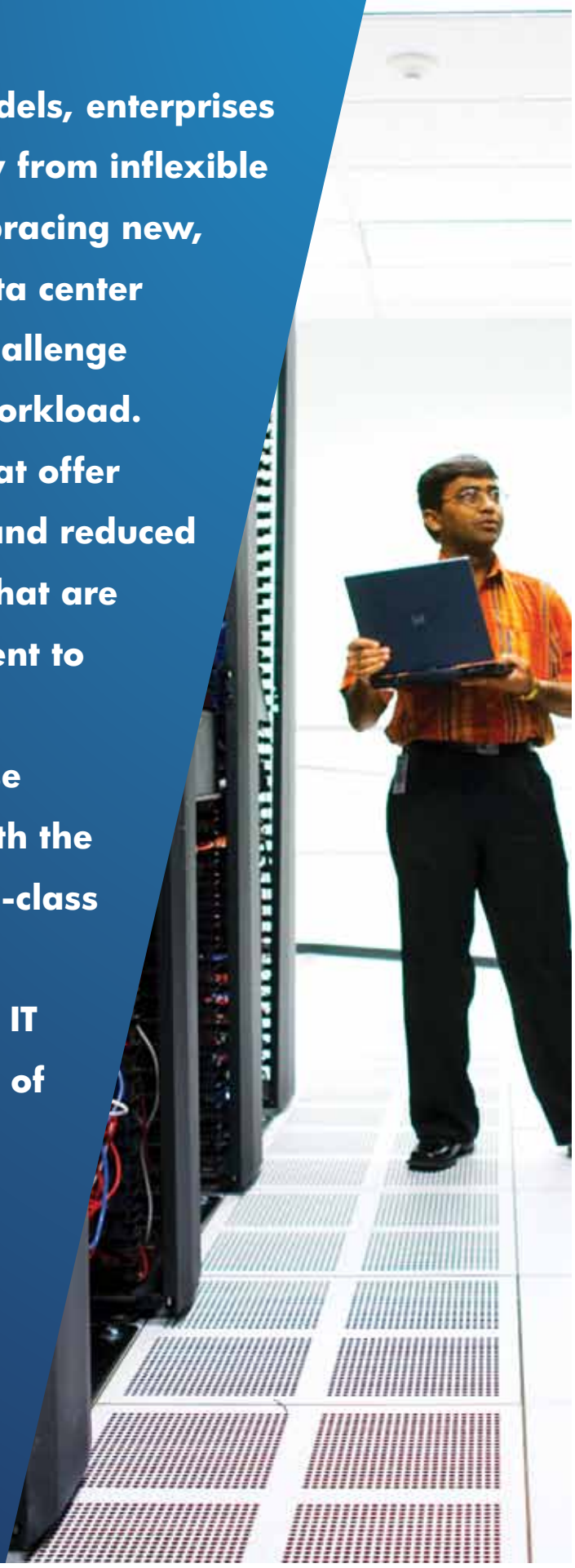
CHANGE

the way you look at data center networking.

HP Data Center Network Solutions

Brochure

Tasked with enabling Web-centric, information-intensive business models, enterprises are taking bold steps to turn away from inflexible legacy architectures. They are embracing new, innovative approaches to build data center networks that are ready for the challenge of a highly virtualized, dynamic workload. With products and technologies that offer superior performance, flexibility, and reduced complexity, HP delivers solutions that are resilient, secure, and energy-efficient to align with the demands of today's and tomorrow's data centers. These game-changing offerings come with the comprehensive backing of a world-class service and support team, and the global reach of the world's largest IT solutions company. This unique set of advantages enables organizations to deploy more new applications, faster, and with a better total cost of ownership (TCO) than ever before.



Enabling next-generation data centers

The traditional, inflexible, and hierarchical model of separately provisioned and maintained server, storage, and network resources constrains organizations from cost-effectively providing on-demand support for applications and meeting unprecedented service levels. Conducting business with the agility required by the more dynamic nature of highly virtualized data center environments necessitates adopting new networking technologies that streamline delivery methods and contain costs.

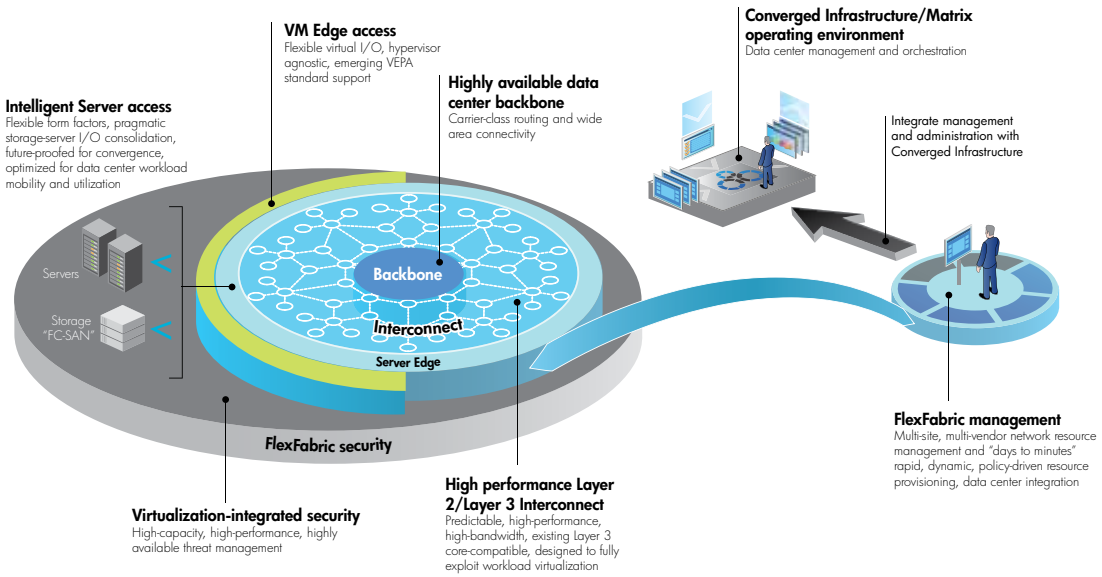
The HP approach to networking is focused on driving innovation that reduces complexity, delivers breakthrough economic benefits, and empowers customers to deploy the network as a business enabler. The HP Converged Infrastructure blueprint and FlexFabric technology enable the predictable performance, high availability, and comprehensive management needed to support large-scale virtualization and convergence implementations, and a spectrum of IT deployment models—including cloud computing, Web hosting, and managed services.

HP networking solutions help customers address today's toughest data center challenges:

- **Consolidation**—Server-integrated Virtual Connect network technologies and Fibre Channel over Ethernet (FCoE)-enabled blade and top-of-rack-based switches complemented with modern, highly scalable, terabit-class switching and routing to efficiently create a single, higher-performing, converged, next-generation data center.
- **Simplification**—Industry-leading scalability and performance with fewer platforms and layers, using a common operating system and management platform.
- **Business continuity**—Innovative Intelligent Resilient Framework (IRF) technology for deploying a Resilient Virtual Switching Fabric and facilitating exceptional network resiliency with network-based In-Service Software Upgrade (ISSU) capability for distributed high availability.
- **Network control**—Single-pane configuration and policy management for virtualized networking resources, enabling application mobility and network-wide visibility.
- **Security**—Dedicated, proven high-performance secure fabric, including robust security appliances and flexible embedded security.
- **Energy efficiency**—Products that consume up to 50 percent[1] less energy than leading competitor systems and simplified designs that require fewer platforms and network layers, significantly reducing power/cooling needs.
- **Investment protection**—Open, standards-based technology to enable interoperability, seamless 10 Gigabit Ethernet migration, and network and I/O consolidation using FCoE.
- **Cost containment**—Unmatched price/performance; simplified architecture for reducing network complexity and related energy expenses; comprehensive, streamlined management; lesser CAPEX; and no hidden software costs.
- **Scalability**—IRF for managing thousands of Gigabit or 10 Gigabit Ethernet (10 GbE) ports as a single common switching fabric with one IP address.
- **Performance**—A12500 with a next-generation 100 Gigabit Ethernet non-blocking architecture designed to address emerging 40/100 Gigabit Ethernet, FCoE, and unified fabric data center requirements.

[1] Based on third-party testing by Miercom, January 2010.

Figure 1
HP FlexFabric architecture



FlexFabric: The network foundation of a Converged Infrastructure

FlexFabric is the vision HP has for a next-generation, highly scalable data center network. This architecture radically streamlines deployment and management, and drives end-to-end data center agility through advanced technology, simplified network designs, and tightly integrated management. FlexFabric connects servers to a virtualized, high-performance, low-latency interconnect that consolidates multiple protocols to dramatically reduce network complexity and cost.

This unique, wire-once approach enables Ethernet and storage networks to be combined into one converged fabric that can easily scale and adapt to changing workloads. Combining intelligence at the server edge with advanced FlexFabric management tools, FlexFabric enables virtualization-aware networking; predictable performance; and rapid, secure, business-enabling provisioning of data center resources.

Along with a line of virtualization-optimized HP BladeSystem-integrated network connectivity devices (Virtual Connect, Virtual Connect Flex-10, and Virtual Connect FlexFabric), HP offers a complete portfolio of data center networking products, including FCoE-capable top-of-rack server edge and high performance, highly scalable aggregation layer and core switch platforms. With high-performance security and advanced network provisioning tools to securely and efficiently manage the network, customers can deploy FlexFabric networks today, while they provide the foundation for future growth and scalability.

For more information on FlexFabric architecture, visit **www.hp.com/go/flexfabric**

A wide range of data center networking solutions for deployment flexibility

Next-generation HP networking data center solutions not only support traditional hierarchical network designs, they also give enterprises the option of collapsing their network architectures from three to two tiers to reduce excess systems, improve overall network performance, decrease end-to-end latency, and simplify operations. Industry experts increasingly point to a two-tier network architecture as a preferred design for highly virtualized next-generation data centers and cloud computing environments.

Partners and certifications

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"If you have switches with adequate capacity and you've got the right ratio of input ports to trunks, you don't need the aggregation layer, which provides marginal value at best. You can avoid a lot of complexity, cost, and extra heat while simplifying design and troubleshooting."

Joe Skorupa,
Research VP, Gartner, Inc.

Figure 2
Three-tier network architecture

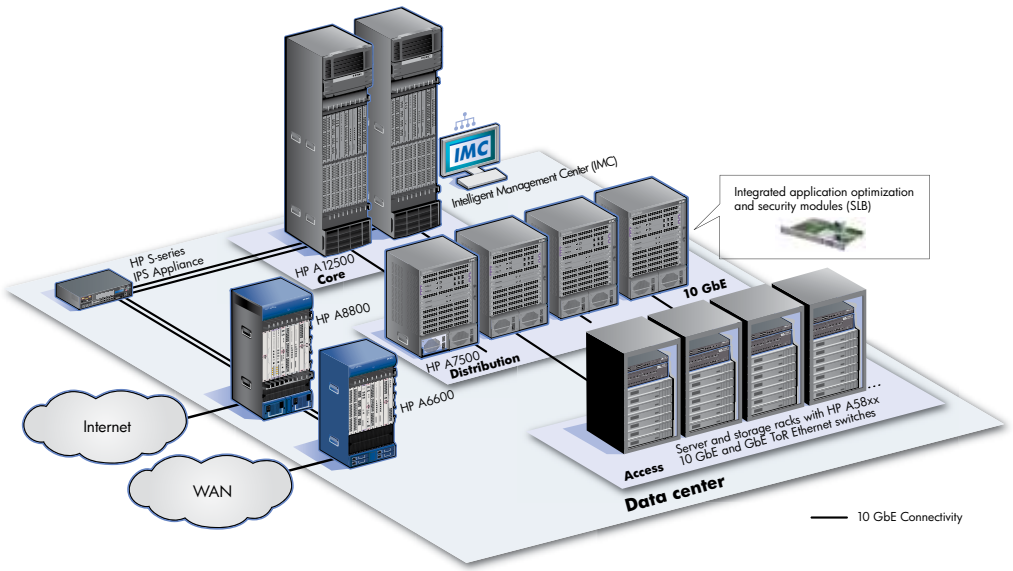
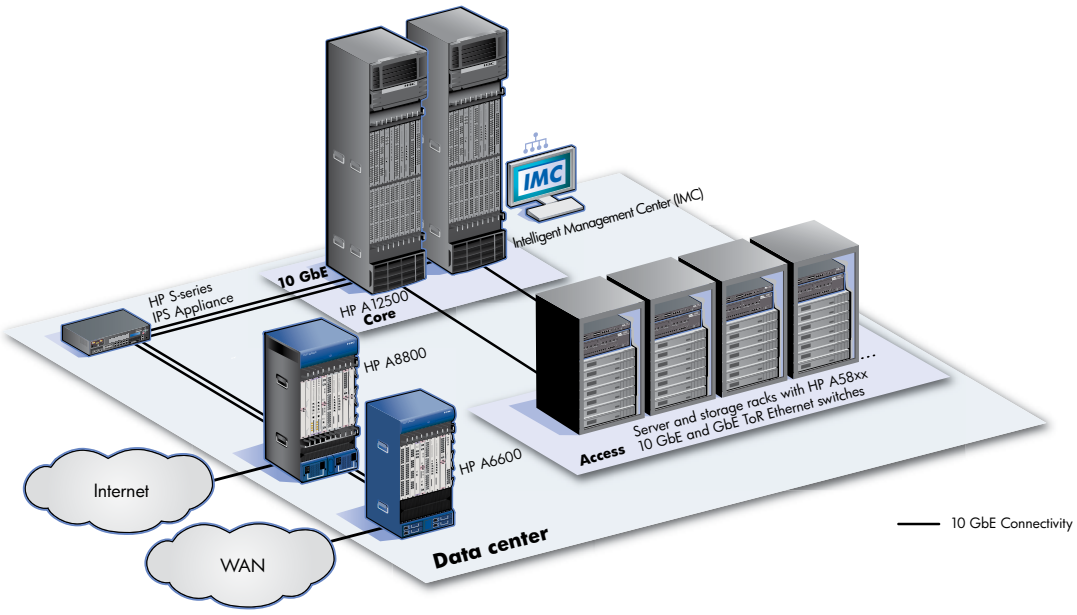


Figure 3
Two-tier network architecture



"We chose H3C* data center solutions for their industry-leading technology and superior product performance. Their ability to help us simplify our data center design and operations coupled with the company's rapid response and understanding of our local and global market needs also played a key role."

Cao Yifeng, Taobao.com,
Operations and Maintenance Director

Data center solutions

Portfolio overview

- **HP A12500 Switch Series**
  Large core/data center switching platforms with future-proof backplane scalability and the ability to deliver more than 6.6 terabits of high-performance switching capacity and to aggregate up to 512 10-GbE or 864 Gigabit Ethernet ports
- **HP A9500 and A7500 Switch Series**
  Core and aggregation-layer switches with flexible high-density Gigabit and 10 Gigabit Ethernet connectivity and network service module integration
- **HP A5800 and A5820 Switch Series**
  High-density, low-latency Gigabit and 10 Gigabit, FCoE-capable Ethernet access layer/top-of-rack switches that deliver industry-leading price/performance value
- **HP A6600 and A8800 Router Series**
  Data center WAN access and Layer 3 routers that support BGP, MPLS, security, quality of service, and optional network service module integration
- **HP 6120 Blade Switch Series**
  Blade form factor for HP BladeSystem c-Class enclosures with full Layer 2/baseline Layer 3 feature set, support for Converged Enhanced Ethernet (CEE) and enterprise-class security, resiliency, and management
- **HP S-Series Security**
  An enterprise security suite that provides proven, scalable, high-performance appliance-based Intrusion Prevention Systems, security management, and security subscription services based on TippingPoint technology that unifies physical and virtualization security in a common high-performance framework
- **HP Intelligent Management Center**
  A comprehensive platform that integrates network technologies and provides full fault, configuration, accounting, performance, and security management functionality for IT infrastructures

HP data center switches

Core/distribution switches

HP A12500 Switch Series

These data center core/distribution switches provide unprecedented levels of performance, scalability, high availability, density, and flexible deployment options validated by independent testing. They drive down data center operations costs while enabling new service levels and delivering the resiliency and low latency required for mission-critical networking.

Key features and benefits

- 6.66 Tbps of high-performance switching capacity (future support for 13.32 Tbps) with more than 2.2 billion packets per second of forwarding performance
- Support for up to 512 10-GbE or 864 Gigabit Ethernet ports
- A future-proof design able to accommodate 40/100 Gigabit Ethernet to support emerging unified network requirements such as FCoE
- High-availability, non-blocking design for zero service interruption; control plane features 1+1 redundancy
- Modern, energy-efficient architecture that dramatically reduces space, power, and cooling requirements

HP A12508 Switch and A12518 Switch (left to right)

HP A9500 and A7500 Switch Series

These cost-effective small core and aggregation layer switches offer Gigabit Ethernet and 10 Gigabit Ethernet port densities to support multi-tier data center architectures with network services modules. Granular control, exceptional scalability, and flexible services, as well as secure, high-performance networking capabilities for non-stop availability of critical applications, make these switches ideal for mission-critical network environments. Redundant power supplies, control units, and switch fabrics provide carrier-class reliability while hot-swappable modules support better network uptime.

Key features and benefits

- Up to 1.4 Tbps switching capacity and 857 Mpps performance (A9500)
- Support for up to 192 10-GbE ports or 576 Gigabit Ethernet ports (A9500)
- Up to 1.2 Tbps switching capacity and 714 Mpps (A7500)
- Support for up to 84 10-GbE or 480 Gigabit Ethernet ports (A7500)

HP A9505 chassis with fans, A9508 vertical chassis with fans, and A9512 chassis with fans (left to right)

Access layer/edge switches

A5800 and A5820 Switch Series
These unique flex-chassis switches can function as a modular chassis, as well as a fixed-form-factor stackable switch, providing the flexibility, scalability, and reliability of a modular platform and the ease of use of a stackable solution. The A5800/A5820 Switch Series delivers line-rate 10 Gigabit Ethernet connectivity and high port density. Additionally, their support for a combination of 10 Gigabit Ethernet, 10 Gigabit FCoE, Gigabit Ethernet, and 8 Gbps Fibre Channel ports facilitates the investment-protecting, cost-effective migration to 10 Gigabit Ethernet functionality.

The high-performance switching and high-density capacity of the A5800/A5820 Switch Series platforms provide flexible deployment options. The switches can be used for top-of-rack, FCoE-enabled data center server access to the A12500 core switch; in a consolidated network as a building or department core; as a Layer 3, 10 Gigabit Ethernet aggregation switch in a campus network; and for the network access layer, as a Gigabit Ethernet PoE switch with 10 Gigabit Ethernet uplinks.

"H3C* data center switches support 100% 10 Gigabit Ethernet throughput with zero packet loss under various traffic and protocol conditions, including Layer 2 and Layer 3 switching, IPv4, IPv6, MPLS, BGP routing, streaming video, and other advanced multicast services... all while achieving remarkably low latency."

Spirent and The Tolly Group public testing, August 2009

Key features and benefits

- Wire-speed, line-rate performance on all ports for IPv4 and IPv6 traffic; Layer 2/3 routing capabilities (IPv6)
- High-performance, high-density Gigabit and 10 Gigabit Ethernet connectivity; two front-facing expansion slots (2RU A5800-48G/A5820-14XG) can dramatically increase 10 Gigabit Ethernet or Gigabit Ethernet port density for even greater deployment flexibility
- Flexible, FCoE module that provides cost-effective Fibre Channel storage and server network I/O consolidation with better interoperability with existing FC-SANs and 1G/10G dual-speed support to enable cost-effective migration
- Next-generation traffic prioritization for converged traffic, including advanced policy-based class of service/quality of service (CoS/QoS), eight priority queues per port, committed access rates, bandwidth limiting, and filtering
- High-availability architecture based on Intelligent Resilient Framework technology
- Redundant, fully hot-swappable power supplies and fans typically found in modular core platforms
- Easily scaled and expanded design with support for the latest SFP+ technology; 1RU and 2RU model options; 10 Gigabit Ethernet and Gigabit Ethernet copper and/or fiber connectivity
- Integrated network services based on Open Application Architecture design that enables consolidating single-function devices and services to simplify deployment and reduce power consumption, cooling, and space requirements

HP A5800 and A5820 switch models (left to right)

HP 6120 Switch Series
The series, featuring the HP 6120G/XG switch and 6120XG switch, simplifies connectivity complexity and reduces cost, while allowing network administrators to maintain end-to-end control of the topology. Designed for deployment directly within an HP BladeSystem c-Class enclosure, the switches enable flexible Gigabit Ethernet and 10 Gigabit Ethernet connectivity with both fiber- and copper-based media. They provide a robust set of industry-standard Layer 2/Layer 3 switching functions, QoS metering, security, and high-availability features, as well as support for Converged Enhanced Ethernet and Fibre Channel over Ethernet for converged server and storage networking solutions, making them an ideal solution for data centers in transition where a mix of Gigabit Ethernet and 10 Gigabit Ethernet network connections are required.

Key features and benefits

- Server enclosure-hosted Layer 2 switching/Layer 3 routing for an efficient network architecture with reduced cabling
- Converged Enhanced Ethernet for Fibre Channel over Ethernet converged server/storage networking
- Flexible Gigabit Ethernet and 10 Gigabit Ethernet connectivity
- Enterprise-class security, resiliency, and management

HP 6120 Switch

"Enterprises are looking for data-center solutions that offer open, flexible, and simplified deployment options to meet today's needs, while offering a clear migration path to what's next. With its new data center networking/security portfolio, 3Com* offers a broad solution set that satisfies today's value conscious enterprise with solutions that deliver next-generation scale, performance, and capabilities."
Cindy Borovick, Research VP,
IDC's Data Center Networks

HP data center routing

HP A6600 and A8800 Router Series

The innovative multi-core and distributed architecture of these routers enables industry-leading performance, multi-service aggregating capability and advanced security. To enable non-stop services, they feature independent routing and service engines, isolated control, and service modules.

The 10 Gigabit Ethernet A8800 Router Series support the IPv6 and IPv4-to-IPv6 transition technologies. Based on a distributed high-performance network processor for hardware forwarding and a large-capacity crossbar, non-blocking switching technology, these routers provide high performance and enable flexible system expansion.

The A6600 Router Series reduce the need for investment in hardware modules. They support services such as NAT, QoS, IPsec, and NetStream via software service engines.

Key features and benefits

- Advanced, fully distributed design—enabled by Open Application Architecture technology—for creating an integrated, easily customized networking platform
- High-density narrowband convergence and access capabilities
- PPP multi-link bundling to cost-effectively speed delivery of real-time data
- Industry-leading, built-in hardware encryption engine for FIP-100/200 to provide high-performance distributed IPsec encryption without additional investment
- Powerful MPLS capabilities, including Layer 2/3 VPN services and MPLS
- Carrier-class reliability with separate control and data planes to avoid interference between services and control applications at high speed; hot-swappable redundant power and hardware; support of active/standby switchover

HP A8805, A8812, A8802, A8808, A6616, A6608, and A6604 routers (left to right)

"3Com's new H3C* data center solutions will enable UTHM to consolidate operations and lower networking costs. The HP A12500 10 Gbps scale and performance allow us to efficiently stream video applications throughout the university while supporting our growing storage area network (SAN) infrastructure. 3Com's* use of open standards and unified switching architecture ensures our investment will be protected as we migrate toward critical initiatives such as virtualization and cloud computing."

Mohd Arshad bin Seeron,

IT Director at Universiti Tun Hussien Onn Malaysia (UTHM)

HP data center security

Secure Network Fabric

The unified, core-to-edge network protection provided by the HP Secure Network Fabric addresses the limitations of perimeter-based security and the increasing number and frequency of security attacks. Security virtualization and segmentation, industry-leading performance, and comprehensive security management enhance protection of business-critical data, applications, and infrastructure.

Secure Virtualization Framework

The Secure Virtualization Framework (SVF) provides consistent, unified security across virtualized and physical data center network infrastructures. SVF extends to virtualized servers the same strong HP TippingPoint security provided to physical infrastructure. It offers simplicity and low-cost operations because it is centrally managed by the HP TippingPoint Security Management System, enables infrastructure-wide policies to be consistently applied to virtual machines.

HP S1200N IPS Module for the A7500 Switch Series

HP S1200N IPS module

The HP TippingPoint S1200N IPS module is the first network-embedded security blade featuring the industry-leading TippingPoint technology, and the first IPS module for the HP A-series portfolio. It enables the integration of the TippingPoint IPS solution directly into the switch chassis through backplane connectivity, while providing the capability to use external ports on the blade similar to a traditional IPS appliance.

HP TippingPoint vController

Part of innovative HP SVF, the HP TippingPoint vController works with an HP TippingPoint N-Platform IPS to provide high-performance intrusion prevention for a virtualized server. Software that is easily installed in a virtualized server, vController directs virtual machine traffic to an N-Platform where robust intrusion protection services are applied with line rate performance. It offers low-cost ownership because vController leverages investments in the same N-Platform that the customers use to protect the enterprise network.

HP S1500 SSL appliance

The HP S1500 SSL appliance provides hardware accelerated Secure Sockets Layer (SSL) offloading and bridging to enable high-performance IPS inspection of SSL encrypted traffic. This delivers increased security coverage in next-generation data centers, prevents encrypted attacks, and helps enterprises address compliance requirements without impacting the performance or availability of the network.

HP S1500 SSL appliance

HP Intrusion Prevention based on TippingPoint technology

HP TippingPoint Intrusion Prevention System (IPS) platforms achieve the highest levels of real-time protection. With the Core Controller, Security Management System (SMS), and world-class Digital Vaccine Service, they deliver a proven foundation for comprehensive network security, proactively addressing today's and tomorrow's data center needs. The IPS solution delivers automated, in-line traffic inspection designed to protect the most demanding 10 Gbps network environments.

HP S Intrusion Prevention System (IPS) N Series

HP data center management

Unified resource management

The HP Intelligent Management Center (IMC) is a powerful and flexible platform that saves enterprises time and money in deploying, managing, and monitoring mission-critical converged networks. By bringing network management and monitoring of services, resources, and users together in a single, integrated, and modular platform, HP solutions deliver greater value, helping enterprises align their networks with their business objectives.

Key features and benefits

- Information Technology Infrastructure Library (ITIL)-based data center orchestration that simplifies complex virtual and physical management operations
- Multi-user, role-based management for powerful and flexible network administration
- Rapid and reliable service provisioning
- Complete fault-management process for in-depth correlation and analysis, real-time alarming, troubleshooting, and experience capture
- Flexible centralized reporting, including historical data and information necessary for network trend analysis and capacity planning
- Ease of deployment and change management to streamline operations
- Reduced downtime, lower operational costs

Intelligent Management Center

Our customer commitment

Every day HP demonstrates its exceptional commitment to innovation, savvy product development, expert implementation, and responsive service—all of which are essential elements to running mission-critical networks. High-quality global sales, delivery, and support services are backed by a 30-year record of successful networking experience, as well as the talent and expertise of certified professionals and networking partners around the world. Additionally, the company's R&D and engineering teams are available to work side by side with the HP customers, establishing a level of intimacy unmatched in the networking industry.

Looking ahead

Enterprises can now build a simplified, higher performing, highly resilient and flatter (two-tier) data center network design that delivers as much as twice the performance with half the power consumption and up to 65 percent[2] lower costs. HP data center networking solutions help enterprises overcome the limitations of low performance/scale and high cost/latency that are inherent to legacy solutions that rely on multi-tier, disjointed platform operating systems and resiliency protocol complexity. They accelerate deployment of enterprise services and applications with streamlined network designs, centralized management, and enhanced performance, provisioning, and security, while reducing cost with energy efficiency and low total cost of ownership.

* The products referenced in this publication were developed and sold by 3Com, H3C, or TippingPoint, which were acquired by HP in April 2010. Many references to HP herein refer to 3Com, H3C, or TippingPoint or those products acquired from 3Com, H3C, or TippingPoint and not the HP product line generally.

2 "ROI of Ethernet Networking Solutions", IDC White Paper, August 2009

To learn more about simplifying data center design and reducing the cost of advanced networking services visit **www.hp.com/networking**

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