthening security. And because personalization in an adaptive network happens automatically, it is simple for network managers to deliver this powerful capability.
- **Adaptive to applications**, which means application enablement and optimization. Adaptive networks let you get the most from all your applications. They are able to easily integrate whatever comes along, whether it's IP telephony, video conferencing, IP video surveillance, Web-based applications, on-demand computing, collaborative applications, video on demand, next-generation applications or future applications that have not yet even been conceived.
- **Adaptive to organizations**, which means evolving and responding to changing needs. Adaptive networks let organizations focus on their business and goals, rather than devoting exorbitant time, money and resources to managing the network and keeping it running. You

retain complete control over your network's operation, but implementation of your policies is handled automatically and centrally by an adaptive network.

With an adaptive network, your organization can focus on your core business so you become and remain more competitive within the rapidly evolving global ecosystem. Your network infrastructure becomes a strategic asset helping you thrive and compete. Users get access to the information and resources they need to be most effective – while your critical information, resources and assets remains available over the network, secure from unauthorized users and safe from attacks.

From an IT perspective, key IT goals fulfilled by an adaptive network include reducing complexity, increasing return on overall IT investments, establishing a service-oriented architecture (SOA), consolidating technologies wherever possible and optimizing Web services, distributed applications, collaboration, virtualization and personalization.

The basic ingredient for adaptive networks: intelligence

In ProCurve's adaptive networks vision, intelligence – of the right kind, and in the right location – is the key ingredient. This outlook derives directly from the [ProCurve AEA](#), the industry's first strategic blueprint to meet the challenges of adding performance, security and intelligence at the network edge while providing a single strategy for a secure, mobile and converged network.

The AEA is significant because it contrasts with the competitive approach, which comprises a collection of strategies resulting in a complex and technically unwieldy “network of networks.” ProCurve's AEA strategy – providing “control to the edge” with “command from the center” – was a breakthrough when first introduced and now has become widely accepted.

The AEA presented a stark contrast to the prevailing view of networks as core-centric, with the edge populated by unintelligent switches and connectivity devices. In contrast, ProCurve understood that changing business and technology needs demanded a network that could scale to accommodate more robust applications and capabilities – and that this could be achieved only with intelligent devices at the client edge of the network.

Built on an AEA foundation, an adaptive network must have embedded intelligence that allows it to understand the user, the policies established by the organization, the full range of applications and the needs of the organization itself. In an adaptive network, intelligence is distributed throughout the network, with emphasis placed at the network edge, where users and devices connect – and where traffic ultimately enters and exits the network.

Fortifying security

One of the most important aspects of an adaptive network is how it can more effectively handle network security. Security continues to be one of the biggest issues facing organizations and IT departments today. They must constantly monitor and detect security breaches that might have occurred while simultaneously protecting the network and information assets before a breach happens. Protection from, detection of and response to external and internal security threats is paramount.

ProCurve's [ProActive Defense strategy](#) represents a unique approach to network security, providing a comprehensive security strategy for automating a security process of protection, detection and response, within a trusted network infrastructure. ProActive Defense encompasses both wired and wireless networks and is a fundamental characteristic of an adaptive network.

The three main pillars of the ProActive Defense strategy are:

Secure Infrastructure: A secure infrastructure secures the network for policy automation from unauthorized extension or attacks to the control plane. It includes protection of network components and prevention of unauthorized managers from overriding mandated security provisions. It also includes privacy measures to ensure the integrity and confidentiality of sensitive data: protection from data manipulation, prevention of data eavesdropping, end-to-end VPN support for remote access or site-to-site privacy and wireless data privacy.

Infrastructure security is a necessary component for building a truly trusted network system that is capable of automating the deployment of security policy. The infrastructure itself must

be trustworthy, managed securely and interconnected with trusted technologies in order to implement a reliable means of automation.

Access Control: ProCurve ProActive Defense proactively prevents security breaches by controlling which users have access to systems and how they connect in a wired and wireless network.

Some of the ProCurve technologies used for access control include:

- [Identity Driven Manager \(IDM\) 2.0](#): IDM allows network managers to manage their network access and performance based on the user identity and device needs, which is a fundamental part of providing a unique, personalized user experience. IDM also allows for identity management for classes of users based on role, type of job and job task needs, and it enables user traffic to be controlled by dynamically provisioning [access control lists \(ACLs\)](#). The organization's network manager becomes the steward for managing the network as a personalized service to users.
- ProCurve switches include built-in support for 802.1X, Web Auth and MAC Auth for [greater access control](#).
- ProCurve's [unified wired and wireless management solution](#) includes dynamic virtual LAN (VLAN) and ACL support. A unified wired and wireless security infrastructure allows you to maintain a single user account across both wired and wireless networks, reducing operational costs and enhancing the user experience (e.g., one password, one account).

Network Immunity: Network immunity defends the network from virus and worm attacks. It monitors behavior and applies security information intelligence to assure uninterrupted network service.

In particular, the network immunity of ProActive Defense is conferred by [Virus Throttle](#) technology and anomaly detection, which are provided as embedded threat defense capabilities in the most recent series of ProCurve switches.

Additionally, [ProCurve Manager \(PCM\) 2.1](#) network management software includes an action/response capability that helps with network immunity. Using PCM, you can configure programmed response automation to help boost the defensive capabilities of your network.

Increasing productivity

Adopting an adaptive network strategy greatly simplifies your ability to set up and manage your network and provide the services needed by users. Network user productivity is increased because users have the access and performance they need to do their job, regardless of their physical location. Adaptive networks provide a seamless, cohesive, personalized user experience, delivering the services that are expected and needed. In this way, adaptive networks will be the standard for future networks.

IT managers benefit from the real-time visibility and insight that adaptive networks provide into the inner workings of their network and organization. As a result, IT managers can steer with agility toward new opportunities and away from potentially detrimental situations.

This agility is accomplished with a cohesive adaptive network strategy and management software tools such as [PCM](#) and its [IDM](#) plug-in. In addition to increasing productivity, these tools also improve manageability of your IT resources through the reduction of complexity, including [unified management of wired and wireless networks](#), integrated voice/data/video networks and implementation of advanced convergence capabilities such as [voice over wireless LAN](#) (VoWLAN).

ProCurve products employ a key standard, the [sFlow](#) monitoring system, which provides tremendous visibility into network operations and enables network resource optimization. sFlow lets you accurately monitor network traffic at Gigabit speeds and higher, and it scales to manage tens of thousands of agents from a single point.

Adaptive networks rely on industry standards, which means a simpler deployment of new equipment and applications along with easy integration of third-party technologies and products. Standards also allow the business to more easily comply with regulations as well as document that compliance. In this way, you can reduce risk of non-compliance while gaining the advantage of technology choices that can improve your overall business processes.

ProCurve networks are renowned for their reliability and availability. As a result, ProCurve adaptive network resources remain available to your entire organization, enabling the IT staff to stay productive and focus on core business objectives, rather than on network maintenance.

Reducing complexity

As previously mentioned, [PCM](#) is key to reduction of network complexity through improved manageability. This sophisticated, secure, advanced Windows-based network management tool comes with most ProCurve products. PCM allows network administrators to configure, update, monitor and troubleshoot ProCurve devices – on both wired and wireless networks – centrally with easy-to-use screens. The administrator can configure template policies that will take automated actions in response to network events from a variety of sources.

[ProCurve Manager Plus \(PCM+\)](#) can also be enhanced with plug-in modules such as IDM and ProCurve Mobility Manager (PMM), to optimize management of mobility, security and convergence solutions.

Some highlights of PCM+ include:

- Group and policy management
- Easier configuration management
- Advanced VLAN management
- Device software updates that can be scheduled easily across large groups of devices, all at user-specified times.

The Web interface and simplified command line interface (CLI) of PCM and PCM+ also serve to vastly simplify network management.

ProCurve's standards support (such as for LLDP-MED) imparts advanced capabilities such as plug-and-play auto-provisioning of voice VLAN and quality of service (QoS) policies for IP phones and PCs sharing the same switch port; automatic location identification for Emergency Call Services such as E-911; and QoS enabled by default to ensure optimal performance for voice, video and business-critical applications.

Performance, interoperability, scalability

ProCurve addresses interoperability through standards leadership, with a long history of both defining and driving adoption and innovation of industry standards in networking. The focus is on reduced complexity and greater automation, to allow the integration of varying technologies and products. ProCurve adaptive networks provide organizations with tremendous multi-vendor interoperability and unprecedented choice and flexibility in what solutions they deploy, as well as how, when and where those solutions are deployed.

ProCurve's support for important industry standards ensures that your network infrastructure has the flexibility to run current applications and is convergence-ready. Our standards support is crucial to our convergence philosophy, where ProCurve focuses on network infrastructure and [partners with a range of convergence solutions providers](#) to deliver best-of-breed solutions for voice, video, data and emerging convergence applications.

To ensure interoperability, ProCurve performs extensive certification testing, compliance testing and multi-vendor interoperability testing/certification, including with IP telephony and video vendors such as Avaya, Cisco, DVTel, Mitel, Siemens and SpectraLink. This rigorous testing provides confidence that ProCurve solutions will integrate easily and run smoothly with even the most demanding applications, such as video and voice.

One of ProCurve's most significant recent achievements has been the introduction of the first truly seamless, secure wired and wireless management environment through our [mobility infrastructure solutions](#). The benefits of unified, secure wired and wireless network management cannot be overstated.

To enable you to choose the network transmission media you need for your own strategic reasons – as opposed to being forced into a media choice because it's what your network equipment supports – ProCurve is committed to protecting your investment by providing options. For example, ProCurve enables [10G over copper](#) and other media.

ProCurve offers a LAN aggregation technology called [switch meshing](#) designed to help optimize and simplify your investments in switches and cables. Switch meshing provides significantly better bandwidth utilization than either Spanning Tree Protocol (STP) or standard port trunking

alone; improves network performance by reducing congestion and load-balancing traffic; is easy to set up; and supports flexible configurations. ProCurve's switch meshing technology is fully interoperable with STP.

In our products that support Power over Ethernet (PoE), ProCurve's intelligent PoE management continuously monitors actual PoE usage, provides fine-grain reporting and dynamically balances power on an administratively configurable priority basis.

High-performance advanced routing and multicast capabilities are often needed to support demanding video solutions (such as Protocol Independent Multicast [PIM] and Internet Group Management Protocol [IGMP]). ProCurve allows meshing and trunking to aggregate traffic and dynamically load balance. Virtual Router Redundancy Protocol (VRRP), meshing and similar technologies ensure fail-over to alternate or redundant links, so that no "single point of failure" will impact connectivity.

In addition, ProCurve products feature hot-swappable modules, fans and PoE power supplies. Power threshold manages the PoE utilization and generates a notification when PoE redundancy is no longer available or if additional power is required.

Looking ahead

To see where ProCurve is headed, you can look at where we are now – and how we got here. Our adaptive networks vision, which is a clear roadmap for the future, arises naturally from our Adaptive EDGE Architecture and our basic value proposition, which has remained constant for many years.

ProCurve has long been dedicated to providing the future-proofed networks that customers need so they can easily adapt to change. This commitment is clearly seen in the [ProCurve 5400zl chassis family and ProCurve 3500yl stackable family](#). These products are Layer 3/4 LAN switches with wirespeed performance and integrated Gigabit PoE.

Both families are based on the ProVision™ ASIC, the fourth generation of custom-designed ASICs from ProCurve, which deliver intelligence and control to the edge of a network. With their capabilities and range, both switch series further sharpen ProCurve's Adaptive EDGE Architecture by delivering advanced functionality to the network edge to meet the evolving needs of security, mobility and convergence applications.

Joining the 5400/3500 intelligent switches are other important ProCurve products. For instance, the [Wireless Edge Services Module \(WESM\)](#) integrates WLAN management and IDM role-based policy enforcement into ProCurve intelligent edge switches. The [ProCurve Access Point 530](#), the most recent ProCurve wireless access point, is a dual-radio 802.11b/g and 802.11 a/b/g access point offering flexible radio and antenna configuration, security, user authentication and access control services.

In addition to providing intelligence to the network edge, ProCurve builds extra capabilities into our intelligent edge switches that allow us to deliver new functionality by moving applications from appliances through blades and into the silicon on every port. An example of this ability to integrate new capabilities into existing products was the Virus Throttling technology that we included as a free software upgrade in 2005.

While predictions are necessarily uncertain, it's likely that the future of networks will be one of evolution rather than revolution: There will be further integration of security offense and defense, with ever easier-to-deploy solutions that will allow security protection to always be enabled. More network capabilities – such as personalization – will be automated, which will boost user productivity while greatly reducing the complexity of network management.

Rest assured that ProCurve has not only the imagination but also the proven technical know-how to deliver on the promise of adaptive networks, both now and tomorrow.

ProCurve offers adaptive network solutions that are real today, and we are committed to providing networks that are open, cohesive, highly available – and that fortify security, increase productivity and reduce complexity by being adaptive to users, to applications and organizations' needs.

ProCurve provides a network infrastructure that can adapt and grow, and we are a partner who will grow with you. Go to www.procurve.com to see how ProCurve can help you start turning your network into a strategic asset.

To find out more about
ProCurve Networking
products and solutions,
visit our Web site at

www.procurve.com



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