



Alteon Application Switch Series 4-5:

Built for the Next-Generation Data Center - White Paper



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General

IT executives face on-going requirements to improve service levels, increase application availability and reduce costs. As increasing amount of mission-critical applications are becoming Web-based, the data center's infrastructure needs to support additional end-user concurrency and addresses greater throughput capacity while ensuring excellent Quality of Experience (QoE), at all times. These requirements create a new set of challenges in the data centers that IT executives and personnel should cope with.

This white paper discusses how Alteon Application Switch Series 4-5, Radware's next-generation platforms, address the various challenges facing IT professionals and data center managers when they come to plan their data centers network infrastructure and specifically the Application Delivery Controllers (ADC) -- today and for years to come.

Next-Generation Data Center Challenges

As enterprises move towards converged networks and increasingly use business applications to drive efficiency, IT departments must support increased network traffic and server load while maintaining satisfactory Quality of Experience (QoE) and mitigating numerous security threats. This section will discuss the following next-generation data center challenges:

- Greater Cost Reduction
- Increased Performance Capacity Needs while Maintaining Best QoE
- Business Continuity
- Securing Mission-Critical Applications
- Data Center Consolidation
- Virtualization
- Convergence

Greater Cost Reduction

Organizations and IT managers constantly seek to reduce costs and to extract more value from existing investments; therefore, any new investment in IT must be backed up with financial gain and with clear foreseen return on the investment. In data centers, cost reduction primarily implies to reducing the cost of products and the costs of operating those products. The challenge of IT managers is to invest in products that last over several years while addressing evolving and ever-changing business and network requirements. On the one hand, IT managers should reduce capacity growth risks by purchasing products that can support the projective growth of the business, but on the other hand, they must avoid overspending on the initial solution. Furthermore, reducing the cost of operating the products in the data center is another on-going challenge for IT managers, who are looking for ways to reduce products downtime, to eliminate forklift upgrades and to reduce the potential of human errors in configuring complicated devices.

Increased Performance Capacity Needs while Maintaining Best QoE

As more and more critical Enterprise applications and services are becoming Web-based, the data centers are facing increased capacity, higher TCP overhead and greater latency, while at the same time they are required to provide superior QoE to users. The data centers are expected to provide service levels along these lines:

- Provide best Quality of Experience (QoE) to users despite inherent slow application response time, due to bottlenecks, peak times, or rich content.
- Ensure consistent user experience across all applications and all services.
- Address network traffic growth with high-speed (10GE) ports
- Insure that high load on one application does not affects other applications.
- Guarantee respective network bandwidth for every application.
- Prevent starvation of business applications on the expense of non-critical bandwidth intensive applications.

Business Continuity

Business reputation, productivity and profitability depend on 24X7 business application and Web site/portal availability. According to Gartner, the average cost of network downtime for large corporations is \$42,000 per hour (\$700 / minute); thus, if annual application unavailability can be reduced from 2 hours to 4 minutes, then the investment could save approximately \$81,000. Even in the difficult economic conditions that many businesses are facing today, 63% of

¹ [Webtorials, 2009 Business Continuity Report](#)

Businesses has raised the importance of Business Continuity plan¹; the reason is that as revenue streams diminish, the business will be looking at all possible options to support the growth of its customers. According to the same report, the top technical sources for business outage are Server Failure and Failure of the Access Network Provider.

Data Center Consolidation

Data center consolidation becomes key part of IT organization's strategy as a major mean of reducing the business's TCO. Yet, such a trend increases the complexity and the capacity requirement of the data center, as it now has to offer more services to more end-users, while meeting service levels. The application delivery infrastructure must be able to address the rising requirements of the consolidated data center, including:

- Greater throughput capacity of the application delivery controller up to 20Gbps.
- High-speed connectivity to "push" increasing traffic to the back-end servers
- State of the art server load balancing to maximize utilization of the servers.
- Configuration and management of multiple applications on fewer servers.
- Eliminate overspending as capacity planning becomes more difficult to anticipate.

Securing Mission-Critical Applications

The rise in security attacks, for profits and for political gain, force organizations to have effective means of security to ensure their sensitive information remains protected and that their mission-critical applications run, even under attack. Security attacks such as non-vulnerability threats, zero-minute attacks, and network flooding are a real threat to the business reputation, revenue and productivity and hence must be treated with highest attention.

Virtualization

IT organizations approach virtualization with the intended goal of achieving significant capital and operational cost savings. Deploying virtualized applications, servers and infrastructure, benefits in direct cost reduction by reducing the number of servers and network devices. At the same time, it also increases the business's agility, as it is simpler to perform modifications in the data center infrastructure, such as capacity growth, topology changes or configuration refinements. However, the deployment of virtualized applications creates new, significant challenges:

- Ensure availability, performance and security of the virtual servers.
- Guarantee sufficient resources to mission-critical applications so they can meet SLA even under Virtual Infrastructure.
- Transparently align the network and ADC configuration with any configuration changes in the virtual environment, ensuring optimal business operation

Convergence

VoIP is rapidly replacing TDM networks with SIP as the foundation of converged voice and data networks. SIP-based services enable the seamless deployment of a wide range of value-added IP services, including voice, video, messaging, and collaboration. With the increased adoption of SIP services data centers face new challenges to support increasing volumes of SIP-based services:

- Maintain excellent voice quality and best QoE even in bandwidth intensive data centers.
- As organizations rely on SIP for call centers and as traditional telephony replacement, 100% availability of the SIP service must be guaranteed.
- Reduce capacity planning risks of the VoIP service for additional users, end points and services
- Protect the VoIP service from security attacks.

Addressing Next-Generation Data Center Challenges with Alteon Application Switch Series 4-5

The new Alteon Series 4-5 application delivery platforms from Radware is an exciting addition to the Alteon Application Switch product line. The Alteon Application Switch Series 4-5, consisting of the Alteon 4408, 4416 and 5412, set a new standard in application availability, performance and security: designed from the ground up to deliver best-in-class load balancing and intelligent traffic management capabilities, they deliver up to 20Gbps of throughput capacity and provide enterprises with unprecedented control over applications and the networks on which they run, whether the environment is physical or virtualized.

The next sections discuss how the Alteon Application Switch Series 4-5 address the next-generation data centers challenges and requirements as described in section 2.

Greater Cost Reduction

The Alteon Application Switch Series 4-5 is a highly integrated solution combining multiple capabilities and offering all application delivery services in a single-box including Advanced Application Delivery, Multi-homing solution, Bandwidth Management and layered security protection. Not only it provides all of the standard application delivery capabilities, it also delivers unique business benefits as follows:

On Demand Infrastructure Approach

The Alteon Application Switch Series 4-5 intelligently embeds Radware's On Demand Infrastructure approach. With Radware's unique "Pay-as-you-Grow" approach, no forklift upgrade is required even when there are new business requirements. This means customers only pay for the exact capacity currently required – to prevent over-spending on the initial ADC solution – and when they need more, they only pay for the delta. By employing a software license based mechanism, throughput capacity as well as application-aware services can be scaled on demand to meet new or changing application infrastructure needs -- without replacing the device, without even restarting it – and with no compromise on performance.

The business benefits of Radware's "pay-as-you-grow" approach include:

- **Eliminate overspending on the ADC solution** for best investment protection – pay for exactly what is needed today; add more in the future when needed. For example, if 1Gbps throughput is currently required and might possibly need to be extended up to 2Gbps throughout next year – only pay for 1Gbps today, instead of putting a high investment upfront. When more capacity is required, easily apply the higher throughput capacity license to meet the increasing capacity
- **Overcome capacity planning challenges and reduce risk** associated with data center growth. For example, when additional services are deployed and/or or new user types start using them, customers can purchase the required software license to add the services to the Alteon Application Switch Series 4-5. These services include bandwidth management, intelligent traffic management, link optimization and more
- **No upgrade projects, no hardware replacements, no forklift upgrade** - eliminate large-scale upgrade projects that are required every time customers max out the capacity of their switches. Customers don't need to design, test, stage, install and debug new hardware device or to schedule maintenance window for hardware upgrade. And most importantly – there is no business disruption or service downtime as a result of eliminating these forklift upgrades
- Obtain the benefits of **10GE connectivity** without being forced to pay for extra capacity

All these benefits present significant cost savings and lowest TCO, while ensuring zero business disruption.

5-Year Longevity Guarantee

With the Alteon Application Switch Series 4-5, customers can benefit from a 5-year platform longevity guarantee that Radware provides. This means that Radware is committed to continue selling the product for the next 5 years. It also means that customers can extend their ADC project life time, which directly translates into reduced TCO and faster ROI.

Download today your platform [longevity certificate](#).

Utilizing the Same Alteon OS

The Alteon Application Switch Series 4-5 encompass the same Alteon OS that customers know and value. For existing customers of Alteon, this means additional reduction in operational costs as there are no learning curves -- related to operations scripts, integration to environment, network topology considerations and infrastructure design -- so that they can immediately enjoy the same renowned ease of operation and stability, while obtaining new benefits.

New software releases are regularly released on [Alteon's Support Portal](#).

Operations Simplicity and Platform Standardization

The Alteon Application Switch Series 4-5 fit into existing networks and help IT administrators to cost-effectively scale their networks and applications to meet changing business requirements. The same next-generation hardware platforms are used and will be used for new, additional platforms of the Alteon product line. Features that enable simple, efficient scalability include:

- **Plug-and-play deployment** - Since Alteon Application Switches use virtual IP (VIP) addresses to represent groups of real servers, firewalls, or other devices, IT administrators can add capacity without having to reconfigure the network by simply adding servers or devices into an existing VIP pool.
- **Multi-application support** on a single platform—simplifying operations. Enterprises can enable one or more applications based on specific business and networking requirements, reducing the need for complex multi-box implementations. All are concurrently supported in a small form factor for operational ease.
- **Easy to use** and secured management application provides simplicity of configuration and saves administrators' costs.

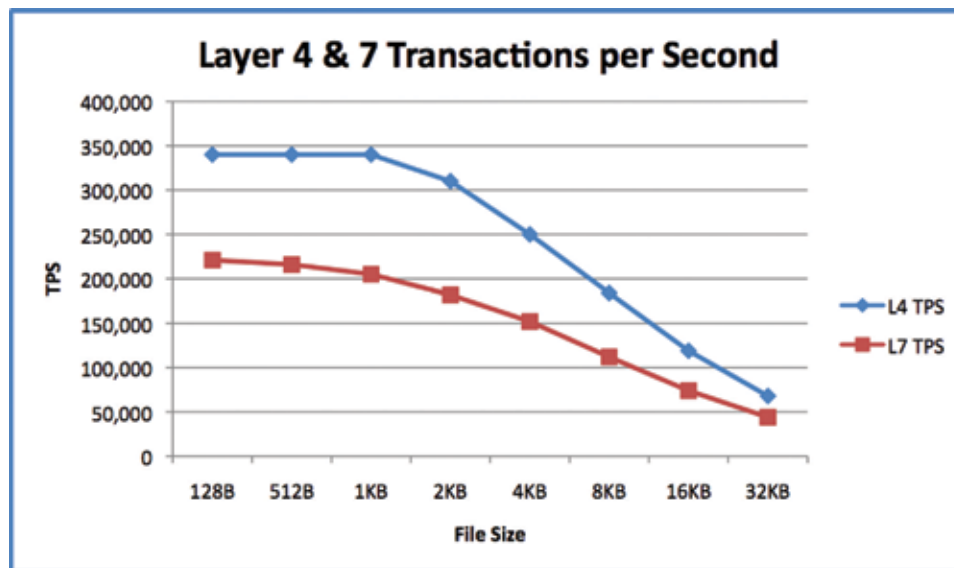
Screaming Performance for Best Quality of Experience

The Alteon Application Switch Series 4-5 address performance capacity requirements and ensure the best Quality of Experience as follows:

Alteon 5412: High-end, 5X-8X More Powerful Performance

Charged with 8 cores for truly parallel performance and packed with four 10GE ports and twelve Gigabit Ethernet ports, the Alteon 5412 provides 5X to 8X better performance compared to the current Alteon Application Switches product line.

- **Up to 20Gbps throughput capacity**
The Alteon 5412 reaches an impressive throughput of 20Gbps, which is sufficient even for the most demanding data centers. This exhibits 4X greater throughput capacity compared to the older Alteon Application Switch platforms, which scaled up to 4Gbps.
- **Up to 340K Layer 4 TPS & 220K Layer 7 TPS**
Measured with a single transaction per connection, the Alteon 5412 handles 340,000 Layer 4 transactions per second and 220,000 Layer 7 transactions per second. This is 8X more TPS than the existing product line.



Alteon 5412 Performance Testing: Layer 4-7 Transactions per Second

- **Fastest Response Time**
Alteon 5412 architecture provides the best response time. During stress performance all packets measured a response time of less than 2ms.
- **2.5M DNS queries per second**
The Alteon 5412 embedded DNS server handles 2.5 Million DNS queries per second. This is 5X to 6X more powerful performance than the existing product line.
- **6M Concurrent SIP Calls and 50K Calls Rate**
Thanks to the powerful architecture of the Alteon 5412, it is capable of handling 6M concurrent SIP calls and a call rate of 50K calls per second.

Alteon 4408 and 4416: Best in Class Performance

The Alteon 4408 and 4416 state-of-the-art platforms provide best in class performance to meet the most demanding requirements of the enterprise data center.

- **Up to 4Gbps throughput capacity**

By utilizing the unique VMA architecture, the Alteon 4408 and 4416 reach throughput of 4Gbps.

- **Up to 215K Layer 4 TPS & 135K Layer 7 TPS**

Measured with a single transaction per connection, the Alteon 4408 and 4416 handle 215,000 Layer 4 transactions per second and 135,000 Layer 7 transactions per second.

- **Fastest Response Time**

The Alteon 4408 and 4416 architecture provides the best response time. During stress performance all packets measured a response time of less than 2ms.

Unleashing the Power of Alteon's VMA

These best-in-class performance capabilities achieved thanks to Radware Alteon's **unique Virtual Matrix Architecture (VMA)**, a fast, flexible architecture which makes efficient use of the entire system's capacity while providing 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. In addition, VMA further optimizes the Alteon Application Switch Series 4-5 architecture by enabling the network processors on ALL ports to execute control tasks simultaneously regardless of how many ports session traffic traverses.

For additional information please refer to the [VMA White Paper](#)

Bandwidth Management and Traffic Shaping

With best-in-class Bandwidth Management and Traffic Shaping capabilities the Alteon Switch is capable of guarantying a contract based method to control the different traffic types in the network. Such a mechanism enables the network administrators to prioritize applications and services so they can meet service levels and provide best QoE for users. The primary features that comprise the powerful Intelligent Traffic Management feature include:

- **Application traffic shaping** - Smoothes burst-intensive applications traffic through the use of Weighted Fair Queuing. This shaping enables high-value or latency-sensitive application traffic to receive priority over less critical application traffic.
- **Application traffic policing/rate limiting** - Enables control of the amount of bandwidth an application is allowed to use. A reservation rate establishes a guaranteed rate available for use by a specific application.
- **Protocol-based rate limiting** - Enables control of the amount of protocol-based traffic, supporting TCP, UDP, and ICMP protocols.

More information on Intelligent Traffic Management can be obtained [here](#).

Application Acceleration Ready

The Alteon Application Switch Series 4-5 platforms are application acceleration ready. Once a new application integration Alteon OS version is released, customers can simply update the Alteon OS software and immediately benefit from advanced application acceleration services while they continue to use the same hardware. The upcoming acceleration capabilities of Alteon further enhance the QoE for users as it reduces the load from the servers as well as helping in further cost reduction.

Guarantee Business Continuity

The Alteon Application Switch Series 4-5 offer the full Application Delivery feature-set to guarantee business continuity:

Carrier-Grade Reliability Ensuring Undisrupted Operations

The Alteon Application Switch Series 4-5 deliver carrier-grade reliability. They feature a reliable, custom-made hardware coupled with embedded components and a dual power supply providing high MTBF. The Series 4-5 platforms are NEBS ready and they also comply with the strictest regulations and are certified by the most up-to-date

hardware and safety standards including EMC, CE, FCC, RoHS 6 and more. The Alteon Application Switch Series 4-5 platforms also support out-of-band management ports² and a USB port for software upgrade and recovery.

Server Load Balancing

Server Load Balancing (SLB) allows customers to configure the Alteon Application Switch to balance user session traffic among a pool of available servers that provide shared services. SLB benefits the network in a number of ways:

- **Increased efficiency for server utilization and network bandwidth** - With SLB, the Alteon Application Switch is aware of the shared services provided by the server pool and can then balance user session traffic among the available servers, according to user-selectable rules, while guarantying persistency of sessions and completion of transactions with best QoE.
- **Increased reliability of services to users** - If any server or application hosted in a server pool fails, the remaining servers continue to provide access to vital applications and data. The SLB offers a sophisticated Health Checks mechanism including scripts, response time based-decision and bandwidth load.
- **Increased scalability of services** - As users are added and the server pool's capabilities are saturated, new servers can be added to the pool transparently.
- **Packet inspection** reaches up to Layer 7 and allows header and body modification for a better control of the traffic and ensuring transaction completion.

Global Server Load Balancing

Global Server Load Balancing (GSLB) allows balancing server traffic load across multiple physical sites. The Alteon Application Switch Series 4-5 take into accounts an individual site's health, response time, and geographic location to smoothly integrate the resources of the dispersed server sites for complete global performance. GSLB benefits the network in a number of ways:

- **GSLB** implementation takes geography as well as network topology into account.
- **High availability** of content and services is achieved through distributed content and distributed decision making. If one site becomes disabled, the others become aware of it and take up the load.
- The **best performing sites** receive a majority of traffic over a given period of time.
- Devices at different sites regularly **exchange information** and can trigger exchanges when any site's health status changes.

WAN Link High Availability

WAN Link high availability is an essential service for reliable networks, providing data centers with protection against connectivity outages and unforeseen ISP failures by managing multiple links to multiple ISPs from the Alteon Application Switch Series 4-5. Benefits of WAN link load balancing:

- **Connectivity** to the WAN and to the mission critical servers is kept alive even during ISP outages.
- **Performance** is improved by balancing the request load across multiple WAN links.
- **Reliability** is increased by providing multiple paths from the clients to the Alteon Application Switch and by accessing a pool of WAN links. If one WAN link fails, the others can take up the additional load.
- Greater **flexibility** to scale bandwidth and reduce spending for corporate connectivity is achieved.

Enabling Data Center Consolidation

Consolidated data centers are more complex, having greater capacity requirements and consisting of many more servers compared to non-consolidated data centers. In addition, the evolving needs of a consolidated data center might be more dynamic than those of non-consolidated. The Alteon Application Switch Series 4-5 address the challenges of a consolidated data center with the following set of capabilities:

- **Superior performance** – Delivering up to 20Gbps of throughput capacity, 340K Layer 4 TPS and fastest response time, the Alteon 5412 supports even the most demanding, consolidated data centers.
- Best in class **Server Load Balancing** and with flexible policies to support the balancing decisions, to enable maximum utilization of the servers.
- As the consolidated data centers contain more applications in fewer locations, Alteon's superior Global SLB ensures applications delivery across all the data center sites.
- Multiple applications and services can be approached by the Alteon Application Switch on each server, allowing the data center to maximize its hardware assets.

² Applies to Alteon 5412 and 4416

- On Demand scalability and pay-as-you-grow approach help to alleviate the challenge of consolidated data centers capacity planning.
- 10GE ports³ enable to drive high traffic load to the consolidated servers, which required to handle higher traffic capacity

Securing Mission-Critical Applications

Inherent multi-layer security features allow the Alteon Application Switch Series 4-5 to protect against external and internal security threats without sacrificing network and application performance. Multi-layer security features include:

- Delivers comprehensive **Denial of Service (DoS) attack protection** based on TCP, IP, UDP and ICMP attacks. Moreover, IT departments can limit the rate of new TCP connections to application servers on a per-client basis. This feature, called Application Abuse Protection, increases control over access to applications and improves application availability.
- **Prevent Intrusion attacks** by allowing security administrators to define signatures of attacks, so that the Switch can identify the malicious traffic and handle it according to the defined policy.
- **Prevent VoIP attacks** by allowing the security administrators to customize the SIP security policies and rules, so that it provides in-depth security to SIP over UDP application servers. The Alteon prevents SIP attacks by denying traffic based on content match, rate limit based on content match and monitoring of SIP Uniform Resource Identifiers (URI).

Enabling Virtualization

The Alteon Application Switch Series 4-5 enable the IT virtualization initiatives using the following services:

- **Load balancing and optimizing the performance of virtual servers** - The Alteon Application Switch Series 4-5 are capable of inspection and handling traffic that is aimed to virtual machines, using exactly the same capabilities as to physical machines. Therefore, all the traffic in the virtual data center is dealt with the same rules and policies as traffic in a non-virtual one, which leads to maintaining a service level and Quality of Experience.
- **vAdapter**, Radware's operational tool for the virtualized data center, ensures that any change in the virtual infrastructure that impacts the Alteon Application Switch Series 4-5 configuration is automatically synchronized with the Alteon device in real-time without manual reconfiguration or coding of complex scripts. VAdapter guarantees the full availability and maximum performance of virtualized applications by preventing configuration errors, eliminating scripting and reducing risk. For more information please refer to the [vAdapter website](#) and [Brochure](#).

Enabling Convergence

The Alteon Application Switch Series 4-5 address converged environments using a set of tools and capabilities mentioned earlier in the paper:

- The **bandwidth management and traffic shaping** capabilities of the Alteon Switch allow prioritization of VoIP traffic over data. This is especially required in networks that carry peer-to-peer data that is known to be high bandwidth consumer, and might require the majority of the bandwidth resources. Only application-optimized network can react to excessive bandwidth use by intelligently managing application traffic and therefore to guarantee best QoE for its voice users.
- The Alteon **server load balancing** solution is capable of balancing VoIP signaling among several SIP servers in the data center. By performing state-full inspection of the SIP messages, Alteon ensures that all the traffic of a certain call is handled by the same SIP server. Customized health checks of the SIP servers guarantee high-availability of the SIP service.
- **Easy upgrade** for higher capacity is discussed in the On Demand Approach section.
- **Prevent security attacks** on the VoIP infrastructure that cause to denial of the service. Refer to VoIP Security threats.
- Using the Alteon's **FlexiRules** mechanism, the Alteon can deny traffic based on content match, rate limit and monitor SIP Uniform Resource Identifiers (URI), to enhance VoIP security.
- Alteon ensures 24x7 availability and superior scalability for Microsoft Office Communications Server (OCS) 2007 deployments. Alteon certificate for OCS can be found [here](#).

Conclusions

The Alteon Application Switch Series 4-5 platforms, the latest addition to the Alteon Application Switch product line, are superior Application Delivery Controllers (ADC), which successfully meet the growing network and application challenges of the next-generation data centers. The Alteon 5412's high-end 20Gbps throughput capacity can service even the most demanding data centers delivering best in class TPS and fastest response time, while the Alteon 4408 & 4416 provide the best, most cost-effective, solution for small to mid-size data centers. Advanced local and global load balancing, bandwidth management, integrated security and WAN multi-homing services ensure that the mission-critical applications are always served and provides the best Quality of Experience to the users, at all times.

Moreover, by embedding Radware's On Demand Infrastructure approach, the Alteon Application Switch Series 4-5 address organizations effort to reduce their CAPEX and OPEX on one hand, and to keep improving service levels and the availability of mission-critical applications on the other hand.

The Alteon Application Switch Series 4-5 advanced capabilities and their cost savings nature makes them the best choice for an Application Delivery solution for data centers.

About Radware

Radware, the global leader in integrated application delivery solutions, assures the complete availability, performance and security of business-critical applications for nearly 10,000 enterprises and carriers worldwide. With Radware's comprehensive and award-winning suite of products, companies can drive business productivity, improve profitability, and reduce IT operating and infrastructure costs by making their networks "business-smart."

Certainty Support

Radware offers technical support for all of its products through the Certainty Support Program. Each level of the Certainty Support Program consists of four elements - phone support, software updates, hardware maintenance, and on-site support. Radware also has dedicated engineering staff that can assist customers on a professional services basis for advanced project deployments.

Learn More

To learn more about Radware Alteon application delivery products please visit us at www.radwarealteon.com. For information regarding Radware's entire portfolio of application delivery and network security products for business-smart networking, please visit www.radware.com.