



IBM Tivoli Storage Manager Family v6.3



Agenda

- **Introduction**
- Leading the Way in Unified Data Recovery Management
- Tivoli Storage Manager Product Overview
 - Data protection & Virtual Environments
 - Disaster recovery & Node Replication
 - Data Deduplication
- What's New in TSM 6.3
 - GPFS
 - Monitoring & Reporting
- Links to More Information
- Summary



How IBM Tivoli Storage Manager can help YOU

- Reduce infrastructure costs – servers, storage, bandwidth
- Reduce operational expenses
- Improve application availability and reduce downtime
- Efficiently protect Virtual environments
- Reduce risk associated with data loss
- Achieve regulatory and corporate compliance
- Manage your data throughout its lifecycle
- Future-proof your data management processes

- Tivoli Storage Manager is a key offering in IBM's Information Infrastructure portfolio, helping clients build a smarter storage infrastructure



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Leading the way for more than 18 years

Tivoli Storage Manager has been a leader in helping organizations protect, retain and assure availability of their most important asset

Innovation from the start

- 1st disk-to-disk backup solution
- 1st to provide support for both disk and tape
- 1st to use hierarchical storage management for offline storage
- 1st to offer a fully incremental approach for backup window management
- 20,000+ loyal customers
- Industry's broadest range of OS and HW platforms *from laptop to mainframe*
- ***Emphasizing data reduction since 1993***

Unified Recovery Management

- Backup / Restore
- Archive / Retrieve
- Disaster Recovery
- Data Lifecycle Management
- Application Protection
- Database Protection
- Virtual Server Protection
- Remote Office Data Protection
- Desktop / Mobile User Protection
- Data Deduplication
- Bare Machine Recovery

IBM Tivoli Storage Manager - Product Family

TSM Server Products

- ✓ Tivoli Storage Manager
 - Backup/Recovery
 - Archive/Retrieve
 - Data Reduction (deduplication)
- ✓ TSM Extended Edition (Basic plus..)
 - Disaster Recovery Management
 - Backup via NDMP for NAS
 - Large Libraries (additional tape support)
- ✓ TSM Suite for Unified Recovery
 - Capacity priced bundle of 10 products
- ✓ TSM FastBack

Application Protection

- ✓ TSM for Mail
- ✓ TSM for Databases
- ✓ TSM for Enterprise Resource Planning (ERP)
- ✓ TSM for Microsoft SharePoint
- ✓ TSM for Virtual Environments
- ✓ TSM FastBack for Microsoft Exchange
- ✓ Tivoli Storage FlashCopy Manager

Space Management, Archiving

- ✓ TSM for Space Management
- ✓ TSM HSM for Windows
- ✓ TSM for Storage Area Networks (SAN)
- ✓ System Storage Archive Manager
- ✓ IBM Information Archive

Desktop / Laptop

- ✓ TSM FastBack for Workstations
- ✓ Tivoli Continuous Data Protection for Files

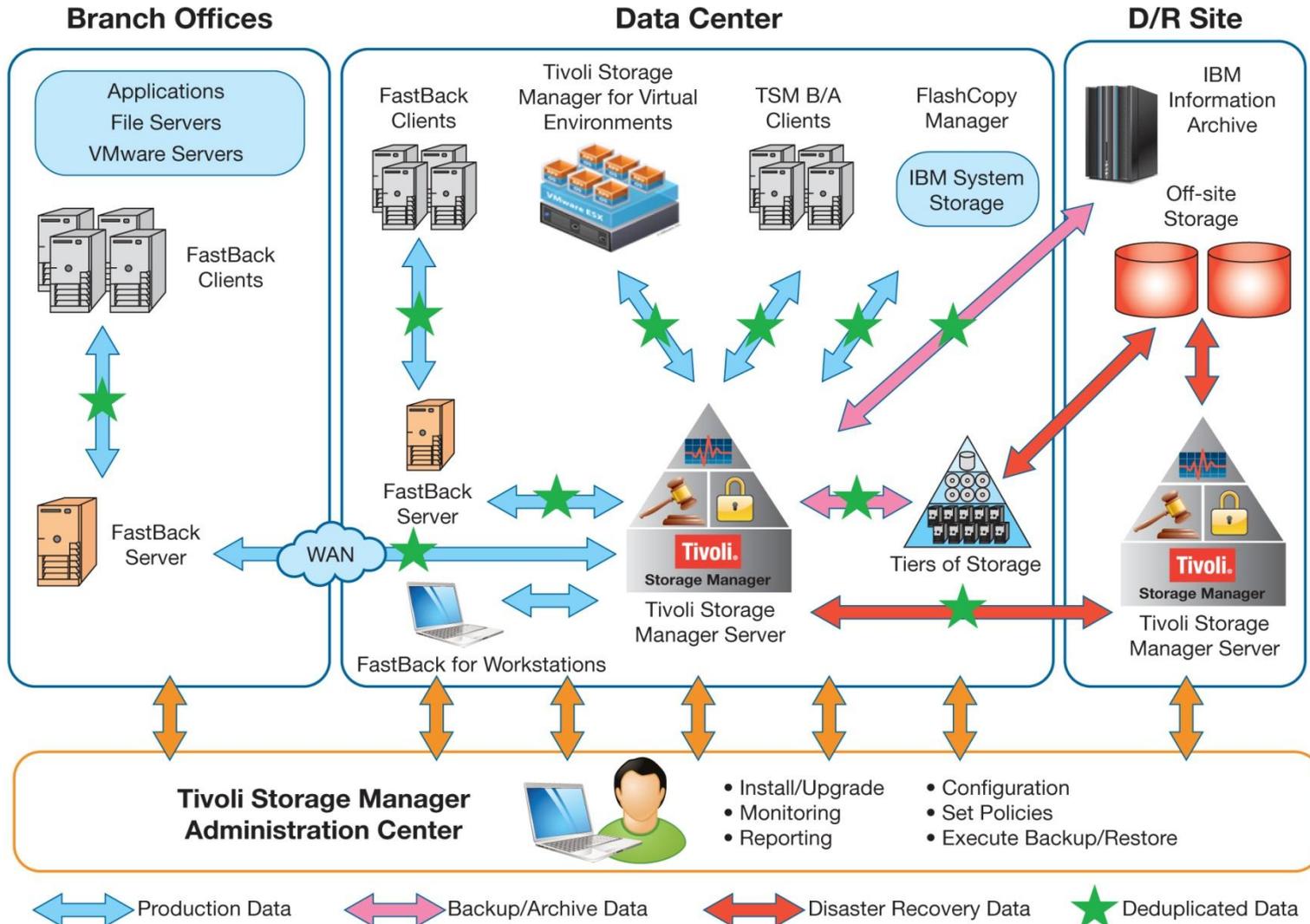
Bare Machine Recovery

- ✓ TSM for System Backup and Recovery (AIX)
- ✓ Cristie Bare Machine Recovery (reseller)
- ✓ Cristie TBMR (reseller)
- ✓ TSM FastBack for Bare Machine Recovery

z/OS

- ✓ **TSM for z/OS Media (NEW)**
- ✓ **TSM EE for z/OS Media (NEW)**

IBM's Unified Recovery Management Platform



Tivoli Storage Manager – the INNOVATION continues

Tivoli Storage Manager has been designed to address our customers' most challenging issues: the continuing growth of data and the complexity of managing it.



New

in TSM v6.1 (03/2009):

- Increased scalability, availability & performance (embedded DB2 database)
- Built-in target-side data deduplication
- Simplified management & deployment
- Improved integration with VMware, NetApp / N series and Windows



New

in TSM v6.2 (03/2010):

- Tight integration with TSM FastBack
- Built-in source-side data deduplication
- Automatic deployment of Windows client updates
- Support for VMware vStorage API and VSS in Hyper-V



New

in TSM v6.2.2 (12/2010):

- Even better support for VMware, Windows and N series / NetApp environments
- High Availability of the TSM Server, using DB2 HADR Replication
- Introduction of **TSM for Virtual Environments** in March 2011 – optimized protection and flexible recovery for VMware vSphere
- Introduction of **TSM Suite for Unified Recovery** in June 2011 – capacity-priced bundle of 10 TSM and FastBack products

Tivoli Storage Manager Suite for Unified Recovery includes ...

Tivoli Storage Manager (TSM) Extended Edition
Highly-scalable enterprise-class backup/restore, archive and disaster recovery

TSM for Databases
Oracle and Microsoft SQL

TSM for Virtual Environments
Advanced VMware Support

TSM for Mail
Domino and Exchange

TSM for SAN
LAN-Free Backup and Restore

TSM for ERP
SAP R/3 Integration

TSM for Space Management
Data Lifecycle Management for UNIX

Tivoli Storage Manager FastBack
Advanced snapshot and near-instant recovery for Windows / Linux servers

FastBack for Exchange
Granular E-mail Recovery

FastBack for BMR
Restore O/S volume in an hour

Central Administration
Configure, manage upgrade, reporting, monitoring

Version-to-Version Comparison

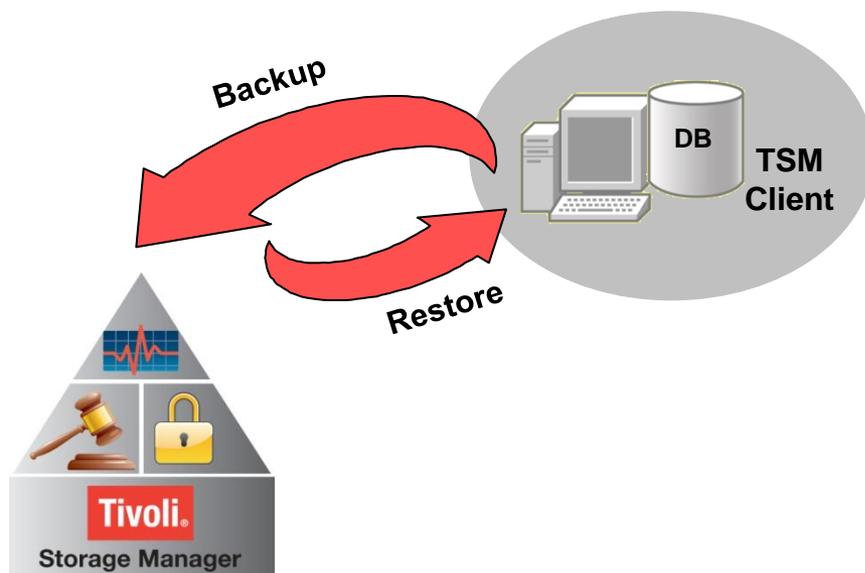
	TSM v5.5 4Q07	TSM v6.1 1Q09	TSM v6.2 1Q10	TSM v6.2.2 4Q10	TSM V6.3 4Q11
TSM Server Capacity (# objects)	0.5 Billion	1 Billion	2 Billion	2 Billion	4 Billion
Disaster Recovery (TSM EE)	DR Planning	DR Planning	DR Planning	Database replication	Client data replication
Reporting and monitoring		New	✓	✓	Add Cognos
VMware support	In-guest	In-guest, VCB	VADP image only	TSM for VE v6.2	TSM for VE v6.3
Target-side data deduplication		New	✓	✓	✓
Source-side data deduplication			New	✓	✓
Automatic client software updates			Windows	Windows	All O/S
Unified Recovery Management			Integrate FastBack, FB for Workstations	✓	TSM Suite for Unified Recovery

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Protecting Databases and Applications



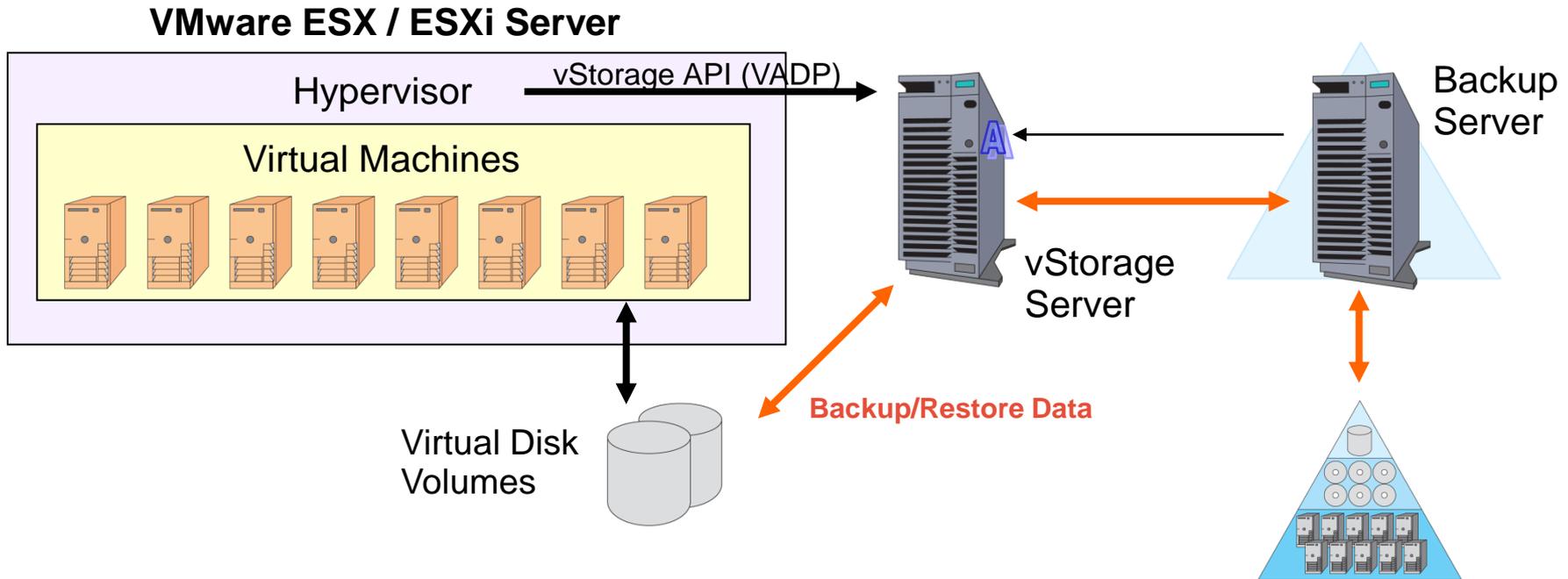
- **TSM for Databases (Oracle, MS SQL)**
- **TSM for Enterprise Resource Planning (SAP/R3)**
- **TSM for Mail (Lotus Domino, MS Exchange)**
- **TSM for Microsoft SharePoint**
- **Support for DB2 is built in the base TSM**

Benefits

- **Online (hot) backup**
 - No downtime for critical applications
 - 24x7 application availability can be guaranteed
- **Incremental backup**
 - Minimize data to store and maintain
 - Faster backups
- **Data integrity**
 - Guaranteed by the use of certified application APIs
 - All required files automatically backed up consistently
- **Automation & Scheduling**
 - No shutdown required
 - Automated restore of consistently backed up files
 - No customized scripts and manual interaction

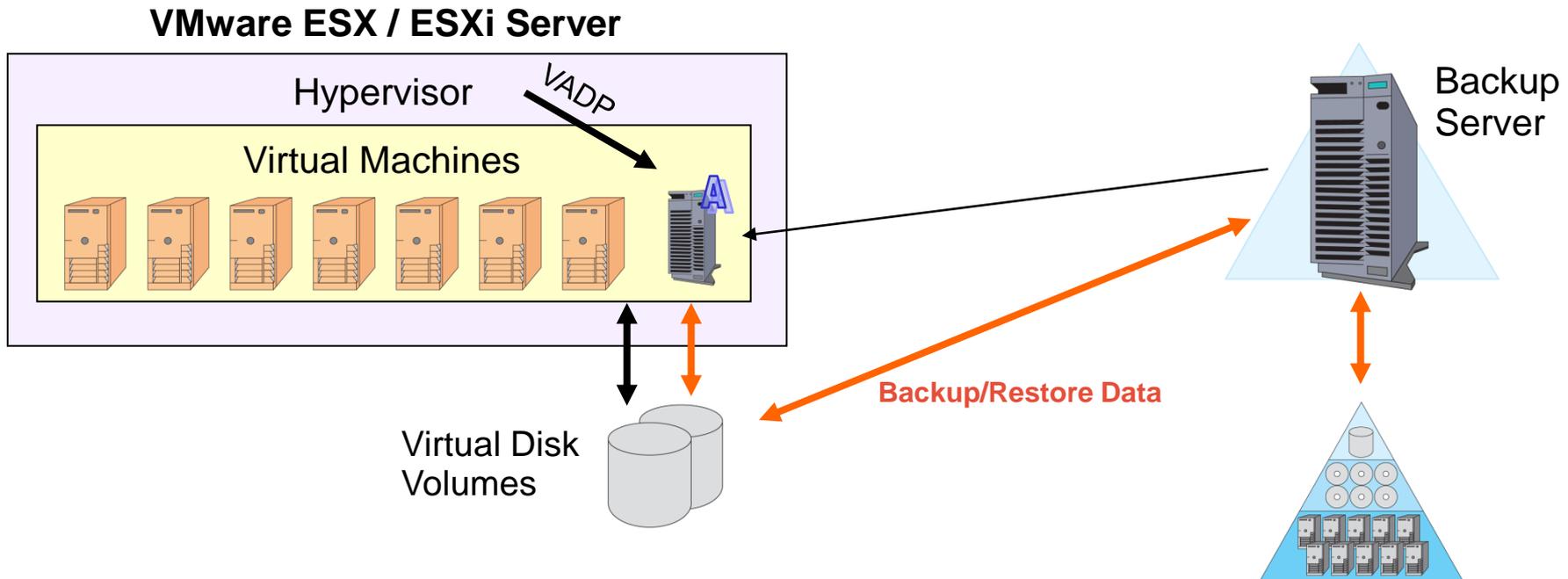
Protecting Virtual Server Environments using VMware vStorage APIs for Data Protection

- Data is accessed directly from the VM storage and passed directly to the backup server (single hop, data is not stored on the vStorage Server)
- Changed Block Tracking allows incremental backups (with periodic fulls) without forcing a scan of the guest OS file system



Protecting Virtual Server Environments using VMware vStorage APIs for Data Protection

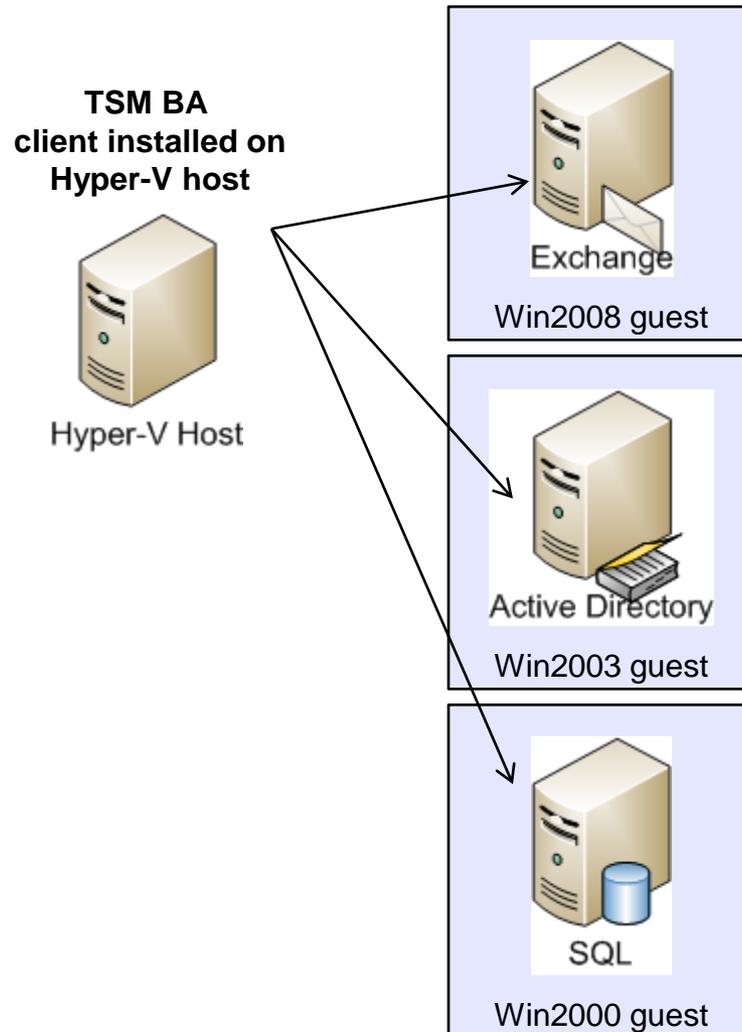
- Data is accessed directly from the VM storage and passed directly to the backup server (single hop, data is not stored on the vStorage Server)
- Changed Block Tracking allows incremental backups (with periodic full backups) without forcing a scan of the guest OS file system
- **The vStorage Server can be a virtual machine – no additional HW needed**



Tivoli Storage Manager for Virtual Environments

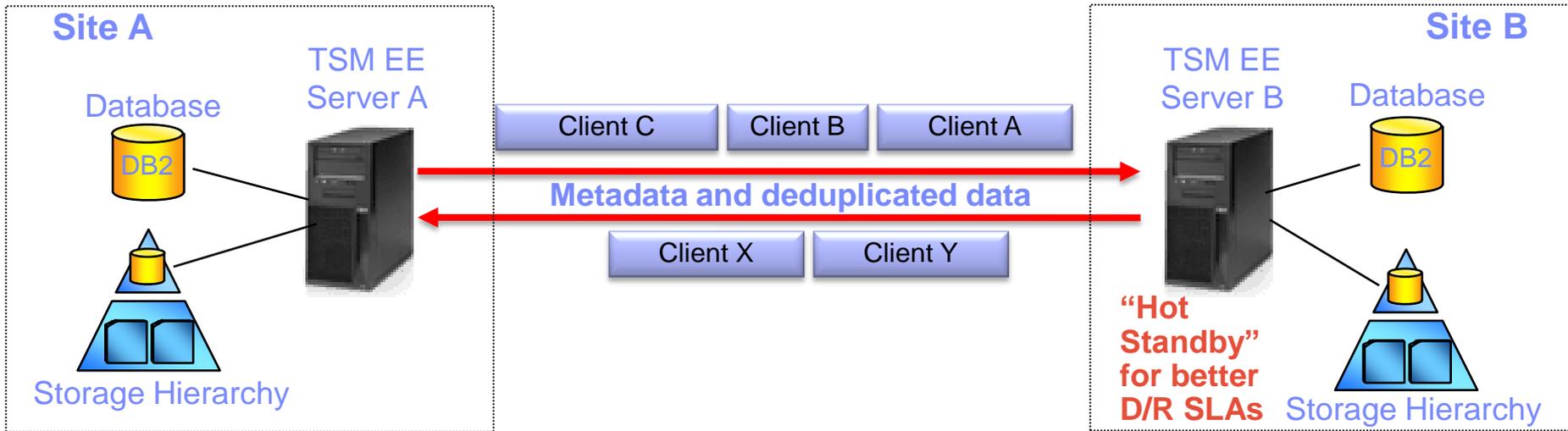
- Support for VMware vSphere v4.1 and 5.0 (new in v6.3)
- Utilizes VMware's vStorage APIs for Data Protection, including block-level incremental backups based on VMware's Change Block Tracking
- Offloads the backup workload from virtual machines and production ESX hosts to vStorage backup servers
- Provides flexible recovery options – file, volume or image – from a single-pass backup
- Near-instant restore of Windows and Linux disk volumes
 - Data is made available immediately while it is copied in the background
- Simplifies day-to-day administration with the centralized Tivoli Storage Manager console
 - TSM for VE is supported on TSM Server v5.5 and above
- Automated discovery of new VMs; automatically applies backup policies
- Plug-in for vCenter for simplified management from within the vSphere environment (new in v6.3)

Microsoft Hyper V guest backup using Volume Shadow Copy Services (VSS)



- Full snapshot backup of guest machine
- Snapshots synchronized with applications and file systems inside guests with VSS

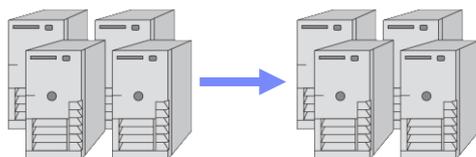
TSM client data replication for FASTER Disaster Recovery



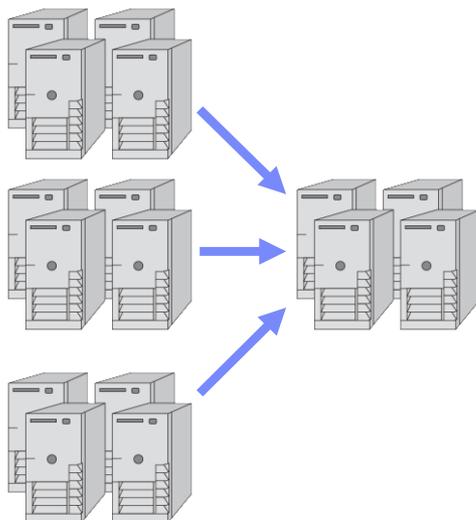
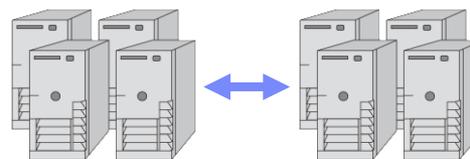
- TSM server replicates all data and metadata for specified client data sets to another server, ensuring completeness and consistency of data/metadata
 - Incremental client data transfer with **deduplication** to minimize bandwidth consumption
 - Many-to-1 transfer to target server
- Remote TSM server could be **hot standby** for primary server, for improved RTO
- Native TSM solution with no dependency on specific storage device
 - Supports dissimilar hardware and configuration at primary and remote sites
- Restore on a **per-client basis** without re-hydrating deduplicated data

Disaster Recovery *Configuration options*

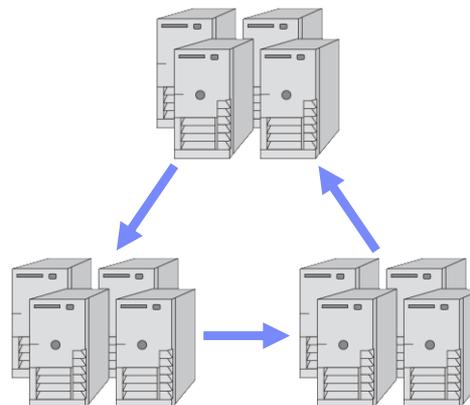
Source to Target



Between active Sources

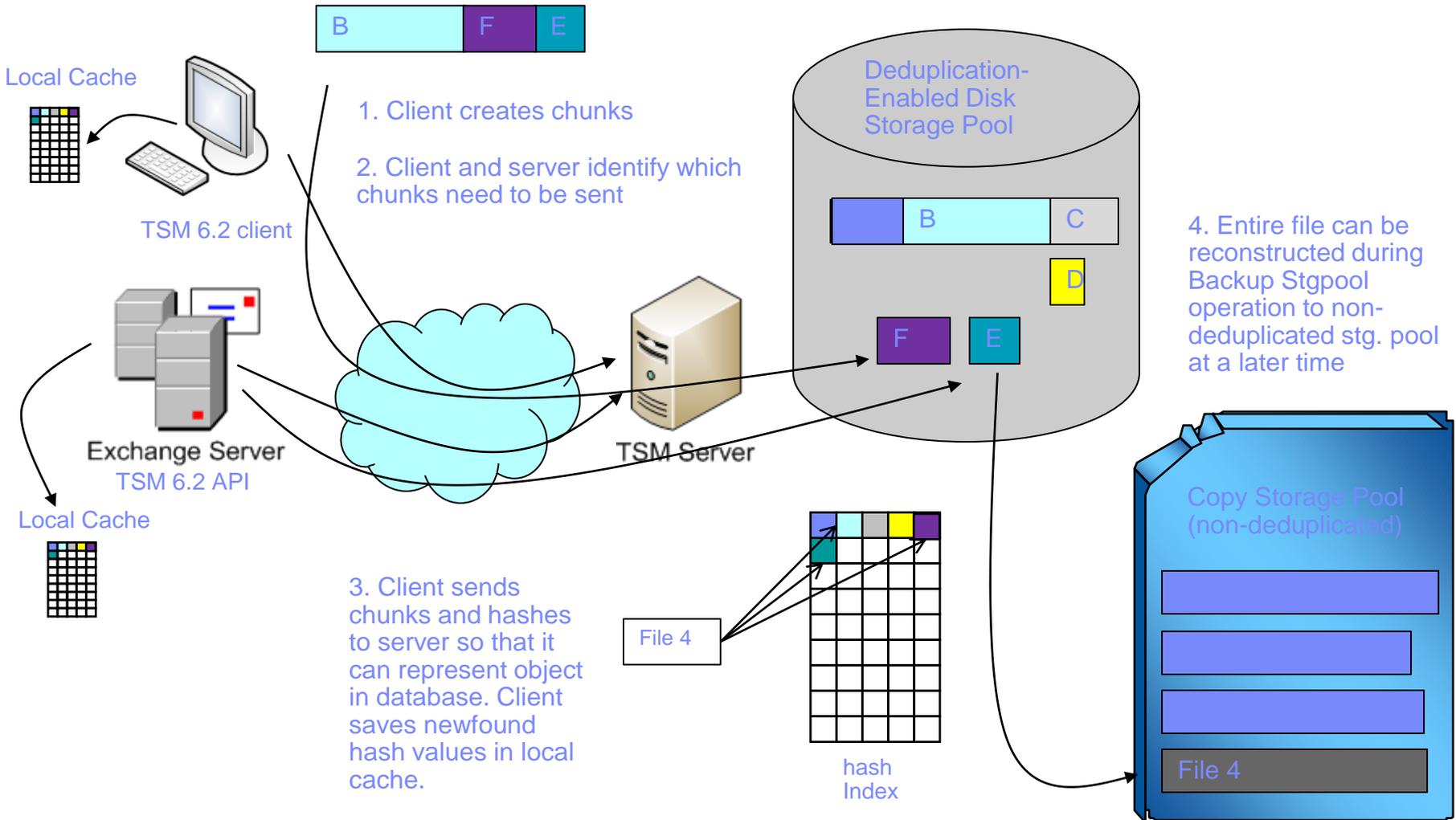


Many to One



Round Robin

Client-Side Data Deduplication - Operation



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TSM 6.3 Server Content

- **TSM for z/OS Media**
- **Node Replication**
- **Node Replication support in the Admin Center**
- **Administrator Center Enhancements**
- **DB Backup Enhancements**
- **Reporting Enhancements**
- **Client Performance Monitoring**
- **Client Deployment**
- **Process Value Unit (PVU)**
- **Tape Optimized Recall Externalized**
- **VTL Awareness**
- **GSKIT 8 and AES enhancements**
- **Install Changes**
- **Software Inventory tagging**
- **Persistent Reserve**

TSM 6.3 Client

- **Backup-Archive client simplify configuration of client in an MSCS cluster**
- **Tape Optimized Recall externalize**
- **Journal Based Backup support on Linux**
- **Upgrade Install for the TSM Linux Client**
- **Extend maximum path name support to 4096 bytes for Linux b/a**
- **Tivoli Integration Agent Management Initiative: Common Agent Package**
- **64 bit Linux**
- **64 bit Solaris**
- **Mac**
- **Integration initiative - Serviceability - Inventory Tagging**
- **HSM migrate/recall log**
- **HSM for Windows - Stub moving tool**
- **UNIX HSM - Multiple Server externalize**

TSM for ... (not covered in this presentation)

TDP for Oracle

- TDP for Oracle: Currency - TDPOSYNC support for backup history in Oracle control file
- TDP Oracle - Add ability to specify TCPSEVER, TCPPOINT using sbtcommand
- TDP Oracle - Provide a mechanism to query backed up Oracle files and Indicate whether a backup was encrypted, compressed, or De-duped
- TDP Oracle - read PASSWORDACCESS from dsm.sys
- TDP for Oracle - Reversion to V6
- TDP for Oracle - UTF-8 message catalog support
- TDP for Oracle - Implement Inventory Tagging as required by SWG
- TDP for Oracle - upgrade install programs to use InstallAnywhere 2010 / InstallShield 2010

TDP for Domino

- TDP Client Scalability Improvement - eliminate memory constraints caused by in memory lists for large numbers of objects
- TDP Domino - Indicate whether a backup was encrypted, compressed, LAN-free or De-duped
- TDP for Domino - Reversion to V6
- TDP for Domino - Implement Inventory Tagging as required by SWG
- TDP for Domino - upgrade install programs to use InstallAnywhere 2010 / InstallShield 2010
- TDP Domino & Oracle - UTF-8 message catalog support
- TDP for Domino - communication failure enhancement
- TDP for Domino - UTF-8 message catalog support

TDP for SAP

- DP for SAP - Add support for RMAN incremental backups of Oracle

TDP for ERP

- TSM for ERP Implement SWG Inventory Tagging

Optimized Tape Recall - HSM for Unix

- Recall of files on tape impacted by
 - Files stored on different tapes
 - Files recalled in different order than as stored on tapes
 - Frequent tape mounts and unmounts
- Optimized tape recall processing, optimizes tape access and minimizes mounting and unmounting tapes

Number of files recalled	No tape optimization	Optimized tape processing
On one tape:		
10.000 files	140 minutes (2.3 hrs)	11 minutes
500.000 files	816 minutes (13.6 hrs)	170 minutes (2.8 hrs)
On two tapes:		
10.000 files	340 minutes (5.6 hrs)	8 minutes

Journal Based Backup on Linux

- JBB on Linux using FilePath technology (same as on AIX since TSM 5.3.2.)
 - Support Linux local file systems: EXT2/3/4, XFS, ReiserFS, JFS, VxFS, NSS
 - Not supporting GPFS for journal based backup
- Linux vs AIX*
 - Similarities
 - Journal daemon code
 - Configuration options
 - Differences
 - Kernel extension code
 - Daemon startup script
 - Install & Configure
 - Two RPM packages
 - TIVsm-filepath-<vendor>.<arch>.rpm
 - TIVsm-JBB.<arch>.rpm
 - Configuration
 - Same as AIX (tsmjbbd.ini)
 - Runtime
 - Kernel module (filepath) is loaded automatically
 - Daemon startup script is provided

Journal Based Backup – All platforms

- Extend the number of file systems monitored for journaling
 - New *JournaledFileSystems.Extended* journal daemon configuration
 - New setting implemented as a stanza section
 - For example:

```
[JournaledFileSystems.Extended]
```

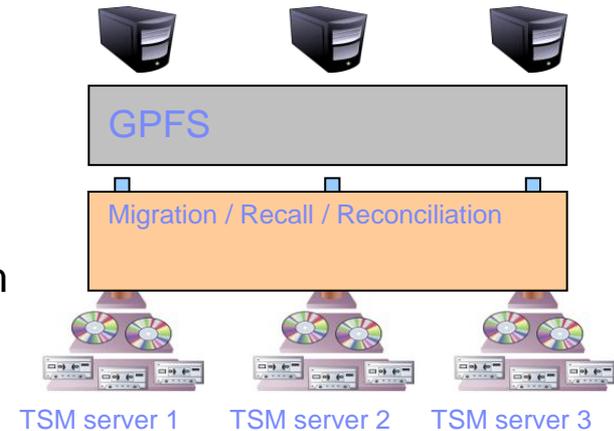
```
  /fs1
```

```
  /fs2
```

- Existing *JournaledFileSystems* setting still supported
- The older setting ignored if the newer *JournaledFileSystems.Extended* setting is specified

Space Management on Unix – Multiple Server support on GPFS

- What does multiple server support do?
 - Enables HSM to migrate files to multiple TSM servers, increasing scalability and performance
 - Server distribution works automatically via GPFS policies
 - Transparent recall from multiple servers is possible
 - Backup is integrated into server distribution
- Previously:
 - Limited to handle one TSM Server for each single file system
 - Limited to handle 1 billion files per TSM Server instance
- How does it help?
 - In GPFS v3.3 the number of object in a single file system limited to 4 billion
 - Single GPFS v3.4 or later can migrate to 2 or more TSM servers
 - As FS exceeds capacity of TSM servers, can add more servers
 - Essential part of high scaling archiving solutions like SoNAS and IIA in conjunction with GPFS
 - Function coded in TSM 6.2 for SONAS, made external in TSM 6.3



Space Management on Unix – Multiple Server support on GPFS

■ Requirements

- GPFS version 3.4 or later
- DMAPI enabled on GPFS file system
- Automatic migration driven by GPFS policy engine
 - Before upgrading to multiple-server support, must configure GPFS appropriately

– Limitations when using multiple TSM server

- mmbackup doesn't backup to multiple TSM servers
 - GPFS will add this support in the near future
- HSM scout based automigration not supported
- TSM archive/retrieve function not supported
- Not possible to encrypt multiple TSM server names on a single node
- TSM server node replication can not supported
- TSM server LAN-free configuration is not supported

Space Management on Unix – Multiple Server support on GPFS

- Preparation of a existing file system

1. Set option **hsmdisableautomigdaemons=YES** for all HSM clients in the GPFS cluster
2. Set option **hsmmultiserver=YES** for all HSM clients in the GPFS cluster
3. Add to the list of servers the TSM server that currently manages the file system:
dsmmigfs addmultiserver -server=server_name file_system_name.
4. Run the **dsmMultiServerUpgrade.pl** script.

uses **dsmreconcile** to couple all FS files with TSM server which manages the migration copies & backup versions

- Adding a TSM server

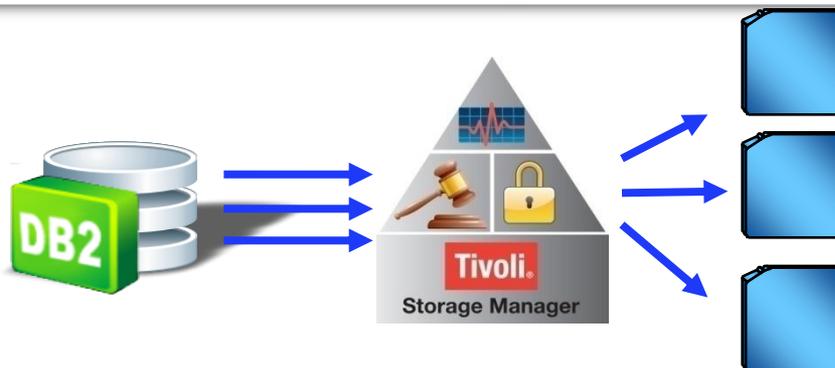
- For each additional server: **dsmmigfs addmultiserver -server=server_name file_system_name**
 - Adds the server name and server specific paramaters to a internal server list
 - **dsmmigfs querymultiserver file_system_name** used to query the content of the server list

- Automatically generated GPFS policy

- **dsmmigfs addmultiserver** command generates a GPFS policy which can be used for GPFS driven threshold migration
- For each added server a new rule is genrated in the policy file under */<FSname>/.SpaceMan/multiserver/ruleset/BasicRuleSet*
- To activate GPFS driven threshold migration with multiple servers:
 - **mmchpolicy Device /<FSname>/.SpaceMan/multiserver/ruleset/BasicRuleSet**
 - If GPFS policy already in place, must merge actual policy file with the generated HSM policy file

- GPFS driven Threshold Migration:
 - The GPFS policy engine decides which TSM server is used
 - IF file previously migrated or backed up the same TSM server will be used
 - ELSE GPFS policy engine will invoke via round robin the `dsmNextServername.pl` script
 - The script can be modified to meet the user expectation*
- Selective migration:
 - **`dsmmigrate -server=<servername> <filename>`** command.
 - If file was migrated before to an other TSM server the file will be skipped for migration
 - After the migration the file will be coupled with that server
- Recall from multiple servers:
 - Rrecall daemon gets the server from a EA stored with the file.
 - **`dsmrecall -Server = <servername>`** command can be used for selective recalls of files
- Reconciliation from multiple servers:
 - Reconciliation uses two way orphan check reconciliation in script **`dsmreconcileGPFS.pl`**
 - For full reconciliation of the fs, script must be started against all TSM servers in the environment
- Backup:
 - `dsmc incr/sel -server=<servername>` (If no server name is specified the default server used)
 - The first backup of a file will couple the file to the specified TSM server
- Restore:
 - `dsmc rest -server=<servername>`
 - To find right server for the restore use command `dsmc query backup <fileName>`
 - To restore whole directory structures use a script to restore from all servers

TSM internal database backup - Parallel streams for backup/restore processing



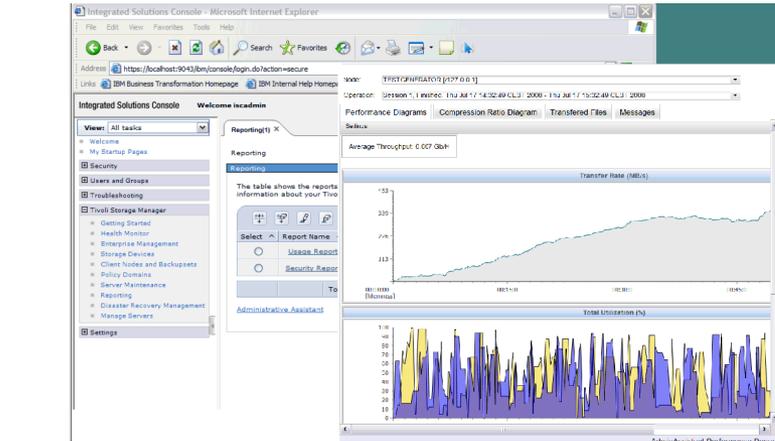
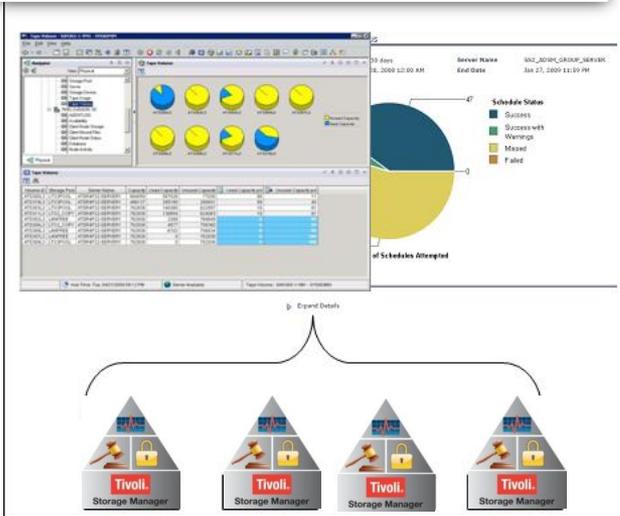
What this is:

- Currently the backup of the TSM internal DB2 database is a single threaded operation
- This enhancement allows multiple, configurable threads for parallel processing.

Benefit to our customers:

- Improved throughput:
 - Example: In the lab we've seen throughput performance increases of 70% for both DB backup and restore, when using 2 parallel streams vs. single stream.
- Reduced time for database backup/restore, frees up server for other operations
- Increased scalability of TSM server without expanding database backup window
- Up to 4 parallel streams

TSM reporting and monitoring enhancements



TSM API Performance Monitoring

PVU Estimation reporting

Processor Details by Node						
Node Name	Product	Proc Vendor	Proc Brand	Proc Type	Proc Model	Proc Count
CG04NODE2	PRODTSMEE	Intel	Quad-Core Xeon	4	E5345	2

License Details by Node												
Node Name	Product	Server	Server Ver	Server Rel	Lic Role	Last Used Date	Lic Role OV	Lic Role EFF	Value Units	Val From Table	PVU	Scan Error
CG04NODE2	PRODTSMEE	LAMBO	6	3	SERVER	02/07/11 00:00:00	USERREPORTED	SERVER	50	YES	100	NO

What this is:

- TSM reporting easier to install, configure and create customized reports
- Additional out of the box reports
- Integrated Cognos reporting engine providing better creation of 'custom reports' capabilities
- Performance monitoring built into TSM API
- PVU Estimation reporting
- Export reports to various formats including XML and Microsoft Excel.
- Automatically e-mailing of reports

Benefit to our customers:

- Install, configure and use reporting and monitoring within 2 hours
- Create a custom report in 30 mins or less
- Aggregated reporting and monitoring view of entire TSM environment
- Bottleneck analysis for API clients - See the time spent per operation along the backup path
- Significant time savings calculating PVU requirements
- Easier administration

A single view of TSM server information

The screenshot shows the Tivoli Storage Manager monitoring dashboard. It features several panels: a tree view on the left, a 'Node Storage Space Used' chart, a 'Storage Pool' table, a 'Tape Drives' table, and an 'Activity Log Errors' table. Callouts are present for each of these elements.

Node Storage Space Used: A 3D bar chart showing storage usage across various nodes. The Y-axis represents 'Storage Used' from 0 to 10,000,000. The X-axis lists nodes like 'WIN2008R8', 'WarehouseProxy', and 'TSMC001'. A legend indicates 'Disk Usage' (blue), 'Total Storage Space Consumed' (orange), and 'Total Tape Space Used' (green).

Storage Pool: A table with columns: Pool Name, Device Class, Total Space, File Space Used, Class Space Used, and Dedupl. Swt. The data is as follows:

Pool Name	Device Class	Total Space	File Space Used	Class Space Used	Dedupl. Swt.
LTOCOPY	LTO_CLASS	50670	0	0	0
LTOPPOOL	LTO_CLASS	16559	0	0	0
FILEPOOL	FILE	8009	8009	0	9822
HSMPOOL	FILE	0	0	0	0
ACTIVEPOOL_TEST	FILE	0	0	0	0

Tape Drives: A table with columns: Library Name, Drive Name, Device Type, Online, Drive Status, Allocated To, Serial, and Volume Name. The data is as follows:

Library Name	Drive Name	Device Type	Online	Drive Status	Allocated To	Serial	Volume Name
LTO1B	LTO3_1	LTO	YES	EMPTY		0007025485	
LTO1B	LTO3_2	LTO	YES	EMPTY		0007025483	
LTO1B	LTO3_3	LTO	YES	EMPTY		0007025483	
LTO1B	RMT1	LTO	YES	EMPTY		1110011006	
LTO1B	RMT2	LTO	YES	EMPTY		1110102830	

Activity Log Errors: A table with columns: Node Name, Date Time, Log Code, TSM Severity, and Log Tr a. The data is as follows:

Node Name	Date Time	Log Code	TSM Severity	Log Tr a
SS2_ADSM_GROUP_SERVER	08/23/11 00:24:00	2034	Error	ANR2034E SELECT: No match
SS2_ADSM_GROUP_SERVER	08/23/11 00:24:00	2034	Error	ANR2034E SELECT: No match
SS2_ADSM_GROUP_SERVER	08/23/11 00:24:00	2034	Error	ANR2034E SELECT: No match
SS2_ADSM_GROUP_SERVER	08/23/11 00:23:00	2034	Error	ANR2034E SELECT: No match
SS2_ADSM_GROUP_SERVER	08/23/11 00:23:00	2034	Error	ANR2034E SELECT: No match
JAKENNEDY01	08/23/11 00:20:00	4037	Error	ANE4037E File 'jakennedy01.cpa
SS2_ADSM_GROUP_SERVER	08/23/11 00:20:00	2034	Error	ANR2034E SELECT: No match
SS2_ADSM_GROUP_SERVER	08/23/11 00:20:00	2034	Error	ANR2034E SELECT: No match

What clients are taking the most storage space?

What is the status of storage pools ?

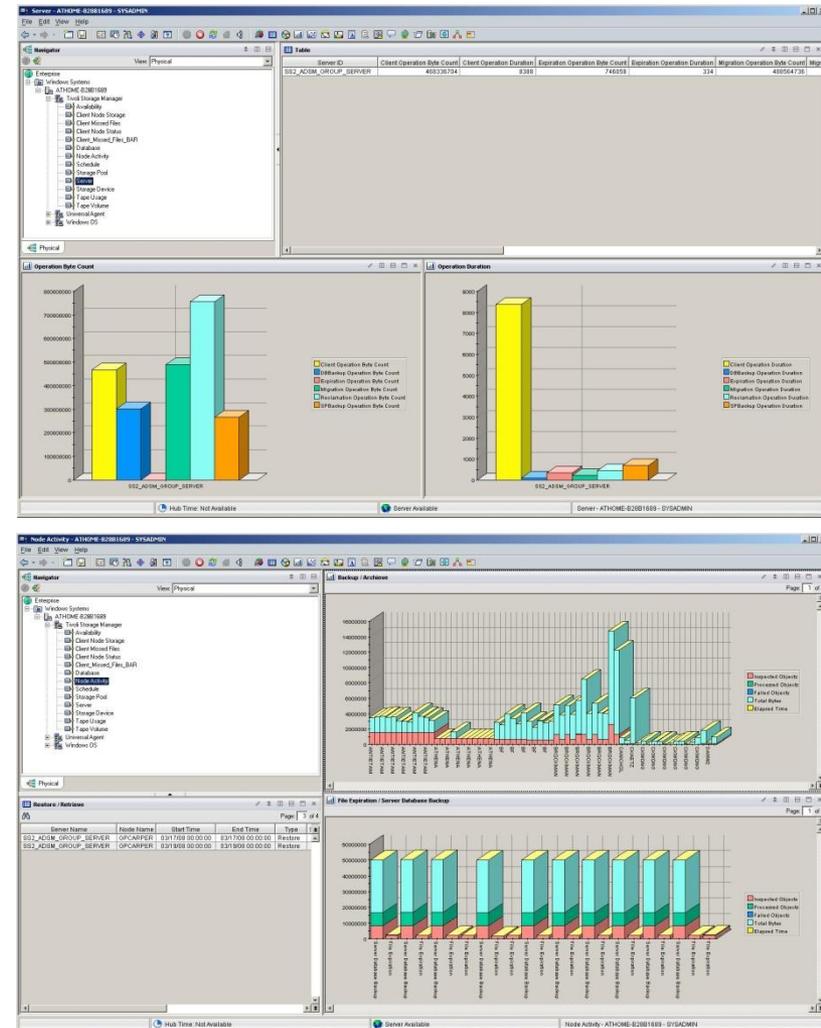
What is the status of tape drives?

Easily see what schedules have been missed

Activity log errors

Reporting and monitoring leverage proven IBM components

- IBM Tivoli Monitoring
 - IBM Tivoli Enterprise Portal
 - IBM Tivoli Enterprise Management Server
 - Tivoli Data Warehouse
- TSM monitoring agent
 - Queries and formats data to be presented
- IBM DB2
 - Stores historical data obtained from TSM servers that are monitored using IBM Tivoli Monitoring
- Leverages Cognos Business Intelligence Reporting to create custom reports



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Please visit these links for more information

(Links active in slide-show mode)

- [Introductory Demo](#)
- Product Information:

<ul style="list-style-type: none"> – Tivoli Storage Manager – Tivoli Storage Manager Suite for Unified Recovery – Tivoli Storage Manager for Virtual Environments – Tivoli Storage Manager FastBack – Tivoli Storage Manager FastBack for Workstations – Tivoli Storage FlashCopy Manager 	<ul style="list-style-type: none"> Data Sheet 	<ul style="list-style-type: none"> Web Page 	<ul style="list-style-type: none"> Tech Info Tech Info Tech Info
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- White Papers:
 - [Ten ways to save money with Tivoli Storage Manager](#)
 - [ESG: Tivoli Storage Manager for Virtual Environments](#)
 - [Unified Recovery Management](#)
 - [Extend Tivoli Storage Manager to the Cloud](#)
 - [Migrate to IBM Tivoli Storage Manager Easily and Confidently](#)
 - [Leverage the IBM Tivoli Competitive Advantages in Storage Management](#)
 - [Using IBM Data Reduction Solutions to Manage More Data with Less Infrastructure](#)
- Solution information:

<ul style="list-style-type: none"> – Storage Management – Backup and Recovery – Data Reduction 	<ul style="list-style-type: none"> - Remote Office Data Protection - Unified Recovery Management - Storage Management in Cloud
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- DeveloperWorks: [TSM Wiki](#)

Agenda

- Introduction
- Leading the Way in Unified Data Recovery Management
- Tivoli Storage Manager Product Overview
 - Data protection & Virtual Environments
 - Disaster recovery & Node Replication
 - Data Deduplication
- What's New in TSM 6.3
- Links to More Information
- **Summary**



Tivoli Storage Manager can meet all of your backup/recovery needs



- Tivoli Storage Manager helps customers address conflicting challenges:
 - Data growth and long term data retention
 - Management of increasingly complex and virtualized IT infrastructures
 - Escalating business service levels requirements
 - Constrained budgets
- Tivoli Storage Manager offers industry-leading levels of:
 - Scalability
 - Functionality
 - Data reduction
 - Resiliency
 - Performance
 - Reliability
- Simplified and Unified Recovery Management across the distributed organization:
 - Hardware platforms
 - Operating Systems
 - Applications
 - Data centers, DR sites, remote offices, mobile workers, Clouds

Ten Ways to Save Money with Tivoli Storage Manager



1. Data Reduction
2. Unified Recovery Management
3. Capacity-Based Licensing
4. Scalability
5. High Performance
6. Data Lifecycle Management
7. Support for Virtualized Environments
8. Ease of Use
9. Reliability
10. Subscription and Support

Any Questions



Khop Khun Mak

Cheers

Sukran

Tack

Merci

Diolch

Gracias

Arigato

Kamsa hamaida

Danke

Salamat

kiitos

Efharisto

Thank You

Dankie

Grazie

Hvala

Xie xie

Kam ouen

Shukria

Tesekkurler

Köszönöm

Takk

Toda

Spasiba

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