

IBM System Storage TS7650G Server with ProtecTIER Enterprise Edition software provides in-line data deduplication

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At a glance



TS7650G ProtecTIER® Deduplication Gateway is designed to deliver high performance of in-line data deduplication and robust scalability for the enterprise data center.

The use of disk cache as a deduplicated storage pool with existing backup applications offers a potentially lower total cost than conventional disk. To facilitate backup applications that are designed for use with tape storage, TS7650G ProtecTIER Deduplication Gateway solution emulates a traditional tape library unit so deployment does not force any changes to existing data protection processes. Symantec NetBackup users may choose to use the OpenStorage interface to communicate with the TS7650G Gateway.

Solution advantages

- Fast backup and recovery addresses shrinking backup windows
- Significantly reduces the amount of disk storage needed for the backup/restore application
- Backup reliability improvements
- Minimal change requirements to the data protection infrastructure

For ordering, contact your IBM® representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

IBM System Storage® TS7650G ProtecTIER Deduplication Gateway, comprised of the IBM System Storage TS7650G Server combined with IBM System Storage ProtecTIER Enterprise Edition software, is designed to address the data

protection needs of enterprise data centers. This solution is designed to offer high performance, high capacity, robust scalability, and a choice of disk-based targets for backup and archive data.

ProtectTIER Enterprise Edition V2.5 introduces support for the Symantec NetBackup OpenStorage API (application programming interface). TS7650G ProtectTIER Deduplication Gateway systems attached to NetBackup environments can be configured for the OpenStorage API, and may benefit from the higher level of integration between NetBackup and ProtectTIER provided by the OpenStorage interface. TS7650G gateways running ProtectTIER Enterprise Edition V2.5 software must be configured as virtual tape library systems, or as OpenStorage systems.

TS7650G ProtectTIER Deduplication Gateway offers:

- In-line data deduplication powered by HyperFactor® technology
- Powerful multicore virtualization and deduplication
- Clustering support for higher performance and availability
- Fibre Channel (FC) ports for host and server connectivity
- In-line data deduplication performance up to 1,000 MB/s (clustered node)
- Flexible storage choices and options

TS7650G Server hardware platform includes:

- Four 8-way processor cards
- Two 300 GB SAS boot disks
- 2 dual port 8 Gb FC Qlogic HBAs
- One LSI MegaRAID card and battery backup
- 64 GB memory
- One 1 GB quad port copper Ethernet adapter
- Adapter options for connecting to backup server hosts:
 - Two 1 Gb quad port copper ethernet adapters for OpenStorage systems
 - Two 8 Gb FC HBAs for VTL systems

TS7650G ProtectTIER Deduplication Gateway is an enterprise-class data protection platform designed to quickly and safely protect business information while drastically reducing the amount of space required to store data. Deploying the TS7650G ProtectTIER Deduplication Gateway can help organizations more efficiently protect corporate data on disk-based storage while helping to manage the exponential growth of new data through reduction and elimination of duplicate data in their backups.

Key prerequisites

IBM System Storage TS7650G ProtectTIER Deduplication Gateway requires a standard FC SAN environment. A wide variety of disk-based storage can be attached to this server gateway. Check the *IBM Interoperability Guide* for specific environmental information.

IBM System Storage ProtectTIER Enterprise Edition preload software is loaded on the IBM System Storage TS7650G Server to create a valid TS7650G ProtectTIER Deduplication Gateway. A separate order for ProtectTIER Enterprise Edition is required.

Planned availability date

December 3, 2010

Description

IBM System Storage TS7650G ProtecTIER Deduplication Gateway is a VTL that appears to back up applications as one or many automated tape libraries. This supports implementation of the TS7650G and ProtecTIER software with minimal change to existing backup policies, practices, or procedures. The backup application accesses VTLs, robotics, and cartridges just as it would in a physical tape library environment.

Typical virtual tape library solutions provide about 2:1 compression of the data backed up. TS7650G ProtecTIER Deduplication Gateway, featuring HyperFactor data deduplication technology, provides up to 25:1 for more data volume reduction.

IBM System Storage ProtecTIER Enterprise Edition V2.5 software that is loaded on the IBM System Storage TS7650G ProtecTIER Deduplication Gateway has been enhanced to support the OpenStorage interface with Symantec NetBackup. ProtecTIER V2.5 systems may be configured as a VTL or as an OpenStorage enabled system. At this time, a ProtecTIER system may only function as a VTL system or an OpenStorage system; it cannot function as both.

OpenStorage API

OpenStorage interface is a NetBackup appliance programming interface (API) supporting communication between NetBackup systems and OpenStorage enabled ProtecTIER systems. The OpenStorage interface provides the following capabilities:

- NetBackup software directs ProtecTIER systems when to create, copy, delete or restore backup images
- Backup images may be replicated to up to 12 different ProtecTIER systems
- Workloads and performance are balanced between NetBackup media servers and ProtecTIER systems
- Detailed statistics on the state of the ProtecTIER systems are available through the API

For additional information, refer to Software Announcement [210-375](#), dated October 26, 2010.

The characteristics of ProtecTIER Virtual Tape Library systems have not changed with this release. Refer to IBM System Storage ProtecTIER Enterprise Edition V2.4 Software Announcement [210-135](#), dated April 13, 2010.

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Product positioning

IBM System Storage TS7650G ProtecTIER Deduplication Gateway is a high-performance, high-capacity open systems disk-based data protection solution for large and mid-sized data center environments. The TS7650G solution can aid in data protection by delivering significant increases in operational efficiency, throughput, and data management capabilities via tape virtualization and data reduction.

TS7650G is designed to help:

- Address shrinking backup windows with faster backup and recovery
- Reduce cost and increase storage capacity utilization

- Improve the reliability and quality of backups
- Increase levels of data protection with enterprise-class data integrity
- Support deployment with minimal change to IT infrastructure

TS7650G is a tape virtualization data deduplication server for open systems attached to SAN environments over Fibre Channel connections. Data centers improve their data protection operations, while reducing the storage required. TS7650G presents itself to backup applications as a standard tape device, while offering the benefit of disk-based storage for fast backup and restores. TS7650G features HyperFactor technology, a data deduplication technology which searches for redundancy in the data while it is backed up. It only stores unique data but tracks all references, maintaining full quality of backup data. In addition, with the space saved through elimination of redundant data, organizations can retain more backups online, for a longer period of time, which enables them to recover critical data and files more quickly.

IBM System Storage TS7650G ProtecTIER Deduplication Gateway server differs from many other open systems virtual tape offerings through its in-line deduplication performance. The TS7650G Server can back up and deduplicate data in less time, enabling customers to address their archiving and replication service level agreements.

Reference information

For information on IBM System Storage ProtecTIER Enterprise Edition V2, refer to Software Announcement [210-375](#), dated October 26, 2010.

Product number

Description	Machine	Model	Feature
TS7650G Server	3958	DD4	
Console Expansion			2714
Console Attachment			2715
TS3000 System Console			2722
Internal Modem			2733
Cluster Connection Kit			3447
1 GB quad port ethernet adapter			3456
8 GB FC Dual Port HBA - Host			3458
Install KVM Switch			5510
KVM Display, Keyboard, Mouse			5512
KVM adjacent frame connection			5513
2nd server in adjacent frame			5514
25 Meter LC/LC FC Cable			6025
VTL			9022
OST			9023
Attach DS8000™			9030
Attach DS5000			9031
Attach XIV®			9033
Attach to other IBM Disk			9038
No New IBM Disk			9039
ProtecTIER EE preload			9306
Rack Mount			9340
No Factory Cables			9700

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® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=110-237>

Publications

The following publications are shipped with the product or are provided on the TS7650 Publications CD-ROM:

Title	Order number	Part number
IBM System Storage TS7600 with ProtecTIER Introduction and Planning Guide for the TS7650G (Gateway)	GC53-1152	N/A
IBM System Storage TS7600 with ProtecTIER Installation Roadmap Guide for the TS7650G (Gateway)	GC53-1154	N/A
IBM System Storage ProtecTIER User's Guide for Enterprise Edition & Appliance Edition	GC53-1156	N/A
ProtecTIER v.2.5 Software Upgrade and Replication Enablement Guide	GC53-1196	N/A
IBM System Storage TS7600 with ProtecTIER Problem Determination Guide for the TS7650 Appliance and TS7650G Gateway (3958 DD1, 3958 DD3, 3958 DD4, & 3958 AP1)	GC53-1157	N/A
IBM System Storage TS7650 ProtecTIER Customer Information Center CD-ROM	N/A	46X6057
IBM System Storage TS7650 ProtecTIER Service Information Center CD-ROM	N/A	46X6058

IBM Publications Center Portal

<http://www.ibm.com/shop/publications/order>

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, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Publications are available on the IBM Publications Center Web site and are included on the *IBM System Storage TS7600 ProtecTIER - TS7650 & TS7650G Publications CD-ROM LCD8-1271-09 (part number 46X6056)*.

To order additional selected hardcopy publications for a fee or download free PDF format publications, visit the IBM Publications Center website

<http://www.ibm.com/shop/publications/order>

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 visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

4 U rack drawer

- Width: 443.6 mm (17.46 in)
- Depth: 712.1 mm (28.04 in)
- Height: 172.8 mm (6.80 in)
- Weight: 43.2 kg (95 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:
 - 10 to 35° C (50 to 95° F) at 0 to 914 m (0 to 3,000 ft)
 - 10 to 32° C (50 to 90° F) at 914 m to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8 to 80 percent
- Wet bulb (caloric value):
 - Ship configuration: 1,297 Btu/hr (380 watts)
 - Typical configuration: 3,753 Btu/hr (1100 watts)
 - Full configuration: 6,739 Btu/hr (2150 watts)
- Electrical power:
 - Minimum configuration: 0.39 kVA (two power supplies)
 - Typical configuration: 1.12 kVA (two power supplies)
 - Maximum configuration: 2.17 kVA (two power supplies)
- Capacity of exhaust: 00 cubic meter/minute
- Noise level: 6.6 dBA
- Leakage and starting current: 00/00 ampere

Equipment approvals and safety:

- FCC Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A

- IEC/UL 60950-1, 1st Edition
- CAN/CSA C22.2 No. 60950-1-03
- NOM-019 *

* This server is certified by the respective UL and NOM agencies.

Hardware requirements

General platform prerequisites

IBM System Storage TS7650G ProtecTIER Deduplication Gateway is based on the IBM System x3850 X5 server technology.

Tested platforms are listed in the Installation Guide under **Release Notes**.

A TS7650G clustered solution with IBM ProtecTIER Deduplication software requires the following hardware, included in the Cluster Connection Kit (feature number 3447):

- **Power switch:** A network power switch, which is used to automatically control the power to a failed node.
- **Network switch:** Two Ethernet switches, which are used to connect the TS7650G Servers with the network power switch, the user console, and the TS3000 System Console (TSSC).

ProtecTIER Manager

ProtecTIER Manager is required for service or maintenance of ProtecTIER systems, and must be installed on a customer provided workstation. The customer provided workstation must be capable of operating one of the following operating systems:

- Microsoft® Windows® 2003, Windows XP, or Windows 7
- Red Hat Enterprise 4 or 5

The console must also have:

- At least 1.2 GB of available disk space
- At least 256 MB of RAM

The workstation must have access to the ProtecTIER service nodes at IP address (port 3501 is open on the firewall).

ProtecTIER Manager can support more than one ProtecTIER server. If the ProtecTIER Manager workstation is connected to more than one ProtecTIER server, they can be connected to a workstation via a switch box or via a terminal server. The workstation and switch box must be provided by the customer.

Confer with your IBM representative for console configuration alternatives.

Supported storage systems

- IBM System Storage DS8300
- IBM System Storage DS8100
- IBM System Storage DS4800
- IBM System Storage DS4700
- IBM System Storage DS5300
- IBM System Storage DS5100
- IBM SVC
- XIV Gen1, Nextra™
- XIV Gen2

- HDS AMS1000
- HDS AMS2300
- EMC CX300, CX500, CX700

A current list of supported open system configurations for the TS7650G server is available from the following website

<http://www.ibm.com/systems/support/storage/config/ssic/index.jsp>

Software requirements

Ordering the ProtecTIER PID is required when the gateway hardware is ordered.

To create a valid TS7650G ProtecTIER Deduplication Gateway, the customer must order the following software PIDs and hardware features in the initial order:

- 3958-DD4, TS7650G Gateway with feature #9306
- 5639-XXB, ProtecTIER Enterprise Edition V2 software
- One of the following software maintenance PIDs:
 - 5639-XXC 1 year registration
 - 5639-XXJ 2 year registration
 - 5639-XXE 3 year registration
 - 5639-XXL 4 year registration
 - 5639-XXK 5 year registration

Refer to IBM System Storage ProtecTIER Enterprise Edition V2 Software Announcement [208-228](#), dated August 26, 2008, for more information on the IBM System Storage ProtecTIER Enterprise Edition V2 software.

Refer to IBM System Storage ProtecTIER Enterprise Edition V2.2 software with additional 2-year, 4-year, and 5-year Software Maintenance agreements, Software Announcement [209-031](#), dated February 10, 2009.

Operating system prerequisites

The appropriate Linux® operating system is included with the IBM System Storage ProtecTIER Enterprise Edition V2 software.

Connectivity prerequisites

The supported Fiber Channel switches are listed in the System Storage Operation Center (SSIC) located at

<http://www-03.ibm.com/systems/support/storage/config/ssic/>

If this IBM System Storage TS7650G ProtecTIER Deduplication Gateway server is to be accessed via ProtecTIER Manager installed on another computer, network connections must be configured to allow access.

IBM System Storage TS7650G ProtecTIER Deduplication Gateway front end links will be up only after configuring a repository.

File system prerequisites

IBM System Storage TS7650G ProtecTIER Deduplication Gateway stores data in Red Hat Global File Systems (GFS). The number and size of the file systems depends on the size and parameters of your configured repository.

Tivoli® Storage Manager and other compatible software offerings can provide storage and tape management software for TS7650G. Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or ISVs. For a current list of compatible software, call your IBM representative, or visit

Compatibility

Virtual emulation

An IBM System Storage TS7650G ProtecTIER Gateway VTL system emulates, in both stand-alone and clustered configurations, the IBM System Storage TS3500 tape library with IBM Ultrium 2 Tape Drives or Ultrium 3 Tape Drives, and the Quantum P3000 tape library with DLT Tape Drives.

Limitations

Both TS7650G Servers in a clustered configuration must be installed in the same rack.

The internal modem option (#2733) is qualified for use in the following countries:

Argentina, Australia, Bahrain, Bolivia, Brazil, Canada, Chile, People's Republic of China, Colombia, Costa Rica, Croatia, Ecuador, Egypt, Guatemala, Guyana, Hong Kong, Indonesia, Israel, Japan, Jordan, Korea, Kuwait, Lebanon, Malaysia, Macau, Mexico, Morocco, New Zealand, Nicaragua, Oman, Panama, Pakistan, Peru, Philippines, Saudi Arabia, Singapore, South Africa, Sri Lanka, Suriname, Taiwan, Thailand, Turkey, UAE, Uruguay, United States, Vietnam, Venezuela, Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK., Honduras, Abu Dhabi, Russia along with CIS (Commonwealth of Independent States - former Soviet Union): Estonia, Kazakhstan, Krygyzstan, Latvia, Lithuania, Ukraine, Armenia, Azerbaijan, Belarus, Georgia, Moldova, Tajikistan, Turkmenistan, and Uzbekistan.

Planning information

Customer responsibilities

Physical planning is a customer responsibility. Detailed planning information is in the *IBM System Storage TS7600 with ProtecTIER Introduction and Planning Guide for the TS7650G (Gateway) GC53-1152*

Rack installations

The TS7650G Server is a 4U rack-drawer model designed to be installed in a 19-inch rack cabinet designed for 26-inch deep devices, such as the NetBAY42 ER, NetBAY42 SR, NetBAY25 SR, or NetBAY11.

When TSSC, feature number 2722, is purchased with the TS7650G Server, it must be installed in the same rack as the TS7650G Server at a suggested height between 14U (24.5 inches), and 22U (38.5 inches). The TSSC requires 2U space in the rack.

When two TS7650G Servers are purchased and installed to form a two node cluster, both servers must be installed in within the same rack. It is encouraged to install the servers in contiguous space.

If using a non-IBM rack, the cabinet must meet the EIA-310-D standards with a depth of at least 71.1 cm (28 in). Also, adequate space (approximately 5 cm (2 in) for the front bezel and 2.5 cm (1 in) for air flow) must be maintained from the slide assembly to the front door of the rack cabinet to allow sufficient space for the door to close and provide adequate air flow.

Customers are responsible for obtaining the appropriate adapters and cables.

You are responsible for downloading or obtaining from IBM, and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM machine) and other software updates in a timely manner from an IBM Internet Web site or from other

electronic media, and following the instructions that IBM provides. You may request IBM to install Machine Code changes; however, you may be charged for that service.

Cable orders

Fibre Channel cables are required to attach the TS7650G Server (3958 Model DD4) to various server adapters. The cables can be customer supplied or ordered with the TS7650G Server with feature number 6025.

25 Meter LC/LC Fibre Channel Cable (#6025)

This feature provides a 25 m (82 ft.) 50.0/125 micrometer short wavelength multimode fiber-optic cable with LC duplex connectors on both ends.

Note: This cable is for attaching a TS7650G Server (that has an LC duplex connector) to switches, disk subsystem, or hosts with LC duplex Fibre Channel connectors.

Direct customer support

Eligible customers can obtain installation and usage assistance through ASK Support using the search words TS7650G, 3958-DD4, or 5639-XXB.

IBM Global Services

IBM Technical Support Services provides comprehensive hardware and software support, including hardware and software implementation for the IBM System Storage TS7650G Server. Technical Support Services are designed to support your installations of IBM Virtualization Engine™ hardware and software. Offering the best solutions for storage management and data migration, IBM Technical Support Services can assist you in developing and deploying storage solutions to enable your success and satisfaction. For more information, contact your IBM representative or Business Partner.

Security, auditability, and control

This product uses the security and auditability features of host hardware, host software, and/or application software to which it is attached.

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

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability.

and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

<http://www.ibm.com/support/electronic>

Terms and conditions

Volume orders: Contact your IBM representative.

IBM Global Financing

Yes

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 which 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 is the same as the machine it is installed.

Extended Warranty Service

This product is provided with one year of standard warranty. For your convenience, IBM has provided additional year(s) of extended warranty services to make this offering. Please consult with your advisors about the appropriate financial treatment for this offering.

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 Web site. 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 and location-specific information.

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 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.

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 Web site. 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, 4 hour average response, same day
- 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 On-site Service levels 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 Web site. 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 and location-specific information. The following service selections are available as maintenance options for your machine type.

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

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 may be provided as part of the machine's standard maintenance service except that you may install a CRU yourself or request IBM installation, at no additional charge, under any of the On-site Service levels specified above.

Warranty service upgrades

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.

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.

The Installation and Planning Guide specifies site preparation, physical requirements, and installation (operating) environment and any cabling included in the installation along with the approximate installation time in hours. Customer requests for installation of items not covered in the installation guide may be performed at IBM's hourly service rate designated for 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 at

http://www.ibm.com/servers/eserver/support/machine_warranties/machine_code.html

IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System Storage technical support Web site

<http://www.ibm.com/servers/storage/support/>

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.

Educational allowance

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

Pricing

Product charges

Description	Machine type	Model	Feature number
TS7650G Server	3958	DD4	
Console Expansion			2714
Console Attachment			2715
TS3000 System Console			2722
Internal Modem			2733
Cluster Connection Kit			3447
1 GB quad port ethernet adapter			3456
8GB FC Dual Port HBA - Host			3458
Install KVM Switch			5510
KVM Display, Keyboard, Mouse			5512
KVM adjacent frame connection			5513
2nd server in adjacent frame			5514
25 Meter LC/LC FC Cable			6025
VTL			9022
OST			9023
Attach DS8000			9030
Attach DS5000			9031
Attach XIV			9033
Attach to other IBM Disk			9038
No New IBM Disk			9039
ProtectIER EE V2			9306
Rack Mount			9340
No Factory Cables			9700

No cables are required with these feature numbers.

Model number	Feature number	Field install only	Plant install only	MES removal	MES removal charge
DD4	2714	N	N	Y	N
DD4	2715	N	N	Y	N
DD4	2722	N	N	Y	N
DD4	2733	N	N	Y	N
DD4	3447	N	Y	N	N
DD4	3456	N	Y	N	N
DD4	3458	N	Y	N	N
DD4	5510	N	N	Y	N
DD4	5512	N	N	Y	N
DD4	5513	N	N	Y	N
DD4	5514	N	N	Y	N
DD4	6025	N	N	N	N

DD4	9022	N	Y	N	N
DD4	9023	N	Y	N	N
DD4	9030	N	Y	N	N
DD4	9031	N	Y	N	N
DD4	9033	N	Y	N	N
DD4	9038	N	Y	N	N
DD4	9039	N	Y	N	N
DD4	9306	N	Y	Y	N
DD4	9340	N	Y	Y	N
DD4	9700	N	Y	Y	N

If field installed on a purchased machine, parts removed or replaced become the property of IBM and must be returned.

Description	Type	Model	Feature	List Price
TS7650G Server	3958	DD4		\$90825
Console Expansion	3958	DD4	2714	0
CONSOLE ATTACHMENT	3958	DD4	2715	0
TS3000 SYSTEM CONSOLE	3958	DD4	2722	5150
INTERNAL MODEM	3958	DD4	2733	226
CLUSTER CONNECTION KIT	3958	DD4	3447	2300
1Gb quad port Ethernet adap	3958	DD4	3456	2400
8Gb FC Dual Port HBA - Host	3958	DD4	3458	4350
INSTALL KVM SWITCH	3958	DD4	5510	1600
KVM DISPL, Keyboard, Mouse	3958	DD4	5512	4500
KVM adj frame connection	3958	DD4	5513	490
2nd server in adj frame	3958	DD4	5514	290
25 METER LC/LC FC CABLE	3958	DD4	6025	330
VTL	3958	DD4	9022	0
OST	3958	DD4	9023	0
ATTACH DS8000	3958	DD4	9030	0
ATTACH DS5000	3958	DD4	9031	0
ATTACH XIV	3958	DD4	9033	0
ATTACH TO OTHER IBM DISK	3958	DD4	9038	0
NO NEW IBM DISK	3958	DD4	9039	0
PROTECTIER EE V2	3958	DD4	9306	0
RACK MOUNT	3958	DD4	9340	0
NO FACTORY CABLES	3958	DD4	9700	0

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Corrections

(Corrected on November 3, 2010)

The Hardware requirements section has been updated.