

IBM Storage Networking SAN96C-6

Table 1. Product specifications

Fibre Channel ports	<ul style="list-style-type: none"> • Fixed-switch form factor with 48 SFP+ ports base • Entry-level 24-port preactivated base model with flexibility to turn on any 24 ports • Incremental ports <ul style="list-style-type: none"> ◦ 8-ports upgrade license offers the option of upgrading to 32, 40, and 48 ports
Security	<ul style="list-style-type: none"> • VSAN fabric isolation • Intelligent packet inspection at port level • Hardware zoning by Access Control Lists (ACLs) • Fibre Channel Security Protocol (FC-SP) switch-to-switch authentication • FC-SP host-to-switch authentication • Role-based access control (RBAC) using RADIUS, TACACS+, or Lightweight Directory Access Protocol (LDAP) authentication, authorization, and accounting (AAA) functions • Secure FTP (SFTP) • Secure Shell Protocol Version 2 (SSHv2) • Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES) • Control-plane security • TrustSec payload encryption • Secure Boot and Anti-counterfeit technology
Performance	<ul style="list-style-type: none"> • Port speed: 4, 8, 16, and 32 Gbps autosensing with 32 Gbps of dedicated bandwidth per port • Aggregate bandwidth of 1.5 Tbps end-to-end full duplex • Buffer credits: Up to 8300 for a group of 16 ports, with a default of 500 buffer credits per port and a maximum of 8270 buffer credits for a single port in the group • Port groups: 3 port groups of 16 ports each • Port channel: Up to 16 load-balanced physical links grouped in one port channel
Diagnostics	<ul style="list-style-type: none"> • Power-On-Self-Test (POST) diagnostics • Online Health Management System (OHMS) diagnostics • Internal loopbacks • SPAN • Fibre Channel traceroute • Fibre Channel ping • Fibre Channel debug • IBM Fabric Analyzer • Syslog • Port-level statistics • Link diagnostics (E-port and F-port links) • Read Diagnostic Parameter
Serviceability	<ul style="list-style-type: none"> • Configuration file management • Call Home • Port beaconing • Link cable beacon • System LEDs • SNMP traps for alerts
Reliability and availability	<ul style="list-style-type: none"> • Hot-swappable, dual redundant power supplies • Hot-swappable fan tray with switch integrated temperature and power management • Hot-swappable SFP+ optics • Stateful process restart • Any port configuration for port channels • Fabric-based multipathing • Per-VSAN fabric services • Port tracking • Virtual Router Redundancy Protocol (VRRP) for management IP interface • FEC with HBA ports • Buffer-to-buffer state change notification with HBA ports

<p>Protocols</p>	<ul style="list-style-type: none"> • Fibre Channel standards• FC-PH, Revision 4.3 (ANSI INCITS 230-1994)• FC-PH, Amendment 1 (ANSI INCITS 230-1994/AM1-1996)• FC-PH, Amendment 2 (ANSI INCITS 230-1994/AM2-1999)• FC-PH-2, Revision 7.4 (ANSI INCITS 297-1997)• FC-PH-3, Revision 9.4 (ANSI INCITS 303-1998)• FC-PI, Revision 13 (ANSI INCITS 352-2002)• FC-PI-2, Revision 10 (ANSI INCITS 404-2006)• FC-PI-3, Revision 4 (ANSI INCITS 460-2011)• FC-PI-4, Revision 8 (ANSI INCITS 450-2008)• FC-PI-5, Revision 6 (ANSI INCITS 479-2011)• FC-PI-6 (ANSI INCITS 512-2015)• FC-FS, Revision 1.9 (ANSI INCITS 373-2003)• FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007)• FC-FS-2, Amendment 1 (ANSI INCITS 424-2007/AM1-2007)• FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011)• FC-FS-4• FC-LS, Revision 1.62 (ANSI INCITS 433-2007)• FC-LS-2, Revision 2.21 (ANSI INCITS 477-2011)• FC-LS-3, Includes revision 3.53• FC-SW-2, Revision 5.3 (ANSI INCITS 355-2001)• FC-SW-3, Revision 6.6 (ANSI INCITS 384-2004)• FC-SW-4, Revision 7.5 (ANSI INCITS 418-2006)• FC-SW-5, Revision 8.5 (ANSI INCITS 461-2010)• FC-SW-6• FC-GS-3, Revision 7.01 (ANSI INCITS 348-2001)• FC-GS-4, Revision 7.91 (ANSI INCITS 387-2004)• FC-GS-5, Revision 8.51 (ANSI INCITS 427-2007)• FC-GS-6, Revision 9.4 (ANSI INCITS 463-2010)• FC-GS-7, Includes revision 10.8• FCP, Revision 12 (ANSI INCITS 269-1996)• FCP-2, Revision 8 (ANSI INCITS 350-2003)• FCP-3, Revision 4 (ANSI INCITS 416-2006)• FCP-4, Revision 2b (ANSI INCITS 481-2011)• FC-SB-2, Revision 2.1 (ANSI INCITS 349-2001)• FC-SB-3, Revision 1.6 (ANSI INCITS 374-2003)• FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007)• FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011)• FC-SB-5, Revision 2.00 (ANSI INCITS 485-2014)• FC-BB-6, Revision 2.00 (ANSI INCITS 509-2014)• FC-BB-2, Revision 6.0 (ANSI INCITS 372-2003)• FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006)• FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008)• FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010)• FC-VI, Revision 1.84 (ANSI INCITS 357-2002)• FC-SP, Revision 1.8 (ANSI INCITS 426-2007)• FC-SP-2, Revision 2.71 (ANSI INCITS 496-2012)• FAIS, Revision 1.03 (ANSI INCITS 432-2007)• FAIS-2, Revision 2.23 (ANSI INCITS 449-2008)• FC-IFR, Revision 1.06 (ANSI INCITS 475-2011)• FC-FLA, Revision 2.7 (INCITS TR-20-1998)• FC-PLDA, Revision 2.1 (INCITS TR-19-1998)• FC-Tape, Revision 1.17 (INCITS TR-24-1999)• FC-MI, Revision 1.92 (INCITS TR-30-2002)• FC-MI-2, Revision 2.6 (INCITS TR-39-2005)• FC-MI-3, Revision 1.03 (INCITS TR-48-2012)• FC-DA, Revision 3.1 (INCITS TR-36-2004)• FC-DA-2, Revision 1.06 (INCITS TR-49-2012)• FC-MSQS, Revision 3.2 (INCITS TR-46-2011)• Fibre Channel classes of service: Class 2, Class 3, and Class F• Fibre Channel standard port types: E, F, and B• Fibre Channel enhanced port types: SD, ST, and TE• FC-NVMe• In-band management using IP over Fibre Channel (RFC 2625)• IPv6, IPv4, and Address Resolution Protocol (ARP) over Fibre Channel (RFC 4338)• Extensive IETF-standards-based TCP/IP, Simple Network Management Protocol Version 3 (SNMPv3), and Remote Monitoring (RMON) MIBs
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<p>Network management</p>	<ul style="list-style-type: none"> • Management access through 2 out-of-band Ethernet ports <ul style="list-style-type: none"> ◦ mgmt0: 10/100/1000BASE-T port ◦ mgmt1: 1/10G SFP+ port# • RS-232 serial console port • USB power-on auto-provision port • Access protocols • Command-Line Interface (CLI) using the console and Ethernet port • SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access • Storage Networking Industry Association (SNIA) • Storage Management Initiative Specification (SMI-S) • NX-API for REST • Full access through HTTPS REST • Distributed device alias service • Network security • Per-VSAN RBAC using LDAP, RADIUS, and TACACS+-based AAA functions • Simple File Transfer Protocol (SFTP) • SSHv2 implementing AES • SNMPv3 implementing AES • Data Center Network Manager (DCNM)
<p>Programming interfaces</p>	<ul style="list-style-type: none"> • Scriptable CLI • DCNM web services API • NX-API RESTful interfaces • Onboard Python interpreter • Embedded Event Manager (EEM) • NX-OS Software scheduler
<p>Physical dimensions (H x W x D) and weight</p>	<ul style="list-style-type: none"> • 1 Rack Unit (1RU) (1.72 x 17.3 x 22.3 in. [4.37 x 43/9 x 56.6 cm]) excluding Power Supply Unit (PSU) and fan-tray handles • 16.7 lb. (8.5 kg)
<p>Power</p>	<ul style="list-style-type: none"> • 80 Plus Platinum certified power supplies • Power supply options <ul style="list-style-type: none"> ◦ 650W AC in base model, port-side exhaust variant (2 per switch) ◦ 650W AC in base model, port-side intake variant (2 per switch) • Power cord <ul style="list-style-type: none"> ◦ IEC60320 C14 plug on 650W power supply connecting to a notched C15 socket connector • AC input: 100 to 240 VAC (10% range) • Frequency: 50 to 60 Hz (nominal) • Typical power consumption <ul style="list-style-type: none"> ◦ 217W for Idle 48-Port switch without optics modules ◦ 251W for 48-Port switch with 24 32G SW optics modules under typical conditions ◦ 297W for 48-Port switch with 48 32G SW optics modules under typical conditions • Airflow <ul style="list-style-type: none"> ◦ Back to front (toward ports) using port-side exhaust fans ◦ Front to back (inward from ports) using port-side intake fans • 50 Cubic Feet per Minute (CFM) through system fan assembly at 77°F (25°C) • 100 CFM maximum
<p>Temperature range</p>	<ul style="list-style-type: none"> • Temperature, ambient operating: <ul style="list-style-type: none"> ◦ 32 to 104°F (0 to 40°C) with port-side exhaust and intake airflow variants • Temperature, ambient nonoperating and storage: -40 to 158°F (-40 to 70°C) • Relative humidity, ambient (noncondensing) operating: 10 to 90% • Relative humidity, ambient (noncondensing) nonoperating and storage: 10 to 95% • Altitude, operating: -197 to 6500 ft (-60 to 2000m)
<p>Approvals and compliance</p>	<ul style="list-style-type: none"> • Safety compliance • CE Marking • UL 60950 • CAN/CSA-C22.2 No. 60950 • EN 60950 • IEC 60950 • TS 001 • AS/NZS 3260 • IEC60825 • EN60825 • 21 CFR 1040 • EMC compliance • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55024 • EN 50082-1 • EN 61000-6-1 • EN 61000-3-2 • EN 61000-3-3
<p>Fabric services</p>	<ul style="list-style-type: none"> • Name server • Registered State Change Notification (RSCN) • Login services • Fabric Configuration Server (FCS) • Broadcast • In-order delivery



Advanced function	• VSAN • IVR • Port Channel with multipath load balancing • Flow- and zone-based QoS
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