IBM Storage Networking SAN256B-6 delivers network innovation for the virtualized, all-flash data center

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At a glance

IBM$^{(R)}$ Storage Networking SAN256B-6 delivers the following benefits:

- Enhance operational stability, maximize application performance, and increase business agility with enterprise-class, b-type Gen 6 directors
- Shatter application performance barriers across 32 Gbps links and support up to 1 billion input/output operations per second (IOPS) without oversubscription
- Consolidate infrastructure with high-density solutions built with 128 Gbps UltraScale ICL connectivity for simpler, flatter, low-latency fabrics
- Simplify end-to-end management of large-scale environments by automating monitoring and diagnostics
- Detect degraded application or device performance automatically with built-in monitoring
- Extend distance and replication with a highly scalable, multiprotocol extension solution
- Integrate next-generation flash storage based on nonvolatile memory express (NVMe) flash memory with current and future b-type Gen 6 Fibre Channel networks
- Mitigate risk with backward-compatibility

Overview

Digital transformation is pushing mission-critical storage environments to the limit, with users expecting data to be accessible from anywhere, at any time, and on any device. Faced with exponential data growth, the network must evolve to enable businesses to thrive in this new era. To meet these dynamic and growing business

demands, organizations need to deploy infrastructure that can deliver greater consistency, predictability, and performance. Legacy infrastructures, however, were not designed to support the performance requirements of evolving workloads and flash-based storage technology. In fact, an aging network will impede the performance of an all-flash data center.

A new approach to storage networking is needed to enable databases, virtual servers, desktops, and critical applications, and to unlock the full capabilities of flash. By treating the network as a strategic part of a storage environment, organizations can maximize their productivity and efficiency as they rapidly scale their environments.

IBM Storage Networking SAN256B-6 director with Fabric Vision technology combines innovative hardware, software, and built-in instrumentation to ensure the industry's highest level of operational stability while redefining application performance. SAN256B-6 delivers a modular building block for increased scalability to accommodate growth for large-scale enterprise infrastructures.

Fabric Vision technology enhances visibility into the health of storage environments, delivering greater control and insight to quickly identify problems and achieve critical service level agreements (SLAs). Breakthrough 32/128 Gbps performance shatters application performance barriers and enables support for more than 1 billion IOPSÂ for flash-based storage workloads. With diverse deployment options, organizations can smoothly adapt and optimize their businesses to meet next-generation storage requirements.

Key prerequisites

The IBM Storage Networking b-type SAN switch and director family supports Fibre Channel connectivity for servers and storage. IBM Storage Networking SAN256B-6 (8961-F04) supports all features and functions listed and require Fabric OS level 8.0.1, or later.

For a list of supported servers and storage systems, refer to the Hardware requirements section.

Planned availability date

November 11, 2016

Description

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Purpose-built for enterprise deployments

Designed to meet relentless growth and mission-critical application demands, SAN256B-6 director is an ideal platform for midsized networks that require increased capacity, greater throughput, and higher levels of resiliency.

SAN256B-6 director (8U) has four horizontal blade slots to provide up to one hundred ninety-two 32 Gbps Fibre Channel device ports and sixteen additional 128 Gbps UltraScale ICL ports. Each blade slot can be populated with two optional blades. For device connectivity, the 48 Fibre Channel port blade (feature #3248, #3249, or #3250) provides forty-eight 32 Gbps Fibre Channel ports. To support disaster recovery and data protection storage solutions over long distances, the 32 Gbps Extension Blade (features #3892 or #3893) provides sixteen 32 Gbps Fibre Channel ports, sixteen 1/10-Gigabit Ethernet (GbE) ports, and two 40-GbE ports for Fibre Channel and IP replication traffic. This modular chassis design increases business agility with seamless storage connectivity and flexible deployment offerings.

Enhanced operational stability for always-on business operations

SAN256B-6 director with Fabric Vision technology delivers a breakthrough hardware and software solution that helps simplify monitoring, increase operational stability, and dramatically reduce costs. Fabric Vision technology now includes IO Insight that offers organizations deeper visibility into the performance of their environments. This enhanced visibility enables quick identification of degraded application performance at host and storage tiers, helping reduce time to resolution.

Innovative Fabric Vision monitoring, management, and diagnostic capabilities enable administrators to avoid problems before they impact operations. Additional Fabric Vision capabilities include:

- **IO Insight:** Monitors application- and device-level I/O to gain deep insights into performance and availability, ensuring predictable performance and operational stability.
- **Monitoring and Alerting Policy Suite (MAPS):** Simplifies fabric-wide threshold configuration, monitoring, and alerting with prebuilt, rule- and policy-based templates.
- **Fabric Performance Impact (FPI) monitoring:** Leverages predefined MAPS policies to automatically detect and alert administrators to different latency severity levels, and to identify slow-drain devices that could impact network performance.
- **Dashboards:** Provide integrated, at-a-glance views that display an overall storage area network (SAN) health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.
- **Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS):** Simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services.
- **ClearLink Diagnostics:** Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics.
- **Flow Vision:** Enables administrators to identify, monitor, and analyze specific application flows in order to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources. Flow Vision includes:
  - **Flow Monitor:** Delivers comprehensive visibility into flows within the fabric, including the ability to automatically learn flows and nondisruptively monitor flow performance. Administrators can monitor all flows from a specific host to multiple targets/logical unit numbers (LUNs), from multiple hosts to a specific target/LUN, or across a specific inter-switch link (ISL) or inter-facility link (IFL). Additionally, they can perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.
  - **Flow Learning:** Enables administrators to nondisruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs and IFLs or Fibre Channel over IP (FCIP) tunnels to monitor fabric-wide application performance. In addition, administrators can discover top and bottom bandwidth-consuming devices and manage capacity planning.

- **Flow Generator:** Includes a built-in traffic generator for pretesting and validating the data center infrastructure for robustness (including route verification and integrity of optics, cables, ports, back-end connections and ISLs) before deploying applications.
    - **Flow Mirroring:** Enables administrators to nondisruptively create copies of specific application and data flows or frame types that can be captured for in-depth analysis.
- **Forward Error Correction (FEC):** Enables recovery from bit errors in device connections and ISLs, enhancing transmission reliability and performance.
- **Credit Loss Recovery:** Detects and recovers buffer credit loss at the virtual channel level automatically, providing protection against performance degradation and enhancing application availability.

Simplified Fibre Channel management with IBM Network Advisor

IBM Network Advisor simplifies Gen 6 Fibre Channel management and helps organizations dramatically reduce deployment and configuration times by enabling fabrics, switches, and ports to be managed as groups. Customizable dashboards graphically display performance and health indicators, including all data captured using Fabric Vision technology.

Maximum performance for highly virtualized workloads

Evolving critical workloads and higher density virtualization are continuing to demand greater, more predictable performance. SAN256B-6 director features industry-leading Gen 6 Fibre Channel that increases performance for demanding workloads across 32 Gbps line-speed links and up to 16 Tbps of chassis bandwidth to address next-generation I/O and bandwidth-intensive applications. In addition, the SAN256B-6 director increases scalability with double the throughput for high-density virtual machine deployments and larger fabrics. This enables organizations to support more storage devices and meet bandwidth requirements using the same number of Fibre Channel links.

SAN256B-6 director delivers outstanding chassis, slot-to-slot, and port performance and bandwidth. In addition, local switching capabilities ensure that data traffic within the same port group does not consume slot bandwidth, maximizing the number of line-rate ports while reducing latency.

SAN256B-6: Nonblocking architecture

- Up to 192 ports (equivalent to 256 with UltraScale ICLs) at 32 Gbps
    - 8 Tbps aggregate chassis bandwidth
    - 6 Tbps Fibre Channel port bandwidth
    - 2 Tbps UltraScale ICL bandwidth
- 1.5 Tbps bandwidth per slot, providing line-rate performance for 32 Gbps 48 port blades

Simplified, scale-out network design

Organizations need to adapt to continuous data growth and seamlessly scale out their storage environments. UltraScale chassis connectivity leverages optical ICLs to deliver 128 Gbps bandwidth through a quad small form-factor pluggable (QSFP) link. These links can support distances of up to two kilometers and connect up to 12 directors, enabling flatter, faster, and simpler fabrics that increase consolidation while reducing network complexity and costs.

UltraScale ICLs enable scalable core-edge and active-active mesh chassis topologies. These high-density chassis topologies can reduce inter-switch cabling by up to 75% and free up to 25% of ports for servers and storage. This maximizes overall port density within the smallest amount of rack space while freeing up front-facing device ports for server and storage connectivity.

SAN256B-6 supports sixteen UltraScale ICL ports, providing the equivalent of sixty-four 32 Gbps ports (2.048 Tbps). Gen 6 UltraScale ICLs are backward-compatible

and can connect to Gen 5 ICL ports, including connectivity with 2- kilometer QSFPs at Gen 5 speeds of 16 Gbps (4-16).

Extended distance and replication with a scalable, multiprotocol extension solution

Connecting distributed data centers enables data mobility for advanced data protection. Enterprise data centers need their disaster recovery infrastructure to ensure fast, continuous, and easy replication of mission-critical data to anywhere in the world. Storage administrators need to replicate large amounts of data quickly, securely, reliably, and simply while minimizing operational and capital expenses.

With a 32 Gbps Extension Blade, SAN256B-6 director provides integrated metro and global connectivity with a purpose-built data center extension solution for Fibre Channel and IP storage environments. This solution delivers unprecedented performance, strong security, continuous availability, and simplified management to handle the unrelenting transfer of data between data centers and maintain SLAs. Native 10 Gbps Fibre Channel connections are also available on the 48-port blade and include in-flight compression, as well as optional support for 10 Gbps Fibre Channel over dense wavelength division multiplexing (DWDM) and dark fiber.

SAN256B-6 director can scale up to four 32 Gbps Extension Blades per chassis. Each 32 Gbps Extension Blade provides sixteen 32 Gbps Fibre Channel/IBM FICON[R] ports, sixteen 1/10-GbE ports, and two 40 GbE ports to deliver the high bandwidth, port density, and throughput required for maximum application performance over wide area network (WAN) connections, and to address the most demanding disaster recovery requirements.

Extending Fabric Vision technology between data centers provides unprecedented insight and visibility across the storage network. With its powerful, built-in monitoring, management, and diagnostic tools, Fabric Vision technology enables organizations to minimize the impact of disruptions and outages for nonstop business operations. Consolidating Fibre Channel/FICON flows and IP storage flows into a single tunnel contributes significantly to operational excellence. By using custom, browser-accessible dashboards for combined Fibre Channel and IP storage, storage administrators have a centralized management tool to monitor the health and performance of their networks.

IBM Fabric Vision technology

Fabric Vision technology with IO Insight, an extension of b-type Gen 6 Fibre Channel, provides unprecedented insight and visibility across the storage network with powerful built-in monitoring, management, and diagnostic tools that deliver the following benefits:

Simplified deployment and monitoring:

- Deploy 20 years of storage networking best practices with a single click
- Leverage visibility into storage I/O health and performance with key latency and performance metrics to maintain SLA compliance
- Gain comprehensive visibility into the fabric using browser-accessible dashboards with navigation capabilities

Increased operational stability:

- Avoid many common network problems with proactive monitoring
- Identify hot spots and automatically mitigate network problems before they impact application performance
- Identify I/Os that deviate from expected behavior to facilitate fault isolation and troubleshooting

Dramatic cost reduction:

- Eliminate a significant amount of maintenance costs through automated testing and diagnostic tools

- Save up to millions of dollars on capital expenditure costs by eliminating the need for expensive third-party tools through built-in instrumentation, monitoring, and diagnostics
- Tune device configurations with integrated I/O metrics to optimize storage performance and increase return on investment

Flexible deployment options for next-generation storage requirements

To realize the full benefits of flash, organizations must transition their high-performance, latency-sensitive workloads to flash-based storage with NVMe. The simplicity and efficiency of NVMe enables significant performance gains for flash storage. Moreover, NVMe over fabrics enables users to achieve faster application response times and harness the performance of hundreds of solid-state drives for better scalability across virtual data centers with flash.

Organizations can also seamlessly integrate b-type Gen 6 Fibre Channel networks with next-generation NVMe flash storage over fabrics. The efficiency of Fibre Channel-NVMe, combined with the high performance and low latency of Gen 6 Fibre Channel, enables administrators to accelerate IOPS to deliver the performance, application response time, and scalability needed for next-generation data centers. When looking for investment protection, SAN256B-6 director offers three generations of backward-compatibility support for connectivity to 4, 8, and 16 Gbps Fibre Channel products.

Outstanding mainframe technology innovation and leadership

SAN256B-6 director delivers seamless FICON connectivity for mainframe storage environments. It complements IBM z Systems™ by offering a fast, reliable, and scalable FICON infrastructure, along with innovative features. The SAN256B-6 director is built on mainframe leadership that includes designing the FICON standard and authoring many FICON patents.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the IBM Accessibility website.

Reference information

IBM Storage Networking SAN256B-6 (8961-F04) and IBM Storage Networking SAN512B-6 (8961-F08) are the new IBM Storage Networking b-type Gen 6 Directors. For additional information about SAN512B-6, refer to Hardware Announcement 116-086, dated October 11, 2016.

Product number

Description	Machine type	Model	Feature
IBM Storage Networking SAN256B-6	8961	F04	
TAA Compliance	8961	F04	0983
TRI-RATE SW SFP TRANSCEIVER	8961	F04	2110
1000BASE-LX SFP SMF LC	8961	F04	2111
SFP+ Transceiver 10 Gbps SR	8961	F04	2117
SFP+ 10 Gbps SR 8-Pack	8961	F04	2118
SFP+ Transceiver 10 Gbps LR	8961	F04	2151

Description	Machine type	Model	Feature
SFP+ 10 Gbps LR 8-Pack	8961	F04	2158
SFP+ 10G,USR OPTIC,1PK,BR	8961	F04	2160
SFP+ 10G,USR OPTIC,8PK,BR	8961	F04	2161
40Gbps SR QSFP	8961	F04	2171
40Gbps LR QSFP	8961	F04	2172
1000BASE-SX SFP MMF LC 8Pack	8961	F04	2180
1000BASE-LX SFP SMF LC 8Pack	8961	F04	2181
SFP+ 32 Gbps SW	8961	F04	2300
SFP 32 Gbps 10Km LW	8961	F04	2301
SFP+ 32 Gbps SW 8-Pack	8961	F04	2308
SFP 32 Gbps 10Km LW 8-Pack	8961	F04	2309
SFP Transceiver 1 GbE Copper	8961	F04	2551
SFP+ Transceiver 16 Gbps SW	8961	F04	2602
SFP+ Transceiver 16 Gbps SW 8-Pack	8961	F04	2603
SFP+ 10 Gbps 10 km SW	8961	F04	2609
SFP+ 10 Gbps 10 km LW	8961	F04	2610
SFP+ Transceiver 16 Gbps 10Km LW	8961	F04	2612
SFP+ Transceiver 16 Gbps 10Km LW 8-Pack	8961	F04	2613
SFP 16 Gbps 25 km ELW	8961	F04	2886
SAN512B-6 48 port Blade	8961	F04	3248
48 port 32Gbps SW Blade	8961	F04	3249
48 port 32Gbps LW Blade	8961	F04	3250
32 Gbps Extension Blade SW	8961	F04	3892
32 Gbps Extension Blade LW	8961	F04	3893
OM3 LC/LC 10 m	8961	F04	5810
OM4 Cable LC/LC 8m	8961	F04	5811
OM4 Cable LC/LC 8m - 4 Pack	8961	F04	5812
OM3 LC/LC 10 m - 4 Pack	8961	F04	5818
OM3 Cable LC/LC 25m - 4 Pack	8961	F04	5828
OM3 Cable LC/LC 5m	8961	F04	5835
OM3 Cable LC/LC 25m	8961	F04	5845
OM3 Cable LC/LC 5m - 4 Pack	8961	F04	5858

Description	Machine type	Model	Feature
16Gbps 2km QSFP	8961	F04	7876
16Gbps 100m QSFP	8961	F04	7878
Front/Port Exh 240VAC PSU	8961	F04	7881
Integrated Routing	8961	F04	7897
Rear/NonPort Exh 240VAC PSU	8961	F04	7900
Gen5 ICL +8x16Gbps QSFPs 100m	8961	F04	7940
Gen5 ICL +8x16Gbps QSFPs 2km	8961	F04	7941
Gen6 ICL +8x32Gbps QSFPs 100m	8961	F04	7942
Front/Port Side Exhaust Fan	8961	F04	8002
Rear/Non Port Side Exhaust	8961	F04	8003
SAN256B Standalone Mode	8961	F04	9310
1st F04 Install in 2109-C36	8961	F04	9311
2nd F04 Install in 2109-C36	8961	F04	9312
Field Merge F04 in 2109-C36	8961	F04	9313
Power cord, US, CA, LA, Japan	8961	F04	9800
Power cord, EMEA	8961	F04	9802
Power cord, Australia, NZ	8961	F04	9831
Power cord, Korea	8961	F04	9835
Shipping and Handling NC	8961	F04	AG00
Shipping Charge	8961	F04	AGFE

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld[(R)] ID and password are required (use IBMid).

BP Attachment for Announcement Letter 116-076

Publications

The following publication is shipped with the products. Additional copies will be available by November 4, 2016.

Title	Form number
IBM Storage Networking SAN256B-6 Installation, Service, and User Guide	SC27-8967-00

For additional information, including details on supported host systems, SAN components, and storage systems, go to the IBM Storage Networking SAN b-type family website.

For additional technical information on IBM Storage Networking SAN256B-6, see the
IBM Redbooks^(R) product guide.

To access the IBM Publications Center Portal, go to the IBM Publications Center
website.

The Publications Center is a worldwide central repository for IBM product
publications and marketing material with a catalog of 70,000 items. Extensive
search facilities are provided. A large number of publications are available online in
various file formats, which can currently be downloaded.

Services

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications,
and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT
infrastructure to be an on-demand business. They can help you integrate your high-
speed networks, storage systems, application servers, wireless protocols, and an
array of platforms, middleware, and communications software for IBM and many
non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or go to the IBM
Global Technology Services^(R) website.

For details on available IBM Business Continuity and Recovery Services, contact your
IBM representative or go to the Resiliency Services website.

Details on education offerings related to specific products can be found on the IBM
authorized training website.

Technical information

Specified operating environment

Physical specifications
- Height: 344.5 mm (13.56 in) (8U)
- Width: 437.4 mm (17.23 in)
- Depth: 610.4 mm (24.04 in)
- Weight:
  - Chassis: 24.5 kg (54 lb)
  - Fully populated: 68.95 kg (152 lb)

To assure installability and serviceability in non-IBM industry-standard racks,
review the installation planning information for any product-specific installation
requirements.

Operating environment
- Temperature:
  - Operating: 0°C to 40°C (32°F to 104°F)
  - Non-operating: -25°C to 70°C (-13°F to 158°F)
- Relative humidity:
  - Operating humidity: 5% to 93% RH noncondensing at 40°C (104°F) with a
    maximum gradient of 10% per hour
  - Non-operating humidity: 10% to 93% RH noncondensing at 70°C (158°F)

- Altitude: Up to 3,000 meters (9,842 feet)
- Shock:
  - Operating: 10 g, 11 ms, half sine wave
  - Nonoperating: 20 g, 11 ms, half sine wave
- Vibration:
  - Operating: 5 Hz to 10 Hz at +5 db/Oct; 10 Hz to 200 Hz at 0.0005 Grms; 200 Hz to 500 Hz at -5 db/Oct; scale 0.05 Grms
  - Non-operating: 3 Hz to 10 Hz at +5 db/Oct; 10 Hz to 200 Hz at 0.0065 Grms; 200 Hz to 500 Hz at -5db/Oct; scale 1.12 Grms
- Heat dissipation:
  - 192-port configuration: 8,139 BTU/hr (2,385 W) maximum per chassis
- Standard AC input:
  - Range: 85 V AC to 264 V AC Auto-volt
  - Nominal: 100 V AC to 240 V AC
- Power:
  - 85 to 132 V AC: 1,450 W
  - 180 to 264 V AC: 2,870 W
- In-rush current: 35 Amps maximum, peak
- Frequency: 50 Hz to 60 Hz (Nominal: 50 Hz to 60 Hz)

Homologation

This product is not certified for direct connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Hardware requirements

Specific details on supported operating system releases are available at the IBM Storage Networking b-type SAN family website.

Software requirements

Specific details on supported operating system releases are available at the IBM Storage Networking b-type SAN family website.

Planning information

Cable orders

The following OM3 and OM4 cables can be ordered:

- OM3 Cable LC/LC 10 m (#5810)
- OM3 Cable LC/LC 10 m - 4 Pack (#5818)
- OM3 Cable LC/LC 5 m (#5835)
- OM3 Cable LC/LC 5 m - 4 Pack (#5858)
- OM3 Cable LC/LC 25 m (#5845)
- OM3 Cable LC/LC 25 m - 4 Pack (#5828)
- OM4 Cable LC/LC 8 m (#5811)

Security, auditability, and control

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and conditions

Volume orders

Contact your IBM representative.

IBM Global Financing

Yes

Products - terms and conditions

Warranty period

One year.

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

Warranty service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information.

On-site Service

At IBM's discretion, you will receive specified CRU service, or IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Service level is:

- 24 hours per day, 7 days a week, 4 hour average, same day response. Same day service level includes the installation of Tier 1 CRUs at no additional charge.

Advanced Part Exchange warranty service

Advanced Part Exchange warranty service allows you to order and track replacement parts directly under Customer Replaceable Unit or Parts Only Service following procedures that are provided by IBM. Replacement parts are shipped to your location for you to install. IBM will use commercially reasonable delivery methods to ship the replacement part for NBD delivery. Advanced Part Exchange warranty

service is not available in all countries. You must be approved and registered to use this service. Contact your IBM representative or your reseller for further information.

Warranty service

IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

International Warranty Service

International Warranty Service allows you to relocate any machine that is eligible for International Warranty Service and receive continued warranty service in any country where the IBM machine is serviced. If you move your machine to a different country, you are required to report the machine information to your Business Partner or IBM representative.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased. Warranty service will be provided with the prevailing warranty service type and service level available for the eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

The following types of information can be found on the International Warranty Service website

- Machine warranty entitlement and eligibility
- Directory of contacts by country with technical support contact information
- Announcement Letters

Warranty service upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. See the Warranty services section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

Maintenance service options

On-site Service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

- 24 hours per day, 7 days a week, 2 hour average response, same day

Customer Replaceable Units (CRUs) may be provided as part of the machine's standard warranty CRU Service except that you may install a CRU yourself or request IBM installation, at no additional charge, under the CRU and On-site Service level specified above. For additional information on the CRU Service, see the warranty information.

Maintenance services

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information. The following service selections are available as maintenance options for your machine type.

On-site Service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Service levels are:

- 24 hours per day, 7 days a week, 2 hour average response, same day

Non-IBM parts service

Under certain conditions, IBM provides services for selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

This service includes hardware problem determination (PD) on the non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, memory) installed within IBM machines and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

Usage plan machine

No

IBM hourly service rate classification

Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

General terms and conditions

Field-installable features

Yes

Model conversions

No

Machine installation

Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the machine. In the United States, contact IBM at 1-800-IBM-SERV (426-7378). In other countries, contact the local IBM office.

Graduated program license charges apply

No

Licensed Machine Code

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement from the License Agreement for Machine Code and Licensed Internal Code website.

Access to Machine Code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

You may also obtain updated code by contacting your IBM representative.

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Machine Code License Acceptance Requirement

Acceptance-By-Use Machine: Yes, acceptance of the Machine Code license terms is conveyed through the user's initial use of the Machine.

Educational allowance

A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

Prices

For additional information and current prices, contact your local IBM representative.

The following are newly announced features on the specified models of the IBM Storage Networking 8961 machine type:

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
IBM Storage Networking SAN256B-6	F04		Initial	N/A	No
TAA Compliance	F04	0983	Initial	N/A	No
TRI-RATE SW SFP TRANSCEIVER	F04	2110	Both	Yes	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
1000BASE-LX SFP SMF LC	F04	2111	Both	Yes	No
SFP+ Transceiver 10 Gbps SR	F04	2117	Both	Yes	No
SFP+ 10 Gbps SR 8-Pack	F04	2118	Both	Yes	No
SFP+ Transceiver 10 Gbps LR	F04	2151	Both	Yes	No
SFP+ 10 Gbps LR 8-Pack	F04	2158	Both	Yes	No
SFP+ 10G,USR OPTIC,1PK,BF	F04	2160	Both	Yes	No
SFP+ 10G,USR OPTIC,8PK,BF	F04	2161	Both	Yes	No
40Gbps SR QSFP	F04	2171	Both	Yes	No
40Gbps LR QSFP	F04	2172	Both	Yes	No
1000BASE-SX SFP MMF LC 8Pack	F04	2180	Both	Yes	No
1000BASE-LX SFP SMF LC 8Pack	F04	2181	Both	Yes	No
SFP+ 32 Gbps SW	F04	2300	Both	Yes	No
SFP 32 Gbps 10Km LW	F04	2301	Both	Yes	No
SFP+ 32 Gbps SW 8-Pack	F04	2308	Both	Yes	No
SFP 32 Gbps 10Km LW 8-Pack	F04	2309	Both	Yes	No
SFP Transceiver 1 GbE Copper	F04	2551	Both	Yes	No
SFP+ Transceiver 16 Gbps SW	F04	2602	Both	Yes	No
SFP+ Transceiver 16 Gbps SW 8-Pack	F04	2603	Both	Yes	No
SFP+ 10 Gbps 10 km SW	F04	2609	Both	Yes	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
SFP+ 10 Gbps 10 km LW	F04	2610	Both	Yes	No
SFP+ Transceiver 16 Gbps 10Km LW	F04	2612	Both	Yes	No
SFP+ Transceiver 16 Gbps 10Km LW 8-Pack	F04	2613	Both	Yes	No
SFP 16 Gbps 25 km ELW	F04	2886	Both	Yes	No
SAN512B-6 48 port Blade	F04	3248	Both	No	No
48 port 32Gbps SW Blade	F04	3249	Both	No	No
48 port 32Gbps LW Blade	F04	3250	Both	No	No
32 Gbps Extension Blade SW	F04	3892	Both	No	No
32 Gbps Extension Blade LW	F04	3893	Both	No	No
OM3 LC/LC 10 m	F04	5810	Both	Yes	No
OM4 Cable LC/LC 8m	F04	5811	Both	Yes	No
OM4 Cable LC/LC 8m - 4 Pack	F04	5812	Both	Yes	No
OM3 LC/LC 10 m - 4 Pack	F04	5818	Both	Yes	No
OM3 Cable LC/LC 25m - 4 Pack	F04	5828	Both	Yes	No
OM3 Cable LC/LC 5m	F04	5835	Both	Yes	No
OM3 Cable LC/LC 25m	F04	5845	Both	Yes	No
OM3 Cable LC/LC 5m - 4 Pack	F04	5858	Both	Yes	No
16Gbps 2km QSFP	F04	7876	Both	Yes	No
16Gbps 100m QSFP	F04	7878	Both	Yes	No
Front/ Port Exh 240VAC PSU	F04	7881	Initial	N/A	No
Integrated Routing	F04	7897	Both	Yes	No

Description	Model number	Feature numbers	Initial / MES / Both / Support	CSU	RP MES
Front/ Port Exh 240VAC PSU	F04	7900	Initial	N/A	No
Gen5 ICL +8x16Gbps QSFPs 100m	F04	7940	Both	Yes	No
Gen5 ICL +8x16Gbps QSFPs 2km	F04	7941	Both	Yes	No
Gen6 ICL +8x32Gbps QSFPs 100m	F04	7942	Both	Yes	No
Front/ Port Side Exhaust Fan	F04	8002	Initial	N/A	No
Rear/Non Port Side Exhaust	F04	8003	Initial	N/A	No
SAN256B Standalone Mode	F04	9310	Initial	N/A	No
1st F04 Install in 2109-C36	F04	9311	Initial	N/A	No
2nd F04 Install in 2109-C36	F04	9312	Initial	N/A	No
Field Merge F04 in 2109-C36	F04	9313	Initial	N/A	No
Powercord, US, CA, LA, Japan	F04	9800	Both	Yes	No
Powercord, EMEA	F04	9802	Both	Yes	No
Powercord, Australia, NZ	F04	9831	Both	Yes	No
Powercord, Korea	F04	9835	Both	Yes	No
Shipping and Handling NC	F04	AG00	Initial	N/A	No
Shipping Charge	F04	AGFE	Initial	N/A	No

CSU = Customer setup

RP MES = Returnable parts MES

N/A = Not applicable

Alternative service

ICA Maintenance

Machine type-model	Feature	IOR IBM same day on-site repair (IOR 24 x 7)	IO8 IBM same day on-sute repair (IOR 9 x 5)
8961-F04			
8961-F04	3248		
8961-F04	3249		
8961-F04	3250		
8961-F04	3892		
8961-F04	3893		

ServiceElect (ESA) charges

For ServiceElect (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

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