



Intercom
Computer
Systems

I-6984/Ultrium Enterprise Virtual Tape Server for S/390 and Open Systems

The I-6984/Ultrium Enterprise Virtual Tape Server (EVTS) is a Tape Storage Area Network (SUN), offering the best combination of price, performance, capacity, scalability and connectivity. Storage capacity ranges from 14 to 496 TB* and bandwidths from 108 GB to 7.8 TB per hour. The EVTS is intended for high end and mid-range Mainframes as well as Open Systems Server. It provides centralized management for local and/or remote tape resources and enables an enterprise wide archiving, backup and data security strategy.

LTO "Ultrium" Technology

The I-6984 Enterprise Virtual Tape Server is based on the latest Linear Tape Open (LTO) "Ultrium" technology, the most innovative and most reliable magnetic tape technology available today. LTO "Ultrium" is based on the tape standard, specified by the LTO Initiative, lead by IBM, HP and Seagate.

Servo track controlled high accurate data recording via thin-film magneto resistive read/write heads with read-after-write data verification and advanced error detection and correction guarantees reliability, durability and data integrity. Automatic data caching and read/write buffering enhances performance.

The "Ultrium" high capacity tape cartridge is specially designed for repeated, unattended and trouble-free use in automated tape libraries. It stores 100 GB native data or 200 GB with 2:1 compression. Data rate 15 MB/s native and 30 MB/s with 2:1 compression. The Memory in Cartridge collects usage and error information for preventive maintenance as well as user data such as Volume and File Labels.

A Ultrium Road Map, released by the LTO Initiative leads far into the next decade and

shows capacity improvements up to 800 GB native per cartridge and data rates up to 160 MB/s.

IBM 3584 UltraScale Tape Library

The I-6984 EVTS integrates the IBM 3584 UltraScale Tape Library, providing highly scalable automated tape storage with outstanding retrieval performance. A dual-gripper accessory improves overall performance by retrieving the next cartridge to be mounted, unloading the current cartridge, and loading the next one. The typical cartridge move time less than 3 seconds enables more than 500 mounts per hour. Barcode support is a standard feature.

"Ultrium"	1. Generation	2. Generation	3. Generation	4. Generation
Capacity native	100 GB	200 GB	400 GB	800 GB
Data Rate native	15 MB/s	20 MB/s	40 MB/s	80 MB/s

The Basic Library Module L32 has 141 to 281 cartridge slots and support for up to twelve IBM LTO "Ultrium" tape drives with an incremental reduction of storage slots for more than four drives. The library door can be opened for cartridge bulk-loading. Typical inventory time is less than 60 seconds. A door lock restricts physical

Highlights

LTO "Ultrium Technology"

100/200* GB per Cartridge
15/30* MB/s

Tape Library

Up to 2,481 Cartridges
Up to 248/496* TB
Up to 72 Tape Drives
Up to 7.8 TB/h Bandwidth

Virtual Tape System

Up to 10 TB Disk Cache
Up to 256 Virtual Tape Drives
Dual Copy Function
Remote Attachment

Connectivity

ESCON
Block Multiplex Channel
Fibre Channel
SCSI

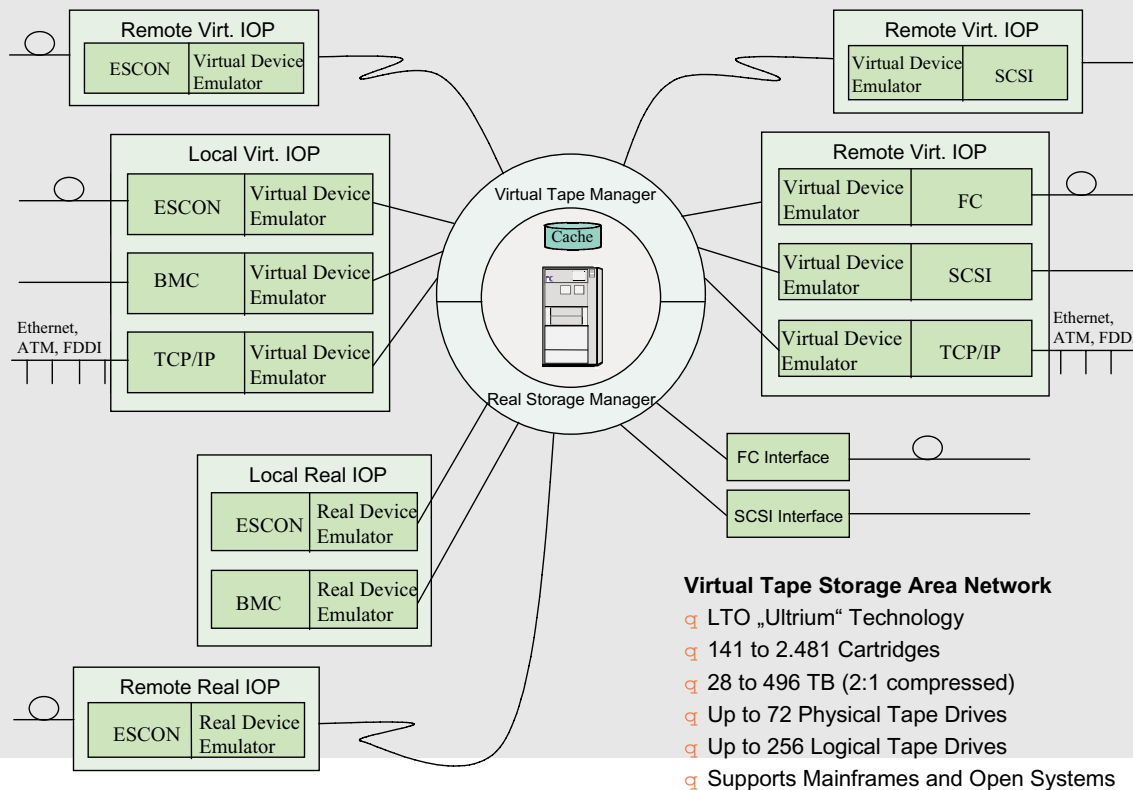
System Support

OS/390, VM/VSE
BS/2000, GCOS 8
UNIX, LINUX, AIX
Windows NT/2000

Backward Compatibility

36 Track with IBM 3490 Emulation
18 Track with IBM 3480 Emulation
9 Track with IBM 3422 Emulation

* with 2:1 data compression



access to cartridges in the library.

Up to 5 Expansion Modules D32 may be added to the Basic Library Module L32 in order to add storage and/or drive capacity. Each D32 expansion module supports up to 440 slots and up to twelve drives, with incremental reduction of storage slots for each set of four drives installed. A fully configured IBM 3584 library with one L32 basic module and five D32 expansion modules supports up to 72 drives with an incredible aggregated data rate of 7.8 TB* per hour, and up to 2,481 storage slots with a total capacity of 496.2 TB*.

Logical Libraries

Heterogeneous server platforms (Mainframes, AIX, LINUX, WIN 2000 etc.) can share tape library robotics with the utilization of the Multi-Path feature. The Multi-Path feature divides a physical tape library into as many as 72 logical libraries. Each logical library has its own separate and distinct tape drives, storage slots and control path and can be connected to different logical or physical hosts via ESCON, Block Multiplex Channel, SCSI or Fibre Channel.

Virtual Tape Management for IBM S/390

As mentioned above, each high capacity LTO

„Ultrium“ cartridge can hold 200 GB* of compressed data on average. Most data volumes in the mainframe environment contain just 500 MB of data or less, wasting 95% or more of the available cartridge capacity.

The I-6984 Enterprise Virtual Tape Server makes optimal use of tape resources and provides immediate benefits to users by reducing personnel, hardware and media expenses. The hosts data volumes are written to virtual drives and temporarily stored on disk cache as virtual volumes. The Virtual Tape Manager migrates virtual volumes according to pre-defined algorithms as logical volumes to real tape. The EVTS can provide faster access to data, reduce tape mounts, utilize the full cartridge capacity, and manage peak loads with reduced hardware by maintaining virtually an unlimited number of virtual tape drives.

Disk Cache

The I-6984 Enterprise Virtual Tape Server can be equipped with Ultra SCSI or Fibre Channel attachment and RAID protected disk cache, ranging from 144 GB to 10 TB for parallel processing of up to 256 virtual tape drives and for keeping work files on disk for fast retrieval. A Fibre Channel attachment is available as an optional feature.

Scalable Bandwidth

The Virtual Input/Output Processor (VIOP) provides connectivity to the host systems via ESCON and Block Multiplex Channel and emulates virtual tape drives. To meet the users bandwidth requirements, up to 16 VIOPs can be attached to an I-6984 Enterprise Virtual Tape Server.

Each VIOP can be equipped with up to four ESCON and/or Block Multiplex Channel interfaces. Fibre Channel and ESCON will be available in Q1/01.

One VIOP emulates up to 16 virtual tape drives, no matter how many physical tape drives are available. An I-6984 EVTS with 16 virtual I/O Processors can maintain a total of 256 virtual tape drives. The virtually unlimited number of virtual drives compensate peak loads, deals with the ever increasing backup data in an ever shrinking backup window and ensures, that no program needs to wait for the availability of tape drives.

Virtual tape drives emulate IBM 3480 and 3490 drives for mainframes, as well as DLT and LTO „Ultrium“ for open systems. This feature guarantees support for all popular operating systems, including OS/390, MVS, VM/VSE, BS2000, GCOS 8, UNIX, LINUX and Win2000 as well as compatibility to all backup and archiving programs, including



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Tivoli, Legato Networker and others.

Real Tape Support

For some applications real tape support may be better suited than virtual tape. The IBM 3584 library can be tailored into two or more logical libraries. One for virtual tapes, maintained by a Virtual IOP (VIOP) and the other for real tapes, maintained by a real Input/Output Processor (IOP). Supported are also real tape drives with IBM 3490, 3480 and 3420 format for data exchange.

Local and Remote Copy

Data can be duplicated for improved data security and disaster recovery. Copies can be generated in the same physical and logical library, in the same physical but another logical library or in another physical library, some 1000 miles away. Connectivity between two physical libraries is provided via Fibre Channel, ATM, FDDI, Ethernet or any other public or private carrier.

Remote Tape Processing

For sharing tape resources by remote systems, one or more Input/Output Processors can be located remotely and connected via TCP/IP (Ethernet, ATM, FDDI etc.) to the Enterprise Tape Server. Supported are virtual as well as real tape drives. This feature eliminates the need of traditional channel extenders and provides new capabilities in the enterprise wide storage management of locally dispersed systems and in developing new strategies for outsourcing and disaster recovery.

Import/Export and Data Exchange

One size fits all: For importing and exporting virtual volumes to/from real volumes and for data exchange, the I-6984 EVTS also supports real 36 track, 18 track and 9 track tape drives, providing full back-

ward compatibility to 3490, 3480 and 3420 tape formats. It supports ESCON, Block Multiplex Channel and SCSI connectivity for traditional tape formats and pays for itself with reduced maintenance costs and savings in floor space, power consumption and increased availability.

True Enterprise Wide Storage Area Network

The I-6984/Enterprise Virtual Tape Server is designed as Tape Storage Area Network (SAN), providing enterprise wide connectivity to mainframes, UNIX and Windows NT/2000 platforms. The SAN architecture provides centralized management for local and/or remote tape resources and enables an enterprise wide backup and data security strategy.

Connectivity for IBM S/390 and Open Systems

The I-6984/EVTS connects to Mainframes, including S/390, FSC BS2000, UNISYS, Tandem and Bull via ESCON or Block Multiplex Channel and to AS/400, AIX, UNIX, LINUX and WIN2000 via SCSI or Fibre Channel, LAN or WAN (Ethernet, ATM, FDDI).

Supported are all popular operating systems, including OS/390, MVS, VM/VSE, OS/390, AIX, BS2000, UNIX, LINUX and WIN 2000 by emulating IBM 3490, 3480 or 3420 device characteristics or DLT and LTO "Ultrium".

Reliability and Availability

The I-6984/EVTS is designed for reliability, durability and availability. The Remote Service Facility via public network and Internet is a standard feature, enabling remote diagnostics and statistical error analysis. Tape drives are hot swappable. Multiple Input/Output processors, a Virtual

Tape Manager Cluster and redundant power supplies provide fault tolerance.

Ready for the Future

With all these features, the I-6984 Enterprise Virtual Tape System is the most advanced tape system available today. It incorporates the latest tape technology, provides full backward compatibility to older tape formats and protects the investment for the future: The LTO Consortium has released an "Ultrium" road map, showing capacity improvements up to 800 GB per cartridge and a data rate of 120 MB/s. Intercom is committed to implementing new features as they become available. Replacing whole tape systems to participate in new tape technologies will be a thing of the past.





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Specifications

	Control Unit	Basic Labrary L32	Expansion Units D32				
		0	1	2	3	4	5
Number of Expansion Units		0	1	2	3	4	5
Number of Cartridges		281	721	1161	1601	2041	2481
Capacity native total		28.1 TB	72.1 TB	116.1 TB	160.1 TB	204.1 TB	248.1 TB
Capacity compressed (2:1)		56.2 TB	144.2 TB	232.2 TB	320.2 TB	408.2 TB	496.2 TB
Number of Drives		12	24	36	48	60	72
Host Interfaces	32						
Escon	Yes						
Block Multiplex	Yes						
SCSI F/W	Q1/01						
Fibre Channel	Q1/01						
Virtual Tape Drives	256						
I/O Processors	16						
Disk Cache	10 TB						
Fault Tolerance	option						
Redudant Power Supply	option						
Raid Protection	option						
Remote Diagnostic	standard						
Dimensions (cm) width	65x110x92	72.5	72.5	145	217.5	290	362.5
	110x92	180x152	180x152				
Weight (kg/lb) ¹	82/182	423/932	370/815	740/1.630	1.110/2.445	1.480/3.260	1.850/4.075
Power 200-240V (kVA) ²	0.8	1.6	1.6	3.2	4.8	6.4	8
Temperature	16° to 32°C	16° to 32°C	16° to 32°C				
Relative Humidity	20%-80%	20%-80%	20%-80%				
Heat Output (kBtu per hour)	2.4	4.8	4.8	9.6	14.4	19.2	24

¹Including 1 Drive / 0 Cartridges

²Including 12 LTO Tape Drives

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