

IBM TotalStorage™ Enterprise Tape Library 3494



A 16-frame IBM TotalStorage Enterprise Tape Library 3494 high availability configuration with two service bay frames

Highlights

- ***Designed to provide cost-effective, reliable, space-efficient tape automation***
- ***Uses IBM TotalStorage Enterprise Tape Drive 3590 and 3490E tape drives***
- ***Supports the IBM TotalStorage Enterprise Tape Model A60 Controller with ESCON® and FICON™ attachment***
- ***Includes a high availability model***
- ***Provides multiple host connectivity options***
- ***Offers exceptional expandability***

- ***Can mount/demount up to 610 cartridges per hour with dual active accessors²***
- ***Can help reduce overall tape operating costs by using the full capacity of 3590 tape cartridges***
- ***Supports the IBM 3466 Network Storage Manager***

Superior tape automation

The IBM TotalStorage Enterprise Tape Library 3494 is a tape automation system consisting of individual frame units that can accommodate a wide range of configurations. This flexibility enables organizations to start small and grow in an affordable and incremental manner.

The basic building block of the Enterprise Tape Library 3494 is the Tape Library Base Frame, which contains a library manager, a cartridge accessor, up to two tape drives and slots to store tape cartridges. Drive frames, storage unit frames and up to two Virtual Tape Servers can be added to the Base Frame. A high availability model can also be created with a maximum of 16 frames and two service bays.

The Enterprise Tape Library 3494 supports all three 3590 models (B1A, E1A and H1A) and 3490E tape drives within the same library.

Wide platform connectivity

The Enterprise Tape Library 3494 attaches to multiple systems, including the IBM @server iSeries™ (IBM AS/400®), pSeries™ (RS/6000®, SP™) and zSeries™ (S/390®); selected systems from Sun Microsystems and Hewlett-Packard, as well as Intel-based xSeries™ systems running Linux®, Microsoft® Windows NT® and Windows® 2000, as well as other selected non-IBM platforms.

Exceptional performance

The average mount-access time in a single-frame Enterprise Tape Library 3494 is only seven seconds. The Enterprise Tape Library 3494 can perform up to 265 cartridge exchanges per hour with a single gripper, up to 305 exchanges per hour with the optional dual gripper and up to 610 exchanges per hour with a dual gripper and dual active accessors². Due to increased accessor travel, the exchange capability of the accessor can decrease as the number of frames increases. The time required to inventory tape cartridges in any single library frame (control unit, drive unit or storage unit) is approximately four minutes.³

Virtual Tape Server

The IBM TotalStorage Virtual Tape Server is designed to help dramatically reduce tape operating costs and



The 3494 cartridge accessor with the dual gripper that provides increased performance and availability

improve overall tape library processing performance. The Virtual Tape Server uses virtual drives composed of RAID-5 disk arrays to cache data and then efficiently fill high-capacity 3590 tape cartridges. This can help reduce the requirements for tape drives, automation devices, media, floor space and operations personnel.

IBM 3466 Network Storage Manager

When paired with the Enterprise Tape Library 3494, the IBM 3466 Network Storage Manager provides an integrated backup, archive and disaster recovery

system for medium to large distributed heterogeneous networks. The advanced software in this system provides a reliable, scalable and versatile storage solution.

High-capacity cartridges

3590 metal particle tape can store up to 30GB of data (90GB with 3:1 compression) when using the Enterprise Tape Drive 3590 Model H1A and the 3590 High-Performance Cartridge Tape. This capacity increases to 60GB (180GB with 3:1 compression) with the 3590 Extended High-Performance Cartridge Tape. The Enhanced-Capacity Cartridge System Tape used with the IBM 3490E tape drives can provide a capacity of 800MB of data (2.4GB with 3:1 compression).

Simplified I/O operations

Two optional convenience I/O stations make it possible to add or remove 10 to 30 cartridges at once without stopping the cartridge accessor. The operator can also add cartridges by opening the door of any frame and inserting cartridges in any available slot. In an Lxx Control Unit frame, a high-capacity, user-defined output facility of up to 160 cartridges is available. An additional high-capacity, user-defined I/O facility of up to 200 cartridges is available for drive or storage frames.

SNMP monitoring

The 3494 supports SNMP alert messaging, enabling 3494 messages to be monitored from one or more SNMP workstations. This support provides more than 80 operator-class alert messages covering:

- 3494 device operations
- Data cartridge alerts
- Service requests
- Virtual Tape Server alerts

Cost-effectiveness

Cost savings can result from a combination of higher performance and reduced requirements for tape drives and cartridges, environmental controls and personnel. In addition, a tape library can be shared across multiple platforms such as the IBM @server iSeries, zSeries, pSeries and xSeries, as well as various non-IBM platforms.

The Enterprise Tape Library 3494 has a small footprint, starting at two and one-half feet wide by five feet deep. This size allows it to fit in most rooms and makes it suitable for vaults. It can also provide a significant savings in floor space.

Library components

Tape Library Base Frame

The IBM TotalStorage Tape Library Base Frame provides the library manager, console, cartridge accessor, optional convenience I/O station, optional tape drives, barcode reader and up to 240 cartridge storage cells.

Standard library manager models are configured with eight control unit ports. The 3494 library manager can be expanded to support up to 32 control unit ports. The 32-port enhancement

3494 performance—exchanges per hour (maximum)^{2,10}

Number of units/drives	With single gripper	With dual gripper	With Dual Active Accessor/dual gripper
1/2	265	305	610
2/4	235	290	580
3/4	215	280	560
4/4	200	260	500
8/16	160 ¹⁰	225	450
16/16	125 ¹⁰	185	370

IBM TotalStorage 3494 Tape Library at a glance

Specifications	Control unit frames			Drive unit frames			Storage units	VTS units	HA1
Model number	L10	L12	L14	D10	D12	D14	S10	B18, B10, B20	
Unit quantity (minimum)	1	1	1						
Unit quality (maximum)	1	1	1	15	15	15	15	2	1(std 2 bays)
Library manager	1	1	1						1
Cartridge accessor	1	1	1						1
Cartridge grippers	1/2	1/2	1/2						1/2
Convenience I/O stations (10 or 30 cartridges)	0/1	0/1	0/1						
Power KVA (excluding drives)	0.3	0.3	0.3	0.1	0.1	0.1		1.8	0.3
Voltage (single phase)	200/240	200/240	200/240	200/240	200/240	200/240		200/240	200/240
BTU/hr (excluding drives)	1000	1000	1000	340	340	340		6550	1000

Maximum cartridge storage cells, single gripper, no I/O station

Zero tape drives	NA	240 ⁵	240 ⁵	400	400	400	400		
One tape drive	240 ⁵	240 ⁵	240 ⁵	300	335	345			
Two tape drives	240 ⁵	240 ⁵	240 ⁵	300	335	345			
Three to four tape drives					290	305			
Five to six tape drives					250				
Maximum capacity (TB)	0.57	4.32 ⁷	43.2 ⁷	0.96	72.0 ⁷	72.0 ⁷	72.0 ⁷		

Maximum cartridge storage cells, dual gripper, no I/O station

Zero tape drives	216 ⁶	216 ⁶	216 ⁶	360	360	360	360		
One tape drive	216 ⁶	216 ⁶	216 ⁶	270	305	305			
Two tape drives		216 ⁶	216 ⁶	270	305	305			
Three to four tape drives					260	275			
Five to six tape drives					230				
Maximum capacity (TB)	0.5	38.8 ⁷	38.8 ⁷	0.8	64.8 ⁷	64.8 ⁷	64.8 ⁷		

Tape drive/control unit models

3490 Model E, F1A	1/2			0/2					
3590 Model B1A, E1A, H1A ⁸		0/2	0/2		0/6	0/4			
3590 Model A60			0/1			0/1			

Physical characteristics

Width in centimeters (inches)	75.0 (29.3)	75.0 (29.3)	75.0 (29.3)	75.0 (29.3)	75.0 (29.3)	75.0 (29.3)	75.0 (29.3)	72.4 (28.5)	75.0 (29.3) ⁴
Depth in centimeters (inches)	152.5 (60.0)	152.5 (60.0)	152.5 (60.0)	152.5 (60.0)	152.5 (60.0)	152.5 (60.0)	75.0 (28.5)	103.6 (40.8)	152.5 (60) ⁴
Height in centimeters (inches)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9)	180.0 (70.9) ⁴
Weight in kilograms (pounds)	559.3 (1233)	559.3 (1233)	454 (1021.5)	418.7 (923)	320 (704)	320 (704)	281.0 (625)	540.0 (1188)	444 (999) ⁴

feature allows the flexibility required to add additional 3590 Tape Drives without having to purchase additional libraries.

Configurations include:

- *Model L12—zero to two SCSI- or Fibre Channel-attached 3590 Tape Drives*
- *Model L14—zero to two 3590 Tape Drives*

Tape Drive Expansion Frame

The IBM TotalStorage Tape Drive Expansion Frame 3494 provides the capability of adding tape drives and up to 400 cartridge storage cells.

Configurations include:

- *Model D12—zero to six SCSI- or Fibre Channel-attached 3590 Tape Drives*
- *Model D14—zero to four 3590 Tape Drives and an ESCON and FICON 3590 Controller*

The 3590 Model A60 Controller installed in a Model D14 Expansion Frame can provide ESCON and FICON support for tape drives in an adjacent Tape Library Base Frame Model L12, L14 or D12 library frame.

The 3590 Model A60 Controller also incorporates the IBM "Call Home" function, which is designed to automatically provide a service alert when a problem occurs in a control unit. A service representative can be sent for installation and to transmit information to the IBM

support center for evaluation. Alerts can also be sent to multiple pagers to alert key personnel.

Tape Storage Frame

The IBM TotalStorage Tape Storage Frame Model S10 provides the capability for adding up to 400 cartridge cells.

Virtual Tape Server

The IBM TotalStorage Virtual Tape Server (VTS) provides up to hundreds of virtual tape addresses to the attached hosts. Tape data is temporarily stored in the VTS disk cache for fast access. Multiple logical volumes are asynchronously migrated to high-capacity cartridges, which may optimize the use of the available capacity of the Enterprise Tape Library.

The VTS is a stand-alone 3494 subsystem that resides in a separate frame outside the library string. The VTS contains a RISC-based microprocessor, storage management functions and disk cache.

High availability model

The TotalStorage Enterprise High Availability Tape Frame 3494 Model HA1 provides a second cartridge accessor, a second library manager and two service frames. If the active accessor fails, the second accessor automatically performs all library tape mounts/demounts. The service bays provide a place to repair a failed accessor while library operations continue. The second library

manager remains in standby mode unless a failure occurs. If the active library manager fails, the standby takes control of the entire library.

The High Availability Frames, having an optional Dual Active Accessor (DAA) feature that enables both accessors to be active simultaneously, improves the mount/demount performance of the Enterprise Tape Library 3494.

Library manager

The integrated library manager controls the following functions:

- *Accessing of cartridges*
- *Placement of cartridges in slots*
- *Movement of cartridges*
- *Automatic drive cleaning*
- *Performance optimization*
- *Tape handling priorities*
- *Error recovery*
- *Error logging*
- *Media inventory*
- *Media pool management*

Cartridge accessor

The cartridge accessor is designed for reliability and performance. The accessor's barcode reader enables rapid inventory management by optically scanning the barcodes on the cartridges. A standard accessor has a single gripper. An optional dual gripper can improve tape cartridge handling performance by as much as 40 percent.

Attachment requirements

Host operating systems send data to tape drives through SCSI, Fiber Channel, parallel channel, ESCON or FICON connections. Host system software communicates library commands to the library manager via a LAN or RS-232 connection or through the ESCON and FICON or parallel channel controller.

IBM @server zSeries

zSeries programming support is provided for z/OS™, OS/390®, (using either DFSMS or Basic Tape Library Support), TPF, VSE/ESA™, z/VM™ and VM/ESA® operating environments. z/VM and VM/ESA provide mount and demount tape support for guest operating systems such as VSE/ESA, OS/390 and Linux.

IBM @server iSeries

iSeries support for the Enterprise Tape Library 3494 is provided by OS/400® and Backup Recovery and Media Services/400 (BRM Services/400).

IBM @server pSeries

pSeries support is provided for AIX® operating environments through a programming interface for applications and user commands.

Optional software

Tivoli® Storage Manager supports z/OS, MVS/ESA™, z/VM, VM/ESA, VSE/ESA, OS/400, AIX, Hewlett-Packard, Microsoft Windows, and Sun™ workstations as server platforms and Enterprise Tape Library 3494 as a storage management device for backing up and managing data.

Media

Tape media can be ordered via library feature codes from IBM Media or Supplies Distribution, or from authorized dealers. To order IBM media and supplies in the United States, call toll-free 1-888-IBM-MEDIA (1-888-426-6334), or go to <http://www.storage.ibm.com/media>.

For more information

For more information, contact your IBM representative or your IBM Business Partner. Or visit www.ibm.com/storage.

Footnotes

¹ These library capacities assume a 10-cartridge I/O station, a single gripper, and Extended High-Performance Cartridge Tape.

² These numbers reflect accessor capability and are limited in practice by the number of drives, application drive residency and other factors.

³ Performance values are based upon laboratory analysis and may differ from those realized by a user. These values do not constitute a guarantee of performance.

⁴ Dimensions for each service bay.

⁵ With a 10-cartridge I/O station, capacity is 210; with a 30-cartridge I/O station, capacity is 160.

⁶ With a 10-cartridge I/O station, capacity is 190; with a 30-cartridge I/O station, capacity is 140.

⁷ Assumes Enterprise Tape Drives 3590 Model H1A, High-Performance Cartridge Tapes, and 3:1 compression.

⁸ Each 3590 Tape Drive contains one transport. If mounted in an L 12 or a D 12 and not attached to a Model A60 Controller, each 3590 Tape Drive counts as one tape control unit.

⁹ Depth excludes operator and service clearance. Weight excludes tape drives and cartridges.

¹⁰ Actual customer performance may vary depending on library configuration, host platform and tape application.

¹¹ A 3590 Model A60 Controller in a D 14 frame can attach 3590 Tape Drives to adjacent D 12, L 12 or L 14 frames.



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