The IBM 3952 Tape Frame Model F05 contains the components of the IBM Virtualization Engine TS7500

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At a glance

The IBM Virtualization Engine TS7520 solution is designed to offer tape virtualization for open systems servers connecting over Fibre Channel connections. The TS7520 solution consists of:

- TS7500 V2R1 Software (5697-N65 or 5697-N66)
- One or two Base 3952 Tape Frames and up to ten Expansion 3952 Tape Frames to contain the other components
- One, two, or four Model CV6 Virtualization Engines
- Up to 24 Model CV6 Cache Controllers
- Up to 112 Model SX6 Cache Modules in twelve 3952 Tape Frames

The TS7520 solution can include up to 1,088 TB of native cache capacity (884 TB useable capacity) to help address large data backup and recovery requirements, a significant enhancement.

The TS7520 solution supports a primary and secondary base frame, allowing four total TS7520 Model CV6 Virtualization Engines. The TS7520 solution also supports up to ten expansion frames.

The TS7520 solution can provide up to 1,088 TB of native cache capacity (useable capacity 884 TB). For ordering, contact:

Your IBM representative, an IBM Business Partner, or the Americas Call Centers at

800-IBM-CALL Reference: YE001

Overview

The IBM Virtualization Engine™ TS7520 solution (TS7520) is a virtual-tape solution designed to help optimize tape processing. Through the implementation of an integrated, tiered storage hierarchy of disk and tape, the benefits of both technologies can be leveraged to help enhance performance and provide the capacity needed for today’s tape processing requirements. Deploying this innovative subsystem can help reduce batch processing time and management overhead.

The 3952 Tape Frame Model F05 is the frame that contains the components of the TS7520 solution.

The TS7520 solution utilizes IBM technology and software to emulate IBM tape libraries, drives, and media. This emulation capability is designed to help customers achieve the following operational and throughput efficiencies:

- Backup window reduction
- Restore time reduction
• Data sharing and resource virtualization facilitation
• Operational efficiencies
• Improved sharing of tape libraries across applications and servers

The TS7520 solution consists of three hardware machine types and an IBM Virtualization Engine TS7500 Software V2.1 program (5697-N65 or 5697-N66).

These Machine Type Models are referred to as:
• The IBM Virtualization Engine TS7520 Model CV6 or
• TS7520 Virtualization Engine

The TS7520 Virtualization Engine is the processing engine for a TS7520 solution.
• The IBM Virtualization Engine TS7520 Model SV6 or
• TS7520 Cache Controller

The TS7520 Cache Controller manages the disk cache for a TS7520 solution.
• The IBM Virtualization Engine TS7520 Model SX6 or
• TS7520 Cache Module

The TS7520 Cache Model expands the disk cache for a TS7520 solution.
• IBM 3952 Tape Frame Model F05

The 3952 Tape Frame can be used to contain the components of a TS7520 solution. The 3952 Tape Frame can contain (configured as a limited edition base frame):
• One Model CV6
• One Model SV6
• Up to two Model SX6s

The 3952 Tape Frame can contain (configured as a base frame or secondary base frame):
• One or two Model CV6s
• Two Model SV6s
• Up to six Model SX6s

The 3952 Tape Frame can contain (configured as an expansion frame):
• One or two Model SV6s
• Up to ten Model SX6s

The TS7520 solution supports a primary and secondary base frame, allowing four total TS7520 Model CV6 Virtualization Engines. The TS7520 solution also supports up to ten expansion frames.

The TS7520 solution can provide up to 1,088 TB of native cache capacity (useable capacity 884 TB).

Key prerequisites

The IBM Virtualization Engine TS7520 solution requires a 3952 Tape Frame containing one or two TS7520 Model CV6 Virtualization Engines. An optional second frame containing an additional two Model CV6 Virtualization Engines, up to two Model SV6 Cache Controllers, and optional Model SX6 Cache Modules is also available. A maximum number of 12 tape frames are allowed: two as base frames, ten as expansion frames.
A customer-supplied management console and the IBM Virtualization Engine TS7500 V2R1 Software program (5697-N65 or 5697-N66) are also required. The TS7520 solution attaches to selected IBM System p™, IBM System i™, RS/6000®, RS/6000 SP™, IBM System x™, Netfinity®, IBM System z™ (Linux™ only), Sun, HP-UX, Windows™ 2003, Linux, and other UNIX® and PC servers. Appropriate levels of host software are required. Refer to the Technical information section for details.

* System i™ support is available under the IBM Request for Price Quotation program.

**Planned availability date**

June 8, 2007

**Description**

The IBM Virtualization Engine TS7520 solution consists of three hardware machine types and the IBM Virtualization Engine TS7500 Software V2.1 program 5697-N65 or 5697-N66.

These Machine Type Models are referred to as:

- The IBM Virtualization Engine TS7520 Model CV6 or
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The TS7520 Virtualization Engine is the processing engine for a TS7520 solution.

- The IBM Virtualization Engine TS7520 Model SV6 or
- TS7520 Cache Controller

The TS7520 Cache Controller manages the disk cache for a TS7520 solution.

- The IBM Virtualization Engine TS7520 Model SX6 or
- TS7520 Cache Module

The TS7520 Cache Model expands the disk cache for a TS7520 solution.

- IBM 3952 Tape Frame Model F05

The 3952 Tape Frame can be used to contain the components of a TS7520 solution.

The TS7520 solution is available in multiple configurations. One TS7520 Virtualization Engine is a single node. The TS7520 solution is available in a single-node configuration, in a dual-node high-availability (HA) configuration, or a four-node high-availability configuration and double the capacity. A single-node configuration supports:

- Up to 128 virtual libraries (3584 Emulation)
- Up to 1,024 virtual tape drives (LTO2/LTO3/3592 Model J1A/E05)
- Up to 64,000 virtual cartridges

In a dual-node configuration, a TS7520 solution can support up to:

- 256 virtual tape libraries
- 2,048 virtual tape drives (LTO2/LTO3/3592 Model J1A/E05)
- 128,000 virtual cartridges

In a four-node configuration, a TS7520 solution can support up to:

- 512 virtual tape libraries
- 4,096 virtual tape drives (LTO2/LTO3/3592 Model J1A/E05)
- 256,000 virtual cartridges
The TS7520 solution provides virtual tape emulation and physical tape attachment for many IBM Tape Libraries. Refer to the Devices supported section of this RFA to view the list of virtually emulated and physically supported tape libraries.

The TS7520 solution provides connectivity through the following:

- Up to eight Fibre Channel ports per node for tape or host server attachment or up to 18 Ethernet ports per node for iSCSI server attachment, Network Replication, or NDMP
- Up to four Fibre Channel ports can be dedicated to physical tape connection, or up to eight ethernet ports
- Any number of available ethernet ports may be used for network replication

An HA TS7520 configuration, with two or four TS7520 servers and dual ac power on the 3952 Tape Frame, is designed to provide redundancy for nodes, disks, power, and tape/host connectivity. Increasing the number of nodes also increases the maximum supported cache for a TS7520 solution.

The 3952 Tape Frame Model F05, is a frame that can be used to house the components of the TS7520 solution. Up to twelve 3952 Tape Frames Model F05 can be attached in a TS7520 configuration. The base unit 3952 Tape Frame Model F05 can accommodate:

- One or two TS7520 Virtualization Engine (3954 Model CV6) servers:
  - A single Model CV6 supports up to ten expansion frames (992 TB raw capacity, 806 TB usable) and an effective data throughput rate of 1,200 MB/second.
  - Two Model CV6s may be configured in a dual-node configuration for twice the virtual drives and virtual volumes. This configuration supports up to ten expansion frames (1,024 TB raw capacity, 832 TB usable) and an effective data throughput rate of up to 2,400 MB/second.
  - Four Model CV6s may be configured in a four-node configuration for four times the virtual drives and virtual volumes of a single-node configuration. This configuration supports up to 1,088 TB of raw capacity (884 TB of useable capacity with ten expansion frames) and an effective data throughput race of up to 4,800 MB/second.
- Two TS7520 Cache Controllers (3955 Model SV6), that each provide 8 TB of raw capacity (6.5 TB usable).
- Up to six TS7520 Cache Modules (3955 Model SX6), that each provide 8 TB of raw capacity (6.5 TB usable).

An optional 3952 Tape Frame Model F05, called the expansion unit, can accommodate another ten TS7520 Cache Modules and two TS7520 Cache Controllers, for a maximum of 96 TB of native cache capacity (78 TB useable) in a TS7520 solution.

The IBM Virtualization Engine TS7520 solution is designed to provide redundancy for critical hardware components and connections between components. Key functional features of the TS7520 solution are:

- Support for many key IBM Tape Libraries both virtual and physical (Refer to the Devices supported section of this RFA to view the complete list of virtually emulated and physically supported tape libraries)
- Physical tape export offered in two modes:
  - a. Backup software controlled
  - b. Operator initiated
- Configuration of two TS7520 Model CV6 Virtualization Engines as an active cluster
- Configuration of four TS7520 Model CV6 Virtualization Engines as two cooperating active clusters
- Support for real-time compression of data, reducing disk storage requirements
- On demand allocation of disk storage to help maximize storage utilization using virtual cartridges (Static allocation is also supported for customized environments)
- Support of import/export to an IBM TotalStorage® 3494 Tape Library using an Ethernet interface to manage the library
- Interaction with the TS7520 Cache Controllers to perform transparent fail-over/fail-back from
path (HBA, port, switch, channel) or storage controller failure to minimize disruption to backup
or restore activities

- Integration of Ethernet and Fibre Channel switches for connectivity between base frames and
  expansion frames
- Ability to scale processing and memory capacity for improved performance

Completing the TS7520 configuration is the IBM Virtualization Engine TS7500 V2R1 Software
program (5697-N65 or 5697-N66) that executes on a TS7520 Virtualization Engine (3954
Model CV6).

3952 Tape Frame Model F05

The TS7520 solution can have up to twelve 3952 Tape Frames Model F05: an Enterprise Edition
primary base frame or Limited Edition base frame, a possible secondary base frame (for
Enterprise Edition Configurations), and up to ten expansion frames (for Enterprise Edition
Configurations). The IBM 3952 Tape Frame holds the components of the TS7520 solution.

Accessibility by people with disabilities

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


Section 508 of the U.S. Rehabilitation Act

The IBM Virtualization Engine TS7500 solution is capable as of October 21, 2005, when used in
accordance with IBM's associated documentation, of satisfying the applicable requirements of
Section 508 of the Rehabilitation Act, provided that any assistive technology used with the
product properly interoperates with it. A U.S. Section 508 Voluntary Product Accessibility
Template (VPAT) can be requested via IBM's Web site at


Product positioning

The TS7520 Virtualization Engine solution is a high-performance, high-capacity open systems
virtual tape offering designed to augment the tape backup and restore process in large tape
environments. The TS7520 solution is designed to aid in the tape backup and restore process by
helping provide customers significant operational and throughput efficiencies via tape
virtualization, namely:

- Backup window reduction
- Restore time reduction
- Data sharing and resource virtualization facilitation
- High availability options
- Integrated server, disk, and tape solution for IT optimization

The TS7520 solution is a tape virtualization solution for open systems attachment over Fibre
Channel interfaces. It can achieve significant operational efficiencies by storing the recently used
data in the TS7520 disk cache. As data ages, the older data may be migrated to real tape for
longer term storage. Since data can now be written to virtual tape via the disk cache, heavy daily
tape drive usage can be greatly reduced. Fewer personnel may be needed to administer the
backup process when it includes virtual tape.

The TS7520 solution provides connectivity through the following:

- Eight Fibre Channel ports per node for tape or host server attachment or up to 18 Ethernet
  ports per node for iSCSI server attachment, Network Replication, or NDMP
- Up to four Fibre Channel ports can be dedicated to physical tape connection or eight ethernet
  ports
- Up to eight ethernet ports may be used for network replication
The TS7520 solution differs from many other open systems virtual tape offerings, by enabling either direct tape attachment or parallel tape attachment. Direct tape attachment is where real tape drives or libraries are physically attached to the TS7520 solution. Parallel tape attachment is where real tape drives or libraries are attached to the host server and data is transferred from the TS7520 solution through the host server to real tape drives or libraries that are physically attached to the host server.

The TS7520 solution can help reduce the backup window in many installations. Since robotic movement, tape load/thread, and physical tape search and rewind is eliminated in virtual tape, the effective utilization of the Fibre Channel interfaces is high. That means more tape jobs can be run to virtual tape over a single interface than to real tape. If the backup window is reduced, the time allowed for migration to real tape is increased, thus potentially reducing the number of real tape drives needed for longer term data storage.

The TS7520 solution is designed to improve business continuity by providing better restore times. By having the data in the disk cache, the TS7520 solution can help reduce restore times. With up to 4,096 virtual tape drives, and up to 512 virtual tape libraries, each backup server can be allocated their own virtual resources, allowing multiple and disparate backup applications to use the same physical resources. This offers the potential for infrastructure simplification.

Multiple different tape libraries and tape drives can be aggregated to one or more TS7520 solutions, helping centralize the backup resources. The addition of the TS7520 solution into your tape backup architecture can help provide significant operational reductions, and performance benefits.

Reference information

Refer to:

- The TS7520 Virtualization Engine in Hardware Announcement 105-406, dated October 11, 2005.

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).

BP Attachment for Announcement Letter 107-232


Trademarks

Virtualization Engine, System p, SP, System x, System z, and System i are trademarks of International Business Machines Corporation in the United States or other countries or both.

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Linux is a trademark of Linus Torvalds in the United States, other countries or both.

Other company, product, and service names may be trademarks or service marks of others.
Publications

The following publications will be available by June 2007.

<table>
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<th>Title</th>
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<tr>
<td>IBM Virtualization Engine(TM) for Tape TS7500 Hardware Installation, Setup, and Problem Determination Guide</td>
<td>GC26-7766</td>
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<tr>
<td>IBM Virtualization Engine for Tape TS7500 Introduction and Planning Guide</td>
<td>GC27-2067</td>
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<tr>
<td>IBM Virtualization Engine for Tape TS7500 User Guide</td>
<td>GC27-2068</td>
</tr>
<tr>
<td>IBM Virtualization Engine for Tape TS7500 Error Codes Customer Manual</td>
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<td>IBM Virtualization Engine for Tape TS7500 Error Codes Technical Support Manual</td>
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<tr>
<td>IBM Virtualization Engine for Tape TS7500 Installation Roadmap</td>
<td>GC26-7778</td>
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<tr>
<td>Statement of Limited Warranty</td>
<td>GC27-2131</td>
</tr>
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</table>

The following publication will be available by June, 2007. To order, contact your IBM representative.

<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
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</thead>
<tbody>
<tr>
<td>IBM Virtualization Engine for Tape TS7500 Introduction and Planning Guide</td>
<td>GC27-2067</td>
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http://www.ibm.com/shop/publications/order

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

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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

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

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**Technical information**

### Specified operating environment

**Hardware requirements:** An IBM TS7520 Model CV6 Virtualization Engine solution can be attached to IBM pSeries®, IBM System i®, RS/6000®️, RS/6000 SP™️ systems, IBM System z™️ (Linux™️ only), IBM xSeries®, Netfinity®, and non-IBM servers, workstations, and personal computers that support Fibre Channel interfaces.

A current list of supported open system configurations for the TS7520 solution is available from the following Web site

http://www.ibm.com/servers/storage/tape

Select "Enterprise tape storage" under Featured Topics, then "TS7520 Virtualization Engine", then "Product Details", then "Interoperability", and view the "Supported Servers and Operating Systems" for the product.

* System™️ support is available under the IBM Request for Price Quotation program.

The IBM 3952 Tape Frame Model F05 provides the frame that contains the various components of the TS7520 solution. The TS7520 solution can consist of one to twelve 3952 Tape Frames that are specified with the following features:

- **1906 (Ethernet Switch Kit) —** Includes one 16-port ethernet switch. Recommended for each Model CV6 (up to a maximum of 2). Include ethernet cables to connect the TS7520 Model CV6 Virtualization Engines in the base frame to the integrated switch, and to connect the ethernet switch to the Fibre Channel switches in the base frame. Required for feature number 7317; optional for feature number 7319.

- **1907 (Fibre Channel Switch Kit) —** Includes two 32-port Fibre Channel switches with 16 ports enabled per switch. Only valid for Model F05 in TS7520 configuration with feature number 7317. Required when feature number 7320 or 7318 is ordered for the first time in a system configuration. Feature numbers 1903 and 1906 are required.

- **1908 (Eight Port Switch Expansion) —** Enables an additional eight ports for each of the Fibre Channel switches added with feature number 1907. Allowed two times to enable the complete 32 ports. These features are required for large configurations including more than three (for the first) and seven (for the second) expansion frames.

- **7317 (TS75200 Series Base Unit) —** Identifies this frame as the base unit frame, which contains one or two TS7520 Model CV6 Virtualization Engines, two TS7520 Model SV6 Cache Controllers, and up to six TS7520 Model SX6 Cache Modules.

- **7318 (TS7500 Series Expansion Unit) —** Identifies this frame as the expansion unit frame, which contains up to two TS7520 Model SV6 Cache Controllers, and up to ten additional TS7520 Model SX6 Cache Modules.

- **7319 (TS7520 Series Limited Edition Base Unit) —** Identifies this frame as a Limited Edition base unit frame, which contains one TS7520 Model CV6 Virtualization Engine, one TS7520 Model SV6 Cache Controller, and up to two TS7520 Model SX6 Cache Modules.

- **7320 (TS7520 Series Secondary Base Unit) —** Identifies this frame as the secondary base unit frame, which contains two TS7520 Model CV6 Virtualization Engines, two TS7520 Model SV6 Cache Controllers, and up to six TS7520 Model SX6 Cache Modules.

One or two TS7520 Model CV6 Virtualization Engines can be installed in the base unit frame with the following features:
• 5728 (Plant Install a 3954 Model CV6) — To have the factory install one TS7520 Model CV6 Virtualization Engine into a new 3952 Tape Frame shipping from the plant. A minimum of one must be installed in the 3952 Tape Frame designated as the base unit (#7317). A corresponding feature number 9326 (Plant Install a 3954 Model CV6) must be ordered on the TS7520 Model CV6 Virtualization Engine.

• 5729 (Field Install a 3954 Model CV6) — To ship a second TS7520 Model CV6 Virtualization Engine for field installation into an installed 3952 Tape Frame designated as the base unit (#7317). A corresponding feature number 9327 (Field Merge a 3954 Model CV6) must be ordered on the TS7520 Model CV6 Virtualization Engine.

Two TS7520 Model SV6 Cache Controllers must be installed in the base unit frame with the following feature:

• 5738 (Plant Install a 3955 Model SV6) — To have the factory install one TS7520 Model SV6 Cache Controller into a new 3952 Tape Frame shipping from the plant. Two of these features must be installed in the 3952 Tape Frame designated as the base unit (#7317). A corresponding feature number 9322 (Plant Install a 3955 Model SV6) must be ordered on the TS7520 Model SV6 Cache Controller.

• 5739 (Field Install a 3955 Model SV6) — To ship an additional TS7520 Model SV6 Cache Controller into a new 3952 Tape Frame installed in the field. Two of these features must be installed in the 3952 Tape Frame designated as the base unit (#7317). A corresponding feature number 9329 (Field Install a 3955 Model SV6) must be ordered on the TS7520 Model SV6 Cache Controller.

The TS7520 Model SX6 Cache Module provides additional disk cache storage and is installed in the 3952 Tape Frame with the following feature:

• 5748 (Plant Install a 3955 Model SX6) — To have the factory install one TS7520 Model SX6 Cache Module into a new 3952 Tape Frame shipping from the plant.

• 5749 (Field Install a 3955 Model SX6) — To ship an additional TS7520 Model SX6 Cache Module for field installation into an installed 3952 Tape Frame. A maximum of six of these features can be installed in the 3952 Tape Frame designated as the base unit, two in a Limited Edition base unit. An additional ten features can be installed in the 3952 Tape Frame designated as the expansion unit.

The appropriate power cord must be specified. The Dual ac Power feature (#1903) should be ordered if connection to two independent branch power circuits is desired. If this feature is ordered, two power cords will be provided. This feature is optional for Limited Edition configurations.

The IBM Virtualization Engine TS7500 V2R1 Software (5697-N65 or 5697-N66) must also be ordered and installed with each TS7520 Model CV6 Virtualization Engine. Refer to the 3954 Model CV6 for additional information.

Management console

A management console is used for configuration, management, and service support for the TS7520 solution. This console is required by the TS7520 solution and is either supplied by the customer or optionally ordered from IBM. If a management console machine is ordered, it is placed as a separate order from the TS7520 solution. The minimum requirements for the management console are:

• Hardware requirements:
  – x86 (Pentium® or higher) microprocessor
  – 512 MB memory
  – 175 MB of disk space for Virtualization Engine for Tape Console Function and Capacity Support
  – Keyboard, mouse, and CD-ROM drive
  – Super VGA monitor with the screen resolution set to at least 800 x 600, small fonts setting, and 256 colors
  – One Ethernet port for attachment to the TS7520 management network
  – One additional Ethernet port recommended for Internet access
- A Web browser and Java™-2 JRE installed

Operating environments supported:
- Windows™ 2000 with Service Pack 4 (SP4)
- Windows 2000 Server SP4
- Windows 2000 Advanced Server SP4
- Windows 2000 Datacenter Server SP4
- Windows 2003 Server Enterprise Edition
- Windows 2003 Datacenter Edition

**Software requirements:** The TS7520 Virtualization Engine supports the following operating systems at the minimum levels indicated:

**Enterprise Edition**
- AIX 5L™ V5.1, V5.2, and V5.3
- V5R3 and V5R4 i5/OS™
  - System i support is available under the IBM Request for Price Quotation program.
- Sun Solaris 8, 9, and 10
- Microsoft™ Windows 2003 (build 3790, or greater)
- 64-bit HP-UX 11i v1 and 11i v2
- Linux distributions:
  - Novell SUSE Linux Enterprise Server 10
  - Red Hat Enterprise Linux 4.4
  - Novell SUSE Linux Enterprise Server 9 SP3
  - Linux Asianux 2.0

**Limited Edition**
- AIX 5L V5.1, or later
- V5R3 and V5R4 i5/OS™
  - System i support is available under the IBM Request for Price Quotation program.
- Sun Solaris 8, 9, and 10
- Microsoft Windows 2003 (build 3790, or greater)
- 64-bit HP-UX 11i v1 and 11i v2
- Linux distributions:
  - Novell SUSE Linux Enterprise Server 10
  - Red Hat Enterprise Linux 4.4
  - Novell SUSE Linux Enterprise Server 9 SP3

Tivoli® Storage Manager and other compatible software offerings provide storage and tape management software for the TS7520. Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or ISVs. A list of compatible software is available from your IBM representative or at


**Planning information**

**Customer responsibilities:** Physical planning is a customer responsibility. Detailed planning information is in the IBM Virtualization Engine for Tape TS7520 Hardware Installation, Setup,
Customers are responsible for obtaining a management console (refer to the Hardware requirements section for detailed information). Customers are responsible for obtaining the appropriate host adapters, cables, network switches, and SAN switches.

**Cable orders:** Fibre Channel cables are required to attach the TS7520 to various server adapters. Refer to the TS7520 Virtualization Engine (3954 Model CV5) for a list of cables.

**Direct customer support:** Eligible customers can obtain installation and usage assistance through ASK Support using the search words TS7520 or 3954.

**IBM Global Services**
IBM Technical Support Services provides comprehensive hardware and software support including hardware and software implementation for the IBM Virtualization Engine TS7520 solution. 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, 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 put you on the road to 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 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.

To learn how Electronic Services can work for you, visit

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

**Terms and conditions**

**MES discount applicable:** Equal to the volume commitment discount.

**Field installable feature:** Yes

**Warranty period:** One year.

These feature assumes the same warranty or maintenance terms as the machine in which it is installed for the full warranty or maintenance period announced for such machine.
**Customer setup:** No

**Machine code:** Same license terms and conditions as base machine.

### Prices

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**MMMC = Monthly Minimum Maintenance Charge**

**NC = No Charge**

No cables are required with these feature numbers.
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**TS7520**
- Base Unit: 7317 N N
- Expansion Unit: 7318 N N
- Limited Edition Unit: 7319 N N
- Secondary Base Unit: 7320 N N

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