

I D C T E C H N O L O G Y S P O T L I G H T

Smart Networking for the Next Generation of Application Delivery

March 2010

Adapted from *Datacenter Network Customer Requirements* by Lucinda Borovick, IDC #217999

Sponsored by Radware

Enterprises are looking at new networking solutions to support new models of delivering applications and data in virtual, distributed, and mobile environments. Distributed applications, applications on demand, cloud computing, and persistent applications all require a higher order of application awareness and Layer 4–7 processing capacity to ensure that service levels are met. This Technology Spotlight reviews how Layer 4–7 switching can add a level of intelligence so that enterprises can better use network resources to meet the business application demands of an ever-changing and mobile workforce or customer base. The paper also looks at Radware and its Alteon line of Layer 4–7 application switches. Finally, this Technology Spotlight makes recommendations for larger enterprises as they strive to support today's more demanding networked applications.

Introduction: Transforming Data Networks

Enterprise datacenters are in the midst of an unprecedented transformation as organizations look to evaluate and rearchitect their IT investments to adapt to changing business requirements. As such, large enterprises will drive continued, albeit slower, growth in networking equipment by making ongoing investments in new consolidated datacenters and associated infrastructure.

These organizations will need to expand infrastructure to support wired, wireless, and Internet computing applications as application-aware networks will be called upon to support the litany of challenges, such as improving network reliability in the face of a growing mix of applications and increased mobility. Networks will need to meet the growing demand for increased speed, performance, and security of enterprise applications. Platform upgrades to support newer, denser computing configurations — especially those incorporating virtualization and "on-demand" applications — in consolidated datacenters also will place greater pressure on network infrastructure.

The investment in a robust, resilient datacenter network will fulfill the following two related but separate goals:

- **Reduce costs by increasing the utilization rates and efficiency of equipment and facilities.** IT is implementing best practices in datacenter design and energy-efficient configurations; hence these new designs require an intelligent network. The demand for increased utilization rates is the starting use case for server and storage virtualization, creating much denser configurations that require the highest-performing network.
- **Increase the velocity at which IT can respond to business needs.** Technology and service innovations are coming together to meet CIO requirements for rapid response times. Virtual server mobility coupled with innovations from virtual server suppliers provides the tools to rapidly provision new workloads based on business requirements, enabling business agility. Cloud services offerings also provide attractive financial and operation alternatives to managing and supporting workloads. Datacenter network architectures are adapting to these new requirements with virtual technology and advanced network resiliency features.

At the core of IT requirements is the ability to architect a network that can adapt to change. IT understands all too clearly that the pace of innovation in Web 2.0 or service-oriented architecture (SOA) environments means that they cannot statically design the network for specific device types, applications, or for that matter security threats. IT is challenged to find the most optimal timing to invest in new network bandwidth and infrastructure. Investing too early causes unnecessary expenses; investing too late creates downtime. As a result, the enterprise network has the following requirements:

- **Scalability.** The use of virtualization has become so pervasive that the number of virtual servers will double in the next few years. While the use of server virtualization is to optimize compute resources, the network is still required to scale to this explosion of virtual servers. Meanwhile, the transaction load on these virtual servers is no longer predictable, causing IT to find solutions that can both scale up and scale down based on time of day or time of year.
- **Performance.** Always-on networking is not just a requirement but a prerequisite. It is paramount that the network have the ability to meet peak traffic demands to improve quality of experience (QoE), including faster response times, and also help meet service-level agreements (SLAs) while intelligently rerouting traffic in the face of system failure or security threats.
- **Flexibility.** Given the dynamic nature of the network with protocols and voice and video applications evolving (as well as more complex applications), the network must have a solid foundation at Layer 2 while possessing the flexibility to adapt to changes in applications and security threats at Layers 4–7.
- **Visibility.** Visibility into the current network environment, including auditing, logging, and bottleneck detection, as well as the ability to analyze for future growth, is a strategy for success.
- **Lower total cost of ownership (TCO).** Without the need to physically cable a new datacenter Layer 4–7 switch, customers will have a much faster time to deploy. The combination of reduced costs and faster deployment times will contribute to a lower TCO and make it much more feasible for customers to deploy these Layer 4–7 networking services for multiple applications in the datacenter.

Layer 4–7 switching is an integral part of this new wave of network investment. Despite these uncertain economic times, IDC believes datacenter Layer 4–7 switching will remain a strategic resource. IDC expects the market, which reached an estimated \$1 billion in 2008, to ultimately see modest growth to \$1.2 billion by 2014, after a downturn in 2009. Critical to this growth is continued innovation in networking that goes beyond increased performance and security to include products that enable the pay-as-you-grow philosophy of IT, scalability support for new Web 2.0 applications, and platform longevity that will meet TCO demands.

From a user perspective, growth will be driven by the expansion of network-based businesses, support for cloud services, convergence of storage on the Ethernet network, support for virtual network services, and the overall need to support mission-critical workloads on x86 platforms.

Layer 4–7 Switching: Architecture and Benefits

Layer 4–7 switching is designed to address the unique requirements of the dramatic increase in Web traffic and complexity caused by distributed and hosted enterprise applications. This content- or application-aware switching intelligently load balances traffic across servers in a datacenter or point of presence based on availability and load. As such, Layer 4–7 switches go beyond the connectivity and routing services provided by Layer 2–3 switches by routing messages to individual machines after inspecting the contents of the messages and forwarding them based on preset policies. To fully leverage the benefits of hosting datacenters, cloud services, and a global workforce, IT will need to

invest in a robust, resilient datacenter network with datacenter Layer 4–7 switching as an integral part of the network. IDC believes datacenter Layer 4–7 switching will remain a strategic resource in the datacenter.

These switches monitor the health of the devices and can provide automatic failover by enabling enterprises to set protocols for routing messages to other devices if needed. The policies, not found in traditional LAN switches and routers, can provide intelligent traffic management capabilities, including local and global server load balancing, access control, quality-of-service, and bandwidth management.

Layer 4–7 switching offers the ability to balance traffic across many servers, firewalls, and other devices to ensure that user requests are fulfilled in the most efficient manner available. This routing or redirection of applications (or user sessions) is based on inspection of URLs, cookies and headers, and "rules of engagement" and can accommodate multiple simultaneous requests and responses. The intelligence built into Layer 4–7 switching can enable organizations to provide differentiated services, such as special treatment of key customers or frequent shoppers.

Performance is also increased by enabling virtual hosting — where users or customers access a single IP address and the application or service provider automatically redirects traffic to ensure demands are met.

As enterprises and communications services providers move to a more on-demand computing model, including "cloud computing," Layer 4–7 switches provide the following benefits:

- Ability to utilize resources in multiple locations
- Maintenance of real-time or persistent sessions
- The possibility of virtual hosting

Servers are used more efficiently and Web site performance can be improved, with the added bonus of the ability to perform content-based server health checks. And as organizations move to more "on-demand" application delivery models, they have the traffic management and security capabilities to offer differentiated services when and where they are needed.

Critical to meeting the demands of an increasingly virtual and distributed enterprise is the ability for Layer 4–7 switches to enable persistent connectivity to ensure consistent performance for ebusiness transactions, multimedia applications, and delivery of mission-critical applications to remote and mobile workers via multiple types of networks, including wireless networks. Because these intelligent network devices are more "aware" of the content being moved, enterprises and communications services providers have greater protection against attacks from viruses and worms or unwanted intrusion because only legitimate traffic is allowed over a network.

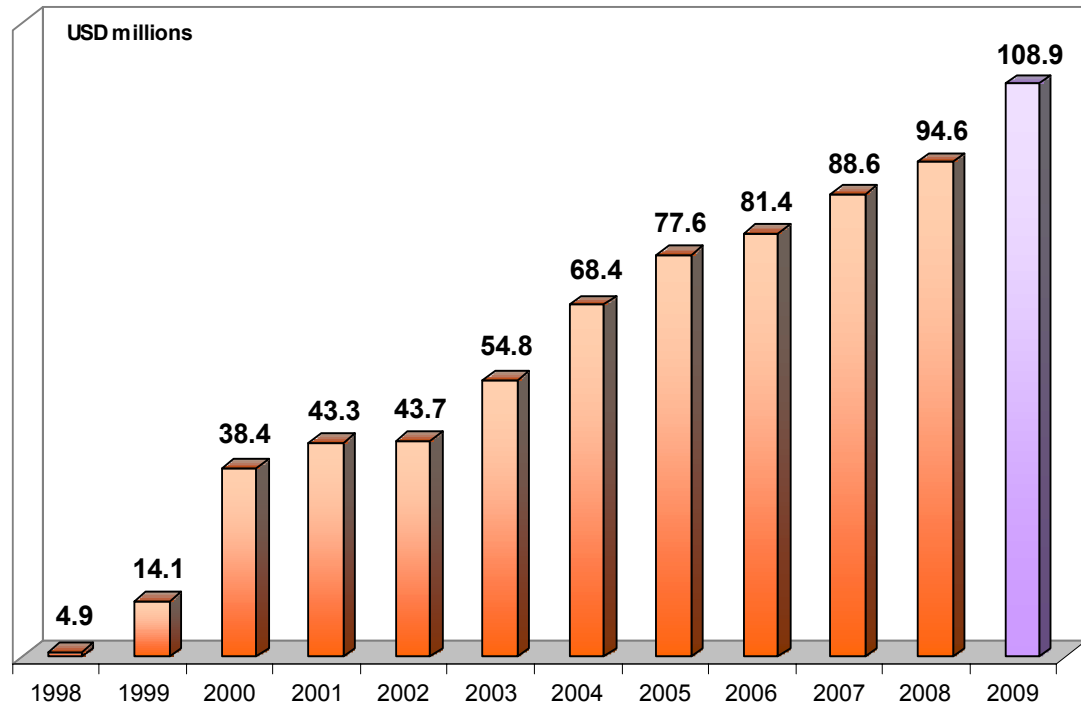
Considering Radware

Radware, one of the earliest entrants in the space, is a publicly traded company headquartered in New Jersey, with offices worldwide. The company delivers application networking and network security products designed to drive business productivity, improve profitability, and reduce IT operating and infrastructure costs for more than 10,000 enterprise and telecommunications carrier customers worldwide.

While the market for Layer 4–7 switching was down 21% in 2009, Radware posted positive gains in terms of year-over-year growth during the economic downturn (see Figure 1). The company has continued to demonstrate forward momentum in terms of annual revenues since its inception.

Figure 1

Radware Annual Revenues, 1998–2009



Source: Radware, 2010

For datacenters in large enterprises, Radware offers networking solutions that ensure business continuity, consolidation, compliance, and increased mobility. The company's products and services also enable SOA, cloud computing, and virtualization solutions for increased connectivity and application distribution. Radware has product sets and services for managed security and network integrity, traffic control and capacity management, and Internet service delivery.

In April 2009, Radware completed its acquisition of Nortel's Alteon line of Layer 4–7 application switches. At the time of the acquisition, Radware declared its commitment to supporting Alteon, and since then, it has invested significantly in upgrading the application delivery platform to the point where the company has revitalized the entire product line.

Alteon application switches integrate routing and switching by forwarding traffic at Layer 2 speed using Layer 4–7 information. All Alteon switches are based on Radware Alteon's Virtual Matrix Architecture (VMA), which uses the entire switch's capacity to provide the parallel performance of distributed processing. VMA creates a virtual matrix of memory and processor resources across the switch that can be used to process traffic from any port.

The revamped Radware Alteon line includes the following:

- The Alteon Application Switch is a multiapplication switching system designed to allow enterprises to prepare their networks for business applications. It provides intelligent application traffic management, application integration support, and added security to help enterprises maximize existing servers and networks.

- The Alteon 4408 and 4416 provide on-demand, scalable throughput capacity of up to 4Gbps, offering performance that includes up to 215K Layer 4 transactions per second (TPS), 135K Layer 7 TPS, and fast response. The Alteon 5412 provides on-demand, scalable throughput capacity of up to 20Gbps, offering performance that includes up to 340K Layer 4 TPS, 2.5M DNS queries per second (QPS), and the fastest response time.

The Alteon switches use network processors on all ports to execute control tasks simultaneously, regardless of the number of ports that session traffic traverses. With Alteon's bandwidth management and traffic-shaping capabilities, the application switches offer a contract-based method to control the growing mix of different traffic types in the network. Datacenter administrators are able to prioritize applications and services to meet service levels and provide the best QoE for users.

According to Radware, the refreshed Alteon product line also reduces capital and operating expenditures because the company has taken a pay-as-you-grow approach, enabling enterprise datacenters and carriers to pay for only what they need and then add capacity incrementally as desired, which means no forklift upgrade and no downtime. Because the underlying operating system is standardized throughout the entire Alteon line, users can also easily upgrade with little or no learning curve.

The company's five-year longevity guarantee extends the application delivery project life span, which increases ROI because customers can benefit from the same investment for a longer time. In addition, Radware offers guaranteed reliability and application availability through redundancy and by separating management data and data traffic paths. For added security, the management ports are isolated from the traffic ports.

Radware's Alteon application switches are commonly used in server farms, datacenters, and Web hosting sites and for distributed applications that require high availability, performance, and security. The application switches have been optimized to work with enterprise applications from leading vendors including Oracle, Microsoft, IBM, and SAP.

Challenges

Radware does face some market challenges, however. First, as with any organization in challenging economic times, Radware must continue to demonstrate that it can deliver products that help enterprises gain a solid ROI.

As the nature of enterprise networks and networking in general continues to change, Radware must align its future road map with the tidal wave of applications and devices that continue to demand network services. Providing a platform that can scale with the transaction explosion, while still being mindful of limited IT budgets, will be the key to future success.

Conclusion and Essential Guidance

Despite economic challenges, enterprises are still evaluating changes to their datacenter architectures — as well they should. It's imperative that the datacenter continue to respond to critical needs as the nature of business changes. As the model for enterprise applications and their delivery moves toward more distributed architectures such as cloud computing, applications on demand, or simply application delivery to an increasingly mobile workforce, new architectures will be required.

Typically, changes will include the physical space and the virtual, including servers, storage, applications, and, importantly, the network. Ultimately the datacenter must reflect today's business model, a dynamic environment that can quickly respond to changes while still using resources efficiently. This will require smart networking solutions that include Layer 4–7 switching to match newer computing models.

For the large enterprise looking for application-aware networking applications to keep abreast of the nature of today's online and distributed economy, IDC recommends finding a networking solutions supplier that truly understands the application environment and can therefore help justify the costs of new equipment or upgrades. The supplier should be able to provide customer case histories and be willing to spend time to ensure that the right solution is utilized.

IDC stresses doing research to understand the need, development, installation, use, and management of intelligent networking solutions. Because new business models demand flexibility, there is a risk of not focusing solutions to truly be effective. Applications on demand, virtual computing, and cloud computing all need underlying rules and processes that clearly specify business needs and appropriate levels of service. Without this understanding, intelligent networking will not deliver its true value.

Layer 4–7 switches, with their ability to analyze applications and application traffic, will increasingly become a key component of intelligent networks. To the extent that Radware can meet the market challenges described, the company's Alteon solutions should be on the short list of enterprise datacenters seeking smart networking solutions.

A B O U T T H I S P U B L I C A T I O N

This publication was produced by IDC Go-to-Market Services. The opinion, analysis, and research results presented herein are drawn from more detailed research and analysis independently conducted and published by IDC, unless specific vendor sponsorship is noted. IDC Go-to-Market Services makes IDC content available in a wide range of formats for distribution by various companies. A license to distribute IDC content does not imply endorsement of or opinion about the licensee.

C O P Y R I G H T A N D R E S T R I C T I O N S

Any IDC information or reference to IDC that is to be used in advertising, press releases, or promotional materials requires prior written approval from IDC. For permission requests, contact the GMS information line at 508-988-7610 or gms@idc.com. Translation and/or localization of this document requires an additional license from IDC. For more information on IDC, visit www.idc.com. For more information on IDC GMS, visit www.idc.com/gms.

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com