



Juniper Networks DX Load Balancing and Application Acceleration Platforms

The DX load balancing and application acceleration platform resides in the data center in front of content servers, where it serves as a full request/response-aware bi-directional HTTP proxy for processing incoming and outgoing requests. By relieving servers of CPU-intensive tasks, the DX platform makes servers much more efficient, accelerating the performance of web-enabled applications and improving the productivity of remote, branch office and mobile employees accessing centralized business applications.

The DX load balancing and application acceleration platform delivers a complete application delivery solution for web-enabled and IP-based business applications. The DX platform, which greatly improves the end-user experience by delivering content quicker, solves IT budget, high-availability and security requirements through a combination of centralized services—including server load balancing, global server load balancing, SSL encryption and termination, HTTP compression, and application security—on a single device. The DX platform also offers multiple scaling options in both functionality and performance for any business environment; working with other Juniper solutions such as the WX/WXC application acceleration platforms and the Secure Access SSL VPN, the DX platform contributes to the industry's most complete, secure and assured application delivery solution for the distributed enterprise.

- Accelerates web-enabled applications by up to 50 percent
- Reduces data center infrastructure and bandwidth costs by up to 60 percent
- Increases server capacity by three to four times
- Increases both application and data center security

Server Load Balancing and Global High Availability

As a fundamental service, the DX platform delivers full Layer 4-7 server load balancer (SLB) functionality. Equipped with multiple load-balancing methods and sticky modes, the DX platform can load-balance any application that needs to be scaled or made highly available.

The DX platform performs server, application and data center health checks ranging from simple ICMP ping and Layer 7 HTTP content validation to scriptable health-check facilities to verify that applications, whether custom or off the shelf, are healthy before any requests are sent to the server. Full server/connection management features ensure that servers and services can be inserted or deactivated at any time in a live network without causing a service outage.

Securing the Application and Data Center

The DX platform provides transport-level security by providing full Secure Sockets Layer (SSL) session termination for any Web or IP application, offloading this task from content servers and providing an extra layer of protection for critical data center resources. Delivering hardware-assisted SSL termination for high-capacity requirements, the DX platform can secure all applications to the desired level.

The DX platform also acts as an “internal firewall,” protecting the Web tier and content servers from malicious TCP and HTTP/web-based attacks by authenticating all users and HTTP sessions before allowing access. The DX platform can provide per-request authorization by leveraging the existing RADIUS and LDAP infrastructure, secure data and connections, protect servers from denial-of-service (DoS) attacks and SYN floods, and provide other security features based on native HTTP protocol communication.

Bi-directional HTTP Proxy: Unparalleled Web Acceleration, Security and Flexibility

Designed with HTTP in mind, the DX platform provides a full suite of services for web-enabled applications that benefit both the end-user and the data center.

• TCP Multiplexing: Efficient Access to the Web Server

TCP/IP connection multiplexing enables the DX platform to reduce thousands of incoming client connections down to just a few, relieving the TCP/IP connection-management burden on back-end servers and allowing them to do what they do best: serve content. By assuming responsibility for resource-intensive tasks such as session set-up and tear-down, the DX platform frees up CPU cycles on the servers, allowing them to process up to four times the number of normal requests.

- **Auto-adaptive Compression: Beyond Deflate and GZIP**

A full understanding of the requesting and sending browser, as well as content and network conditions, enables the DX platform to speed content to the user in record time without requiring a proprietary client to the browser.

The DX platform employs standards-based Deflate and GZIP algorithms to compress all application flows, from standard HTTP objects to Microsoft Office documents and XML content, to accelerate web-enabled applications for all local, remote and mobile users. To provide the best possible performance, the DX platform imposes no size restriction for documents being compressed, and support for mechanisms such as chunking allow content to be displayed as soon as it's available to accelerate page loads.

- **Symmetric Caching**

The DX platform's on-board DRAM cache, coupled with the ability to rewrite HTTP content on-the-fly to enable browser-side caching, ensures that no bandwidth is wasted on downloading unnecessary objects. A 3G caching capability enables the DX platform to locally store commonly-requested objects in fast DRAM and quickly respond to requests for those objects at speeds that only silicon-based storage can achieve. The server never sees the request, preserving valuable cycles for serving dynamic content.

The DX platform's ability to dynamically rewrite content also allows previously uncacheable HTTP objects to be stored on the client browser so that the next time the object is requested, it is locally served without wasting WAN bandwidth or consuming data-center processing cycles.

- **Client TCP Connection Keep-Alive**

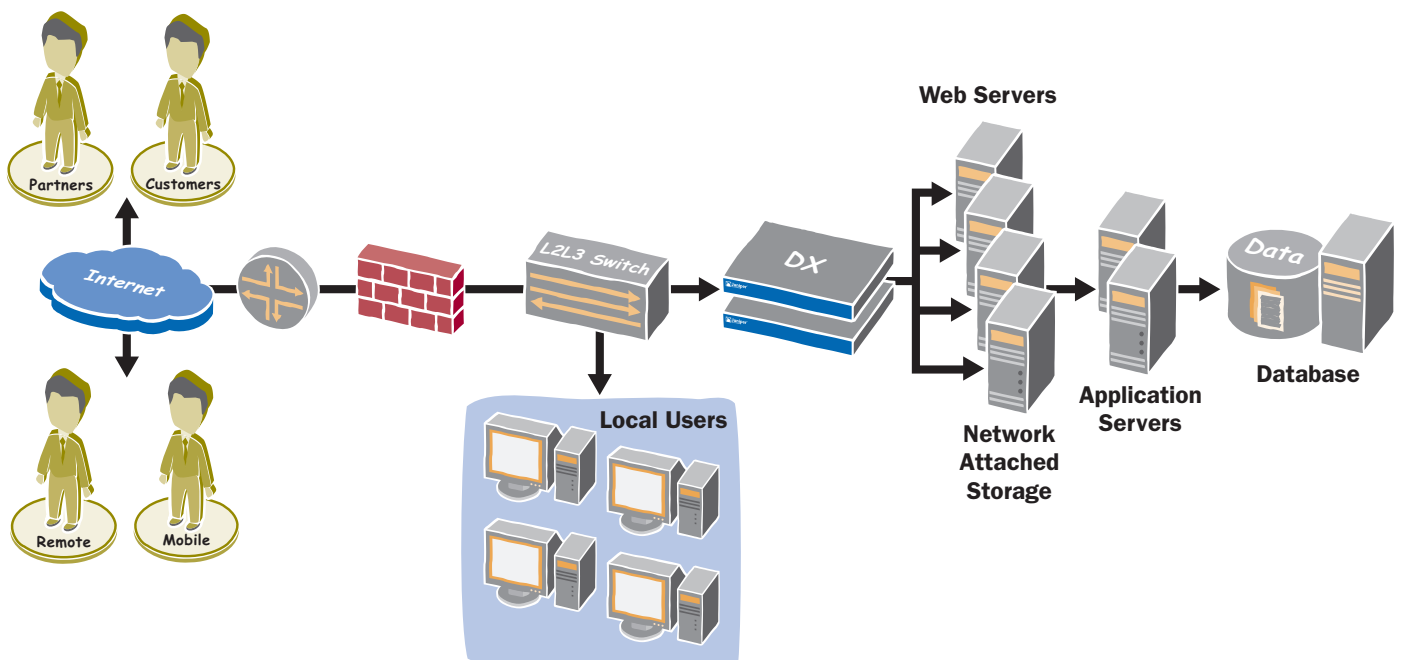
A major cause of Web traffic delay is the TCP connection set-up and bandwidth tuning process called slow-start, which can take multiple round trips before everything is optimized. Servers and clients automatically close these connections after a brief period of inactivity, even within an active browser session, forcing users to incur the start-up penalty each time they initiate an action.

To accelerate performance, the DX platform keeps all client TCP connections open for as long as capacity allows, ensuring an immediate response the next time the client browser retrieves content from the server, even if hours or days later.

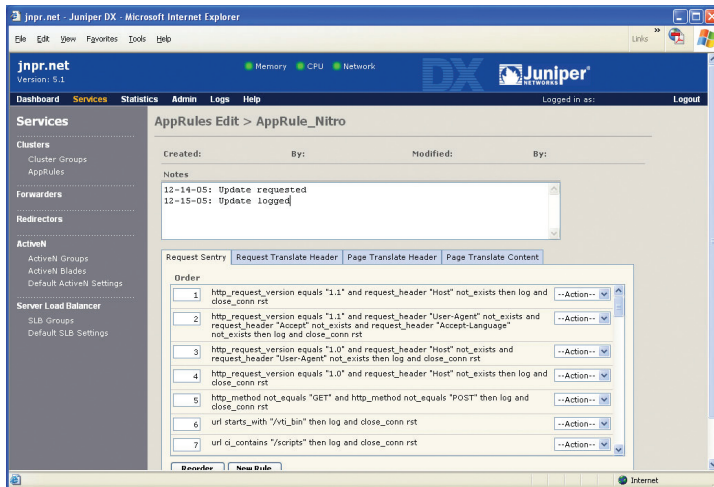
AppRules: Network Programming Language for Applications

The DX platform features a flexible bi-directional HTTP header and body inspection/content rewriting programming language called AppRules™ adaptive content processing. The AppRules capability enables IT to modify application behavior on active traffic flows to compensate for inefficiencies or other problems without altering the application code itself. Users can choose from an existing template of general optimization rules or, using a simple GUI-based wizard, they can write their own custom "if-then" rules based on any combination of factors for both incoming user requests and outgoing server responses. Some AppRules examples include:

- AutoSSL™, which automatically converts HTTP to HTTPS for complex applications such as OWA
- HTTP transaction assurance, which intercepts server errors and automatically resubmits the request to other servers
- URL rewrite, which allows IT to hide back-end directory structures for security purposes



The DX load balancing and application acceleration platform speeds the delivery of web-enabled applications from the data center for local, remote and mobile users.



The AppRules wizard enables users to easily modify application behavior in real time without having to change any actual code.

ActiveN: Capacity Scaling and High Availability

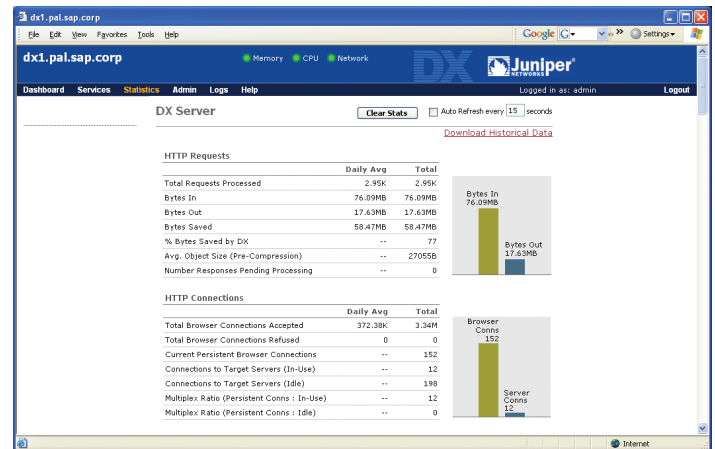
The DX platform includes the unique ActiveN™ scaling and high-availability feature, which allows new DX devices to be incrementally added to the data center as needed to meet growing demands. More than just a high-availability system, the ActiveN feature enables an entire DX cluster to act as a single device, linearly scaling performance. Up to 64 units can be clustered in a mesh topology, and the ActiveN feature ensures that if a single DX platform becomes unavailable, the workload is automatically redistributed among the remaining units, providing N + 1 redundancy.

Global Server Load Balancing: Worldwide Application Support

For widely distributed environments supporting multiple data centers, the DX platform offers a global server load balancing (GSLB) feature that allows clients to be connected to the data center best equipped to fulfill their request, regardless of location. GSLB routing decision algorithms include active/standby status, closest data center, least-loaded data center, or a combination of these and other decision metrics. Acting either as a DNS transparent proxy or a full DNS BIND agent, the GSLB feature can be incorporated into any DNS infrastructure. A combination of GSLB and DX platform stickiness means clients will always connect to the same server in the same data center, ensuring server-resident client information is always available.

Monitoring and Reporting

The DX platform provides IT with real-time and historical reports that offer a complete overview of web-based application performance. Through the DX dashboard, users can assess the health of their data center at a glance and quickly identify and drill down to find and correct problems. All data can be exported and viewed via a Web interface, providing universal access to performance statistics.



Reporting capabilities provide a wealth of historical performance data for the DX platform.

DX Product Family

The DX product family is composed of four platforms: the DX 3200/3280 and the 3600/3680.

The following table provides additional details on each of the platforms.

Product	Interface	Size	SSL	DRAM	Flash	Processing	Redundant Power
DX 3200	2 x GE	1U	Software	2 GB	512 MB	1x 2.8 GHz P4	
DX 3280	2 x GE	1U	Hardware	2 GB	512 MB	1x 3.0 GHz P4	
DX 3600	4 x GE	2U	Software	4 GB	512 MB	2x 3.2 GHz Xeon	Yes
DX 3680	4 x GE	2U	Hardware	4 GB	512 MB	2x 3.2 GHz Xeon	Yes

DX Licensing Options

Four DX licensing options are available, each offering additional levels of functionality. The licensing options, enabled via software upgrades, include:

- Server load balancing (SLB) and SSL termination functionality as the base DX license
- HTTP acceleration and compression, including transport connection multiplexing (includes SLB and SSL termination functionality)
- Advanced HTTP acceleration, including AppRules adaptive content processing (includes transport connection multiplexing and SLB and SSL termination functionality)
- Global SLB functionality (applicable across all license levels)

SLB and SSL Termination License Features

The DX platform base-level license includes the following features:

Layer 4 TCP/UDP Load Balancing

- Supports full Layer 4 server load balancing of HTTP, HTTPS (SSL), FTP, and most TCP and UDP protocols
- Supports full-function, flexible, scriptable health checking, enabling programmatic verification of external devices and services (ICMP, HTTP, SMTP, FTP, ...)
- Supports common load-balancing techniques such as weighted round robin, least connections, fail-over chaining, etc.

SSL Transport and DoS Security

- End-to-end and one-way SSL termination with accelerated download of secure content
- Supports ARC4, RSA, DES, 3DES, AES, MD5 and SHA-1 encryption algorithms
- Defends against SYN flood and denial of service (DoS) attacks
- Terminates and tunnels any TCP protocol over SSL for session-based, point-to-point or client-to-gateway SSL security (including mail, Telnet, etc.)

LDAP and RADIUS Authentication Caching

- Caches successful login attempts to reduce load on the authentication server, dramatically improving performance of authentication and authorization
- Single Sign-on dramatically simplifies application security by reusing user credentials for multiple applications in a domain

Historical Statistics

- Reports more than 200 real-time statistics, available by second, minute, hour, day, month and year

Role-based Multi-level Administrative Access

- Supports differentiated user access levels
- Provides complete system, administration and audit logs

Administration Tools

- Web browser interface (HTTP, HTTPS) simplifies configuration and management
- Supports command line interface via SSH, Telnet, SCP, or console (RS-232)
- Includes administration dashboard, e-mail alerts
- Supports SNMP through Juniper MIB
- Synchronizes configuration across multiple DX platforms, simplifying configuration and management for large scale deployments

Configuration Flexibility

- Supports one- or two-arm configuration modes
- Supports client IP transparency to simplify configuration and installation into an existing network
- Offers wide range of functionality, including load balancing, compression, SSL, TCP offload, HTML rewrite, accounting/authentication/authorization, application firewall
- Offers performance linearity – all functions can be used simultaneously while maintaining performance linearity
- Enables drop-in replacement of existing server load balancing equipment, or can complement existing server load balancing equipment

- Supports 802.1Q VLAN Tagging to differentiate packets belonging to different VLANs in a multi-VLAN environment
- Supports DX redundancy for SLB

HTTP Acceleration and Compression License Features

In addition to the SLB and SSL termination features, the HTTP acceleration and compression license offers the following features:

Acceleration

- Transport connection multiplexing engine reduces server connections by a ratio of up to 1,000:1
- Terminates and persistently maintains separate internal and external TCP and HTTP/S connections (full TCP and HTTP Proxy)
- Multiplexes HTTP/S requests and supports pipelining and chunking
- Real-time HTTP 1.0-to-1.1 conversions
- Client connection keep-alive for quicker performance on return visits

Compression

- Compresses all HTML, SHTML, DHTML, JHTML, PHTML, Javascript, J2EE, JSP, CSS stylesheets, XML, SOAP
- Compresses all Microsoft Office documents
- Internal compression policy engine includes more than 4,000 compression policies to ensure 100 percent page fidelity
- Programmatically controls compression of any MIME type, including doc, xls, ppt, Flash, etc., on a per-object or per-object-class basis
- Web-services compression for server-to-server protocols including SOAP
- Supported by all standard browsers (IE 7.0 + , Netscape 4.0 +)

Protocol Scrubbing (HTTP and TCP)

- Ensures only valid, well-formed HTTP/S requests reach servers; never passes packet fragments
- Delivers full-function Authentication and Authorization
- Supports Client Certificate Authentication, Radius and LDAP
- Offers full content-stream inspection
- Blocks, logs or rewrites bad URLs and malicious requests
- Provides buffer overflow inspection and protection

Native HTTP Protocol Communication

- Dynamically inspects, verifies and rewrites client requests or server responses
- Acts on HTTP headers, POSTs, SOAP and HTML, JavaScript, etc.

SLA Monitoring and Analysis

- Tracks, monitors and logs server response time and client download time for each HTTP/S request and response

ActiveN High Availability

- Supports self-healing mesh of up to 64 DX platforms, actively processing traffic to one or more VIPs with cascading failover and linear scaling
- Provides active-active or active-standby high-availability

Layer 7 Load Balancing

- Supports full Layer 7 load balancing based on any request method, protocol version, URL, cookie, other header, POST data, header or body content, SOAP, or XML contents
- Utilizes patented Fewest Outstanding Requests balancing algorithm for HTTP/S, delivering most optimal load distribution and performance

Advanced HTTP Acceleration License Features

In addition to the SLB, SSL termination, HTTP acceleration and compression features, the advanced HTTP acceleration license offers the following features:

3G Caching

- Improves server performance and scalability by serving from internal, memory-resident cache
- Provides complete operational transparency to both client and server

Application Control

- AppRules control environment enables bi-directional modification of HTTP applications with a wide range of actions, including alert, block, groom, transform, repair and rewrite
- GUI-based AppRules wizard supports simple creation of “if/then” rules for modifying application behavior without rewriting underlying code
- Rules template allows selection and enforcement of predefined AppRules changes
- Content manipulation such as compression and 3G Caching can be controlled with near-infinite granularity for maximum flexibility

Network and Transport Security through Content Rewrite

- AutoSSL feature rewrites HTML “on the fly” to secure content without modifying the application

Transaction Assurance

- Detects transaction errors by incorrect content within the page itself or error code
- Repairs, retries, redirects requests, shielding users from errors and increasing transaction success

Global Server Load Balancing License Features

- Distributes requests to the data center best equipped to fulfill them
- DNS resolution decisions based on active/standby status, closest data center to origin of request (round-trip time), least-loaded data center (bandwidth, packets, connections), DX loading (memory or CPU utilization), or a combination of these metrics
- DX can act as a full DNS proxy (using BIND) or transparent DNS cache
- DX-to-DX communication conducted over secure communication channel

Physical Specifications

Power Requirements

AC Power Voltage 100-240VAC, 50-60Hz, auto-sensing
 1U System: 260 Watts
 2U System: 500 Watts (dual redundant, hot-swappable)

Dimensions and Weight

1U System:

- Dimensions: 16.7”W x 1.74”H x 15”D (42.42cmW x 4.41cmH x 38.10cmD)
- Weight: 12.5lb (5.68 kg) typical (unboxed)

2U System:

- Dimensions: 16.7”W x 3.5”H x 16.2”D (42.42cmW x 8.89cmH x 41.15cmD)
- Weight: 28lb (12.73 kg) typical (unboxed)

Operating Environment

1U System Operating Temp: 50° to 95°F (10°C to 35°C)
 2U System Operating Temp: 50° to 104°F (10°C to 40°C)
 Storage Temp: -40° to 158°F (-40°C to 70°C)
 Relative Humidity (Operating): 8% to 90% non-condensing
 Relative Humidity (Storage): 5% to 90% non-condensing

Safety and Emissions

Safety: EN60950-1:2001 + A11, CSA C22.2 No. 60950-1, IEC 60950-1:2001, ANSI/UL 60950-1-2002

Emissions: FCC Class A, VCCI Class A, CE class A
 ROHS compliant

Ordering Information

DX with Server Load Balancing and SSL Termination License

DX-3200-SLB-SSL-N-2C-A	Entry-level SLB/SSL termination with 2 x 10/100Base-TX interfaces
DX-3280-SLB-SSL-S-2C	SLB, high speed SSL termination with 2 X 10/100/1000 Base-T interfaces
DX-3600-SLB-SSL-N-4G-A	SLB, SSL termination with 4 x 10/100/1000Base-T interfaces, dual PS
DX-3600-SLB-SSL-N-2G2F-A	SLB/SSL termination with 2 x 10/100/1000Base-T and 2 x 1000Base-SX (Fiber) interfaces, dual PS
DX-3680-SLB-SSL-S-2G2F	SLB, high speed SSL termination with 2 X 10/100/1000Base-T interfaces and 2 X 1000Base-SX (fiber) interfaces, dual PS
DX-3680-SLB-SSL-S-4G	SLB, high speed SSL termination with 4 X 10/100/1000Base-T interfaces

DX Upgrade Licenses

DX-UPGRADE-HTTP-ACCEL	Upgrade license for HTTP acceleration (Auto-adaptive compression, TCP Multiplexing)
DX-UPGRADE-HTTP-ADVANCED	Upgrade license to enable Override Apprules and HTTP caching. DX-UPGRADE-HTTP-ACCEL is a prerequisite
DX-UPGRADE-GSLB	Upgrade license to enable Global Server Load Balancing (GSLB)

Spares

SA6000-PS	Single field-replaceable power supply module for 2U units (3600, 3680)
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About Juniper

Juniper Networks develops purpose-built, high performance IP platforms that enable customers to support many different services and applications at scale. Service providers, enterprises, governments and research and education institutions rely on

Juniper to deliver a portfolio of proven networking, security and application acceleration solutions that solve highly complex, fast-changing problems in the world's most demanding networks. Additional information can be found at www.juniper.net.



CORPORATE HEADQUARTERS
AND SALES HEADQUARTERS
FOR NORTH AND SOUTH AMERICA
Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or 408.745.2000
Fax: 408.745.2100
www.juniper.net

EAST COAST OFFICE
Juniper Networks, Inc.
10 Technology Park Drive
Westford, MA 01886-3146 USA
Phone: 978.589.5800
Fax: 978.589.0800

ASIA PACIFIC REGIONAL
SALES HEADQUARTERS
Juniper Networks (Hong Kong) Ltd.
Suite 2507-11, 25/F
ICBC Tower
Citibank Plaza, 3 Garden Road
Central, Hong Kong
Phone: 852.2332.3636
Fax: 852.2574.7803

EUROPE, MIDDLE EAST, AFRICA
REGIONAL SALES HEADQUARTERS
Juniper Networks (UK) Limited
Building 1
Aviator Park
Station Road
Aldershot
Surrey, KT15 2PG, U.K.
Phone: 44.(0).1372.385500
Fax: 44.(0).1372.385501

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