BROCADE SERVERIRON ADX 1000, 4000, AND 10000 SWITCHES

APPLICATION DELIVERY

High-Performance Application Delivery for Physical and Virtualized Environments

HIGHLIGHTS

- Enables low-latency, high-performance delivery of critical applications using data center–class application switches
- Optimizes delivery of Web applications from BEA, IBM, Microsoft, Oracle, SAP, and Siebel, and infrastructure services such as DNS, RADIUS, firewalls, and cache services
- Delivers superior HTTP performance with up to 3 million connections per second and 70 Gbps throughput
- Offers a seamless and cost-effective transition to leading-edge Internet technologies such as IPv6
- Gives greater application visibility in cloud environments using Brocade Application Resource Broker and simplified integration with third-party orchestration tools
- Simplifies operations with on-demand, field upgradability to meet increased performance, port, and feature requirements

The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. The Brocade ServerIron ADX Series supports this strategy by delivering record performance and a range of application optimization functions to deliver critical applications.

Data center virtualization and consolidation are driving more change than the IT industry has seen in years. Although organizations are well on their way to virtualizing the data center foundation of servers and applications, virtualizing the networking infrastructure will require a new class of networking solutions that can respond to the dynamic demands of a virtual data center. Service providers and enterprises now need record levels of performance and scalability to meet growing requirements for elasticity, shared services, and seamless availability and security.

In these new cloud-based and virtualized environments—as well as in traditional IT environments—the need for next-generation application delivery controllers is clear. Organizations must have the ability to enable global deployment of Web 2.0 applications and address their challenges of network latency, packet loss, and server and network load—all while delivering uncompromised performance under high-volume and unpredictable traffic conditions.

The Brocade® ServerIron® ADX Series of high-performance application delivery switches provides a broad range of application optimization functions to ensure reliable delivery of critical applications. Purpose-built for large-scale, low-latency environments, the Brocade ADX Series accelerates application performance and improves application availability—all while making the most efficient use of existing infrastructure. These benefits—coupled with the orchestration capabilities and elasticity offered by the Brocade Application Resource Broker—enable service providers and enterprises to deliver applications at a global scale with more efficiency and higher availability while streamlining operations, increasing business agility, and significantly reducing costs.

BROCADE

The Brocade ADX product family includes:

- **Brocade ADX 1000 Series:** A 1 RU application delivery switch with up to sixteen 1 Gigabit Ethernet (GbE) copper ports, one management CPU, up to four application CPUs (two dual-core processors), and up to two AC or DC power supplies. The on-demand software license-based upgrade capability on this platform allows customers to double or quadruple system performance, add 1 GbE/10 GbE ports, or add software features without requiring hardware upgrades.
- **Brocade ADX 4000 Series:** A 4 RU chassis-based modular application delivery switch with one management module, up to two application switching modules—each with eight application CPUs (four dual-core processors), one switch fabric module, up to two AC or DC power supplies, one hot-swappable fan tray, and up to two interface modules.
- **Brocade ADX 10000 Series:** A 10 RU chassis-based modular application delivery switch with up to two management modules, up to four application switching modules—each with eight application CPUs (four dual-core processors), two switch fabric modules, up to four AC or DC power supplies, one hot-swappable fan tray, and up to four interface modules.

OPTIMIZED APPLICATION DELIVERY

The Brocade ADX Series offers a wide range of functions for an optimal application experience, including:

- **Enterprise applications:** Provides uninterrupted, high-performance, and low-latency delivery of popular applications, including Microsoft Exchange, Microsoft SharePoint, Microsoft Lync Server (formerly Microsoft Office Communications Server), SAP, Oracle, BEA WebLogic, IBM WebSphere, and Siebel, and financial services applications based on the Financial Information eXchange (FIX) protocol.
- **Infrastructure load balancing:** Increases availability of infrastructure devices such as firewalls, caches, intrusion prevention appliances, Domain Name Server (DNS) and DNS Security Extension (DNSSEC) servers, and Remote Authentication Dial-in User Service (RADIUS) servers.
- **Efficient load balancing:** Enables efficient distribution of traffic among application servers using load-balancing methods that monitor server connection load, server resources such as CPU and memory, application response time, and pre-assigned server weights.
- **Application health monitoring:** Conducts periodic checks of application servers and services through Layer 2 ARP, Layer 3 PING, Layer 4 TCP three-way handshakes or UDP queries, and Layer 7 application-level queries.
- **Layer 7 content inspection:** Provides advanced Layer 7 inspection of the HTTP URL, cookie, host headers, and data for maintaining application flow persistence.
- **SSL and server connection offload:** Offloads Secure Sockets Layer (SSL) negotiation and connection management tasks from application servers, giving servers more cycles for critical application delivery and improving application response time. Provides comprehensive support for a variety of cipher suites and 1024- and 2048-bit SSL keys.
- **Application infrastructure agility:** Enables on-demand inclusion and removal of application instances using Brocade Application Resource Broker.

SIMPLIFIED ORCHESTRATION AND MANAGEMENT

The Brocade ADX Series supports a range of capabilities to simplify installation, configuration, operation, and management of application delivery infrastructures.

Application Resource Broker: Brocade Application Resource Broker is an infrastructure software component that simplifies the management of on-demand application resources within IT data centers. This solution helps ensure optimal application performance by dynamically adding and removing application resources (such as virtual machines). The Brocade Application Resource Broker—working in tandem with the Brocade ADX Series—provides these capabilities through real-time monitoring of application resource responsiveness, traffic load information, and infrastructure capacity information from server infrastructures (see Figure 1).

A programmable decision engine compares application experience information with preconfigured threshold rules. When thresholds are exceeded, Brocade Application Resource Broker initiates provisioning actions to ensure that necessary and appropriate application resources are available to meet Service Level Agreements (SLAs).

The Brocade ADX Series with Brocade Application Resource Broker also automatically associates various application services with their respective virtual machines. It collects historical application-centric performance statistics to enable true application-level operational visibility. Brocade Application Resource Broker directly supports VMware environments through a vSphere Client Plug-in, and can leverage real-time application response monitoring capabilities of any Brocade ADX switch in the network to deliver immediate provisioning adjustments in response to fluctuating demand. This capability helps ensure consistent and reliable application responsiveness between end users and the application infrastructure.

Flexible Control Interfaces: The Brocade ADX Series supports a range of flexible and powerful interfaces for system configuration and management.

- **Command Line Interface:** The Brocade ADX Series supports an industry-standard Command Line Interface (CLI) for device configuration.
- **Programmatic interface:** A standards-based SOAP/XML-application

programmatic interface allows for tighter integration with third-party orchestration and automation tools. This interface provides greater application visibility and control over the application infrastructure.

- **Web Graphical User Interface:** Application and network administrators can also utilize a browser-based Graphical User Interface (GUI) for configuring and monitoring the Brocade ADX switches.
- **SNMP support:** The Brocade ADX controllers support Simple Network Management Protocol (SNMP) v1, v2, and v3, enabling device monitoring through third-party network management applications.
- **Role-based management:** This capability of the Brocade ADX Series allows organizations to create multiple administrative domains and assign different access privileges to users inside these domains.

Brocade Network Advisor: Large numbers of Brocade ADX devices can be managed from one central console through Brocade Network Advisor. Brocade Network Advisor provides additional tools for simplifying management of SSL keys, certificates, and application services, such as Virtual IP Manager and Global Server Load Balancing (GSLB).

SEAMLESS TRANSITION TO IPV6

While the ubiquity of the Internet creates vast new opportunities for service providers and enterprises alike, the rapid growth of Internet-enabled devices and applications has led to IPv4 address depletion. This depletion is forcing many organizations to begin serious adoption of IPv6 as a solution to this impending threat to Internet growth. At the same time, many organizations face regulatory or governance-driven mandates to offer IPv6 services to their customers but struggle with the cost of a complete network redesign.

The Brocade ADX eases the migration to IPv6 by enabling service providers and enterprises to maximize their existing IPv4-based investments while communicating with the growing IPv6-based world, without the need for "rip-and-replace" upgrades (see Figure 2).

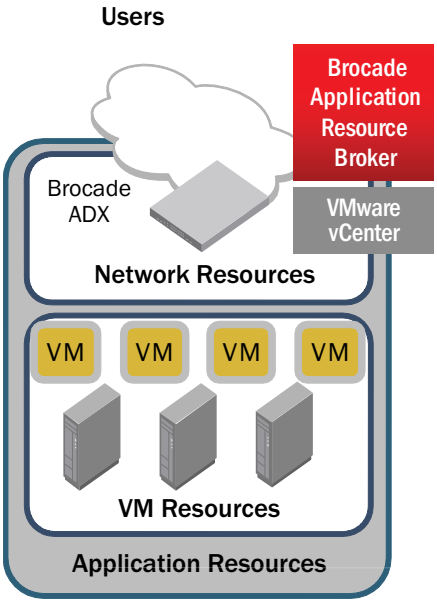
IPv6 gateway: The Brocade ADX enables IPv4 networks to interoperate with IPv6 networks via a simple, standards-based Network Address Translation 64 (NAT64) gateway. This capability enables IPv4 clients to communicate with new IPv6 services, as well as new IPv6-based clients to communicate with the traditional IPv4 networks, all without requiring forklift upgrades to existing infrastructure.

IPv6 SLB gateway: The Brocade ADX also allows existing IPv4 applications to be advertised via an IPv6-based Virtual IP (VIP) service. Existing servers and applications can then be slowly migrated to IPv6 on their natural upgrade cycles. The Brocade ADX load-balances traffic destined to an IPv6 VIP among IPv4 application servers, which can be upgraded to support IPv6 at an evolutionary rate.

ALWAYS-ON APPLICATION AVAILABILITY

The Brocade ADX application delivery switches maximize availability and provide non-stop delivery of business-critical applications through a range of capabilities (including application-level health monitoring).

Figure 1.
Brocade Application Resource Broker provides infrastructure monitoring, loading analysis, resource provisioning and de-provisioning, and reporting.



n availability: The Brocade ADX vides multiple high-availability options uit varying infrastructure and business ds for overall enhanced application iency. Real-time synchronization of sions between two peer Brocade ADX s operating in high-availability mode vides protection against system outages. e device shuts down, then the second ce transparently resumes control ient traffc, with no loss to existing sions or connectivity.

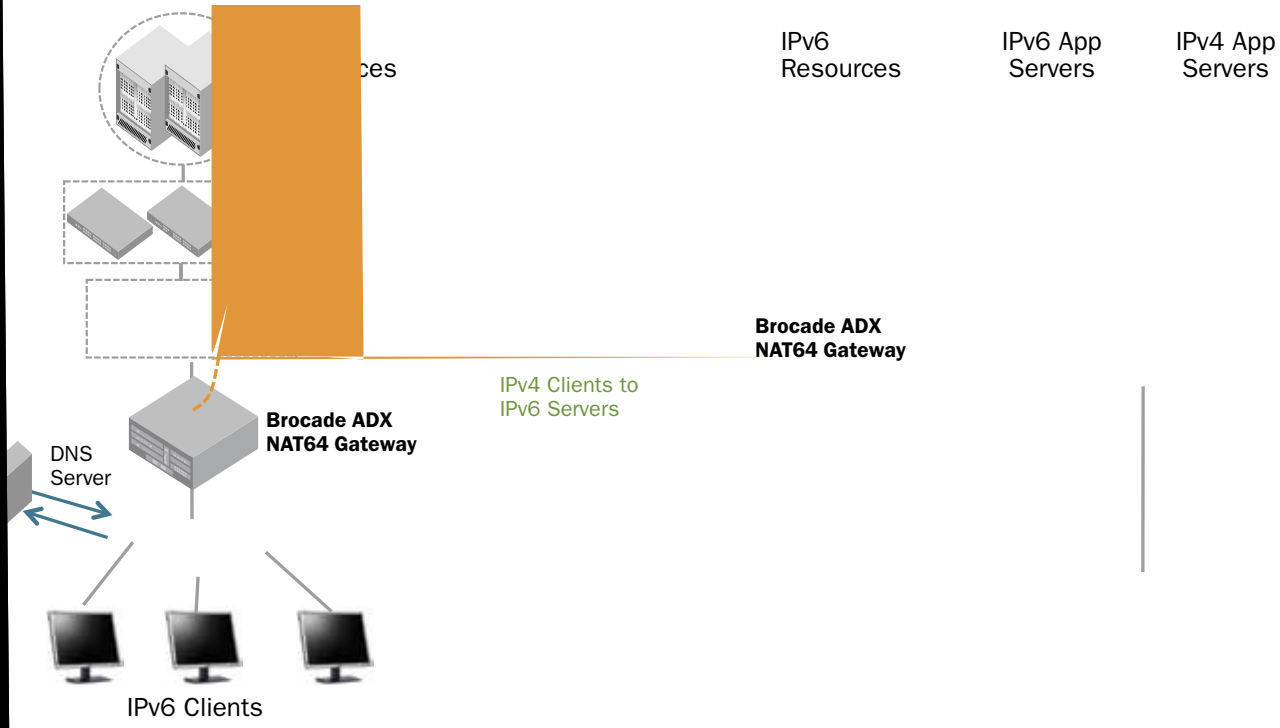
redundancy using GSLB: Organizations oying multiple, geographically disparate centers can beneft from GSLB. This ability allows the Brocade ADX switches stribute client traffc among data center based on site availability, site load, several other metrics. The Brocade ADX ches determine client-to-server proximity by computing the round-trip delay between the client and the data center site. A site nearest to the client is generally selected to deliver application traffc in order to provide the optimal user experience.

Brocade ADX switches also continually monitor data center sites to detect any changes in servers or services due to varying health and traffc conditions. Confgurable site-load thresholds allow organizations to align health-checking parameters with the server and service capabilities of each site. All of these features work in conjunction with existing DNS as well as DNSSEC servers to minimize service disruption and maximize application uptime.

Site redundancy using Healthy Route Injection: The Brocade ADX Series provides a site redundancy solution for non-DNS–based infrastructures by injecting network routes for healthy VIPs from multiple data center locations. These network routes are propagated through routing protocols such as BGP, IS-IS, and OSPF, enabling clients to connect to the closest available site.

HIGH-PERFORMANCE ARCHITECTURE

The Brocade ADX application delivery switches provide more than 3 million HTTP Connections Per Second (CPS) and 70 Gbps of HTTP application traffc throughput. The Brocade ADX switch also acts as a high-performance proxy for the DNS server farm, delivering up to 18 million DNS queries per second. Brocade ADX switches provide reliable protection against many forms of Denial-of-Service (DoS) attacks such as DNS attacks and SYN attacks, and offer industry-leading



BROCADE ADX MODULES

Management Module

Application Switch Module

Switch Fabric Module

Interface Modules

12-port 10/100/1000 Mbps Ethernet copper (RJ45)

12-port 1 GbE fber (SFP)

4-port 10 GbE fber (XFP)

BROCADE ADX SERIES SPECIFICATIONS

Platform	ADX 1000	ADX 4000	ADX 10000
HTTP connections/sec (CPS)	375,000	1,500,000	3,000,000
HTTP transactions/sec (TPS)	2,500,000	10,000,000	20,000,000
Layer 4–7 application throughput	9 Gbps	35 Gbps	70 Gbps
DNS queries/sec (stateful)	300,000	1,200,000	2,400,000
DNS queries/sec (fast stateless)	2,250,000	9,000,000	18,000,000
Maximum SSL TPS[1]	28,000	112,000	224,000
Maximum SSL CPS[1]	6,500	26,000	52,000
Maximum SSL bulk throughput	1.8 Gbps	7.2 Gbps	14.4 Gbps
Maximum concurrent SSL connections[2]	64,000	256,000	512,000
IPv6 HTTP Connections Per Sec (CPS)	125,000	500,000	1,000,000
IPv6 application throughput	7.5 Gbps	30 Gbps	60 Gbps
IPv6 DNS queries/sec (stateful)	140,000	560,000	1,120,000
IPv6 DNS queries/sec (fast stateless)	500,000	2,000,000	4,000,000
SYN attacks/sec and hardware DDoS protection (packets/sec)	15,000,000	60,000,000	120,000,000
Packet-switching latency (microseconds)	20	20	20
Maximum concurrent connections	16,000,000	64,000,000	128,000,000
Maximum concurrent sessions	32,000,000	128,000,000	256,000,000
Maximum application cores	4	16	32
Maximum system memory	8 GB	32 GB	64 GB
Maximum 1 Gigabit Ethernet ports	Up to 16 copper	Up to 24 copper or fber	Up to 48 copper or fber
Maximum 10 Gigabit Ethernet ports	2	8	16
Maximum number of VIPs	1024	4096	4096
Maximum real servers	4096	16,384	16,384
Maximum application ports	8192	32,768	32,768
Physical dimensions	Height: 4.3 cm (1.7 in.) Width: 44.3 cm (17.4 in.) Depth: 45.8 cm (18.1 in.)	Height: 17.7 cm (7.0 in.) Width: 44.3 cm (17.4 in.) Depth: 44.5 cm (17.5 in.)	Height: 44.5 cm (17.5 in.) Width: 44.3 cm (17.4 in.) Depth: 44.5 cm (17.5 in.)
Weight	37.5 lb fully loaded (17.0 kg)	54.0 lb fully loaded (24.5 kg)	112.3 lb fully loaded (50.9 kg)
Maximum power requirements	390 watts	952 watts	1920 watts
Warranty	1-year hardware, 90-day software, upgrades to higher levels available		

[1] A single SSL module provides up to 112,000 SSL TPS and 7.2 Gbps of bulk throughput performance. However, net SSL performance relies on the number of application cores in the system. As an example, an eight-application core Brocade ADX 4000 system supports up to 56,000 SSL TPS and 3.6 Gbps of bulk throughput while utilizing a single SSL module.

SSL TPS—multiple HTTPS transactions over fewer SSL negotiated tunnels.

SSL CPS—single SSL negotiation followed single HTTPS transaction per connection.

[2] Maximum number of concurrent SSL connections is based on a maximum of 16,000 SSL connections per application processor core.

BROCADE APPLICATION DELIVERY INFRASTRUCTURE COMMUNITY

Brocade ADX users now can find numerous support resources through the Brocade Application Delivery Infrastructure (ADI) community. This group focuses on Brocade ADX products and related partner technologies, and provides a Web 2.0 social networking resource for application and networking professionals seeking discussions, solutions, information, education, and implementation guidance.

Brocade customers and partners can easily leverage the collective knowledge and experience of the Brocade ADI community to enable real-time resolution of current application delivery challenges. Resources include the latest information and use cases, along with configuration scripts and examples. Learn more at http://community.brocade.com/adi.

BROCADE GLOBAL SERVICES

Brocade Global Services delivers world-class professional services and technical support to enable the transition to virtualized data centers and cloud-optimized architectures. Brocade Professional Services offers assessment, design, and implementation services to help organizations optimize application delivery in cloud-optimized data centers. Brocade Premier Support and onsite residencies help organizations maximize the availability of mission-critical applications through personalized, preferential, and proactive technical support.

MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include education, support, and services. For more information, contact a Brocade sales partner or visit www.brocade.com.

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