BROCADE VIRTUAL ADX APPLICATION DELIVERY SWITCH

NETWORK FUNCTIONS VIRTUALIZATION

- Provides a dynamic multi-core system architecture with integrated Intel technology for ADC performance scaling
- Delivers a full-fledged ADC system with a virtual footprint supported on standards-based hypervisors and hosted on a general-purpose x86 system
- Maximizes application availability, protection, and programmability through robust ADC services
- Simplifies data center operations with extensible management and open cloud orchestration integration
- Leverages comprehensive software networking services with Brocade Vyatta® vRouters to enable Network Functions Virtualization (NFV)

Increasing Data Center Agility and Efficiency

The proliferation of mobile computing, cloud-based services, Big Data analytics, and social networking has conditioned users to expect services to be more nimble and resources to be available in an on-demand, self-service manner, regardless of location. Server virtualization has played a critical role in reinventing how compute resources can be managed, provisioned, and run with a higher degree of flexibility and agility in the data center. However, virtualization will not fully deliver its promise of agility as long as networks are statically provisioned and managed. Network Functions Virtualization (NFV) promises to breathe life into these static networks the same way server virtualization has done for the compute domain.

DYNAMIC VIRTUAL APPLICATION DELIVERY CONTROLLER

The Brocade® Virtual ADX® (vADX™) is a full-fledged Application Delivery Controller (ADC) platform with a virtual footprint that leverages Intel advanced technology to deliver remarkable performance. The software is designed to run on standards-based hypervisors, hosted on Intel x86 COTS hardware. It offers a complete suite of Layer 4 and Layer 7 server load balancing capabilities and application security services with extensible management via rich SOAP/XML APIs.

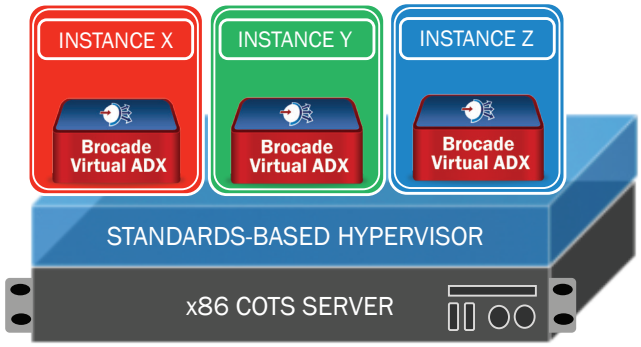

Figure 1.
Brocade Virtual ADX Application Delivery Switch.

BROCADE

Distributed Multi-core Architecture

At the heart of the Brocade Virtual ADX is a scalable and distributed multi-core system architecture characterized by a logical management processor and multiple application processors. Besides system configuration, the management plane performs system monitoring through comprehensive metrics to ensure application availability. The data plane is responsible for maintaining reliable traffic distribution to the available servers and securing client and application communications. This distributed architecture can elastically scale up performance with the addition of more virtual CPU cores.

Comprehensive ADC

The Brocade Virtual ADX supports comprehensive IPv4 and IPv6 server load balancing methods for basic and advanced protocols such as DNS, SIP, TFTP, and HTTPS to increase scalability and availability of critical application and infrastructure servers. The Brocade Virtual ADX is also equipped with extensive application health checks such as server connection load, application response time, and server computing resources for dynamic server monitoring. Furthermore, it provides a unified application security solution to protect against sophisticated SYN/DDoS attacks, deny services to unauthorized users, and terminate SSL-based traffic.

Application Scripting Engine

The Brocade OpenScript® engine, a powerful and sophisticated scripting engine, is an ideal tool for building advanced policies and custom services that are more complex in nature. With extensive libraries of open software modules via the Comprehensive Perl Archive Network (CPAN), organizations can leverage their application development resources to provide differentiated value-added services to meet unique customer requirements for faster time to market.

Distributed Sites Selection

Organizations deploying multiple, geographically disparate data centers can benefit from the Global Server Load Balancing (GSLB) functionality of the Brocade Virtual ADX. It can distribute client traffic to servers based on site availability, load, latency, and more customized advanced metrics in order to provide the optimal user experience.

Simplified Management

The Brocade Virtual ADX provides an industry-standard Command Line Interface (CLI), advanced Web-based Graphical User Interface (GUI), and embedded Linux tools to enable the following robust management functions:

- **Real-time system monitoring and reporting:** Provides detailed system information, resource utilization, network status, and traffic monitoring.
- **Configuration template:** Creates extensive server load balancing deployments quickly with pre-defined, customized XML-based configurations.
- **Application scripting development:** Enables rapid development of application scripts with the intelligent Brocade OpenScript editor and built-in compiler.

All of these functions can be securely managed through SSHv2, RADIUS, and TACACS+.

Automated Orchestration

Cloud professionals can provide initial deployment configurations of the Brocade Virtual ADX in OpenStack environments through OpenStack Horizon. In addition, they can automate the management of the Brocade Virtual ADX via OpenStack Heat templates, thereby minimizing human errors for large-scale cloud deployments. Application administrators can also leverage the SOAP/XML APIs to build an elegant configuration wizard within the GUI and integrate control of Brocade Virtual ADX management into custom and third-party orchestration tools.

RAPID APPLICATION PROTOTYPING, TESTING, AND PRODUCTION

Ideally, each application deployment lifecycle (development, testing, and production) should be in sync, allowing applications to behave consistently within each environment. To facilitate this complex requirement, an organization requires a sandbox system that can simulate all of the functional aspects of a production environment. The Brocade Virtual ADX offers simplified licensing types and flexible performance tier options to meet the needs of these diverse deployment modes. The evaluation edition provides the full range of Brocade Virtual ADX features with maximum performance for a period of 60 days at no cost. Organizations can seamlessly move to a production environment by replacing the trial license with the full license (see Figure 2).

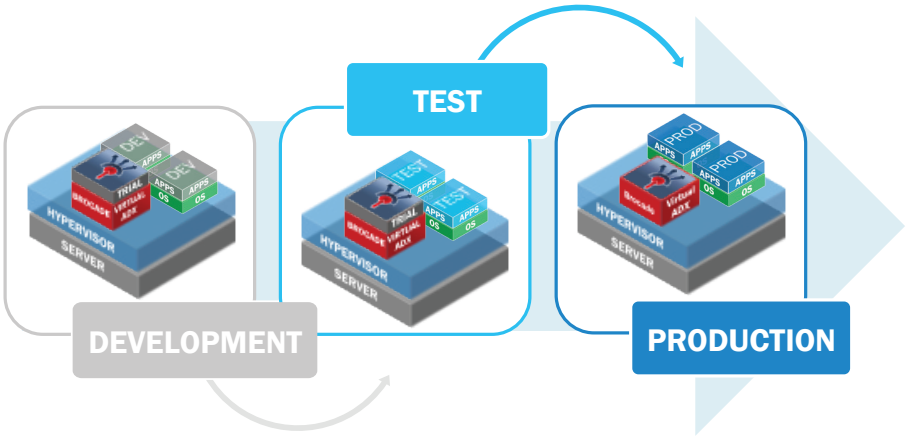

Figure 2.
Seamless migration in the application deployment lifecycle, from development to production.

VIRTUAL APPLICATION LOAD BALANCING

A large percentage of critical IT workloads are now run as virtual applications since x86-based system capacities have continued to increase while hypervisor overheads have continued to decrease. The prevalent problem with custom-built hardware load balancing design has been underutilization of dedicated ADC appliances. The Brocade Virtual ADX can enable per-application load balancing, regardless of its size or location—dynamically scaling capacity as demands dictate (see Figure 3). The Brocade Virtual ADX instance can run on the same hypervisor or server where one or more instances of applications reside. Each application can benefit from customized provisioning of complete Layer 4 and Layer 7 server load balancing functions.

OPTIMAL PATH FOR MULTITENANCY

Resource sharing in a multitenant cloud network is an ongoing concern for cloud service providers and enterprise users. One significant challenge is maintaining compliance with corporate and regulatory standards, while leveraging the shared infrastructure model's cost benefits and improved operational efficiency. To meet this challenge, each tenant or customer must have its own private network infrastructure with a pre-defined resource level guarantee. The Brocade Virtual ADX allows for multiple instances of ADC services to run on a general-purpose x86 COTS system, thereby enabling multitenancy with guaranteed dedicated resources and a high-degree of isolation per tenant in a shared environment (see Figure 4).

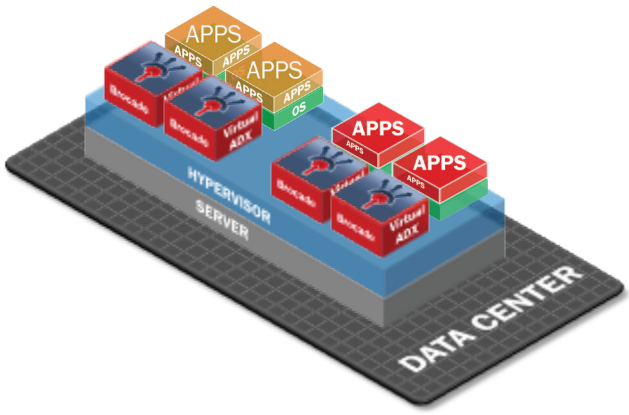

Figure 3.
Increased availability, scalability, and resiliency for individual virtual application domains.

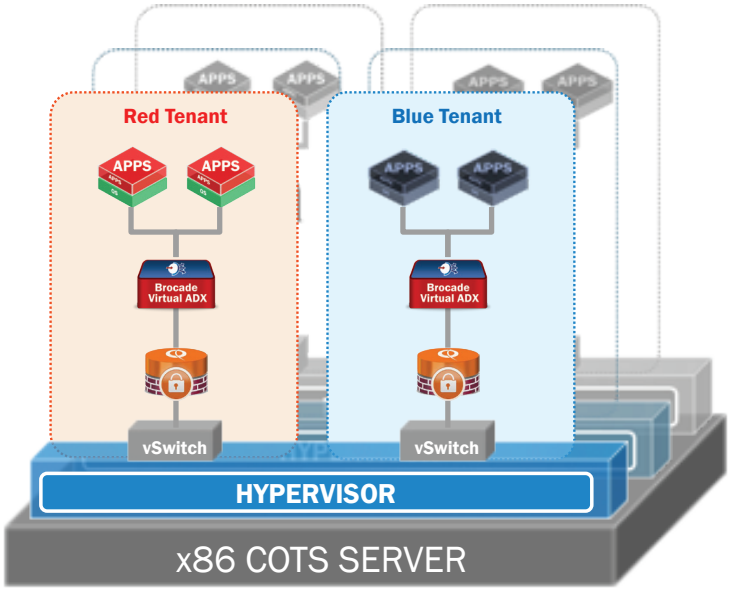

Figure 4.
Private ADC resources for individual subscribers in a multitenant cloud environment.

DYNAMIC RESOURCE MANAGEMENT IN A HYBRID CLOUD

Varying demands on compute and network resources pose a significant challenge for administrators planning for the right capacity in a hybrid cloud environment. However, by leveraging the cloud bursting capability of Brocade Application Resource Broker, in conjunction with the Brocade Virtual ADX and standards-based APIs, administrators can burst their local application delivery resource footprints (see Figure 5). They can create additional Brocade Virtual ADX instances in either a private or public cloud when demand for computing resources exceeds capacity, then recapture the capacity as demand subsides. This operating model enables network traffic to be offloaded in a cost-effective manner when it exceeds the resources in the on-premise data center.

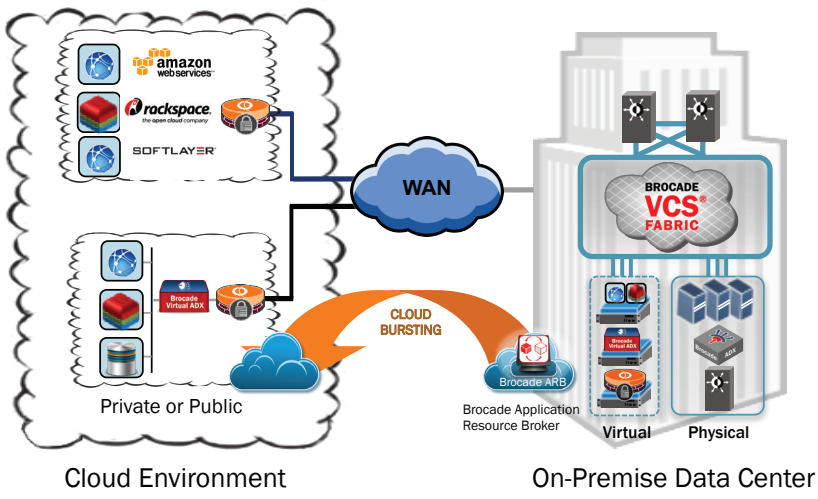

Figure 5.
On-demand capacity planning for a hybrid cloud environment.

SITE REDUNDANCY AND BUSINESS CONTINUITY

For planned disaster recovery, redundant copies of the same applications are typically deployed on multiple sites in order to have them available for transaction and backup purposes. By distributing these sites across several areas, the organizational impact from a major failure can be minimized. In virtual environments, the distributed application deployment model has been the standard for maintaining the highest uptime and resiliency across hypervisors located in disparate locations. To support this resilient distributed environment, the Brocade Virtual ADX can act both as an application load balancer and a global site load balancer (see Figure 6). Multiple localized Brocade Virtual ADX instances can collocate with the applications themselves to perform ADC services, while dedicated Brocade Virtual ADX instances provide global server balancing between multiple sites.

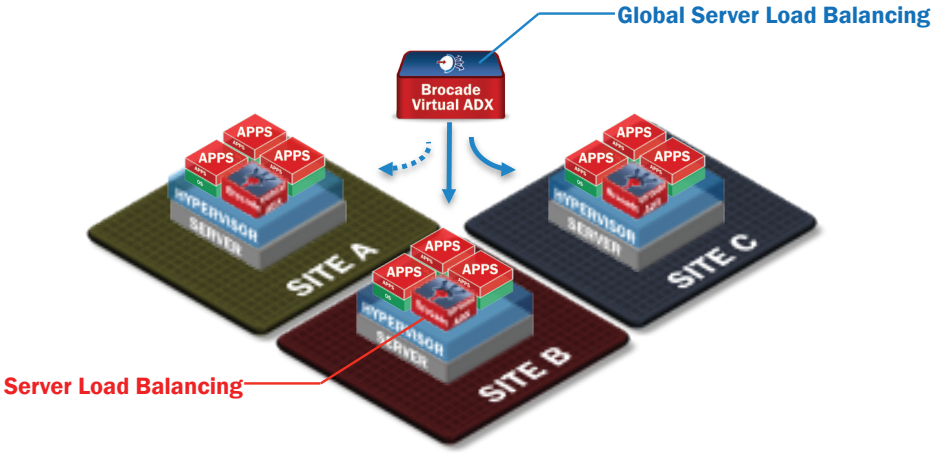

Figure 6.
Greater business continuity with server load balancing and distributed site load balancing.

BROCADE COMMUNITY

- **Brocade Application Delivery:** Focuses on Brocade Virtual ADX products and associated partner technologies, and provides 24×7 online assistance for evaluation, resources for real-time discussions, the latest product information, configuration examples, and implementation guidance.
- **Brocade SDN + NFV:** Focuses on unique topics associated with Software-Defined Networking (SDN) and Network Functions Virtualization (NFV) technologies, and offers discussion boards, blogs and articles, videos, and the latest product and solution offerings.

BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, and education services, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

FLEXIBLE ACQUISITION OPTIONS

Brocade helps organizations easily address their software networking requirements by offering flexible licensing options and support alternatives. Organizations can select from perpetual, subscription, and pay-as-you-go options or the Cloud Service Provider License (CSPL) Program to align software networking acquisition with their unique business requirements and risk profiles. To learn more, visit Brocade Virtual ADX License Options or contact your Brocade sales representative for details.

MAXIMIZING INVESTMENTS

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

TRY BROCADE VIRTUAL ADX FOR 60 DAYS

Get instant access to your free Brocade Virtual ADX trial now and enjoy 24×7 online support.

AVAILABLE AT THE ONLINE STORE

Take advantage of a fast and simple purchase through the Brocade online store.

THE BROCADE VIRTUAL ADX AND BROCADE VYATTA CONTROLLER INTEROPERABILITY

The Brocade vADX operates seamlessly under the Brocade Vyatta Controller. This controller is a quality-assured edition of the OpenDaylight controller code supported by an established networking provider and its leaders within the OpenDaylight community.

BROCADE VIRTUAL ADX FEATURE HIGHLIGHTS

Load Balancing Methods

- Least Connections
- Weighted Least Connections
- Round Robin
- Weighted Round Robin
- Static Weighted Round Robin
- Enhanced Weighted
- Dynamic Weighted (SNMP-based)
- Response Time

Layer 4 and Layer 7 Load Balancing Support

- TCP, UDP, MMS, RTSP, FTP, TFTP, HTTP, DNS, SIP, SSL Session ID Switching
- Brocade OpenScript engine
- Global Server Load Balancing (GSLB) Site and Controller
- IPv6 Server Load Balancing (SLB 6 to 6)

Application Health Monitoring

- Layer 2: ARP
- Layer 3: PING
- Layer 4: TCP and UDP
- Layer 7: DNS, SIP, RADIUS, HTTP, SSL, LDAP, LDAPS, MMS, RTSP, SMTP, TELNET, FTP, NNTP, IMAP4, PNM, POP3

Application Security and Protection

- Layer 3/Layer 4 Access Control List (ACL)
- Dynamic and Static Network Address Translation (NAT)
- DDoS/SYN protection
- Transaction Rate Limiting (TRL)
- Virtual IP (VIP) Prioritization
- SSL termination

High Availability

- Hot-Standby

Layer 2 and Layer 3 Network Services

- Layer 2: VLAN, 802.1q VLAN Tagging
- Layer 3: IPv4/IPv6 routing—OSPFv2, OSPFv3, BGP, Static Routing

Management

- CLI, GUI, XML API, Syslog, Telnet, SNMP, SCP, AAA

Cloud Orchestration

- Brocade Application Resource Broker
- OpenStack open cloud framework

BROCADE VIRTUAL ADX LICENSE AND SYSTEM OPTIONS

PERFORMANCE TIER	HYPERVISOR SUPPORT			LICENSE OPTIONS		
MAX SLB THROUGHPUT	VMware vSphere	Linux KVM	XenServer	Perpetual	Annual Subscription	Pay-As-You-Go (utility-based)
10 Mbps	•	•	•	•	•	•
200 Mbps	•	•	•	•	•	•
1 Gbps	•	•	•	•	•	•
3 Gbps	•	•		•	•	
5 Gbps	•	•		•	•	
10 Gbps	•	•		•	•	

BROCADE VIRTUAL ADX MINIMUM REQUIREMENTS

HYPERVISOR SUPPORT	MINIMUM VIRTUAL RESOURCES			MINIMUM SERVER RESOURCES		
Minimum Version	Virtual CPUs	RAM	Disk Space	CPUs	RAM	Disk Space
VMware vSphere ESX/ESXi 4.x/5.x	2	2 GB	20 GB	1.5 GHz dual-core with HT*	4 GB	40 GB
RedHat/CentOS/Ubuntu Linux KVM 0.9.0 or higher						
XenServer 6.2.0 or higher						

* HT=Hyper-Threading

Corporate Headquarters
San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters
Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters
Singapore
T: +65-6538-4700
apac-info@brocade.com

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