FUJITSU

Datasheet
ExtremeSwitching VDX8770

HIGHLIGHTS

- Transforms networks to deliver cloud scale, agility, and operational efficiency with data center fabrics
- Delivers 1, 10, 40, and 100 Gigabit Ethernet (GbE) wire-speed switching with auto-trunking Inter-Switch Links (ISLs) for non-disruptive scaling
- Meets today's application demands with high performance and low latency
- Enables connectivity for more than 1,000 server ports with scaleout fabrics, 10,000 ports with multifabrics, and 100,000 ports using multifabrics with overlays
- Maximizes network availability with efficiency and resiliency
- Automates infrastructure provisioning, validation, troubleshooting, and remediation workflows

Advanced Features to Enable Data Center Transformation

The data center is evolving, driving requirements for infrastructure that can support dynamic growth in Virtual Machines (VMs), distributed applications, and Big Data, as well as the transition to cloud-based computing—without compromising performance. The VDX® 8770 and the Extreme VDX family of switches deliver the performance, flexibility, scale, and efficiency essential to modern data centers, including cloud and highly virtualized environments.

Advanced Features to Enable Data Center Transformation

The VDX 8770 switch is designed to scale and support complex environments with dense virtualization and dynamic traffic patterns—where more automation is required for operational scalability. Available in fourslot and eight-slot versions, the VDX 8770 is a highly scalable, low-latency 1/10/40/100 GbE modular switch.

The VDX 8770 delivers high-performance to support the most demanding data center networking needs. Key features include:

- Line-rate support for 1, 10, 40, and 100 GbE to satisfy current and future needs

- Packet forwarding performance of up to 11.42 billion packets per second

- 4 Tbps per slot line-rate design for substantial capacity and headroom (up to 32 Tbps capacity for the VDX 8770-8; up to 16 Tbps for the VDX 8770-4)

- 4-microsecond latency to assure rapid response or latency-sensitive applications

- Support for up to 384,000 MAC addresses per fabric for extensive virtualization scalability

- Multi-core CPUs within each line card to support two separate Extreme Network OS instances for high availability

Features and benefits

- · Efficient multipathing technology and virtual Link Aggregation Groups (vLAGs) to allow extremely large-scale deployments with the best-possible network utilization

- · The flexibility to deploy data center networks ranging from hundreds of server ports using scale-out fabrics to over 100,000 ports using multifabrics with overlays

Figure1: The VDX 8770-4 Switch supports up to 192 10 GbE ports, 108 40 GbE ports, and 24 100 GbE ports.

Figure2: The VDX 8770-8 Switch supports up to 384 10 GbE ports, 216 40 GbE ports, and 48 100 GbE po

A Choice of Chassis with Multiple Line Cardsnsforms Networks to Deliver New Levels of Scale, Agility, and Operational Efficiency
The flexible, modular switch design offers interconnection with other VDX 8770 switches, VDX 6740 and 6940 fabric switches, traditional Ethernet switch infrastructures, and direct server connections. Modular four-slot and eight-slot chassis options are available to match the switch to the needs of the organization. These include:

- – VDX 8770-4: Supports up to 192 10 GbE ports, 108 40 GbE ports, 24 100 GbE ports (see Figure 1).
- – VDX 8770-8: Supports up to 384 10 GbE ports, 216 40 GbE ports, 48 100 GbE ports (see Figure 2).

The VDX 8770 supports a variety of wire-speed line cards to offer maximum flexibility in terms of port bandwidth as well as cable and connector technology:

- · 1 GbE: 48×1 GbE line card provides up to 48 SFP/SFP copper ports.
- · 10 GbE: 48×10 GbE line card provides up to 48 SFP+ ports.
- · 10 GbE-T: 48×10 GbE line card provides up to 48 RJ45 ports.
- · 40 GbE: 12×40 GbE line card provides up to 12 40 GbE QSFP ports.
- · 40 GbE: 27×40 GbE line card provides up to 27 40 GbE QSFP ports.
- · 100 GbE: 6×100 GbE line card provides up to 6 100 GbE CFP2 ports.

Aggregation and Migration for Traditional Ethernet Environments
Organizations utilizing traditional Ethernet technology need sensible ways to scale and expand their networks, while enabling seamless migration to fabric-based technologies to support advanced virtualization. For organizations with traditional hierarchical Ethernet environments, the VDX 8770:
Aggregates multiple traditional access-tier switches in an aggregation-tier fabric, with efficient multipathing capabilities at multiple layers to insulate core switches from unnecessary traffic

- – Provides access-layer fabric capabilities in end-of-row or middle-of-row configurations
- – Establishes a migration path for organizations to adopt and grow resilient and scalable Extreme Networks data center fabrics

VDX 8770 switches provide the advanced feature set that data centers require while delivering the high performance and low latency virtualized environments demand. Together with Extreme Networks data center fabrics, these switches transform data center networks by enabling cloud-based architectures that deliver new levels of scale, agility, and operational efficiency. These highly automated, software-driven, and programmable data center fabric design solutions support a breadth of network virtualization options and scale for data center environments ranging from tens to thousands of servers. Moreover, they make it easy for organizations to architect, automate, and integrate current and future data center technologies while they transition to a cloud model that addresses their needs, on their own timetable and on their terms.

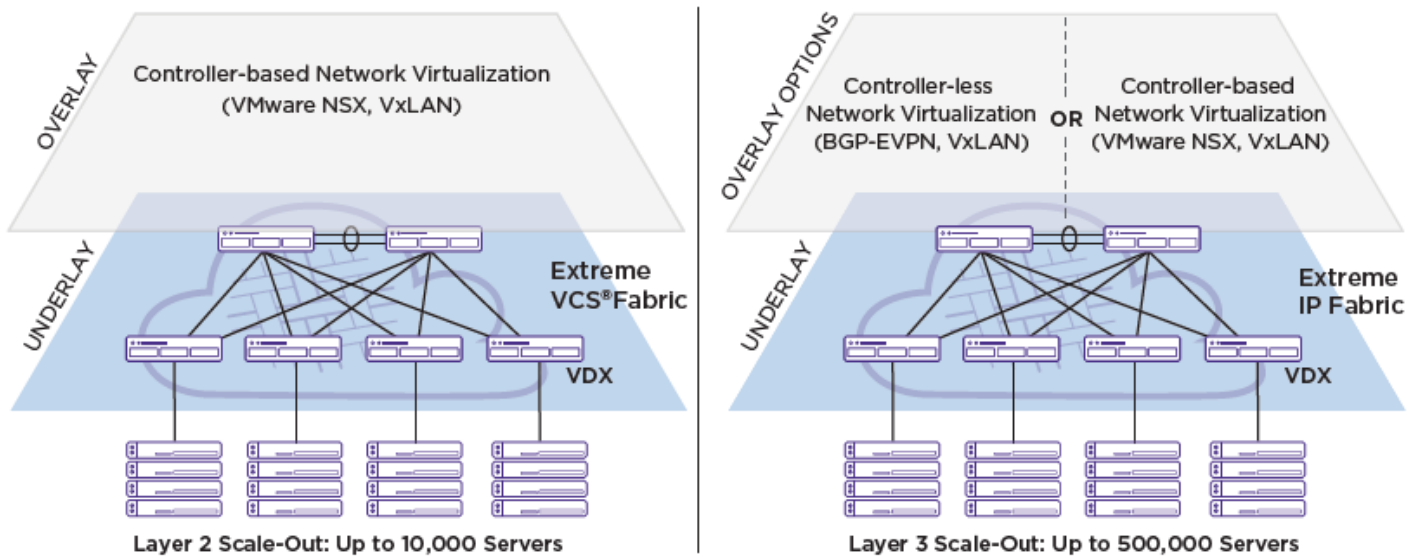## Extreme Data Center Fabrics and Network Virtualization Options

Figure 3: Multiple network architectures offer the flexibility that can help organizations rapidly adapt to changing business conditions and traffic patterns.

Transforms Networks to Deliver New Levels of Scale, Agility, and Operational Efficiency

VDX switches enable organizations to evolve their data center networks at their own pace, with full investment protection. As the foundation for several data center architectures, VDX switches support Extreme Networks IP fabrics, Extreme Networks VCS® fabrics, as well as network virtualization, including controller-based network virtualization architectures, such as VMware NSX, and standards-based (BGP-EVPN) controller-less architectures with BGP-EVPN Network Virtualization for architectural flexibility (see Figure 3).

For organizations seeking automated provisioning capabilities to improve IT agility, VDX switches, together with VCS Fabric technology, accelerate time to value through automated provisioning of network devices and network virtualization. Automated service and resource upgrades further reduce ongoing maintenance time and costs. High availability is achieved through non-disruptive In-Service Software Upgrade (ISSU) and self-healing fabrics.

Optionally, for DevOps-centric organizations, VDX switches can be provisioned using Extreme Workflow Composer™ and Extreme Workflow Composer Automation Suites.

Turnkey and Customizable Lifecycle Automation

Organizations that aim to automate the entire network lifecycle but lack sufficient engineering resources can leverage Workflow Composer, a server-based, DevOpsinspired network automation platform powered by StackStorm. The Workflow Composer platform automates the entire infrastructure lifecycle—from provisioning and validation to troubleshooting and remediation. It also integrates across IT domains for end-to-end event-driven workflow automation.

Designed to run with the Workflow Composer platform, Composer Automation Suites are ideal for IT organizations that seek to embrace automation yet possess limited automation training or time. The suites provide out-of-the-box network lifecycle automation for commonly performed tasks, and are packaged to address major use cases.

The automation suites include:

- **Network Essentials**:
  Basic building blocks to help organizations with limited resources get up and running quickly, including workflows that automate steps common to most networks.

- **Data Center Fabrics**:
  A collection of workflows specific to provisioning, troubleshooting, and remediating data center fabrics, including Extreme Networks IP fabric deployments.

- **Internet Exchange Points**:
  Workflows to automate steps specifically associated with Layer 2 Internet exchange connectivity, such as tenant provisioning and maintenance.

Each automation suite includes documentation and a collection of turnkey yet customizable workflows, services, sensors, actions, and rules. Organizations can use Automation Suites as-is or as starter kits for building or customizing workflows specific to their data center requirements to reduce time-to-value.

Additionally, VDX switches offer programmability and interoperability options through a PyNOS Library and YANG model-based REST and Netconf APIs. Cloud orchestration and control through OpenStack and OpenDaylight-based SDN controller support enable full network integration with compute and storage resource provisioning and management.

Meets Today's Application Demands with High Performance and Low Latency
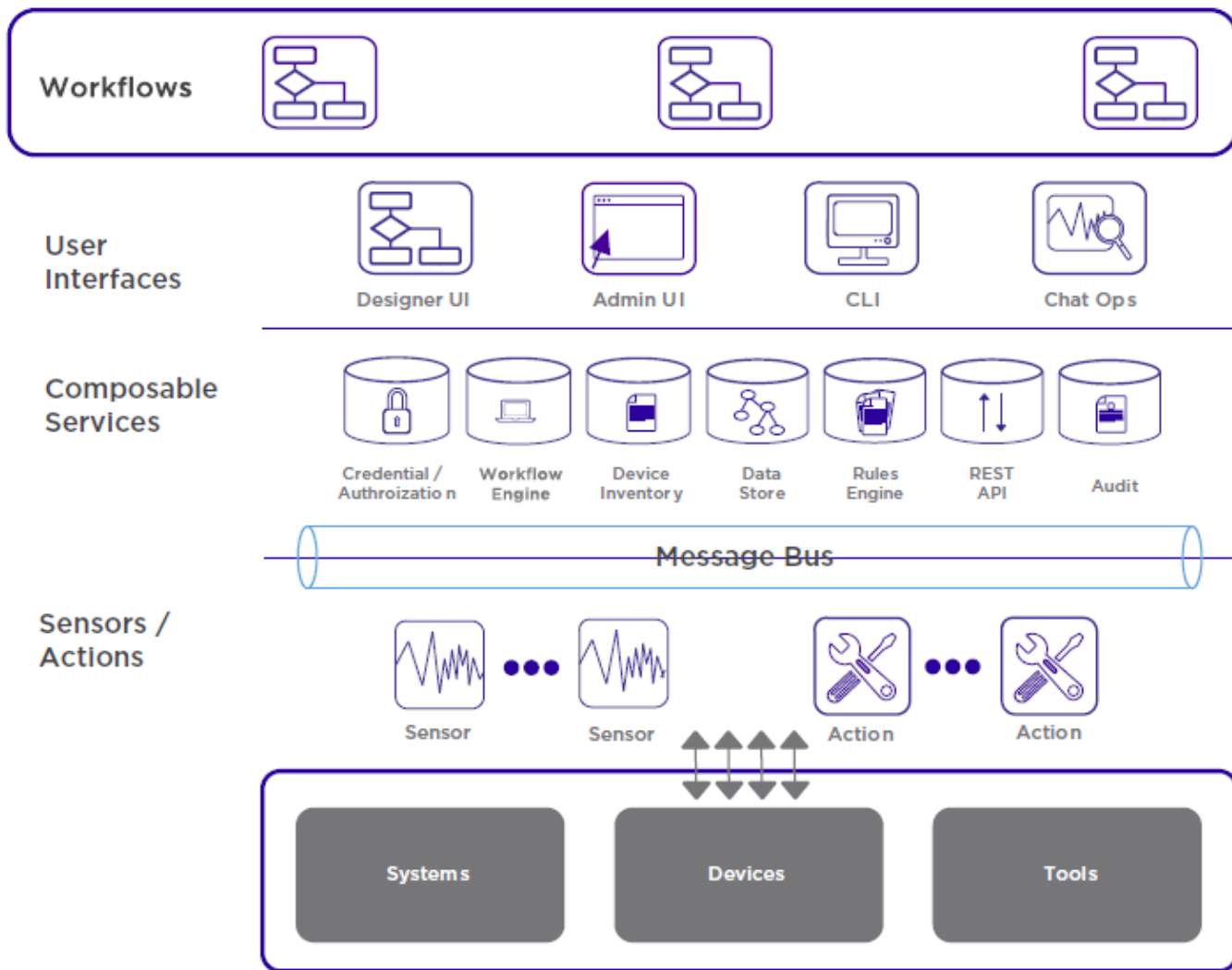
Figure 4: The Workflow Composer architecture brings workflow-centric, cross-domain network automation to IT operations.

Meets Today's Application Demands with High Performance and Low Latency

As data centers virtualize more of their servers and VM density per server increases, organizations will require higher bandwidth connectivity to support the explosion of data and application processing. With 1, 10, 40, and 100 GbE options, VDX 8770 switches deliver the high-performance computing needed to keep up with the demands of a virtualized data center, allowing organizations to reduce network congestion, improve application performance, and meet the capacity required by 10 GbE servers. The 40 GbE and 100 GbE uplinks can easily aggregate high-bandwidth traffic and reduce bottlenecks that occur when aggregating multiple 10 GbE or 40 GbE connections, keeping data center networks working at peak performance.

In a VCS fabric, VDX 8770 switches also help maximize network utilization with hardware-based Extreme Networks Inter-Switch Link (ISL) Trunking. Organizations can create an 80 GbE Extreme Networks ISL trunk by utilizing eight 10 GbE ports. In a VCS fabric, the ISL trunk is automatically formed between two VDX 8770 switches when they are linked together, allowing traffic to be equally distributed among all ports. This increases link efficiency and limits traffic disruptions, especially during high-traffic times. Also, 40 GbE and 10 GbE trunking is supported between VDX 8770, 6940, and 6740 Switches.

Extreme Networks Metro VCS technology provides an innovative solution to interconnect data centers and their traffic flows over distance, guaranteeing supported traffic characteristics. Metro VCS technology configured for regular Ethernet traffic supports 10 GbE ISLs up to 80 km, 40 GbE ISLs up to 40 km, and 100 GbE ISLs up to 40 km.

To configure Metro VCS technology for lossless traffic applications (DCB/FCoE), refer to the Extreme Metro VCS Pre-deployment Guide for details.

Cloud and Big Data Environments

VDX 8770 switches deliver optimized buffer and latency and high performance to enable greater cross-sectional bandwidth for east-west traffic—exactly what cloud workloads demand. These switches offer the flexibility needed to scale out networks, deliver intelligence to more effectively manage VM mobility, as well as provide an SDN-enabled and programmable infrastructure. In addition, VDX 8770 switches offer an advanced feature set that non-virtual and Big Data environments require. With 10, 40, and 100 GbE options for designing oversubscribed or nonoversubscribed networks, high throughput, and optimized buffer and latency, the VDX 8770 is an ideal switch for Big Data applications.

Together with Extreme Networks data center fabrics, VDX 8770 switches can simplify network design and operations for both cloud and Big Data network fabrics. These switches deliver 4-microsecond port-to-any-port latency. Moreover, they offer an industry-leading 15 GB/ module deep buffer, which provides the buffering capacity to handle increases in traffic, especially during peak times when ports are congested, allowing traffic to be distributed across the ports.

High Availability

The VDX 8770 provides high availability at the line-card level, an industry first. Line-card high availability allows the multi-core CPU within each line card to support two separate Network OS instances in an active/standby configuration. This enables hitless failover within each line card of the chassis. Even during an In-Service Software Upgrade (ISSU), there is no disruption because the line card does not need to completely restart while trying to sync with the new code version.

Support for Current and Future Application Needs

The VDX 8770 can be used to build a variety of VCS fabric topologies to support a wide range of scale and application requirements. Architectural options include:

· Small-scale fabrics: Can collapse access and aggregation tiers using the VDX 8770 as a port-dense, middle-of-row/end-of-row access switch.

· Medium-scale fabrics: Can utilize the VDX 8770 as a spine switch in combination with VDX 6740 and 6940 leaf switches to build highly scalable Layer 2/3 domains, complete with automatic and secure support for VM mobility.

· Large-scale fabrics: Can use the VDX 8770 homogeneously as both a leaf and spine switch or to aggregate multiple access-tier switches in full or partially meshed fabric domains with a logically flat network topology.

Optimizing East-West Traffic

Traditional data centers are architected with a rigid, threetier tree topology optimized for the north-south traffic flow of client-server computing environments, compromising performance, increasing latency, and creating bottlenecks. With the increased prevalence of virtualization and distributed applications, data center network traffic is now predominantly east-west, or server to server. Extreme Networks data center fabrics address these traffic patterns by moving traffic through any of the active paths and avoiding the multiple hops required in other tiered topologies.

The VDX 8770 and VCS fabrics offer benefits for today's most compelling and demanding applications, including:

·**Rich media**:
Service providers and cloud providers require support for significant east-west traffic within their data centers, along with support for large numbers of VMs and VM mobility. Content providers with applications such as video on demand require support for significant amounts of north-south traffic. The VDX 8770 and Extreme Networks data center fabrics are ideal for these applications, as they provide a low-latency, cut-through architecture and considerable throughput to enable balanced east-west and north-south traffic performance.

·**Big Data**:
To realize business benefits from their unstructured data, organizations require seamless access to both compute and storage resources. High-performance computing environments process large amounts of data that drive significant eastwest traffic patterns and require low latency for IPC interconnection. Big Data has emerged as a critical technology trend, and the VDX 8770 provides key advantages such as high-performance, line-rate 10 GbE, 40 GbE, and 100 GbE.

·**Mission-critical applications**:
A wide variety of data center, cloud, and enterprise applications can take advantage of the VDX 8770, including ERP, Virtual Desktop Infrastructure (VDI), and collaboration applications such as Microsoft Exchange and SharePoint. The virtualization-aware networking characteristics of the VDX 8770 and Extreme Networks data center fabrics, along with high-availability and essential security functionality, help ensure that critical data services function as intended while protecting vital data from corruption or loss.

Advanced Storage Support

VDX 8770 switches provide advanced storage support with multiple storage connectivity options, including Fibre Channel over Ethernet (FCoE), iSCSI, and NAS. They also feature Data Center Bridging (DCB), which enables the reliable exchange of storage traffic over the LAN, eliminating packet loss when network congestion occurs and allocating bandwidth as needed to keep the network running efficiently. Moreover, Extreme Networks 8770 Switches offer NAS Auto QoS intelligence to prioritize delay-sensitive IP storage traffic within the fabric and to help ensure consistent performance while decreasing latency.

VDX 8770 Feature Overview

VDX 8770 Specifications

Overview	VDX 8770-4	VDX 8770-8
Port-to-port latency (64-byte packets)	4 microseconds	4 microseconds
Form Factor	8U	15U
Slots	4	8
Dimensions and weight	Width: 43.74 cm (17.22 in.) Height: 34.7 cm (13.66 in.) Depth: 66.04 cm (26 in.) Weight: 31.75 kg (70 lb) Weight (fully loaded): 86.18 kg (190 lb)	Width: 44 cm (17.32 in.) Height: 66.2 cm (26.06 in.) Depth: 66.04 cm (26 in.) Weight: 61.24 kg (135 lb) Weight (fully loaded): 165.55 kg (365 lb)
1 GbE SFP/SFP copper ports	192	384
10 GbE SFP+/RJ45 ports	192	384
40 GbE QSFP+ ports	108	216
100 GbE CFP2 ports	24	48
Power supplies	4 max	8 max
Cooling fans	2	4
Airflow	Side-to-back airflow	Front-to-back airflow

VDX 8770 Specifications (Continued)

Scalability Information

Connector options	1 GbE copper SFP options
	10 Gbps SFP+ options: 1/3/5 m direct-attached copper (Twinax)
	10 GbE SR and 10 GbE LR
	10 GbE 10GBASE-T RJ45
	40 GbE QSFP+
	100 GbE CFP2
Maximum VLANs	4,096
Maximum MAC addresses	384,000
Maximum IPv4 routes	352,000
Maximum IPv6 routes	88,000
Maximum ACLs	57,000
Maximum port profiles (AMPP)	1,024
Maximum ARP entries	128,000
Maximum members in a standard LAG	64
Maximum switches in a VCS fabric	48
Maximum ECMP paths in a VCS fabric	16
Maximum trunk members for VCS fabric ports	16
Maximum switches that a vLAG can span	8
Maximum members in a vLAG	64
Maximum jumbo frame size	9,216 bytes
DCB Priority Flow Control (PFC) classes	8

VDX8770 Modules and Line Cards

Management Module (half-slot)	- Multicore Processor
	- 8GB SDRAM, USB port
	- Console, management port, auxiliary service port (all RJ-45)
Flash memory support	- One 8GB compact flash in each Management Module
	- Two 4GB compact flash in each line card
1 GbE access (fiber/copper) line card	48-port SFP/SFP-copper
1 GbE/10 GbE access (copper) line card	48-port RJ45
10 GbE access or aggregation line card	48-port SFP+ (10 GbE/1 GbE)
	48-port RJ45 (10 GbE/1 GbE)
40 GbE aggregation line card	48-port RJ45 (10 GbE/1 GbE)
	27-port QSFP+ module
100 GbE aggregation line card	6-port CFP2 module

Mechanical

Enclosure	19-inch EIA-compliant; power from port side

Environmental

Temperature	Operating: 0℃ to 40℃ (32℉ to 104℉)
	Non-operating and storage: -25℃ to 70℃ (-13℉ to 158℉)
Humidity	Operating: 10% to 85% non-condensing
	Non-operating and storage: 10% to 90% non-condensing
Altitude	Operating: Up to 3,000 meters (9,842 feet)
	Non-operating and storage: Up to 12 kilometers (39,370 feet)
Airflow	VDX 8770-4 VDX 8770-8
	· Maximum: 675 CFM · Maximum: 1,250 CFM
	· Nominal: 200 CFM · Nominal: 375 CFM

VDX 8770 Specifications (Continued)

Power

Max power utilization	VDX 8770-4: 3,250 W
	VDX 8770-8: 6,387 W
Power inlet	C19
Input voltage	200 to 240 VAC (Operating voltage range: 180 to 264 VAC)
Input line frequency	50/60 Hz
Maximum current	AC: 16.0 A max per power supply
	DC: 70.0 A max per power supply

Safety Compliance
· UL 60950-1 Second Edition
· CAN/CSA-C22.2 No. 60950-1 Second Edition
· EN 60950-1 Second Edition
· IEC 60950-1 Second Edition
· AS/NZS 60950-1

EMC
· 47CFR Part 15 (CFR 47) Class A
· AS/NZS CISPR22 Class A
· CISPR22 Class A
· EN55022 Class A
· ICES003 Class A
· VCCI Class A
· EN61000-3-2
· EN61000-3-3
· KN22 Class A

Immunity
· EN55024
· CISPR24
· EN300386
· KN 61000-4 series

Environmental Regulatory Compliance
·RoHS-6 (with lead exemption) Directive 2002/95/EC
·NEBS-Compliant

Standards Compliance
· The VDX 8770 products conform to the following Ethernet
  standards:
· IEEE 802.3ad Link Aggregation with LACP
· IEEE 802.3 Ethernet
· IEEE 802.3ae 10G Ethernet
· IEEE 802.1Q VLAN Tagging
· IEEE 802.1p Class of Service Prioritization and Tagging
· IEEE 802.1v VLAN Classification by Protocol and Port
· IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
· IEEE 802.3x Flow Control (Pause Frames)
· IEEE 802.1D Spanning Tree Protocol
· IEEE 802.1s Multiple Spanning Tree
· IEEE 802.1w Rapid Reconfiguration of Spanning Tree Protocol
 The following draft versions of the Data Center Bridging (DCB) and
 Fibre Channel over Ethernet (FCoE) standards are also supported on
 the VDX 8770:
· IEEE 802.1Qbb Priority-based Flow Control
· IEEE 802.1Qaz Enhanced Transmission Selection
· IEEE 802.1 DCB Capability Exchange Protocol
(Proposed under the DCB Task Group of IEEE 802.1 Working Group
· FC-BB-5 FCoE (Rev 2.0)

RFC Support
· RFC 768 User Datagram Protocol (UDP)
· RFC 783 TFTP Protocol (revision 2)
· RFC 791 Internet Protocol (IP)
· RFC 792 Internet Control Message Protocol (ICMP)
· RFC 793 Transmission Control Protocol (TCP)
· RFC 826 ARP
· RFC 854 Telnet Protocol Specification
· RFC 894A Standard for the Transmission of IP Datagram over
         Ethernet Networks
· RFC 959 FTP
· RFC 1027 Using ARP to Implement Transparent Subnet Gateways
         (Proxy ARP)
· RFC 1112 IGMPv1
· RFC 1157 Simple Network Management Protocol (SNMP) v1 and v2
· RFC 1305 Network Time Protocol (NTP) Version 3
· RFC 1492 TACACS+
· RFC 1519 Classless Inter-Domain Routing (CIDR)
· RFC 1584 Multicast Extensions to OSPF
· RFC 1765 OSPF Database Overflow
· RFC 1812 Requirements for IP Version 4 Routers
· RFC 1997 BGP Communities Attribute
· RFC 2068 HTTP Server
· RFC 2131 Dynamic Host Configuration Protocol (DHCP)
· RFC 2154 OSPF with Digital Signatures (Password, MD-5)
· RFC 2236 IGMPv2
· RFC 2267 Network Ingress Filtering
· RFC 2328 OSPF v2
· RFC 2370 OSPF Opaque Link-State Advertisement
         (LSA) Option – Partial Support
· RFC 2375 IPv6 Multicast Address Assignments
· RFC 2385 Protection of BGP Sessions with the TCP MD5 Signature
         Option
· RFC 2439 BGP Route Flap Damping
· RFC 2460 Internet Protocol, Version 6 (v6) Specification (on
         management interface)
· RFC 2462 IPv6 Stateless Address Auto-Configuration
· RFC 2464 Transmission of IPv6 Packets over Ethernet Networks (on
         management interface)
· RFC 2474 Definition of the Differentiated Services Field in the IPv4
         and IPv6 Headers
· RFC 2571 An Architecture for Describing SNMP Management
         Frameworks
· RFC 2711 IPv6 Router Alert Option
· RFC 2865 Remote Authentication Dial-In User Service (RADIUS)
· RFC 3101 The OSPF Not-So-Stubby Area (NSSA) Option
· RFC 3137 OSPF Stub Router Advertisement
· RFC 3176 sFlow
· RFC 3392 Capabilities Advertisement with BGPv4
· RFC 3411 An Architecture for Describing SNMP Frameworks
· RFC 3412 Message Processing and Dispatching for the SNMP

RFC Support (cont.)

· RFC 3413 Simple Network Management Protocol (SNMP)
            Applications
· RFC 3587 IPv6 Global Unicast Address Format
· RFC 3623 Graceful OSPF Restart — IETF Tools
· RFC 3768 VRRP
· RFC 4271 BGPv4
· RFC 4291 IPv6 Addressing Architecture
· RFC 4292 IP Forwarding MIB
· RFC 4293 Management Information Base for the
            Internet Protocol (IP)
· RFC 4443 ICMPv6 (replaces 2463)
· RFC 4456 BGP Route Reflection
· RFC 4510 Lightweight Directory Access Protocol (LDAP): Technical
            Specification Road Map
· RFC 4601 Protocol Independent Multicast–Sparse Mode (PIM-SM):
            Protocol Specification (Revised)
· RFC 4724 Graceful Restart Mechanism for BGP
· RFC 4861 IPv6 Neighbor Discovery
· RFC 4893 BGP Support for Four-Octet AS Number Space
· RFC 5082 Generalized TTL Security Mechanism (GTSM)
· RFC 5880 Bidirectional Forwarding Detection (BFD)
· RFC 5881 Bidirectional Forwarding Detection (BFD) for IPv4 and
            IPv6 (Single Hop)
· RFC 5882 Generic Application of Bidirectional Forwarding Detection
            (BFD)
· RFC 5883 Bidirectional Forwarding Detection (BFD) for Multihop
            Paths
· RFC 5942 IPv6 Neighbor Discovery
· RFC 7432 BGP-EVPN–Network Virtualization Using VXLAN Data
            Plane

IPv6 Routing

· RFC 2545
· Use of BGP-MP Extensions for IPv6
· RFC 2740
· OSPFv3 for IPv6

IPv6 Multicast

· RFC 2710
· Multicast Listener Discovery (MLD) for IPv6

VRRP/VRRPe

· RFC 5798
· VRRP Version 3 for IPv4 and IPv6

Network OS Software Capabilities

	VSC Fabrics	IP Fabrics
Software Scalability		
Maximum switches in a fabric	48	Unlimited
Maximum ECMP paths in a fabric	32	32
Maximum LAGs in a fabric	2,000	384
Layer 2 Switching		
Service Node Load Balancing BFD/ARP Optimizations	x	x
Conversational MAC Learning	x	x
Virtual Link Aggregation Group (vLAG) spanning	x	x
Layer 2 Access Control Lists (ACLs)	x	x
Supports 2K ingress and egress ACLs	x	x
Edge Loop Detection (ELD)	x	x
Address Resolution Protocol (ARP) RFC 826	x	x
Private VLANs	x	
Maintenance Mode/Graceful Traffic Diversion	x	
Distributed VXLAN Gateway	x	
Diagnostic Port	x	
IP Maps Support	x	
L2 Loop prevention in an overlay environment		x
High availability/In-Service Software Upgrade - hardware-enabled	x	x
IGMP snooping support for multicast flooding	x	x
IGMPv1/v2 Snooping	x	x
IGMPv3	x	x
MAC Learning and Aging	x	x
Link Aggregation Control Protocol (LACP) IEEE 802.3ad/802.1AX	x	x
Virtual Local Area Networks (VLANs)	x	x
VLAN Encapsulation 802.1Q	x	x
Per-VLAN Spanning Tree(PVST+/PVRST+)	x	x
Rapid Spanning Tree Protocol (RSTP) 802.1w	x	x
Multiple Spanning Tree Protocol (MSTP) 802.1s	x	x
STP PortFast, BPDU Guard, BPDU Filter	x	x
STP Root Guard	x	x
Pause Frames 802.3x	x	x
Static MAC Configuratio	x	x
Uni-Directional Link Detection (UDLD)	x	x
Uplink switch for VDX switches, VCS fabrics, and the VCS Virtual Fabric feature	x	
Transparent LAN Services	x	
L2 Traceroute for VXLAN	x	x
BUM Storm Control	x	x
Layer 3 Switching		
Border Gateway Protocol (BGP4+)	x	x
DHCP Helper	x	x
Layer 3 ACLs	x	x
Multicast: PIM-SM, IGMPv2	x	x
OSPF v2/v3	x	x
Static routes	x	x
IPv4/v6 ACL	x	x

	VSC Fabrics	IP Fabrics
Layer 3 Switching		
Policy-Based Routing (PBR)	x	x
Bidirectional Forwarding Detection (BFD)	x	x
32-Way ECMP	x	x
VRF Lite	x	x
VRF-aware OSPF, BGP, VRRP, static routes	x	x
VRRP v2 and v3	x	x
uRPF for IPv4 and IPv6	x	
IPv4/IPv6 dual stack	x	x
IPv6 ACL packet filtering	x	x
BGP automatic neighbor discovery for IP fabri		x
BGP Additional-Path	x	x
BGP-Allow AS	x	x
BGP Generalized TTL Security Mechanism (GTSM)	x	x
BGP graceful shutdown for maintenance mode		x
BGP Peer Auto Shutdown	x	x
Multicast Refactoring	x	x
IPv6 routing	x	x
OSPF Type-3 LSA Filter	x	x
Wire-speed routing for IPv4 and IPv6 using any routing protocol	x	x
BGP-EVPN Control Plane Signaling RFC 7432		x
BGP-EVPN VXLAN Standard-based Overlay		x
Multi-VRF	x	x
IP Unnumbered Interface		x
Intersubnet Routing (Symmetric and Asymmetric)		x
IP over Port Channel		x
VRRP-E	x	x
Fabric Virtual Gateway	x	x
Static Anycast Gateway		x
ARP Suppression		x
Automation and Programmability		
OpenFlow 1.3	x	x
REST API with YANG data model	x	x
Puppet	x	x
Python	x	x
PyNOS libraries	x	x
VMware vRealize plugins	x	x
DHCP automatic fabric provisioning	x	x
Netconf API	x	x
Multitenancy and Vrtualization		
TRILL FGL-based VCS Virtual Fabric feature	x	
Virtual fabric extension	x	
VM-Aware Network Automation	x	
BFD for virtual fabric extension	x	
Automatic Migration of Port Profiles (AMPP)	x	x

Network OS Software Capabilities (cont.)

DCB	VSC Fabrics	IP Fabrics
Priority-based Flow Control (PFC) 802.1Qbb	x	
Enhanced Transmission Selection (ETS) 802.1Qaz	x	
Manual configuration of lossless queues for protocols other than FCoE and iSCSI	x	
Data Center Bridging Exchange (DCBX)	x	
DCBX Application Type-Length-Value (TLV) for FCoE and iSCSI	x	
Fibre Channel/FCoE		
Multi-hop Fibre Channel over Ethernet (FCoE); requires Extreme Networks VCS Fabric technology	x	
FC-BB5 compliant Fibre Channel Forwarder (FCF)	x	
Native FCoE forwarding	x	
FCoE to Fibre Channel Bridging	x	
FCoE on VDX 8770	x	
FCoE on QSFP+ port	x	
Multi-hop Access Gateway Support	x	
End-to-end FCoE (initiator to target)	x	
FCoE Initialization Protocol (FIP) v1 support for FCoE device login and initialization	x	
Name Server-based zoning	x	
Supports connectivity to FIP Snooping Bridge (FSB) device	x	
FCoE traffic over standard LAG	x	
Interface Binding	x	
Dual Personality Ports	x	
Logical SANs	x	
High Availability		
ISSU L2 and L3	x	x
BFD	x	x
OSPF3-NSR	x	x
BGP4-GR	x	x
Management Module Failover	x	x
Quality of Service (QoS)		
ACL-based QoS	x	x
Eight priority levels for QoS	x	x
Class of Service (CoS) IEEE 802.1p	x	x
DSCP Trust	x	x
DSCP to Traffic Class Mutation	x	x
DSCP to CoS Mutation	x	x
DSCP to DSCP Mutation	x	x
Random Early Discard	x	x
Per-port QoS configuration	x	x
ACL-based Rate Limit	x	x
Dual-rate, three-color token bucket	x	x
ACL-based remarking of CoS/DSCP/Precedence	x	x
ACL-based sFlow	x	x
Scheduling: Strict Priority (SP), Deficit Weighted Round-Robin (DWRR), Hybrid	x	x
Scheduling (Hybrid)		
Queue-based Shaping	x	x
Flow-based QoS	x	x

Management and Monitoring	VSC Fabrics	IP Fabrics
Logical chassis management	x	
IPv4/IPv6 management	x	x
Industry-standard Command Line Interface (CLI)	x	x
Netconf API	x	x
REST API with YANG data model	x	x
VDX Plugin for OpenStack		
Link Layer Discovery Protocol (LLDP) IEEE 802.1AB	x	x
MIB II RFC 1213 MIB	x	x
Switch Beaconing	x	x
Management VRF	x	x
Switched Port Analyzer (SPAN)	x	x
Telnet	x	x
SNMP v1, v2C, v3	x	x
sFlow RFC 3176	x	x
Out-of-band management	x	x
Remote SPAN (RSPAN)	x	x
RMON-1, RMON-2	x	x
NTP	x	x
Management Access Control Lists (ACLs)	x	x
Role-Based Access Control (RBAC)	x	x
Range CLI support	x	x
UDLD	x	x
OpenStack Neutron ML2 plugin X X	x	x
Python	x	x
Puppet	x	x
Distributed Configuration Management	x	
Maps switch health monitoring	x	
Security		
Port-based Network Access Control 802.1X	x	x
RADIUS (AAA)	x	x
Secure Shell (SSHv2)	x	x
BPDU Drop	x	x
Lightweight Directory Access Protocol (LDAP)	x	x
Secure Copy Protocol	x	x
Port Security	x	x

More information

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In addition to ExtremeSwitching VDX, Fujitsu provides a range of platform solutions. They combine reliable Fujitsu products with the best in services, know-how and worldwide partnerships.

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