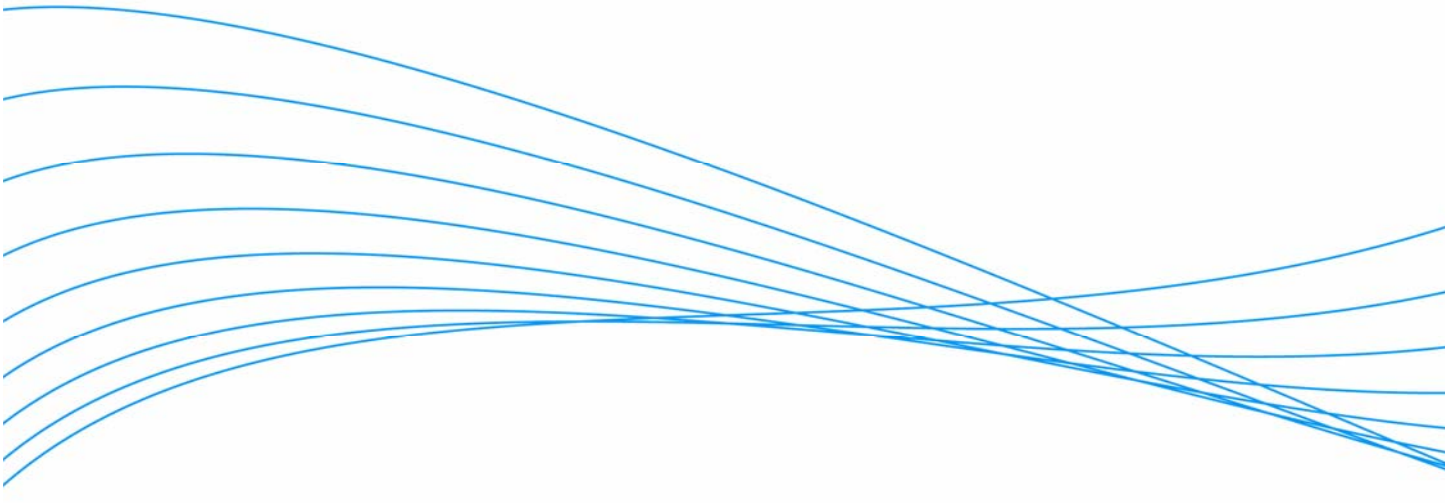
ProCurve Networking by HP

Interconnecting the Intelligent EDGE



Introduction

Throughout history, enterprises have been forced to evolve and adapt to an ever-changing business environment to be successful. They face constant pressure to improve their products or services, become more efficient and create competitive advantages wherever possible.

Many organizations are now finding their technology infrastructure holds a wealth of opportunity for business improvement. In fact, this improvement is swiftly becoming a necessity.

Networking advancements are transforming infrastructure utilization and changing the way organizations provision communications and information technology (IT) for the enterprise. In order to keep up, companies need a secure, mobile, multi-service network; one that is able to make intelligent decisions at every point of access and continually adapt to evolving business and user requirements.

Moving toward this end allows a company to protect its increasingly valuable digital assets, enhance business productivity and simplify internal and external communications, ultimately improving organizational efficiency and profitability.

ProCurve Networking by HP offers new strategies and solutions that place and integrate critical intelligence and functionality at the network edge for automated, dynamic configuration of network behavior. This paper will explore the changing networking environment and how this new design approach helps organizations improve business and technology performance while minimizing investment risk. In addition, ProCurve's intelligent EDGE solutions, including the new ProCurve Interconnect Fabric offerings, will be highlighted.

Networks in Transition

As information and resources become more public, more converged and more mobile, enterprises must understand and support new security methods, advanced applications and new connection management solutions for their existing local area networks (LANs). In addition, with data volumes increasing, technologies becoming more complex and new constituencies – employees, partners and customers – requiring varying levels of access and service, a fully integrated and adaptive network is necessary.

Companies must transition their infrastructure to facilitate a converged, mobile, highly secure network. These three driving forces are related, interactive and interdependent. As a result, enterprises need a dynamic, intelligent infrastructure that is able to fully integrate and leverage all three.

Unfortunately, traditional network design strategies have placed all network intelligence and decision-making abilities in the core devices. These devices – typically core routing switches – have acted as the brains, brawn and traffic police for the entire network. They are asked to handle all client and user identification, access and security enforcement as well as bandwidth and quality of service (QoS) allocation.

With all intelligence residing at the network core, the network edge has been unable to assist in the identification, authentication, traffic prioritization and service allocation tasks. The hubs and switches located at the network edge are generally unintelligent and only capable of passing packets to the core devices.

This traditional, core-centric model of network design creates several roadblocks to implementing a secure, mobile, multi-service network. Challenges associated with network performance, scalability, security and QoS are only the beginning; overall business efficiency suffers as well.

Performance

With all the intelligence and decision-making capabilities placed in core devices, network performance is oftentimes significantly hindered. This approach creates a considerable and obvious bottleneck, and the infrastructure can become easily overloaded. Routing is also inefficient, with all traffic having to travel from the edge devices to the core devices (where a decision can be made) and then back out to the edge.

Every client, user, server, application and edge device added to the network intensifies the traffic and decision-making burden on the core devices, further increasing the possibility of overload.

Additionally, when a user's traffic takes extra time or bandwidth to process, all other users' traffic must wait.

Simply put, when the core devices are overloaded, or even strained, all other networking operations are adversely affected and network performance suffers.

Scalability

Scalability is also compromised through traditional network design strategies. With all the power and decision-making capabilities residing at the network core, and new traffic and services easily straining it, frequent core device upgrades and redeployments are necessary to scale the network.

This is an expensive and inefficient way to enhance the network in accordance with business growth and evolving infrastructure needs. It locks companies into a continual cycle of "ripping and replacing" both the brains and brawn of the network rather than improving it over time in a logical, affordable manner.

Security

Traditional network design strategies raise several security issues. Since all decision-making and access enforcement responsibilities reside in the core devices, users are oftentimes already on the network before the core routing switches are able to identify and approve their clients' access rights, if at all. Furthermore, networks are frequently left wide open within a building or campus, with security gates being relegated to users logging on remotely and few, if any, safeguards at the port level.

As a result, most enterprise networks offer minimal, inconsistent security checks, clearing the way for malicious traffic to infiltrate the infrastructure.

This strategy is tantamount to an organization placing its sole security guard in the middle of the building, checking visitors' identification after they have been allowed to freely roam the company hallways. Or worse yet, having no security guard whatsoever.

Quality of Service (QoS)

Core-centric networks employ simplistic configuration for simplistic connectivity across multiple domains to ensure the core devices can handle all identification and connection decisions. The network behaves uniformly no matter what user is connecting or what services they require. The result is a static, rigid infrastructure that, once configured, does not change or adapt.

However, certain individuals and groups have diverse networking and QoS needs. For example, an engineering organization may need constant, uninterrupted access to high-bandwidth services such as computer-automated design (CAD) applications, whereas guests may only need Internet access.

Emerging applications and traffic types, such as Voice over Internet Protocol (VoIP), create a greater need for QoS control. These diverse applications must be able to coexist without interfering one another or disrupting service. For example, if a user is on a VoIP phone call and needs to concurrently receive a large data file, the network must be able to prioritize the two and limit the bandwidth for the file transfer to ensure the phone call is not disrupted.

However, with the network behaving uniformly for every user and service, there is no prioritization for particular individuals, the groups with which they are associated or the services to which they need access. This hinders an organization's ability to create efficiencies and maximize network performance based on factors such as traffic, bandwidth and QoS propagation.

In addition, all access rights have traditionally been port-based because, in the past, users were tied to a single port. However, with the proliferation of mobile functionality, users are able to connect to the network from anywhere. Therefore, it is important that the users' access and associated QoS rights be able to move with the user.

Business Efficiency

Lastly, core-centric infrastructures render network operation more of a technology function than a business function. The overriding emphasis is on enabling connectivity and maintaining network performance, not meeting business objectives and users' unique needs.

Furthermore, it can be extremely difficult to deploy new applications. Since traditional networks are static, adjusting their behavior to meet new applications' requirements without adversely affecting existing applications and functions is highly complicated. This not only hinders network scalability, but can also affect an organization's ability to improve customer service, distribution and sales channels and revenue potential.

Consequently, companies are limited in their ability to continually enhance overall business efficiency through improved communications and network functionality.

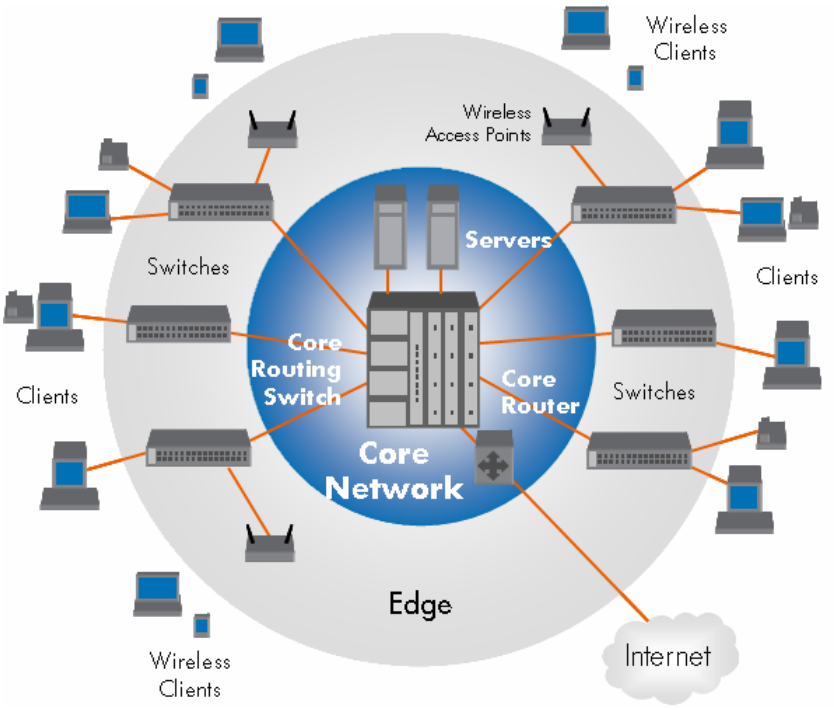


Figure 1. Traditional Core Network

ProCurve's Approach to Network Design: Move Intelligence to the EDGE

An alternative to the traditional network design model is to extend critical intelligence and functionality beyond the core devices and fully integrate the infrastructure. Pioneered by ProCurve, this new architectural approach places intelligence at the edge of the network where users connect, enabling command from the center with control to the edge.

With intelligence at the edge – using intelligent edge devices – security is enhanced, traffic prioritization is improved and users can connect anytime, anywhere with a singular view of the network. With command from the center – using network management software with dynamic policy control and modules for security, mobility and convergence – companies have centralized control of network configuration, making it easier to implement new applications and support new traffic types across the enterprise.

Not only does this approach enable companies to improve security, enable mobility and capitalize on new technologies, it also helps reduce costs and safeguard IT investments.

The ProCurve Adaptive EDGE Architecture is the only network design approach that recognizes the necessary migration of intelligence and functionality to the network edge and gives companies a cost-effective, easy-to-manage solution to achieve command from the center with control to the edge. The architecture enables organizations to preserve networking investments while readying their networks to support future business needs and priorities. With the Adaptive EDGE Architecture, a company's network can truly become an anywhere, anytime resource.

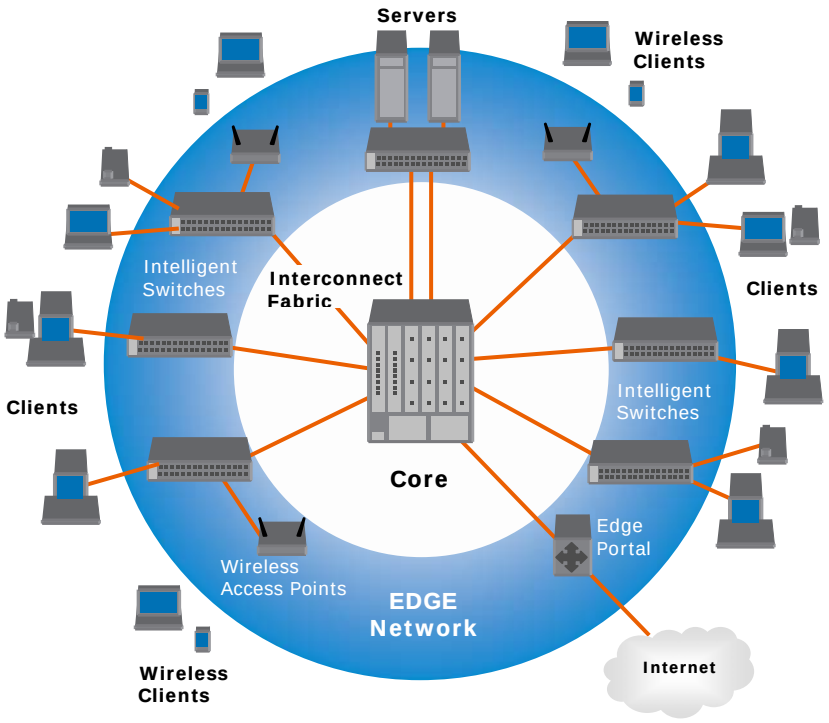


Figure 2. Intelligent EDGE Network

ProCurve's Intelligent EDGE Solutions

Utilizing the ProCurve Adaptive EDGE Architecture as a foundation, companies are able to push intelligence to the edge of the network to improve organizational performance, ensure appropriate connectivity and service for each user and receive maximum return on IT investment (RoIT). Most importantly, with command from the center and control to the edge, the network is able to adapt dynamically to business and user needs.

With intelligence pushed to the edge of the network, ProCurve solutions are able to:

- Utilize command from the center to dynamically automate the configuration of the intelligent edge to provide unique behavior for every individual or group.
- Facilitate control to the edge by allowing switch and access point features to make correct decisions at the perimeter of the network.

ProCurve offers a portfolio of intelligent EDGE solutions that help companies deploy a secure, mobile, converged network. These include intelligent EDGE switches and a new category of switching product called Interconnect Fabric, which simplifies the interconnection of intelligent EDGE switches compared to traditional core routing switches.

In essence, ProCurve intelligent EDGE solutions are able to share the network "brain" responsibilities so the core devices can more effectively function as the network "brawn." All ProCurve solutions work in concert according to the unique business needs of the company utilizing them.

ProCurve Intelligent EDGE Switches

ProCurve offers a variety of switches that reside at the edge of the network and deliver exceptional intelligence and functionality. These switches are able to make decisions at the point of access, reducing the load on core devices and enforcing access and security policies before traffic has been placed on the network.

In addition, these intelligent EDGE switches can be dynamically and automatically configured – on a per-user, per-session basis – as dictated by IT management. They are able to grant or

restrict access based on the particular access rights of the individual accessing the network. These auto-configuration capabilities render the network more dynamic, secure, adaptive and able to serve users' unique needs.

ProCurve Interconnect Fabric

As an alternative to traditional core routing switches, ProCurve Interconnect Fabric delivers high-performance, cost-effective, high-availability solutions for connectivity between intelligent EDGE devices.

ProCurve Interconnect Fabric offerings are designed to be the best choice for integrating and managing intelligent EDGE devices. They optimize network infrastructure and provide additional options for designing, migrating and deploying a high-performance network.

ProCurve Interconnect Fabric is not the genesis but rather the result of intelligence being moved to the network edge. The success of the ProCurve Adaptive EDGE Architecture has driven demand for this new class of high-speed, redundant and resilient network interconnect fabric solutions.

ProCurve Interconnect Fabric offerings act as either the new network engine or a counterpart to existing core devices, bolstering their power and availability and extending their value. ProCurve Interconnect Fabric offerings interoperate with a company's existing network infrastructure, allowing a seamless (and gradual, if desired) migration to an optimized network design based on the Adaptive EDGE Architecture. With this flexibility, companies have a wider choice of options for meeting the challenges of current, emerging and future applications.

Only ProCurve offers a choice of new Interconnect Fabric and traditional core solutions to interconnect the intelligent edge.

Intelligent EDGE Networks versus Traditional Core Networks

ProCurve offers organizations utmost flexibility to deploy a network that delivers maximum value and meets their particular needs, with the ability to utilize new intelligent EDGE solutions, existing core devices or a combination of both.

The contrast of functionality and feature sets provided by traditional core networks and Intelligent EDGE networks are highlighted below. Table 1 outlines the key differences between conventional core routing switches and ProCurve Interconnect Fabric offerings.

Traditional Core Networks

Functions at the core:	Functions at the edge:
• High availability • Advanced routing • Multicast • Security • Bandwidth management • Quality of Service • Deep packet inspection • Wide Area Network (WAN) edge features	• Client connectivity • Basic user authentication

Intelligent EDGE Networks

Functions at the core:	Functions at the edge:
• High availability • High performance forwarding • Ability to honor decisions made at the EDGE	• Robust access security • Advanced routing and multicast • Dynamic configuration • Bandwidth management • Quality of Service • Deep packet inspection • Virus protection • WAN edge features • Encryption • Caching • Stream processing

	Traditional Core Routing Switch	Interconnect Fabric Switch
Principle Roles in Network Design	• Central point of network interconnect, security, traffic management • Enables multiple network domains (routing) • Provides complex traffic filtering and traffic control functions (including deep packet inspection)	• Highly reliable high speed interconnect for intelligent EDGE switches • Honor all decision made at the EDGE (at layer 2) • Supports migration to optimized AEA without immediate changes to addressing architecture (routing)
Key Features & Functions	• Robust routing with multiple protocol support	• Bandwidth and high availability • Simple, easy to deploy and manage
Limitations	• Scalability limited by bandwidth of processor sub-systems • Complex and difficult to configure	• Will not have feature set of a core routing switch because this functionality exists at network edge
Key Benefits	• Familiar and pervasive • Available from many vendors	• Lower cost and complexity • Highly scalable performance

Table 1. Traditional Core Routing Switches versus ProCurve Interconnect Fabric Switches

The Value of Deploying an Intelligent EDGE Network

There are numerous benefits to deploying and interconnecting an intelligent EDGE network with ProCurve switches and Interconnect Fabric offerings. In addition to providing maximum RoIT by minimizing investment risk and extending the life of existing solutions, companies are able to enhance network performance, security and flexibility. All of these factors combine to improve overall business performance and efficiency.

Minimize Investment Risk

By enhancing their networks over time through the addition of high-volume, intelligent EDGE devices – versus continually ripping and replacing expensive core solutions – companies are able to save costs and minimize investment risk. Organizations can affordably and efficiently scale their networks and maximize RoIT.

Furthermore, by offloading the decision-making burden from the existing core solutions, companies are able to extend the lifespan and usability of those devices. Less complexity, less intelligence and fewer decisions placed on core devices render them more powerful. Instead of being the brains, brawn and traffic police for all network operations, these core devices can simply act as the network engine.

Simply put, adding to a network is far better from an investment standpoint than continually replacing it.

Improve Network Performance and Availability

Deploying and interconnecting intelligent EDGE devices also eliminates the bottleneck that plagues many traditional, core-centric networks. Decisions are made and enforced where users connect, reducing the burden on the core devices. This renders policy enforcement more efficient and traffic routing more direct.

In addition, as convergence and security become integral facets of network operation, availability is more important than ever. For example, users of VoIP applications expect 100 percent uptime on their phones and traditional core-centric networks have not been able to deliver. The purely data-driven networks of the past must now support all communications and computing needs simultaneously.

With hardware redundancy and software resiliency features built into ProCurve intelligent EDGE solutions, network availability is improved and downtime is reduced.

Increase Network Security

With the ability to identify, authenticate and authorize users at the point of access, network security is vastly improved with intelligent EDGE solutions. Malicious users are stopped before they are on the infrastructure, not after they have been placed on the network and routed to the core devices for authentication.

Intelligent EDGE solutions enable companies to better control network access, protect network resources and prevent unauthorized traffic from harming the network.

Bolster Choice and Flexibility

Because ProCurve intelligent EDGE devices can be easily implemented over time and work in conjunction with existing solutions, companies have a flexible, affordable migration path.

Whereas traditional network design strategies required frequent upgrades or redeployments of expensive core devices, ProCurve offers complete flexibility to enhance a network instead of replace it.

ProCurve intelligent EDGE switches present a far more affordable and easy way to deploy additional intelligence and functionality to a network than replacing expensive core devices. And implementing ProCurve Interconnect Fabric offerings can help complement and extend the lifespan of existing core devices.

Companies are able to scale and enhance their infrastructure over time as they move to an intelligent EDGE network. There is maximum choice, with the ability to utilize new intelligent EDGE solutions, existing core devices or a combination of both.

Summary

Networks are clearly in transition. The roadblocks associated with traditional core-centric networks – where the core devices must be the brains, brawn and traffic police for all network operations – have become more apparent as user, business and technology requirements evolve.

By building upon the ProCurve Adaptive EDGE Architecture, moving intelligence and functionality to the edge of the network and interconnecting all devices with Interconnect Fabric offerings, companies can effectively establish a secure, mobile, multi-service infrastructure. Not only does an intelligent EDGE network improve network performance, security and scalability, it also helps minimize investment risk and ensure maximum value – immediately and well into the future.

For More Information

To learn more about ProCurve solutions, contact your local ProCurve sales representative or visit: www.procurve.com.

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

www.procurve.com

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