IBM Technical Conference

Buenos Aires 30 Mayo 2013

IBM ProtecTIER Library

IBM Backup Tapes & Library

LTFS, TSM y TPC

Lic. Nicolas Goicoechea
CTSS Storage
nigoico@ar.ibm.com

Agenda

- *IBM ProtecTIER Library*
- *IBM Tape & Library Backup Units*
- *Linear Tape File System (LTFS)*
- *Tivoli Storage Manager (TSM)*
- *Tivoli Productivity Center (TPC)*

IBM Storage Systems Portfolio

IBM

Integrated Solutions

PureFlex

IBMSmartCloud
Virtual Storage Center

IBM Smart Analytics Solutions (ISAS)

Built-in Innovation

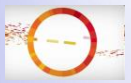
FlashSystems

Storage Virtualization SW and SVC

Easy Tier

Real-time Compression

IBM Active Cloud Engine™



Deduplication

Linear Tape File System (LTFS)

Optimized Storage Systems

For Enterprise Workloads

DS8000

XIV

SONAS

For Midrange and Entry Workloads

Storwize V7000 Unified

Storwize V7000

N series

Storwize V3700

DS3500

For Data Protection and Retention

ProtecTIER TS7620/TS7650G

Tape drives LTO 4, 5, 6

Tape Library TS3310

Tape Automation TS3500

Tape Virtualization TS7740

Storage Management Software

Tivoli Storage Productivity Center

Tivoli Key Lifecycle Manager

Tivoli Storage FlashCopy Manager

Tivoli Storage Manager

IBM ProtecTIER

What is ProtecTIER?

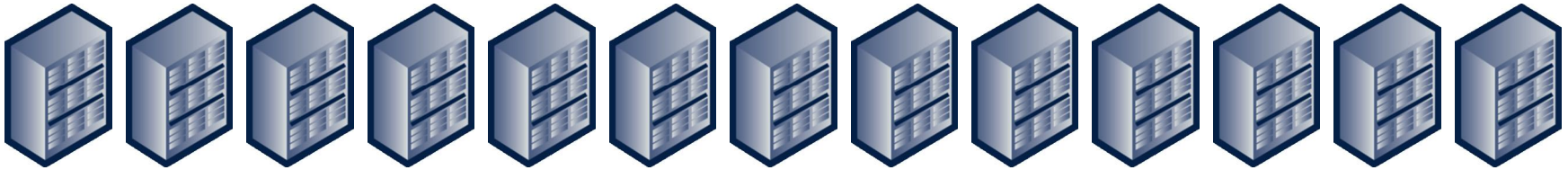
ProtecTIER was the first virtual tape product (2005) to contain patent-pending data factoring technology that IBM calls *HyperFactor*™ for data deduplication.

Today ProtecTIER supports VTL, Symantec Netbackup OST and FSI-CIFS/NFS…

1. In-line deduplication vs. Post Processing
2. UP TO 25:1 or more deduplication factoring
3. High Performance (Backup/Restore 2500/3200MBs)
4. Highly Scalable (UP TO 1PB physical storage)
5. 100% Data Integrity
6. Clustering (dual (2) Node Cluster for High Availability)
7. Global Deduplication
8. Native replication (M – 1; M – M: 1 – M)
9. VTL, OST , CIFS & *NFS* Capable

Data deduplication is the key to using disk more cost effectively

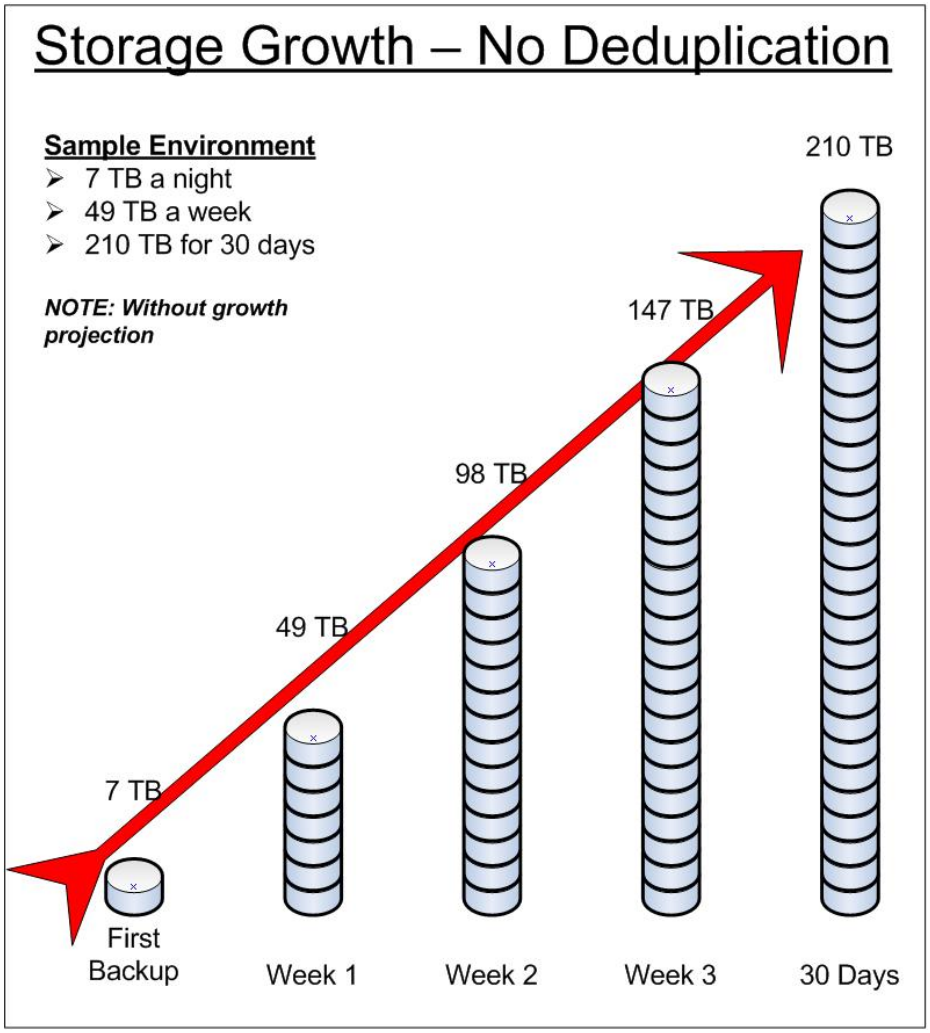
Protect More. Store Less™

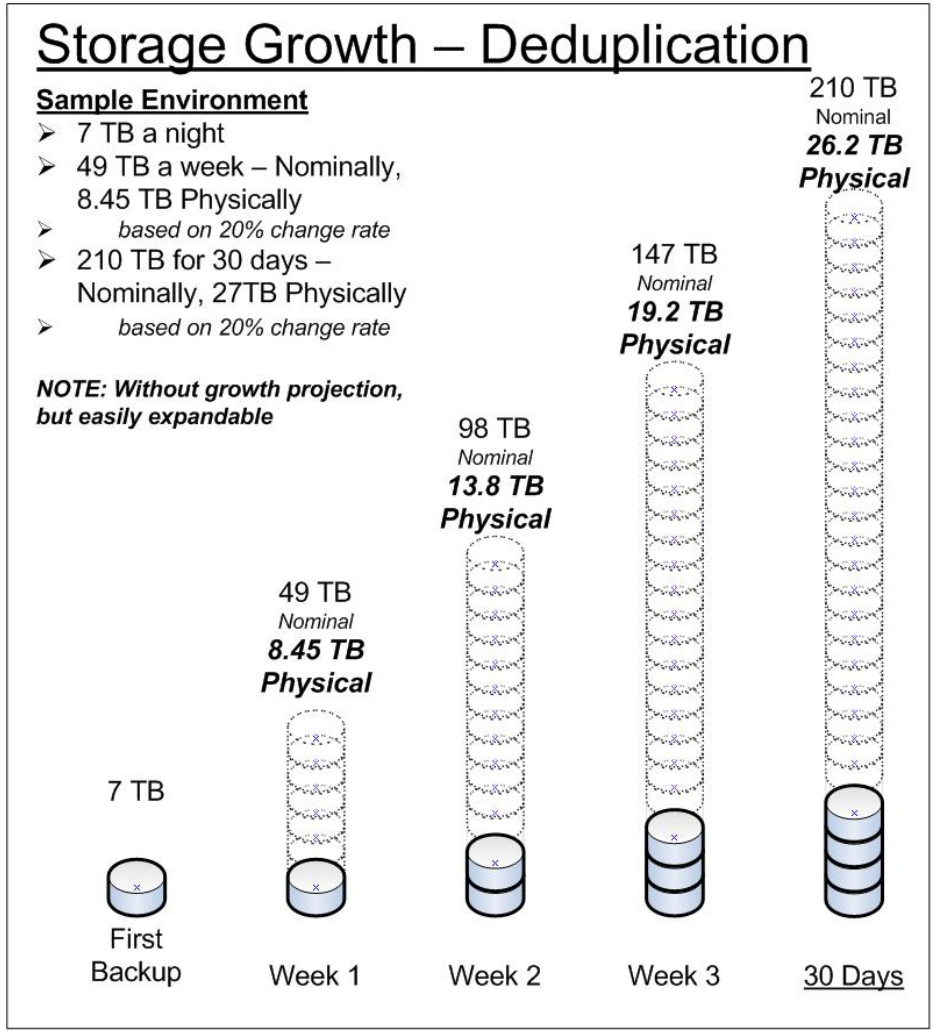


ProtecTIER reduces the required backup disk capacity

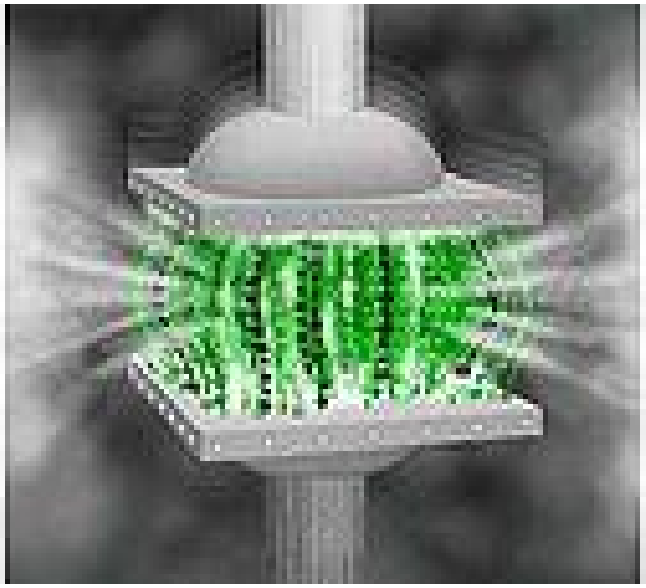
ProtecTIER Value Proposition

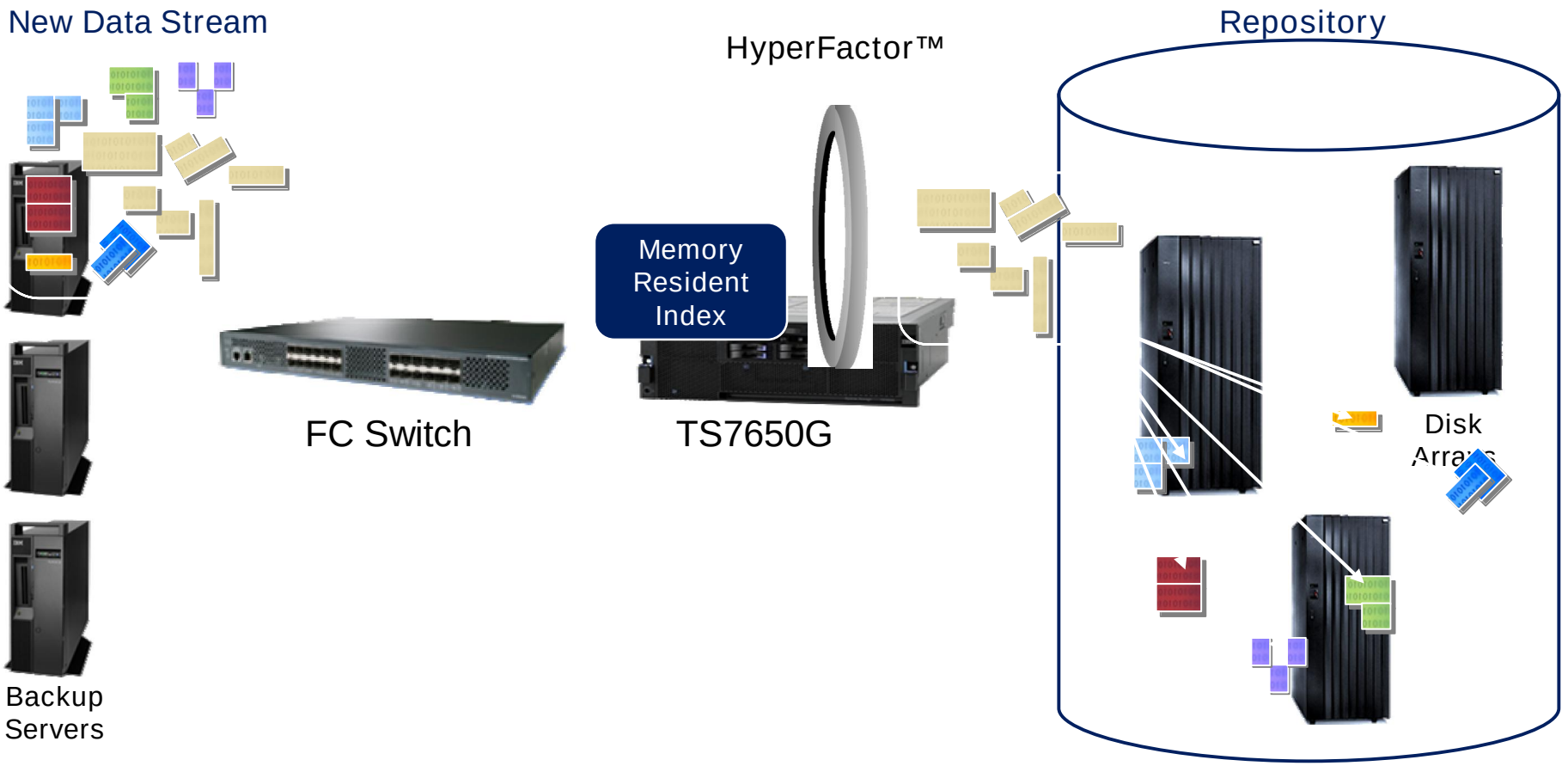
"Deduplication is the key to using less disk"





How does it work?





“Filtered” data

Two Basic Implementation

#1 Inline

§ As data is received by the target device it is:
  – deduplicated in real time
  – stored as unique references on disk
§ Data lands on disk de-duplicated – NO NEED FOR TEMPORARY STORAGE

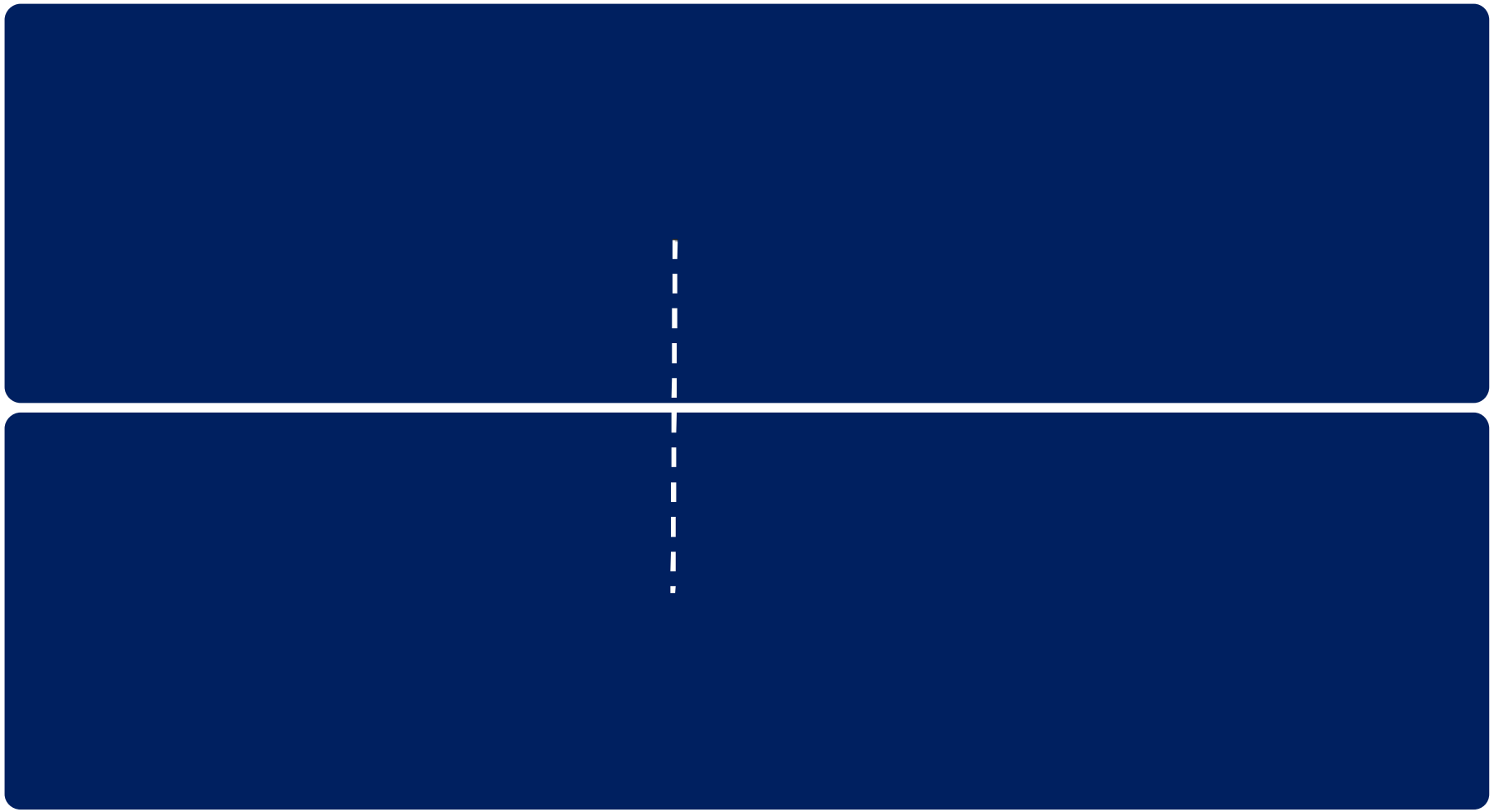
#2 Post Processing

§ As data is received by the target device it is:
  • temporarily stored on disk storage – a “landing zone” large enough to hold a full backup
§ Data is subsequently read back in to be processed by a de-duplication engine

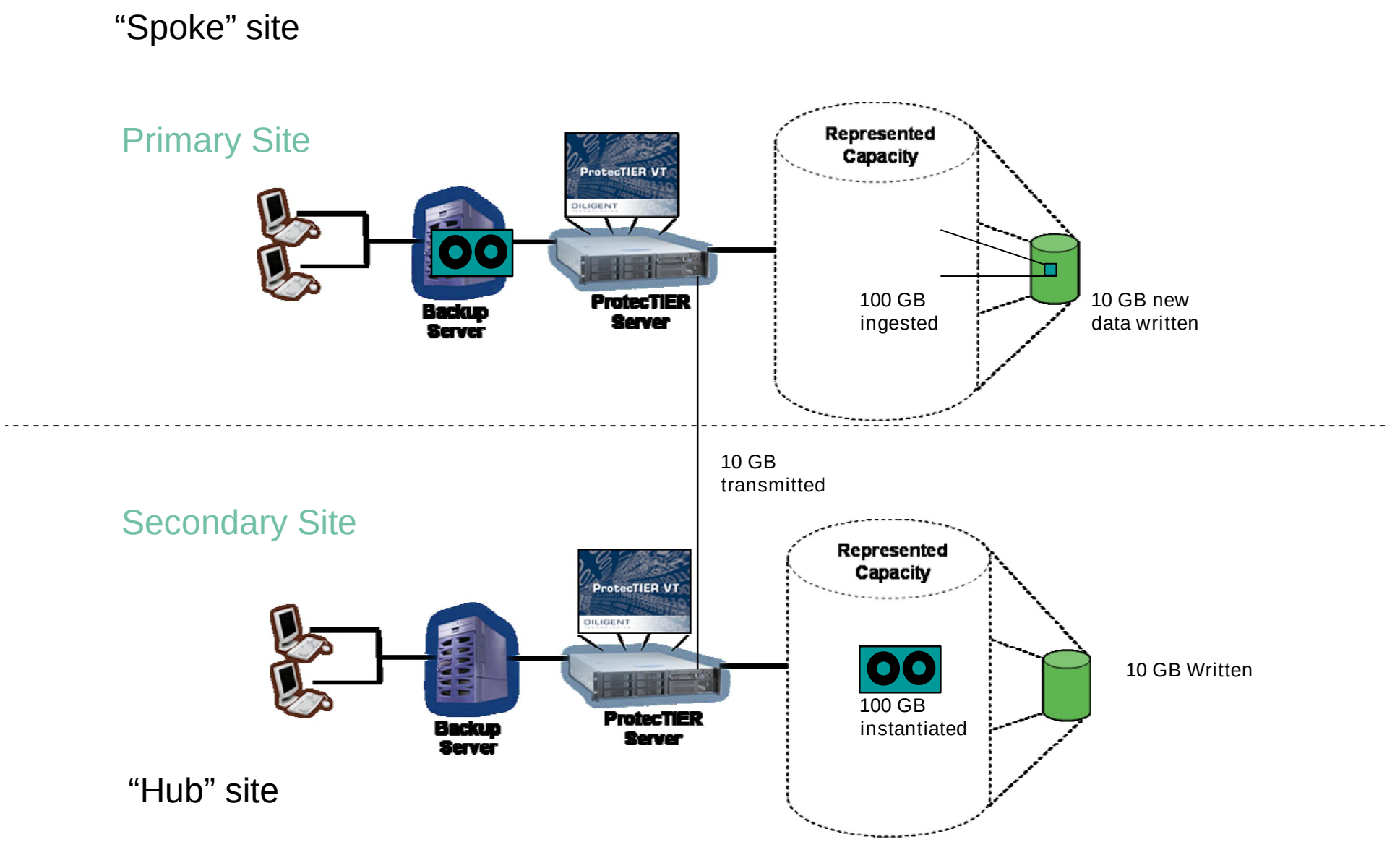
“The” Enterprise De-duplication Requirement

- If no knowledge exists the whole disk farm must be scanned
  - Not practical
- A catalogue or Index (or database) is created to host the knowledge
  - How the Index grows proportionally to the data inhibits some deduplication approaches

Replication with ProtecTIER



Native ProtecTIER Replication



ProtecTIER Competitive Advantage

Performance

2,500 MB/s ingest
3,200 MB/s Restore

Delivering superior competitive throughput for the Enterprise

Capacity

Up to 1 PB physical capacity per node

Open Gateway Design

Disk selection freedom

Provides best of breed disk now and with future upgrades

Non-Disruption

Daily Operations
Inline de-duplication eliminates need for significant secondary processing

Implementation
Integrates well with existing backup environment and infrastructure

Continuous Availability

Dual node design for high availability

The only HA solution available

Global Deduplication

Deduplicates ALL data

Provides superior deduplication ratios

ProtecTIER: WW Success in 2012

- Highlights
  - Over 1,500 ProtecTIER customers WW

    Approximate 30% increase in new installations
  - Over 3,000 ProtecTIER sytsems shipped.
  - Continued double digit growth for IBM deduplication
  - ProtecTIER deduping 300 PB of physical disk
  - Significant competitive wins in 2012
- Key Wins
  - *American Express*
  - *Virgin Media*
  - *BMW*
  - *Charles Schwab*
  - *Principal Insurance Group*
  - *Norfolk Southern*
  - *Bell Aliant*

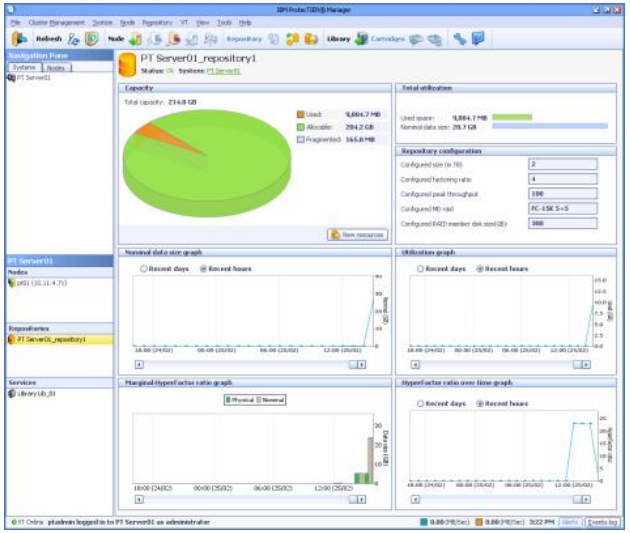
TS7620 ProtecTIER Capacity/Performance Increases

TS 7620 Capacity Options

- 6TB
- 12TB
- *23 TB* NEW!
- *35 TB* NEW!

Enables users to easily scale capacity requirements to effectively meet capacity increases.

Same enterprise-proven ProtecTIER technology



Performance:

SM2	Backup	Restore
VTL, OST, FSI	300 MB/s	300 MB/s

ProtecTIER Portfolio

TS7620 ProtecTIER Appliance Express

Hasta 300 MB/sec

6 TB hasta 35TB de Capacidad Usable

1TB/h

TS7650G ProtecTIER Gateways

Hasta 2500 MB/sec

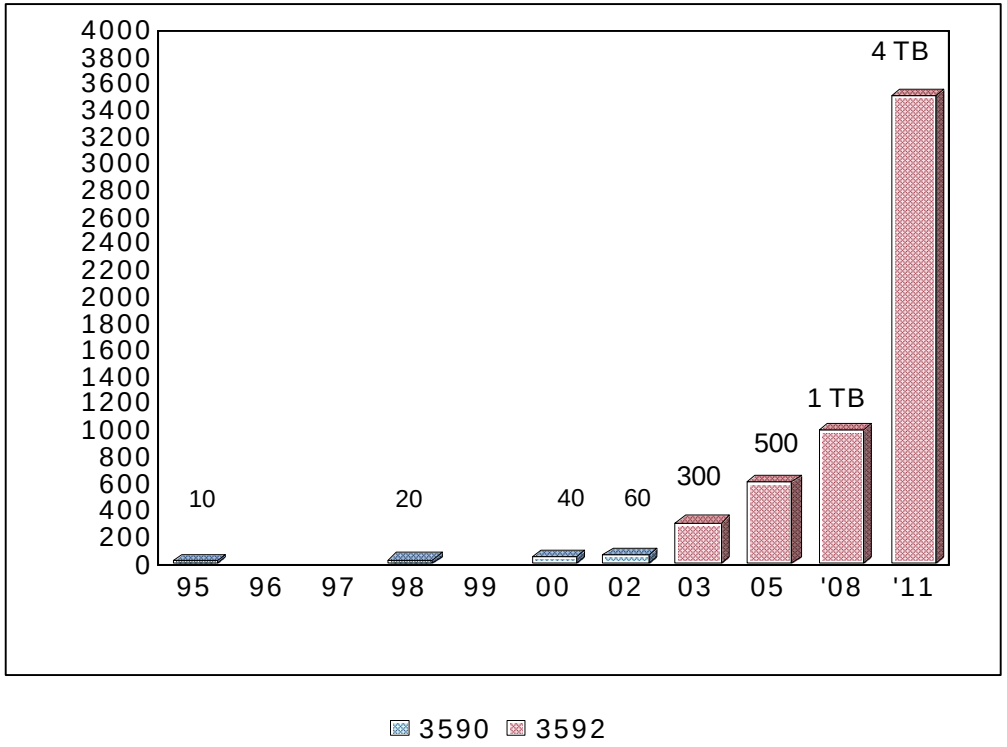
Hasta 1PB de Capacidad Usable

10TB/h

Capacidad y Performance Escalable

IBM Tapes Backup

IBM 3592.... the 4TB Tape Technology



IBM TS1140 Highlights

- Enterprise class drive
- Open systems / mainframe
  - Dual port 8Gb Fibre
  - Fibre/FICON/Virtual Tape attachment
- 4000GB native (3.5X capacity improvement over previous TS1130)
- 500GB Scaled
  - WORM capability too
- 250 MB/s native (56% faster than previous TS1130)
- Advanced Encryption
- 1000MB Buffer
- Speed Matching
- Virtual Backhitch
- High speed data search
- High-resolution directory
- Media and drive health statistics
- Media reuse (read and write)

IBM ADVANTAGE!!!

One drive for both high-capacity and fast-access!!!
One drive for Encryption and non-encryption requirements!
One drive for mainframe and open.

TS1140 Drive

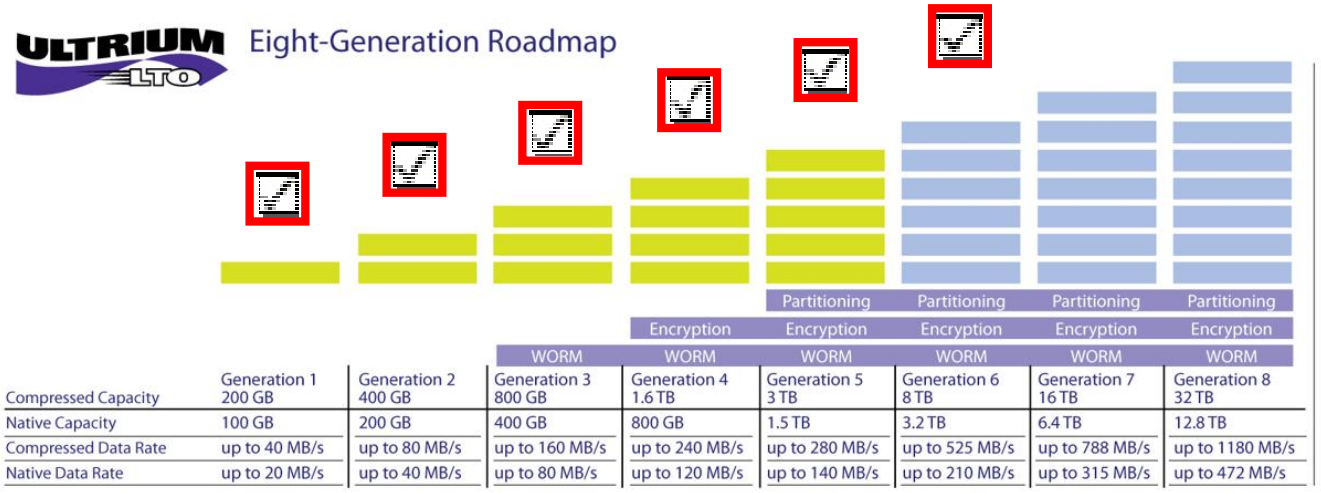
GA since June 3, 2011

- Performance and Capacity Improvements
  - 4TB native cartridge capacity and 500 GB short cartridge capacity – 12TB with 3:1 compression
  - 250 MB/s native data rate and 650 MB/s max compressed data rate
  - Dual 8Gb fibre ports
  - 14 speed support with digital speed matching
- High access performance for locate/search
  - 38 seconds avg access time (including 12.5 load & thread time to access data somewhere on 4TB cartridge)
  - 12.4 mps search / locate / rewind speed
  - High resolution tape directory
  - 1 GB main data buffer with enhanced read-ahead buffer management
- Investment protection features
  - Field MES upgrade available E06>E07 model conversion
  - Legacy media support and re-use
  - Supported in existing rack/TS3500 automation, and TS77XX Virtual Tape libraries
- Significant Technology Enhancements
  - New 32-channel enhanced ECC recording format
  - Enhanced JC-type media servo pattern
  - " Flangeless tape guiding" with third Generation GMR "3-bump" head technology

The Linear Tape Open (LTO) Standard

§ Since September 2000 LTO has proliferated *(IDC Worldwide Tape QView, March 2012)*

- Collectively the three LTO technology companies have shipped
  - Over 200 million tape cartridges – Over 80,000 PB uncompressed worldwide
  - Over 4 million tape drives
- LTO Roadmap extended twice (2004 and 2010)
  - Added support for LTO Write Once Read Many Cartridges
  - Added four more generations (over original roadmap)



Compressed Capacity	Generation 1 200 GB	Generation 2 400 GB	Generation 3 800 GB	Generation 4 1.6 TB	Generation 5 3 TB	Generation 6 8 TB	Generation 7 16 TB	Generation 8 32 TB
Native Capacity	100 GB	200 GB	400 GB	800 GB	1.5 TB	3.2 TB	6.4 TB	12.8 TB
Compressed Data Rate	up to 40 MB/s	up to 80 MB/s	up to 160 MB/s	up to 240 MB/s	up to 280 MB/s	up to 525 MB/s	up to 788 MB/s	up to 1180 MB/s
Native Data Rate	up to 20 MB/s	up to 40 MB/s	up to 80 MB/s	up to 120 MB/s	up to 140 MB/s	up to 210 MB/s	up to 315 MB/s	up to 472 MB/s

Note: Compressed capacities for generations 1-5 assume 2:1 compression. Compressed capacities for generations 6-8 assume 2.5:1 compression (achieved with larger compression history buffer).
Source: The LTO Program. The LTO Ultrium roadmap is subject to change without notice and represents goals and objectives only.

Introducing new IBM LTO Ultrium 6 Technology

- Sixth Generation IBM LTO Tape Drive
  - Announced Oct 3rd 2012, 1st ship Nov 9th 2012
  - 160 MB/sec performance native data transfer rate
  - Up to 6.25 TB of capacity at 2.5:1 compression (2.5 TB native capacity)
  - 30% more energy efficient than IBM generation 5 LTO tape drives (power consumed / data transferred)
  - Tape media investment protection: read/write LTO-5 media and read LTO-4 media
- Data protection: same industry standard data encryption used in previous generations of drives
- Direct access to data stored on tape with IBM's Linear Tape File System software
  - Provides simplified file system access at the operating system level

IBM LTO Gen 6 Tape Drive

§ Specifications
- up to 160MBps native data transfer rate (with digital speed matching)
- 2.5TB native capacity (6.25TB compressed)
- 8Gbps FC, 6Gbps SAS

§ Functionality
- WORM for compliance
- Encryption for security
- Long Term File System for future application exploitation

§ Both Attach to:
- IBM Power Systems, System x and System z (Linux)
- Other major open systems

IBM LTO Gen 5 Tape Drive

§ Specifications
- up to 140MBps native data transfer rate (with digital speed matching)
- 1.5TB native capacity (3TB compressed)
- 8Gbps FC, 6Gbps SAS

§ Functionality
- WORM for compliance
- Encryption for security
- Long Term File System for future application exploitation

LTO6 Full High / Half High

§ Full High

- Libraries supported
  - TS3500, TS3310, TS32/3100
- Capacity: 2.5TBs
- Transfer rate: 160MBs/sec
- Locate / Space / Rewind
  - 10m/s
  - Locate from BOT: 62 sec
- Acceleration: 10 m/sec/sec
  - Stop/Start: 3.6 sec
- Buffer: 1024 MBs
- FC Ports: 1
- Drives per TS3200/3100: 2/1
- Duty Cycle
  - High

§ Half High

- Libraries supported
  - TS32/3100, TS2900
- Capacity: 2.5TBs
- Transfer rate: 160MBs/sec
- Locate / Space / Rewind
  - 9m/s
  - Locate from BOT: 77 sec
- Acceleration: 5 m/sec/sec
  - Stop/Start: 5.2 sec
- Buffer: 512 MBs
- FC Ports: 1
- Drives per TS3200/3100: 4/2
- Duty Cycle
  - Medium

IBM Tape Library Portfolio

IBM LTO Ultrium 5 HH Product Family

TS2250 (3580) H5S External Tape Drive

- One LTO Ultrium 5 HH Drive
- SAS attach
- One Cartridge
- Desktop or Rack Mount
- LTO Gen 5 Media

TS2900 (3572) 1U Tape Autoloader

- One LTO Ultrium 5 Drive
- HH SAS
- 9 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- Entry Level, compact tape library
- LTO Gen 5 Media
- LTO Gen 5/4 Encryption

TS3100 (3573) 2U Tape Library

- 1-2 LTO Ultrium 5 HH drive
- HH SAS or Fibre
- 24 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- LTO Gen 5 Media
- LTO Gen 5/4 Encryption

TS3200 (3573) 4U Tape Library

- 1-4 LTO Ultrium 5 HH Drive
- HH SAS or Fibre
- 3-slot I/O
- 48 Data Cartridge Slots
- Standalone or Rack
- Multi-Path Architecture
- LTO Gen 5 Media
- LTO Gen 5/4 Encryption

IBM LTO Ultrium 5 FH Product Family

TS2350 (3580) S53 External Tape Drive

- One LTO Ultrium 5 Drive
- FH SAS
- One Cartridge
- Desktop or Rack Mount
- LTO Gen 5 Media

TS3200 (3573) 4U Tape Library

- 1-2 LTO Ultrium 5 FH Drives Features
- FH SAS or Fibre
- 3-slot I/O
- 48 DataCartridge Slots
- Standalone or Rack
- Multi-Path Architecture
- Path Failover
- LTO Gen 5 Media
- LTO Gen 5/4 Encryption

TS3100 (3573) 2U Tape Library

- 1 LTO Ultrium 5 FH drives
- FH SAS or Fibre
- 24 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- LTO Gen 5 Media
- LTO Gen 5/4 Encryption

TS3310 (3576) Tape Library

- LTO Ultrium 5 Drive
- Dual-Ported Fibre
- Standalone or Rack
- Multi-Path Architecture
- Path Failover
- COD (Capacity on Demand)
- Model L5B – Base Control Module
  - 1-2 drives
  - 30 carts
  - 6 I/O option
- Model E9U – Expansion Module (Max of 4 for 41U)
  - 1-4 drives
  - 80 carts
  - 12 I/O option
- LTO Gen 5/4 Encryption

TS3500 (3584) Tape Library

- L53 Library & D53 Expansion LTO Frames
- L23 Library & D23 Expansion 3592 Frames
- HA1 High Availability & Dxx Dual Accessor Frames
- Reduced Footprint
- Capacity on Demand entry configuration
- TS1050 LTO Ultrium 5 and TS1100 3592 Drive Integration
- Mixed LTO & 3592 Drive & Media in Same Library
- Multi-Path Architecture
- Path Failover
- ALMS
- Advanced Electronics
- 3592 E0x & LTO Gen 5/4 Encryption
- S54 & S52 HD Frames
- Shuttle Expansion to 15 subsystems

* Note: TS3100 and TS3200 only have single FC port with FH LTO-5 FC drive

IBM LTO Ultrium 6 HH Product Family – Dec 2012

TS2260 (3580) H6S External Tape Drive

- One LTO Ultrium 6 HH Drive
- SAS attach
- One Cartridge
- Desktop or Rack Mount
- LTO Gen 6 Media
- LTFS Single Drive Edition (ships with each box)

TS2900 (3572) 1U Tape Autoloader

- One LTO Ultrium 6 Drive
- HH SAS
- 9 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- Entry Level, compact tape library
- LTO Gen 6 Media
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

TS3100 (3573) 2U Tape Library

- 1-2 LTO Ultrium 6 HH drive
- HH SAS or Fibre
- 24 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- LTO Gen 6 Media
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

TS3200 (3573) 4U Tape Library

- 1-4 LTO Ultrium 6 HH Drive
- HH SAS or Fibre
- 3-slot I/O
- 48 Data Cartridge Slots
- Standalone or Rack
- Multi-Path Architecture
- LTO Gen 6 Media
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

IBM LTO Ultrium 6 FH Product Family – Dec 2012

TS2360 (3580) S63 External Tape Drive

- One LTO Ultrium 6 Drive
- FH SAS
- One Cartridge
- Desktop or Rack Mount
- LTO Gen 6 Media
- LTFS Single Drive Edition (ships with each box)

TS3200 (3573) 4U Tape Library

- 1-2 LTO Ultrium 6 FH Drives

Features

- FH Fibre
- 3-slot I/O
- 48 DataCartridge Slots
- Standalone or Rack
- Multi-Path Architecture
- Path Failover
- LTO Gen 6 Media
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

TS3100 (3573) 2U Tape Library

- 1 LTO Ultrium 6 FH drives
- FH Fibre
- 24 Data Cartridge Slots
- 1-slot I/O
- Standalone or Rack
- LTO Gen 6 Media
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

TS3310 (3576) Tape Library

- LTO Ultrium 6 Drive
- Dual-Ported Fibre
- Standalone or Rack
- Multi-Path Architecture
- Path Failover
- COD (Capacity on Demand)
- Model L5B – Base Control Module
  - 1-2 drives
  - 30 carts
  - 6 I/O option
- Model E9U – Expansion Module (Max of 4 for 41U)
  - 1-4 drives
  - 80 carts
  - 12 I/O option
- LTO Gen 6/5/4 Encryption
- Supports IBM LTFS Library Edition and LTFS Storage Manager

TS3500 (3584) Tape Library

- L53 Library & D53 Expansion LTO Frames
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- HA1 High Availability & Dxx Dual Accessor Frames
- Reduced Footprint
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- TS1060 LTO Ultrium 6 and TS1100 3592 Drive Integration
- Mixed LTO & 3592 Drive & Media in Same Library
- Multi-Path Architecture
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- ALMS
- Advanced Electronics
- 3592 E0x & LTO Gen 6/5/4 Encryption
- S54 & S52 HD Frames
- Shuttle Expansion to 15 subsystems
- Supports IBM LTFS Library Edition and LTFS Storage Manager

IBM Linear Tape File System

What is LTFS?

1) Open File Format for data which is written to tape

- è Developed and disclosed by IBM
- è Describes the format of data and meta data stored on tape
- è Meta data is based on XML schema
- è Applicable to LTO5, LTO6 and TS1140
  - è Requires tape partitioning

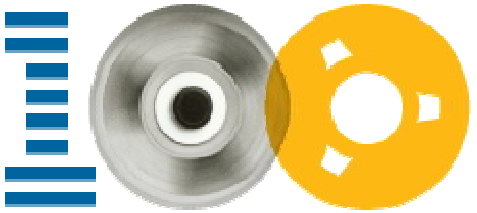
2) File System support (code) to R/W tapes in LTFS format

- è Externalizes the LTO5 / LTO6 / TS1140 tape as file system
  - è Enables standard applications to write/read LTFS tapes
  - è Supports update, edit, and delete of files on LTFS tape
  - è Supports partial recall
- è Available on Linux, Mac OS X and Windows

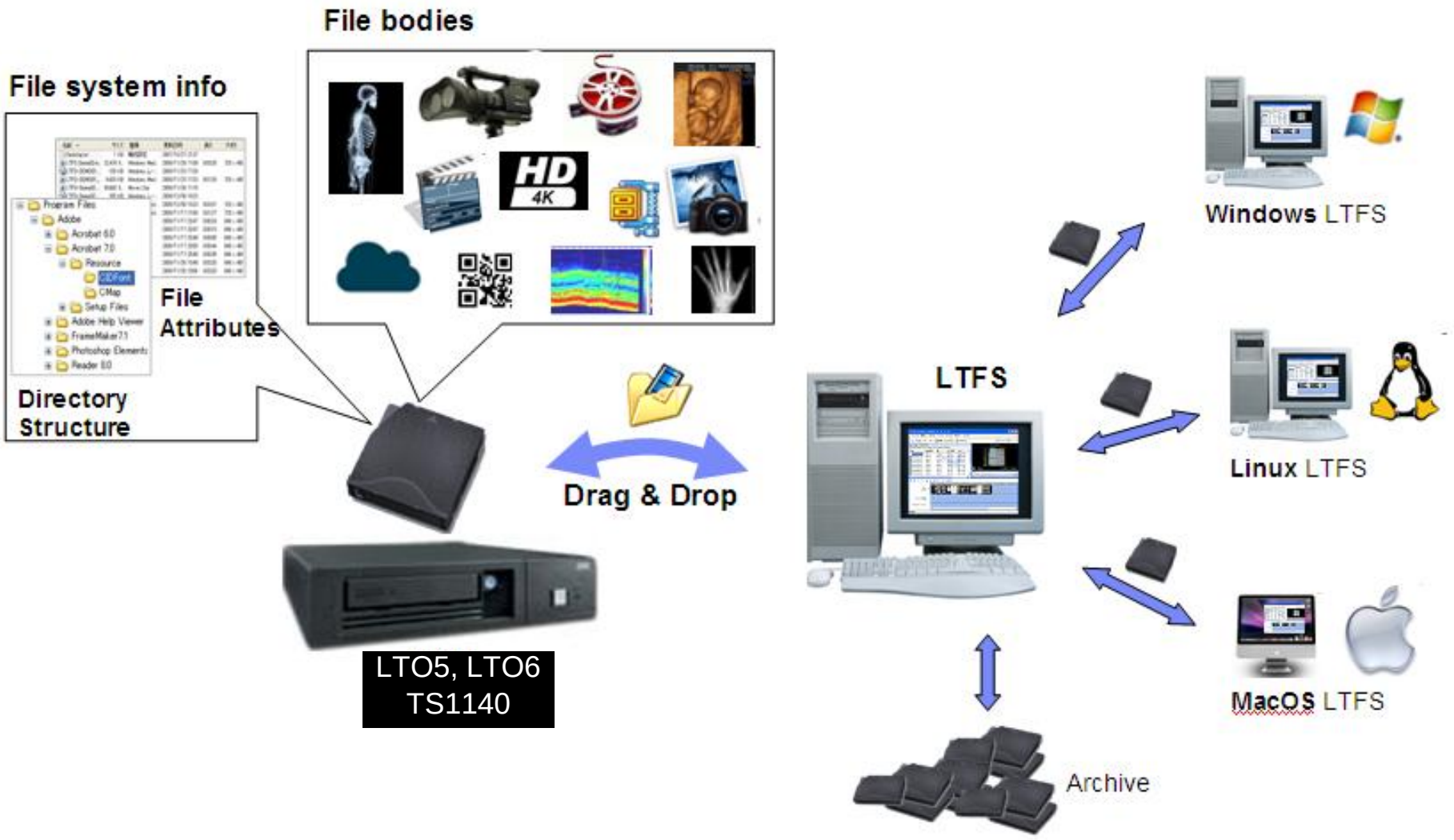
- Makes tape look and work like any removable media (e.g., USB drive, removable disk)

LTFS Value Proposition

§ Self-Describing cartridge
  – Remove requirement to commit long term to tape software application
  – Content protection in event of database corruption or loss
§ Improve content interchange/distribution
  – Eliminate need for common tape software across enterprise and/or interchange locations
  – Reduce cost of data interchange
§ Partial Recall
  – Eliminate time penalty in moving large video content to tape in event of need small part of video content (ie. Goal in game)
§ $/GB, Power
  – Reduce cost of digital storage – power and $/min
§ Open Standards
  – Large diverse infrastructure requires open standard
  – Standard/support of MXF video
§ Long Term Content Archive Life
  – Archive life desire for 50-100 years



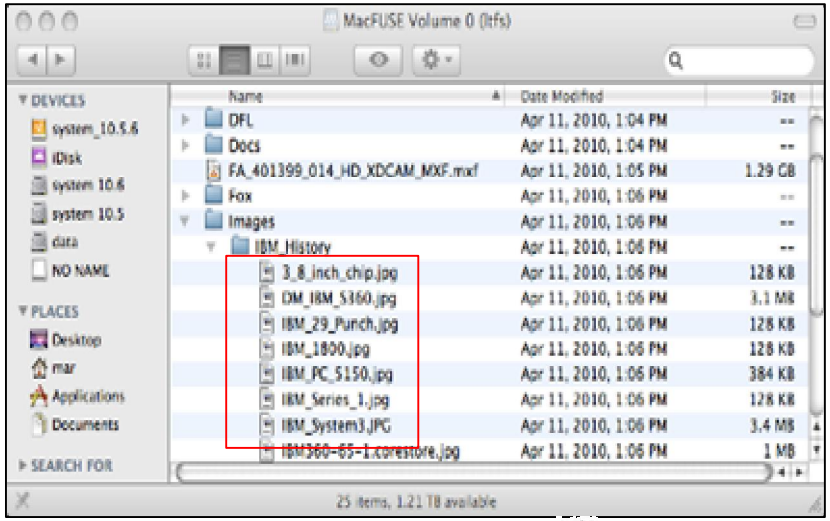
LTFS – Easy Exchange of Data – Share Data across Platforms

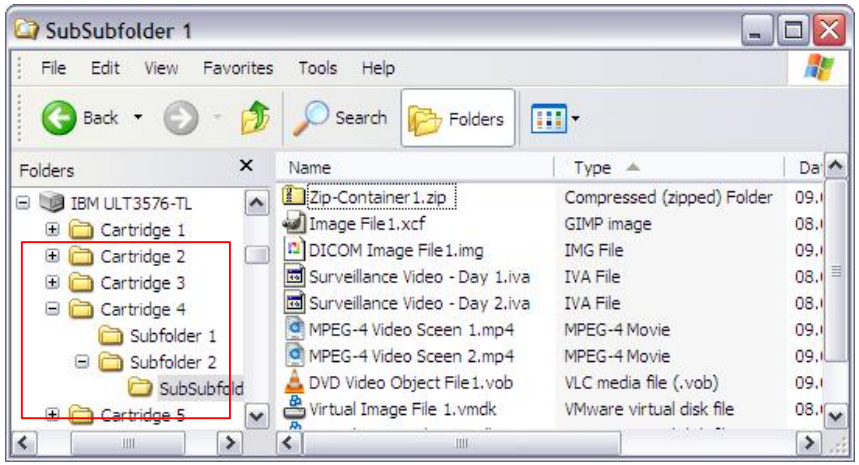


Current Editions of LTFS (Linear Tape File System)

Single Drive Edition (SDE)

- Used with standalone LTO-5, LTO-6, TS1140 tape drives
- Enables directs, fast access, easy exchange of Data across systems. self-describing archives
- No charge download



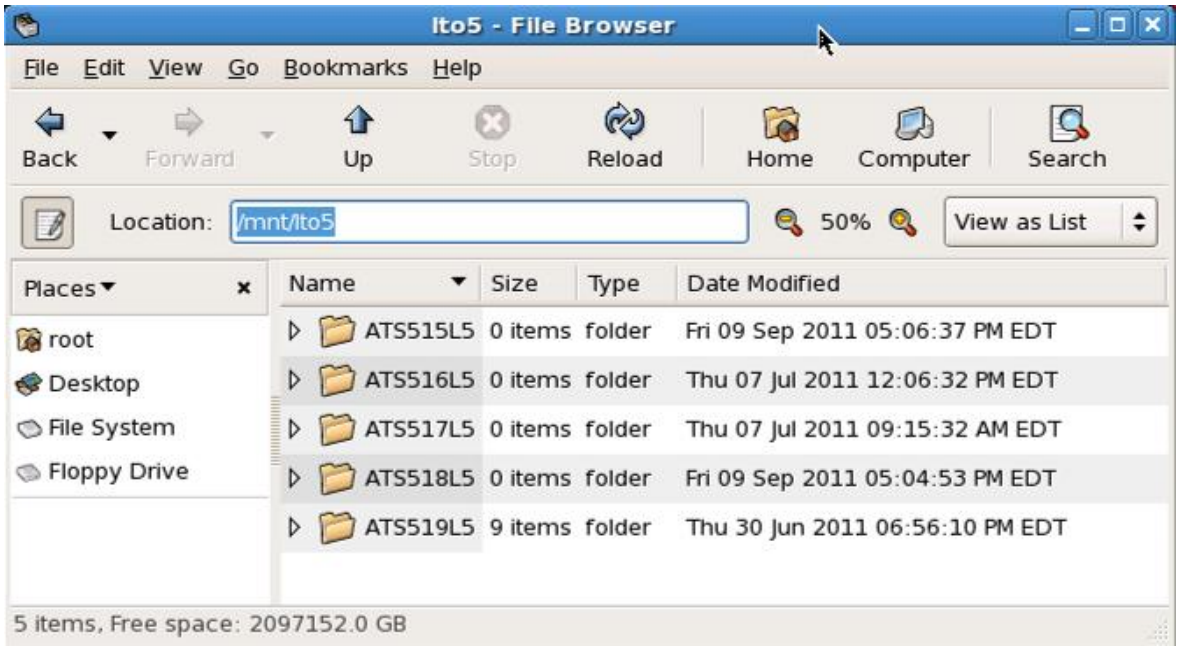


Library Edition (LE)

- Mount point is the library
- All cartridges in the library are subdirectories under the mount point.
- Caching of tape indices in memory
- Priced software PID

LTFS-LE (Library Edition)

- Mount point is the library
- Cartridges are subdirectories
- LTFS mounts cartridges into drive to service file access requests
- Easy usage, no ISV required
- Caching of tape indices in memory
  - For searching and displaying tape contents without needing a mount



IBM Tivoli Storage Manager

IBM Tivoli Storage Manager – TSM

IBM Tivoli Storage Manager es el principal componente de la solución de gestión corporativa de datos, responsable por la protección segura y centralizada de datos críticos al negocio, contra desastres, fallas de máquinas o de personas.

En el mercado desde 1993 (IBM ADSM hasta 1998)

Única solución que ofrece backups incrementales progresivos

20 patentes exclusivas en gestión de datos

20 mil clientes en todo el mundo, incluyendo 60% de las empresas Fortune 500

Primera solución del mercado en permitir uso de discos para backup

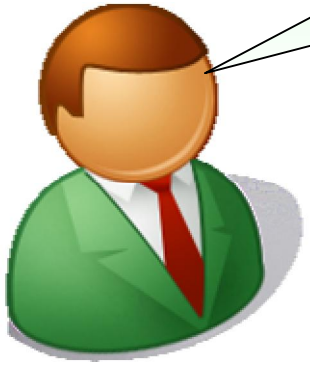
Desde 2005, solución de backup que más crece en el mercado (IDC, 01-09)

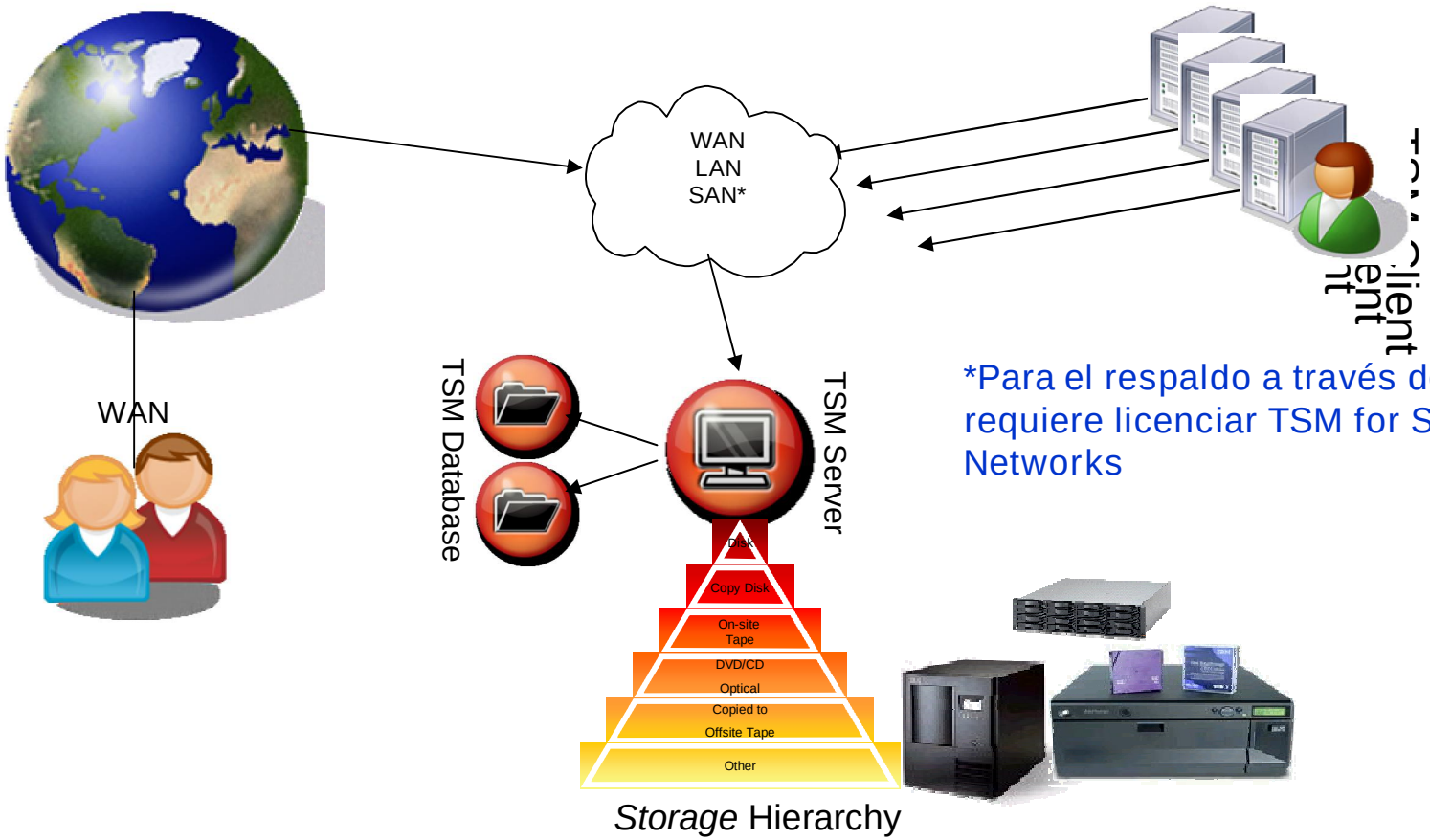
TSM ofrece:
Backup / restore
Archive / retrieve
Recuperación ante desastres
Protección de aplicaciones y bases de datos

TSM ofrece:
Space management (HSM&ILM)
Bare machine recovery
Continuous data protection
Content Management

The answer is Comprehensive Storage Management with TSM.

Answer



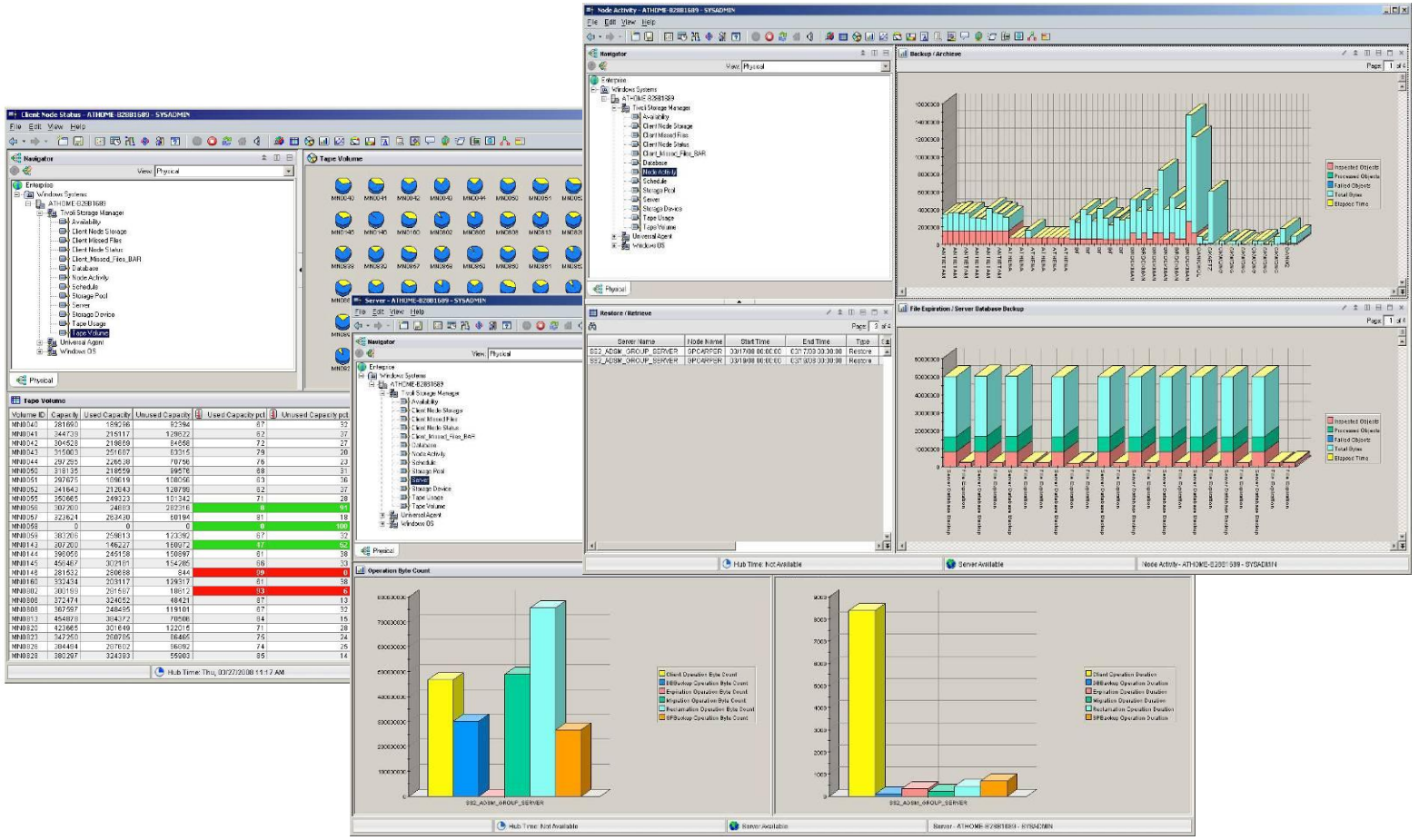


*Para el respaldo a través de la SAN se requiere licenciar TSM for Storage Area Networks

Interfaz única de gestión

Monitoreo*

También es posible monitorear las actividades en curso en el TSM Server, desde sesiones de envío o recibo de datos, hasta procesos internos del servidor:



*Incluido con la licencia de TSM/TSM EE

Reportes*

TSM posee un mecanismo propio para la generación de reportes históricos, a través de la extracción de la información de su base de de datos:

*Incluido con la licencia de TSM/TSM EE

Diferenciales en proteción de aplicaciones*

TSM posee agentes para proteción on-line de diversas aplicaciones del mercado, entre las cuales se destacan:

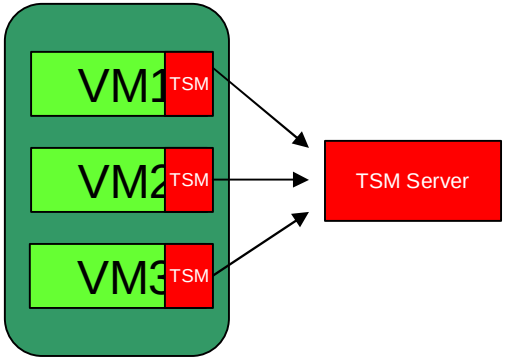
- Agentes para IBM DB2, Informix sin costo
- Restore individual de MS-Exchange Server
- Integración con Volume Shadow Services (VSS) para MS-SQL y MS-Exchange
- Backup y restore de SAP integrados con herramientas nativas (BRTOOLS)
- Backup y restore de bases Oracle/Oracle RAC integrados con Oracle Recovery Manager (RMAN)
- Integración con ambientes Lotus Domino
- Todos los agentes de TSM permiten que el backup y restore ocurran a través de la SAN

*Agentes opcionales que complementan TSM Extended Edition

Integración com VMware®

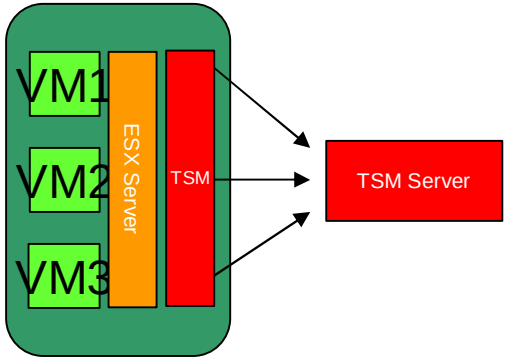
TSM puede ser fácilmente integrado para la protección de ambientes virtualizados VMware

1. Por máquina virtual
Clientes TSM instalados dentro de las máquinas virtuales para backup granular (tradicional)



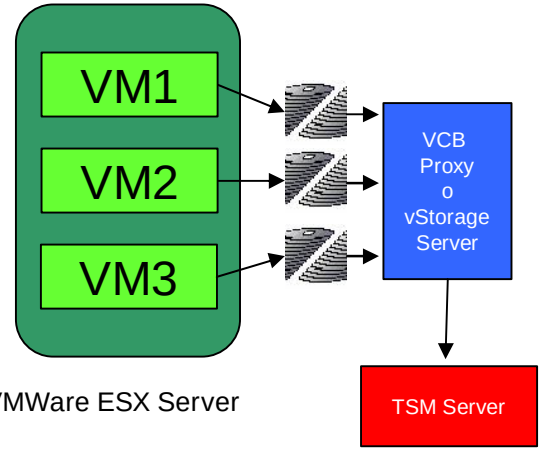
VMWare ESX Server

2. Por ESX Server
Clientes TSM instalados dentro de cada VMware ESX Server para backup full (disaster recovery) de las VM's



VMWare ESX Server

3. Utilizando VCB / vStorage
Backups son enviados al TSM Server a través de un Proxy Server, que accede a los datos de las VM's



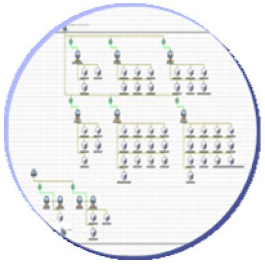
VMWare ESX Server

Integración de TSM 6.x para File-level y Full-Image VCB's

*Opciones 1 y 2 incluidas con la licencia de TSM/TSM EE
Opción 3 requiere licencia de TSM for Virtual Environments

IBM Tivoli Productivity Center

Tivoli Storage Productivity Center enables control over data growth and protection



Topology viewer

End-to-end connectivity views of the SAN, including physical and virtual entities; new, web-based user interface

Single pane of glass

Capacity planning

Monitor and manage storage utilization, forecast trending, advanced analytics and reporting

Control costs

End-to-end provisioning

Wizard-based full provisioning; ad-hoc or scheduled execution, provision new volumes with protection

Simplified allocation

Replication services

Central control for copy services; automated tasks without scripts; allows DR testing on practice volumes

Data protection and recovery

Tivoli Storage Productivity Center provides comprehensive monitoring capabilities for service assurance

Monitor performance

Manage disk performance from a central console, historical trending, automated status alerts

Reduced downtime

Threshold alerting

Choose parameters based on business policies; set alerts to admins when thresholds are breached

Proactive management

SAN best practices

Multi-vendor switch zone provisioning; switch port performance reporting, and alert monitoring

Avoid bottlenecks

Advanced reporting

IBM Cognos integration; enterprise-wide reporting; insights on capacity, data throughput and performance

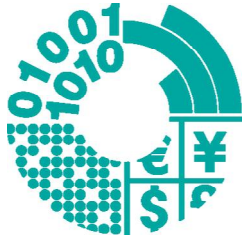
Professional information

Tivoli Storage Productivity Center allows you to cut costs and improve utilization of storage assets and staff

Monitor utilization

Track storage utilization and allocation; efficiently plan for more storage acquisitions

Cost savings



Best practices

For configuration of systems and fabric, provisioning, change management

Improved productivity

Automation of tasks

Wizard-based configuration and change management nullifies human errors and reduces time spent

Time savings

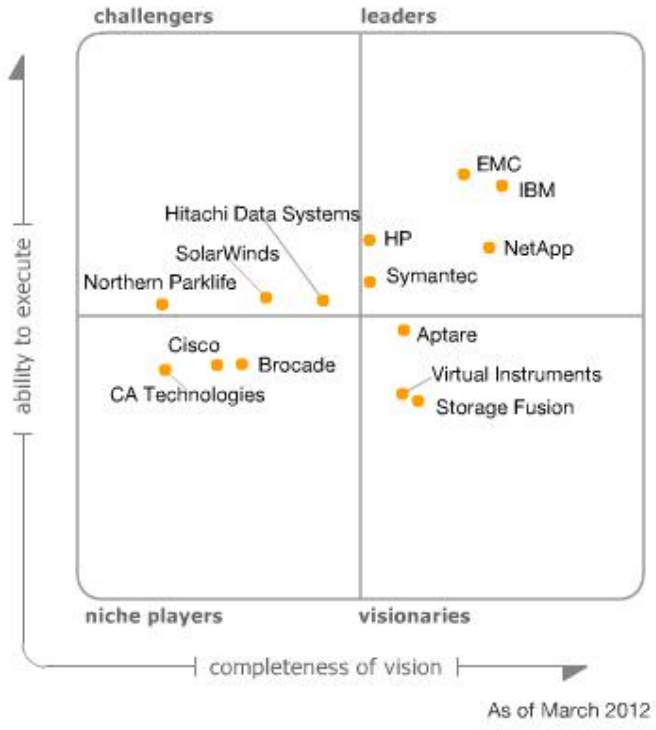
Monitor the monitors

Centralized management of all storage systems and SAN devices; integrates with other monitor of monitors (MOMs)

Consolidated management

IBM positioned as a Leader in Magic Quadrant: Storage Resource Management and SAN Management Software

SRM and storage area network tools enable customers to manage shared storage environments. These fully featured, integrated and user-friendly tools are offered as solutions ranging from the holistic to the specialist, for customers with a broad range of maturity levels and requirements.



Magic Quadrant for
Storage Resource Management and SAN Management Software
Valdis Filks, Gene Ruth
March 27, 2012 (G00232275)

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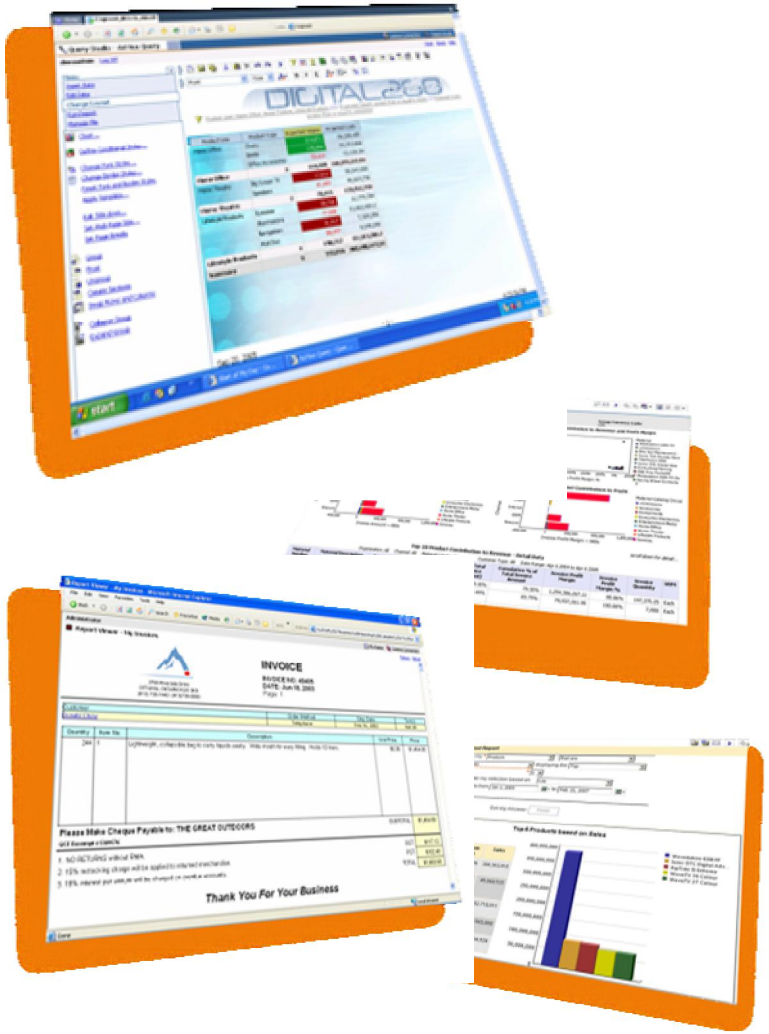
The all-new, web-based user interface

- Proof of technology with most core day-to-day function
- Redesigned web-based interface based on customer feedback
- Navigation built around the tasks needed for the environment
- Rapid access via simplified navigation

As part of IBM's strategy to provide consistent user experience, TPC user interface has same look and feel as other major IBM storage offerings such as DS8000, SAN Volume Controller, XIV and Storwize V7000

Tivoli Productivity Center v5.1

IBM Cognos integrated analytics and reporting



- Makes advanced report creation and customization simple and easy
- Quicker time to value with out-of-the-box reports on predetermined topics
- Novice users can rapidly create reports with intuitive drag & drop function
- Easy drill up and drill down options for both reporting and charting
- Reports can be generated on schedule or on demand
- Available through Tivoli Common Reporting
- Offers multiple distribution formats such as email, pdf, etc.

Gracias!!!