IBM Storage Networking SAN18B-6 delivers fast, reliable, and secure data protection over long distances

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At a glance

IBM® Storage Networking SAN18B-6:

- Moves more data faster over longer distances and cost-effectively replicates data using less expensive WAN connections
- Drives more throughput with advanced compression technology to expand WAN capacity
- Consolidates replication workloads from Fibre Channel and IP storage arrays
- Encrypts storage data flows over distances without a performance penalty
- Provides load balancing and network resilience with Extension Trunking to increase WAN utilization and protect against WAN link failures
- Delivers comprehensive management for greater control and insight
- Prevalidates the WAN infrastructure with a built-in Flow Generator and WAN Test Tool (Wtool) to ensure a worry-free deployment
- Extends proactive monitoring between data centers to automatically detect WAN anomalies and avoid unplanned downtime
- Enables pay-as-you-grow scalability for up to 10 Gbps of replication throughput with an on-demand upgrade license

Overview

With the world's embrace of digital business, data has become more valuable than ever. Expectations for that data to be accessible from anywhere, at any time, on any device are pushing infrastructures to the limit. IT organizations are under pressure to keep pace with the growing avalanche of data and ensure their valuable information is protected from a disaster. The loss of any crucial data could lead directly to lost revenue or damage to the company's brand reputation. To safeguard data from a disaster, storage administrators need a way to achieve sufficient replication performance over distances, keep data flowing over unreliable WAN connections, and secure data-in-flight while controlling costs for equipment and long-distance connections.

IBM Storage Networking SAN18B-6 extension switch addresses these challenges by delivering a modern replication connectivity solution that cost-effectively and rapidly replicates data across sites for fast, continuous data protection. With powerful performance, nonstop reliability, and strong security, SAN18B-6 can handle the unrelenting transfer of data between data centers, minimize the impact of disruptions to maintain service-level agreements (SLAs), and secure data-in-flight between data centers. The switch has built-in technology that overcomes the
inherent challenges of latency and packet loss over long distance. It dramatically speeds up replication performance and enables organizations to substantially reduce costs by deploying less-expensive WAN connections.

### Key requirements

IBM Storage Networking b-type SAN switch and director family supports Fibre Channel connectivity for servers and storage. IBM Storage Networking SAN18B-6 (8960-R18) supports all features and functions listed, and requires Fabric OS level 8.2.x, or later.

### Planned availability date

April 19, 2019, except for the Russian Federation, which will have a general availability of May 31, 2019.

### Description

IBM Storage Networking SAN18B-6 extension switch is a cost-effective solution that securely moves data faster over longer distances for continuous data protection. This powerful, reliable, and secure platform is purpose-built to handle the unrelenting growth of data traffic between data centers in Fibre Channel and IP storage environments.

**A purpose-built extension platform for midrange storage**

IBM Storage Networking SAN18B-6 extension switch is a robust platform for medium-scale, multisite data center environments implementing block, file, and tape data protection solutions. It is an ideal platform for building a high-performance data center infrastructure for multisite asynchronous and synchronous storage replication and centralized tape backup, recovery, and archiving solutions. Extension maximizes replication and backup throughput over distance, using WAN-optimized TCP, disk and tape protocol acceleration, and data compression. Without the use of this extension, the long distance required for disaster recovery often makes it impossible or impractical for organizations to meet their recovery point objective (RPO) and recovery time objective (RTO). In addition, the platform offers both Fibre Channel over IP (FCIP) and IP extension technology, and is designed to handle simultaneous replication from Fibre Channel and IP storage arrays to consolidate replication workloads over WAN connections.

Whether supporting point-to-point connections, a multisite SAN, or remote offices, SAN18B-6 offers enterprise-class capabilities to meet demanding disaster recovery requirements. With twelve 32 Gbps-capable Fibre Channel ports and six 1/10-Gigabit Ethernet (GbE) ports, this switch provides the bandwidth and throughput required for maximum application performance over WAN connections.

Designed to be affordable, SAN18B-6 offers flexible configurations. To meet current and future requirements, organizations can purchase a full configuration with 2.5 Gbps WAN capacity or pay as they grow with an on-demand upgrade license (feature code 7425) to quickly and cost-effectively scale their WAN rate from 1 Gbps to 2.5 Gbps. With a compression ratio of 4 to 1, organizations can scale up to 10 Gbps replication throughput, depending on the type of data and the characteristics of the WAN connection.

**Note:** 4:1 is typical, but the compression ratio is data dependent and will vary significantly depending on whether the data is easily compressible or already compressed.

SAN18B-6 base configuration provides four 32 Gbps-capable Fibre Channel ports and six 1 GbE ports with Adaptive Rate Limiting (ARL) and IPsec. The on-demand upgrade license (feature code 7425) enables all 12 Fibre Channel ports, 10 GbE

**Move more data faster over distance with powerful performance**

The advanced performance and network optimization features of the SAN18B-6 enable replication and backup applications to send more data over metro and WAN links in less time, and optimize available WAN bandwidth.

Supporting up to 250 milliseconds round-trip time latency, SAN18B-6 enables cost-effective extension solutions over distances up to 25,500 kilometers (15,845 miles).

SAN18B-6 maximizes replication and backup throughput over distance using data compression, disk and tape protocol acceleration, WAN-optimized TCP, and other extension networking technologies. Advanced features and technologies include:

- **Extension Trunking:** Combines multiple WAN connections into a single, logical, high-bandwidth trunk, providing active load balancing and network resilience to protect against WAN link failures.

- **Lossless link loss (LLL):** Provides recovery of data lost in-flight when a link goes offline as part of Extension Trunking. From the perspective of the storage applications, nothing ever occurs because all data is delivered, and delivered in order.

- **Failover/failback with failover groups:** Provides circuit assignments to metrics and enables them to be put in a failover group. If all circuits of the lower metric within the failover group go offline, the higher metric circuits take over. This uses LLL, and all data is delivered in order. The storage application will not know that a failover/failback has occurred.

- **ARL:** Adjusts bandwidth sharing between minimum and maximum rate limits to optimize bandwidth utilization and maintain maximum WAN performance during disruptions.

- **IPsec:** Ensures secure transport of data over WAN links without a performance penalty or excessive added latency by encrypting data-in-flight with a hardware-implemented, standard 256-bit AES algorithm.

- **Unparalleled, extremely efficient architecture:** Permits the high-speed, low-latency processing of IP datagrams and Fibre Channel, making extension of synchronous applications possible.

- **WAN-optimized TCP:** Optimizes TCP window size and flow control, and accelerates TCP transport for high-throughput storage applications.

- **Streams:** Uses WAN-optimized TCP with IP extension to prevent Head of Line Blocking (HoLB) across the WAN.

- **Per Priority TCP Quality of Service (PTQ):** Provides high-, medium-, and low-priority handling of Fibre Channel and IP extension flows within the same tunnel for transmission over the WAN using autonomous, individual TCP sessions per quality of service (QoS) priority.

- **Advanced compression architecture:** Provides multiple modes to optimize compression ratios for various throughput requirements.

- **FCIP FastWrite (FCIP-FW):** Accelerates SCSI write processing, maximizing performance of synchronous and asynchronous replication applications across high-latency WAN connections over any distance.

- **Open Systems Tape Pipelining (OSTP):** Accelerates read and write tape processing over distance, significantly reducing backup and recovery times over distance anywhere in the world.

Midrange and IP storage arrays with native replication applications generally do not handle latency and packet loss well. SAN18B-6 provides a robust extension solution that delivers local performance at long distances, along with strong encryption for comprehensive disaster recovery. It leverages TCP acceleration to help achieve the fastest replication speeds possible from storage devices, and Brocade WAN-optimized TCP to ensure in-order, lossless transmission of extension data.
Extension solutions help to significantly increase the performance of IP storage applications across the WAN, even with encryption turned on. The more latency and packet loss between the data centers, the greater the performance gain using these solutions. SAN18B-6 can move more data than native TCP/IP stacks to meet rigorous recovery objectives. These performance gains enable use cases that were previously unattainable.

Extension also offers other far-reaching benefits. SAN18B-6 supports and manages Fibre Channel and IP-based data flows, enabling storage administrators to consolidate I/O flows from heterogeneous storage devices and multiple protocols.

The consolidation of these applications into a single, managed tunnel between data centers across the WAN has significant operational, availability, security, and performance value. Consolidating IP storage flows, or both Fibre Channel and IP storage flows into a single tunnel contributes significantly to operational excellence. Operational advantages are gained with Fabric Vision, Monitoring Alerting Policy Suite (MAPS), Wtool, and SAN management software. Using custom, browser-accessible dashboards for IP storage, or combined Fibre Channel and IP storage, storage administrators have a centralized management tool to monitor the health and performance of their networks.

Extension supports a range of common storage applications, including array native IP Remote Data Replication (RDR), IP-based centralized backup, virtual machine (VM) replication, host-based and database replication over IP, NAS head replication between data centers, and data migration between data centers.

**Protect data from network disruptions and outages**

Today's organizations depend on fast, reliable access to data, regardless of location. The ramifications and potential business impact of an unreliable disaster recovery and data protection infrastructure are greater than ever.

SAN18B-6 provides a suite of features, from predeployment validation to advanced network failure recovery technologies, to ensure a continuously available storage extension infrastructure. It has built-in tools to validate the condition of WAN links and network paths, as well as to validate the proper setup of configurations prior to deployment. Administrators can validate and troubleshoot the physical infrastructure with the built-in Flow Generator and Wtool, thereby easing deployment and avoiding potential issues.

Extension Trunking protects against WAN link failures with tunnel redundancy for lossless path failover and guaranteed in-order data delivery using LLL. The advanced Extension Trunking feature enables multiple network paths to be used simultaneously, and when there is a failure for a network path, Extension Trunking will retransmit the lost packets to maintain overall data integrity. The storage application will be protected with no disruption.

With ARL, organizations can optimize bandwidth utilization and maintain full WAN performance of the link during periods when a path is offline due to an extension platform, IP network device, or array controller outage. ARL uses dynamic bandwidth sharing between minimum (floor) and maximum (ceiling) rate limits to achieve maximum available performance during failure situations.

SAN18B-6 leverages the core technology of IBM Storage Networking b-type Gen 6 Fibre Channel platforms, consistently delivering 99.9999% uptime in the world's most demanding data centers. These capabilities enable a high-performance and highly reliable network infrastructure for disaster recovery and data protection.

**Secure data from network breaches**

Growing concerns about potential damage to brand reputation, class-action lawsuits, and costly downtime are causing executives to pay greater attention to the security practices of their organizations. Leaving data exposed in-flight over distance while replicating to a remote location can result in data breaches and unwanted publicity. With security-related outages on the rise, organizations do not want to leave
themselves exposed and need to ensure that all data leaving the confines of their data center is secure.

SAN18B-6 extension switch uses unbreakable network encryption to ensure that data-in-flight is protected from threats over the WAN. This switch features robust, hardware-based IPsec with AES 256-bit encryption to keep data secure and meet security compliance requirements. In addition, hardware-based IPsec encrypts data flows over distance without a performance penalty.

SAN18B-6 includes IPsec; no additional licenses or fees are required.

**Simplified management and robust network analytics**

Fabric Vision technology provides a breakthrough hardware and software solution that helps simplify monitoring, maximize network availability, and dramatically reduce costs.

Featuring innovative monitoring, management, and diagnostic capabilities, Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet SLAs. SAN18B-6 supports the following Fabric Vision technology features for storage extension management:

- MAPS
- Fabric Performance Impact (FPI) Monitoring
- Integrated dashboards
- Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS)
- ClearLink Diagnostics
- Flow Vision
- Forward Error Correction (FEC)
- Credit Loss Recovery

For disaster recovery, it is important to have visibility and insight for greater control of WAN traffic to guarantee that the RPO and RTO are met. Flow Vision enables administrators to quickly identify, monitor, and analyze specific application flows to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources. Flow Vision includes Flow Learning, Flow Monitor, and Flow Generator.

Flow Learning enables administrators to discover all flows that go to or come from a specific host port or storage port, or traverse Inter-Switch Links (ISLs), Inter-Fabric Links (IFLs), or FCIP tunnels to monitor fabric- wide application performance. In addition, Flow Learning enables discovery of top and bottom bandwidth-consuming devices to help manage capacity planning.

Flow Monitor provides comprehensive visibility into flows across a storage extension network. It automatically learns and nondisruptively monitors all flows from a specific storage device that are writing to or reading from a destination storage device or logical unit numbers (LUNs), or across a storage extension network. Additionally, LUN-level monitoring of specific frame types can be performed to identify resource contention or congestion that is impacting application performance.

Flow Generator provides a built-in traffic generator for pretesting and validating the storage extension infrastructure, including route verification, QoS zone setup, Extension Trunking configuration, WAN access, IPsec policy setting, and integrity of optics, cables, and ports, for robustness before deploying applications.

**Integrated architecture and management**

SAN18B-6 utilizes the same Fabric OS (FOS) that supports the entire IBM Storage Networking b-type product family. This helps ensure seamless interoperability with advanced features in FOS version releases, such as Integrated Routing, Extension Trunking, Fibre Channel Trunking, and Fabric Vision technology.
IBM Storage Networking SAN18B-6 (8960-R18) and all of its related features are not available in Bosnia and Herzegovina.

**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.

### Product number

The following are newly announced features and model on the specified model of the IBM System Storage® 8960 machine type:

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<th>Machine type</th>
<th>Model</th>
<th>Feature</th>
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<td>R18</td>
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<td>TAA Compliance</td>
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<td>XFP Transceiver 850nm 300m MMF</td>
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**Publications**

The following publication is shipped with the products. Additional copies will be available by April 2, 2019.

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>IBM Storage Networking SAN18B-6</td>
<td>SC27-9416-00</td>
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<tr>
<td>Installation, Service, and User Guide</td>
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<tr>
<td>IBM Storage Networking SAN18B-6 Quick Start Guide</td>
<td>SC27-9555-00</td>
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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 SAN18B-6, see the IBM Redbooks® 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.
IBM Systems Lab Services

IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the Lab Services website.

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 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

- Width: 44.0 cm (17.32 in.)
- Depth: 45.7 mm (17.74 in.)
- Height: 4.4 mm (1.73 in.)
- Weight:
  - 7.98 kg (17.6 lb.) empty
  - 8.35 kg (18.4 lb.) fully loaded

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 environment: 0°C to 40°C (32°F to 104°F)
  - Nonoperating environment: -25°C to 70°C (-13°F to 158°F)
- Relative humidity:
Operating environment: 10% to 85%
Nonoperating environment: 10% to 90%
- Operating altitude: Up to 3,000 m (9,842 ft)
- Storage altitude: Up to 12 km (39,370 ft)
- Shock:
  - Operating: Up to 20 G, 6 ms half-sine
  - Nonoperating: 33 G, 11 ms half-sine, 3/eg axis
- Heat dissipation: 128 ports at 3512 BTU per hour
- Power:
  - AC input: 90 V to 264 V, 2.2 A
  - AC input line frequency: 47 Hz to 63 Hz
  - AC power consumption:
    -- 100 V: 1.29A, 130 W, 444 BTU/hr, 135 VA (max config)
    -- 200 V: 0.65A, 132 W, 449 BTU/hr, 146 VA (max config)

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 (SAN) b-type family website.

Software requirements
Specific details on supported operating system releases are available at the IBM Storage Networking (SAN) b-type 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 5 m (#5835)
- OM3 Cable LC/LC 25 m (#5845)
- OM4 Cable LC/LC 8 m (#5811)

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

IBM Systems Lab Services
For details on available services, contact your IBM representative or go to the Lab Services website.

Global Technology Services
Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

## Terms and conditions

### Volume orders

Contact your IBM representative.

### Products - terms and conditions

#### Warranty period

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<tr>
<th>Warranty and additional coverage options</th>
<th>Coverage summary (1)</th>
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<tbody>
<tr>
<td>Warranty period:</td>
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<td>Service level:</td>
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#### Service upgrade options

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<td>Maintenance services (Post-warranty)</td>
<td>IBM On-Site Repair, Next Business Day and Same Day options</td>
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<td>IBM Hardware Maintenance Services -</td>
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<td>Committed maintenance (4)</td>
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(1) See complete coverage details below  
(2) Warranty period in Turkey is 2 years  
(3) Only offered in US and EMEA  
(4) Not offered in the US

### One year

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. 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. 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 through 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.
CRU Service
IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

Tier 1 (mandatory) CRU
Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

Tier 2 (optional) CRU
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next business day (NBD) delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU. You may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:
- Fiber optic cables
- Transceivers
- Service kit
- Slide mounting kit
- PDU jumpers
- Power supply
- Fan

CRU and 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:
- 9 hours per day, Monday through Friday, excluding public or national holidays, next business day response. Calls must be received by 15:00 local time in order to qualify for next business day response.

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**

**CRU and On-site Service**

At IBM's discretion you will receive 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. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

- 9 hours per day, Monday through Friday, excluding public or national holidays, same business day response. Calls must be received by 12:00 local time in order to qualify for same business day response.
- 24 hours per day, 7 days a week, same day response.

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, through 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.
• IBM On-Site Repair, Next Business Day Response Target, Monday-Friday. Calls must be received by 3:00 PM local time in order to qualify for next business day response.
• IBM On-Site Repair, Same Day On-Site Response Target, Monday-Friday 08:00-17:00 (excluding public holidays), Last Call Registration: 12:00.
• IBM On-Site Repair, Same Day On-Site Response Target, Monday-Sunday 00:00-24:00, 365 days a year.

IBM Hardware Maintenance Services -- committed maintenance

Organizations can lose as much as USD100 million per year to downtime related to information and communications technology. IBM Hardware Maintenance Services -- committed maintenance can deliver various guaranteed hardware service for IBM equipment from the moment you call for support worldwide (based on the countries in which IBM has a presence) and around the clock. Through clear response targets and standardized service-delivery metrics, we help you optimize your IT infrastructure and reduce the threat of hardware-related outages.

(1) Currently not available in the US

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.

Customer Replaceable Unit (CRU) Service

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography, IBM will ship the replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next business day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

Tier 1 (mandatory) CRUs: Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with On-site Same-day Response Service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 (optional) CRUs: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

The following parts and feature(s) have been designated as Tier 1 CRUs:

• Fiber optic cables
• Transceivers
• Service kit
• Slide mounting kit
• PDU jumpers
• Power supply
• Fan

Feature codes or models for which there is a maintenance charge:
• IBM Storage Networking SAN18B-6 (8960-R18)

Additional reference for Europe
The following European documents can be found on the IBM Maintenance and Technical Support Services website.

• European Announcement Letter ZS03-0150 for IBM Customer Agreement (ICA)
• European Announcement Letter ZS04-0135 for Enterprise Agreement Contract
• European Announcement Letter ZS98-0118 for ServiceSuite Contract

CRU and Machine Exchange Service
At IBM’s discretion you will receive CRU service or IBM will initiate shipment of a replacement machine to your location. You are responsible for its installation and verification of operation. You must pack the failed machine into the shipping container that contained the replacement machine and return the failed machine to IBM. Transportation charges, both ways, are paid by IBM. You may be charged for the replacement machine if IBM does not receive the failed machine within 15 days of your receipt of the replacement.

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.

Maintenance service offerings
These machines are eligible under terms and conditions of IBM ServiceElite, the IBM Enterprise Service Agreement (ESA), or the IBM Maintenance Agreement. Consult your IBM representative for details.

General terms and conditions

Field-installable features
Yes

Model conversions
No
**Machine installation**
Client setup. Clients are responsible for installation according to the instructions IBM provides with the machine.

**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.

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**Prices**

For all local charges, contact your IBM representative.

**IBM Global Financing**

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Financing solutions from IBM Global Financing can help you stretch your budget and affordably acquire the new product. But beyond the initial acquisition, our end-to-end approach to IT management can also help keep your technologies current, reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology lifecycle.

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**Announcement countries**
All European, Middle Eastern, and African countries, except Bosnia and Herzegovina, Islamic Republic of Iran, Sudan, and Syrian Arab Republic.

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IBM Directory of worldwide contacts