Tivoli Flashcopy Manager Update and Demonstration

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Session:9092

Topics

- Tivoli Flashcopy Manager Functionality
- Flashcopy Manager Backup and Restore
- Configuration Details
- Flashcopy Manager in High Availability Configurations
- Advanced Restore Techniques
- Demonstration of Flashcopy Manager with Exchange

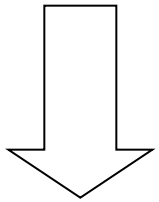
Flashcopy Manager – The Big Picture

Microsoft

AIX

Tivoli Storage Manager for Copy Services

Tivoli Storage Manager for Advanced Copy Services



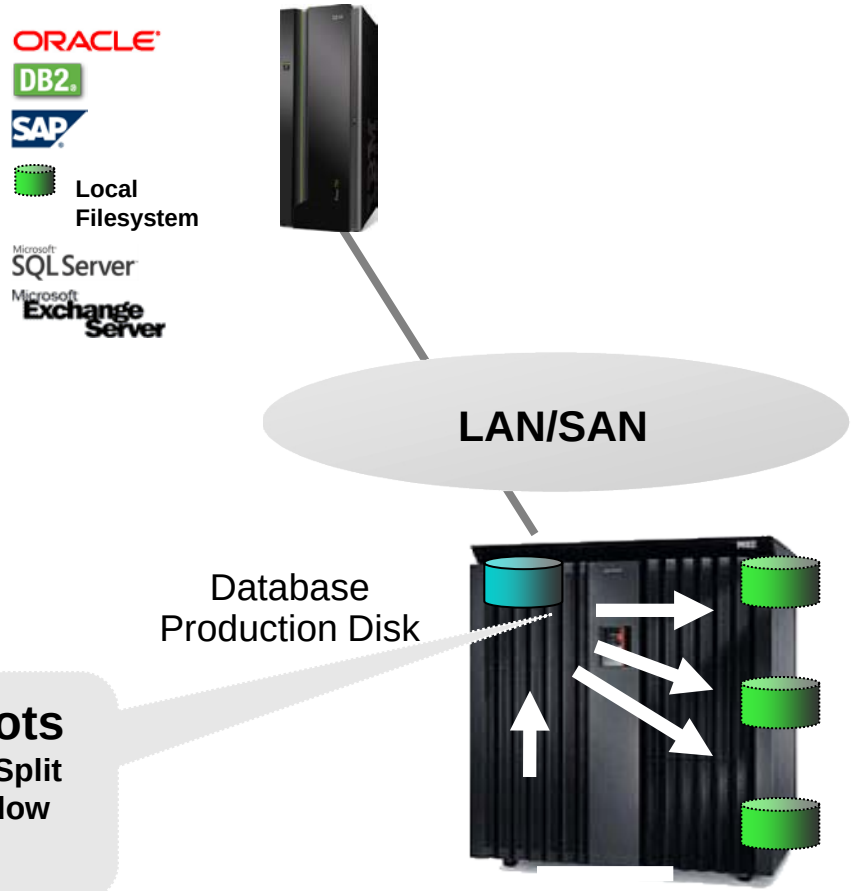
Tivoli Storage Flashcopy Manager

Microsoft

AIX

solaris

IBM Tivoli Storage Flashcopy Manager

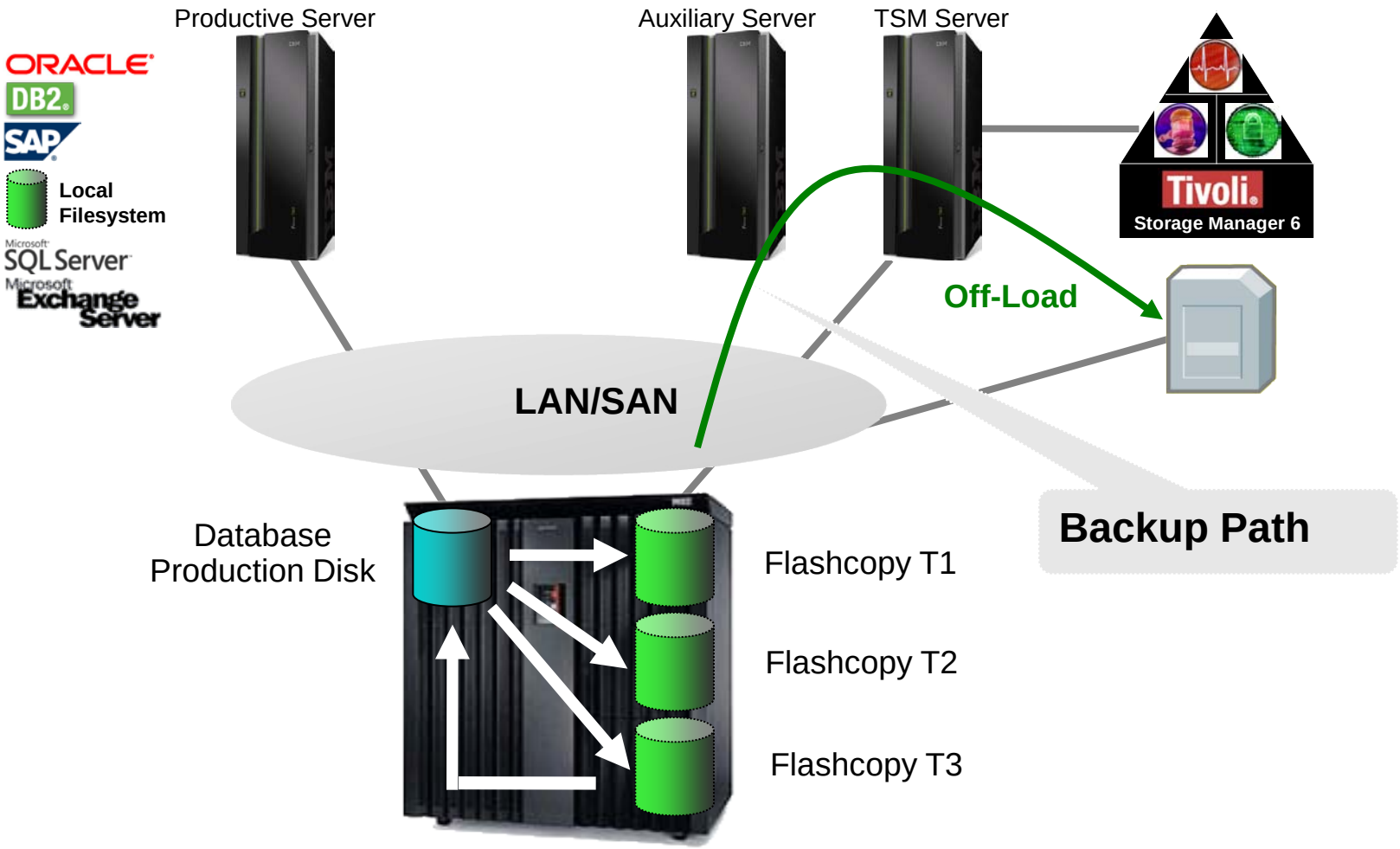


Benefits:

- ✓ Online, near instant snapshot backups with minimal performance impact
- ✓ Enable Storage Subsystems Flashcopy for Applications
- ✓ Instant Restore (FlashBack)
- ✓ No deep storage skills necessary

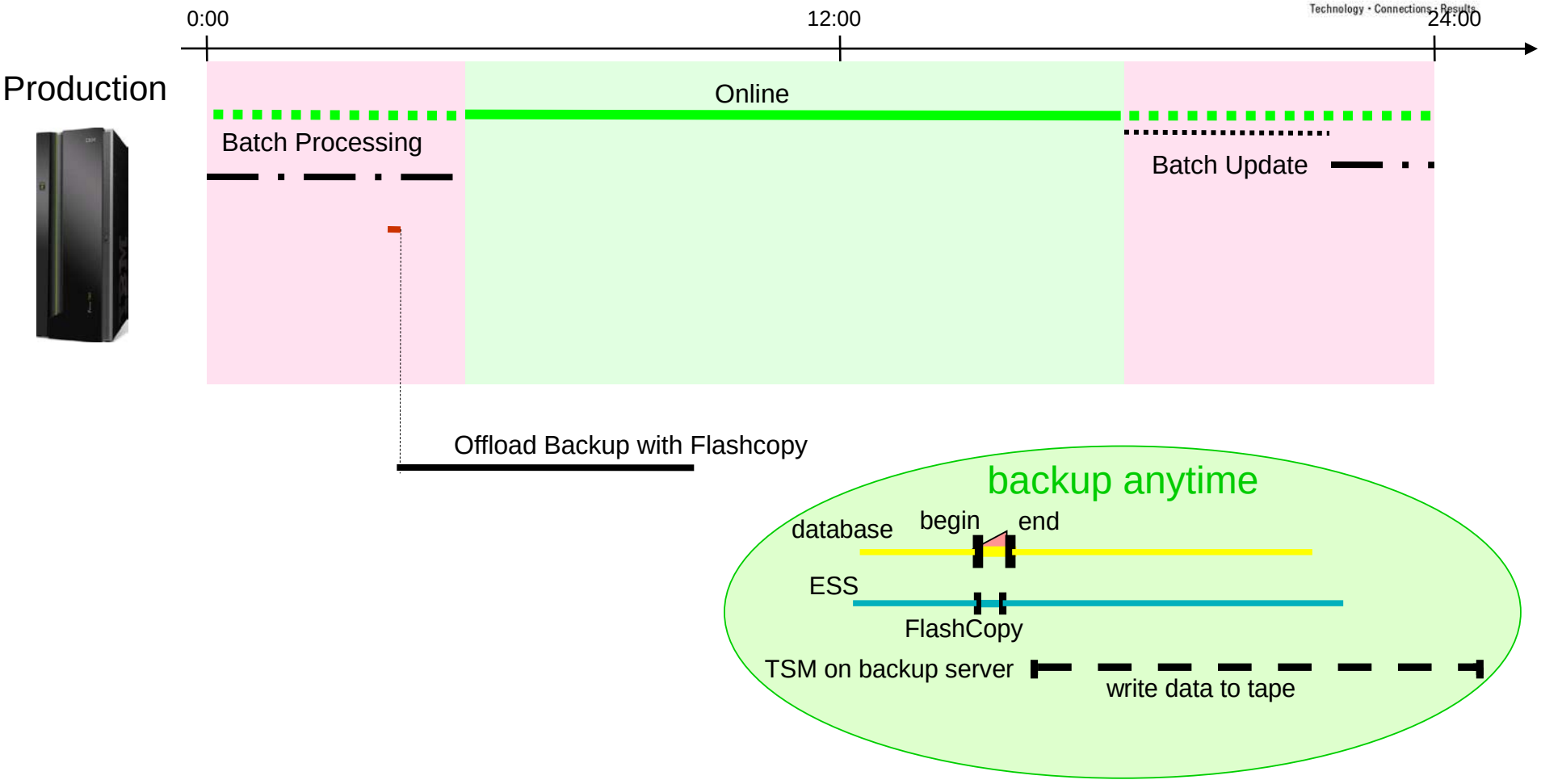
*VSS Integration

Flashcopy Manager with TSM



*VSS Integration

“Advanced” Data Protection



Tivoli Storage Flashcopy Manager

Using Flashcopy Manager without TSM

- Intended to be a quick solution for making backups without the need to have a TSM server running
- Flashcopy/Snapshot Backups and Restores only
- Flashcopy/Snapshots are managed locally with settings for versions and retention dates (Windows) and versions (AIX, Linux, Solaris)
- It is possible to start with FCM in local only mode and later add TSM server capabilities

Using Flashcopy Manager with TSM

- When used with TSM, FCM functions just like the Data Protection modules with Advanced Copy Services or Copy Services
- Flashcopy/Snapshot backups can be created to be stored locally, stored on the TSM server or both simultaneously
- Restores can be from the Flashcopy/Snapshot or from TSM disk/tape
- A robust solution for local recovery, disaster recovery and long term retention

Key Functionality

- Volume level Full Database or Storage Group backups
- Exploit Storage Copy Services features
  - Block level Incremental Flashcopy
  - Space Efficient Flashcopy
  - Auto provisioning of targets (XIV) or selection of targets from a pool (SVC, DS8000)
- Enables Frequent Snapshot backups for near CDP operation
  - Allows addressing aggressive recovery time objectives
- Policy Managed
  - Maintain a number of backup versions
  - Adaptive to changing requirements
- Cluster Support
  - Windows MSCS and VCS
  - Exchange 2007 LCR, CCR and SCR
  - Exchange 2010 DAG
  - AIX HACMP
- User Interface
  - Windows native look & feel via GUI and CLI
  - AIX: integrated with application backup & restore utilities

Flashcopy Manager Storage Device Support

Storage Architecture		**Windows** **(Instant restore and fast restore)**	**Unix** **(Instant restore)**
DS8000, SVC 4.3.x	FULL Flashcopy	Yes	Yes
	INCR Flashcopy	At most one incremental target set	At most one incremental target set per LVM mirror
SVC 5.1	FULL Flashcopy	Yes	Yes
	INCR Flashcopy	At most one incremental target set	Yes
	Space efficent Flashcopy	For instant restore at most one SEFC backup generation is supported	Yes
XIV	Space efficient	Yes	Yes
DS3000, DS4000, DS5000		Fast restore only	No

Custom Application/Filesystem Support

Linux

Versions supported:

RHELinux 5 x64 >= 5.1

SUSE Linux 10 >= SP2 /11 x64

Volume Managers supported:

LVM Version 2

File Systems supported:

ext2, ext3

Solaris

Versions supported:

- Solaris 10 on SPARC >= U4

Volume Managers supported:

Veritas Volume Manager (VxVM)* 5.0

File Systems supported:

UFS, Veritas File System (VxFS)*

AIX

Versions supported:

AIX 5.3

AIX 6.1

Volume Managers supported:

AIX LVM

File Systems supported:

jfs, jfs2

Flashcopy Manager Supported Environments

Storage Devices

- IBM System Storage DS8XXX
- IBM System Storage SAN Volume Controller
- IBM XIV Storage System
- IBM System Storage DS 3XXX/4XXX/5XXX using VSS
- Any other Storage System using VSS

Applications & Platforms

- Microsoft Exchange 2003*, 2007 and 2010** on Win 2003 and Win 2008
- Microsoft SQL Server 2005 & 2008 (R2) on Win 2003 and Win 2008
- Oracle 10g & 11g on AIX 5.3 and 6.1
- DB2 UDB V9.5 or later on AIX 5.3 and 6.1
- SAP Releases supported by SAP BRTools 7.10 or later on AIX 5.3 and 6.1

Virtual Machines

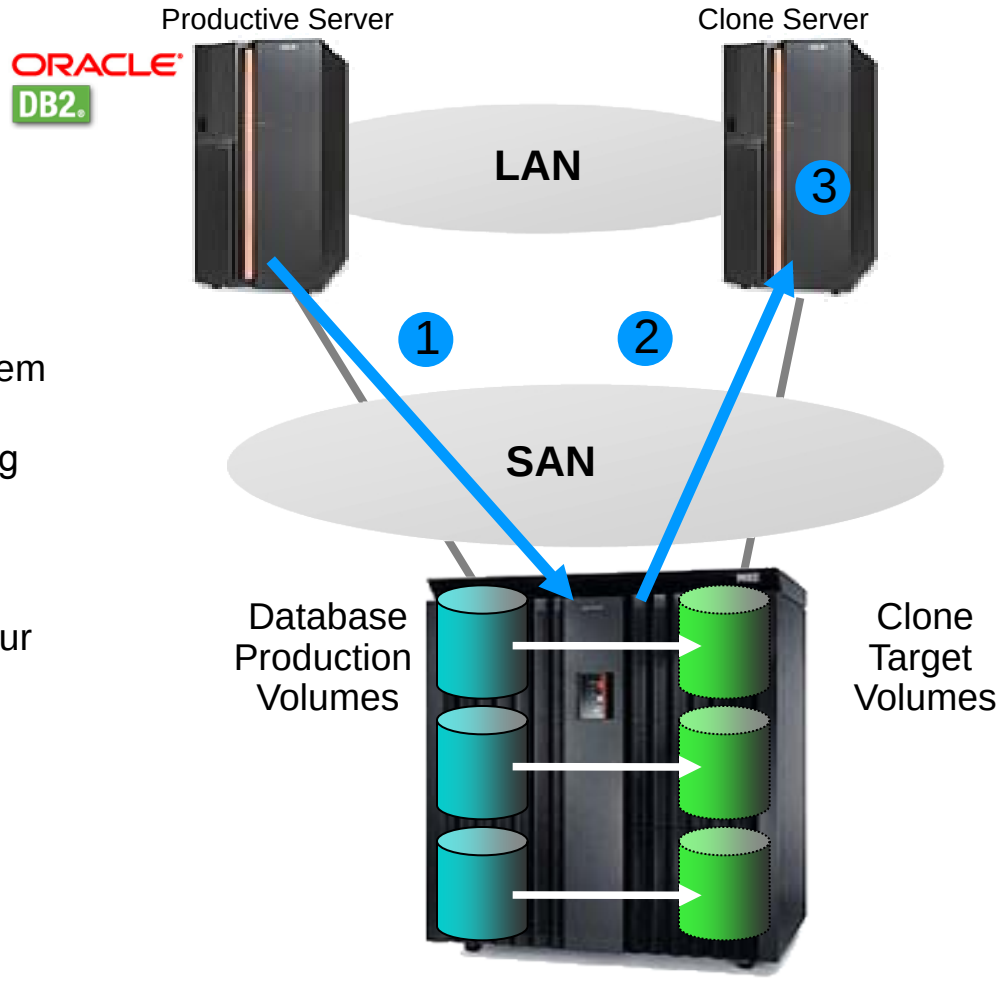
- VMware and Hyper-V: Dependent on VSS provider support
- AIX LPAR with VIO: NPIV for P6 and later

* Win 2003 only
** Win 2008 only

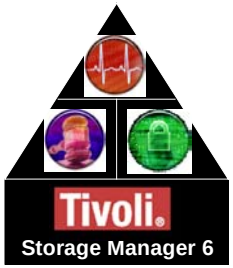
Flashcopy Manager Cloning

1 2 3 Benefits

- ✓ Zero Impact on Production System
- ✓ No Downtimes → Online Cloning
- ✓ Short time to activate clone
- ✓ Individual Postprocessing for your application



Flashcopy Manager – HA Solution



Storage Hierarchy

TSM Server

SAP Server

LVM mirroring provides for seamless take-over. Mirror rebuilt in background after problem fixed.

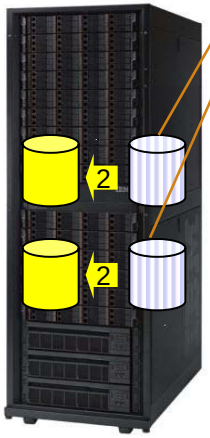
Flashcopy Solutions added-value
- backup needs 1 mirror copy FC only
- alternating FC for 2 backup generations on disk for fast Flashback

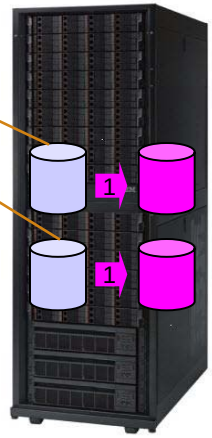
LVM Mirroring

FC BACKUP
Mo

Wed

Fri





FC BACKUP

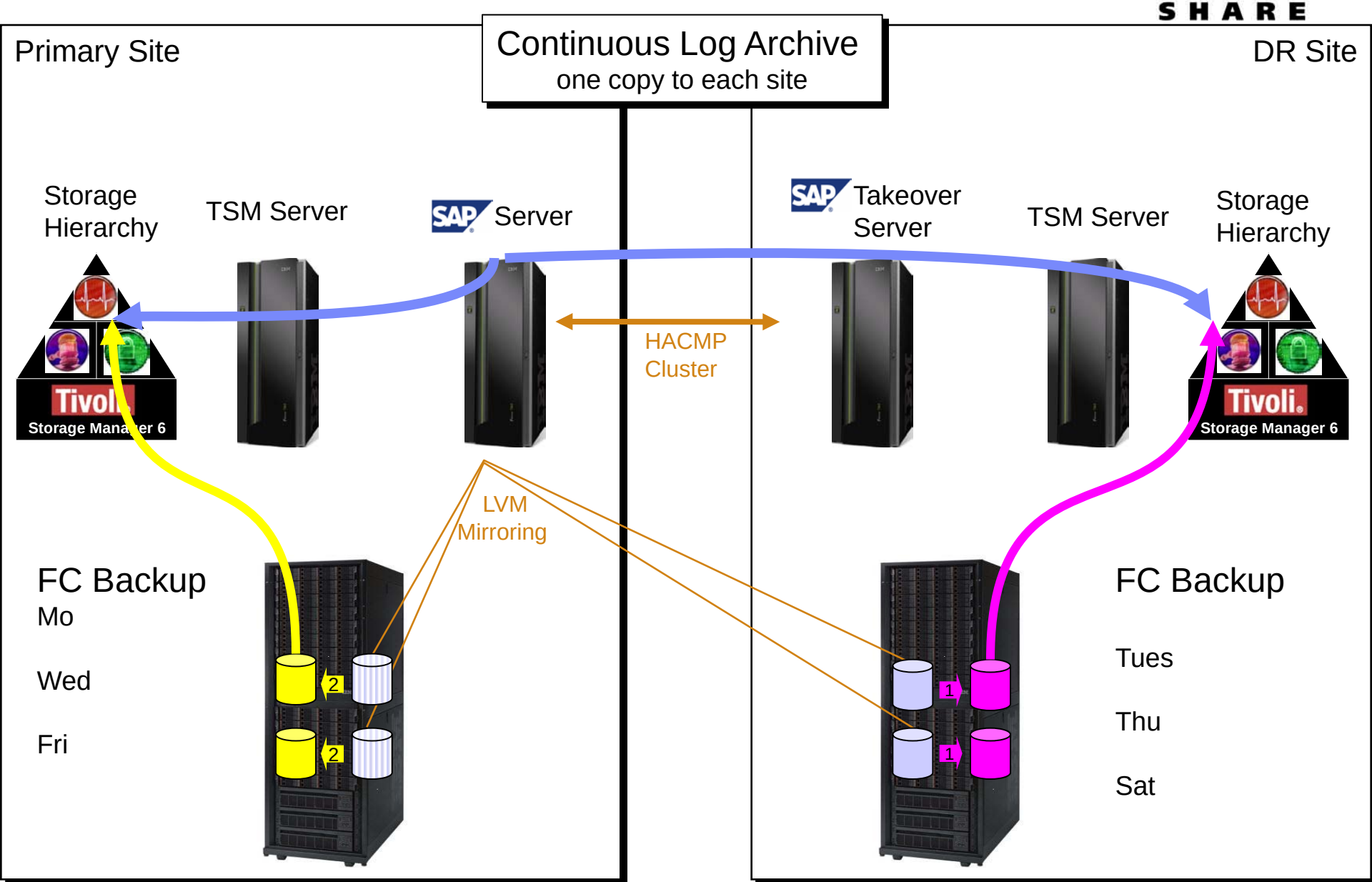
Tues

Thu

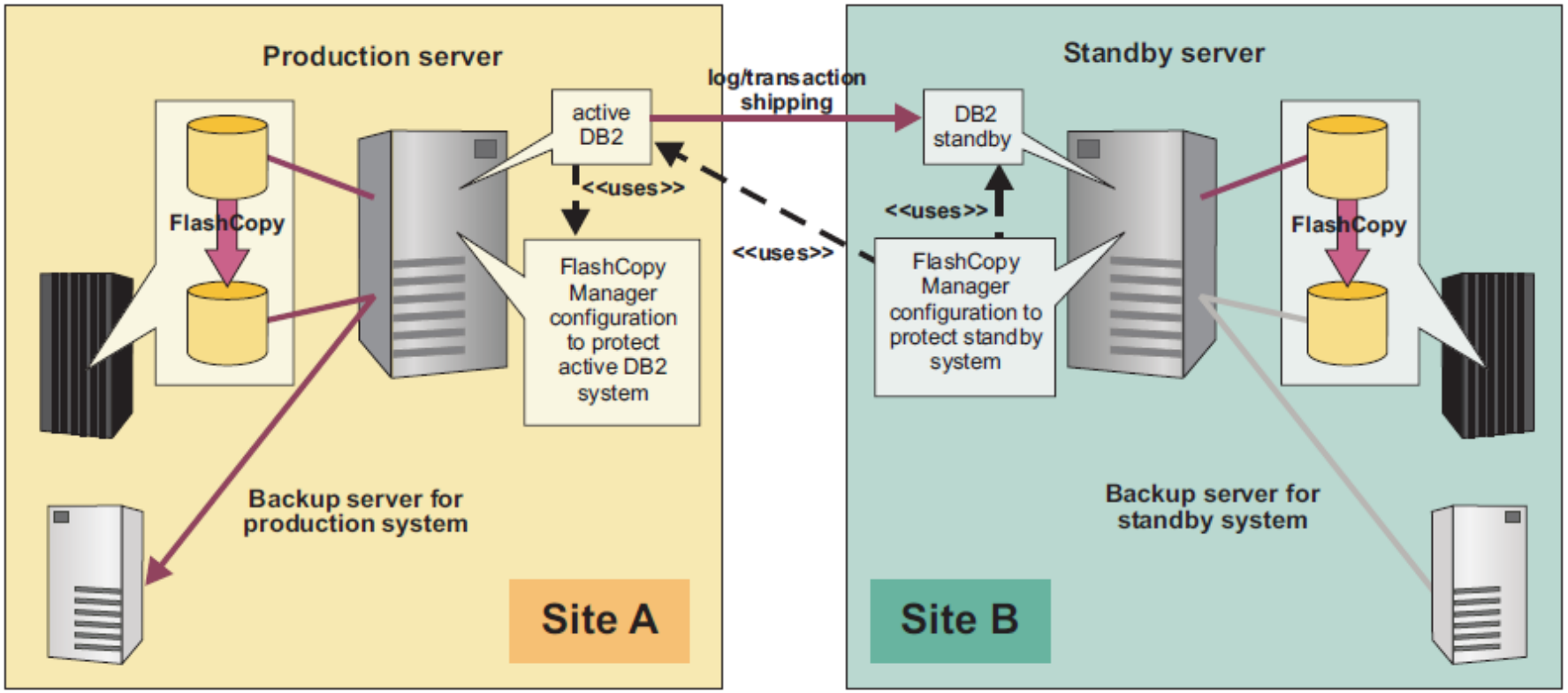
Sat

SHARE in Anaheim 2011

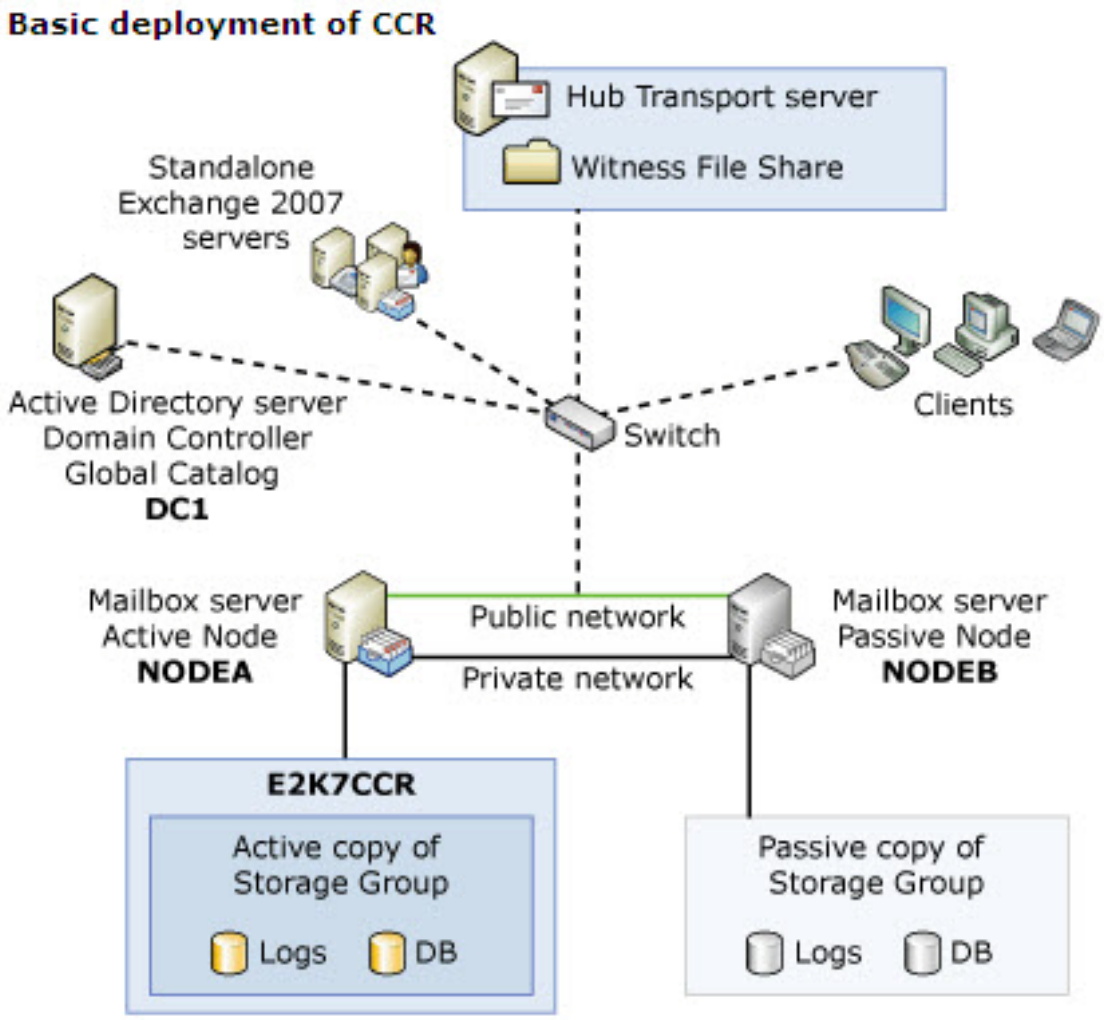
Flashcopy Manager – HA Solution + DR, TSM



Flashcopy Manager – HA Solution + DR, TSM



FCM Backup in LCR and CCR Environments Exchange 2007



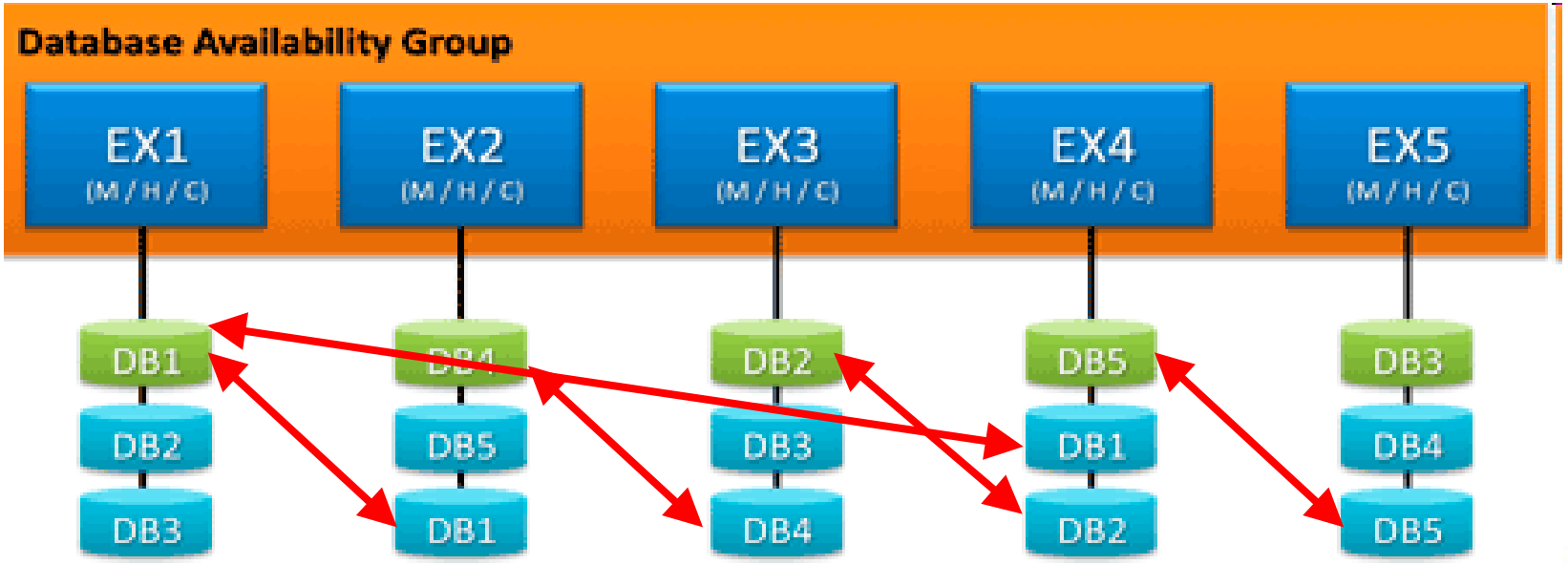
- LCR – **Local Continuous Replication**
- CCR – **Cluster Continuous Replication**
- LCR and CCR **use asynchronous techniques (log shipping) to replicate an Exchange storage group**

FCM Backup in LCR and CCR Environments

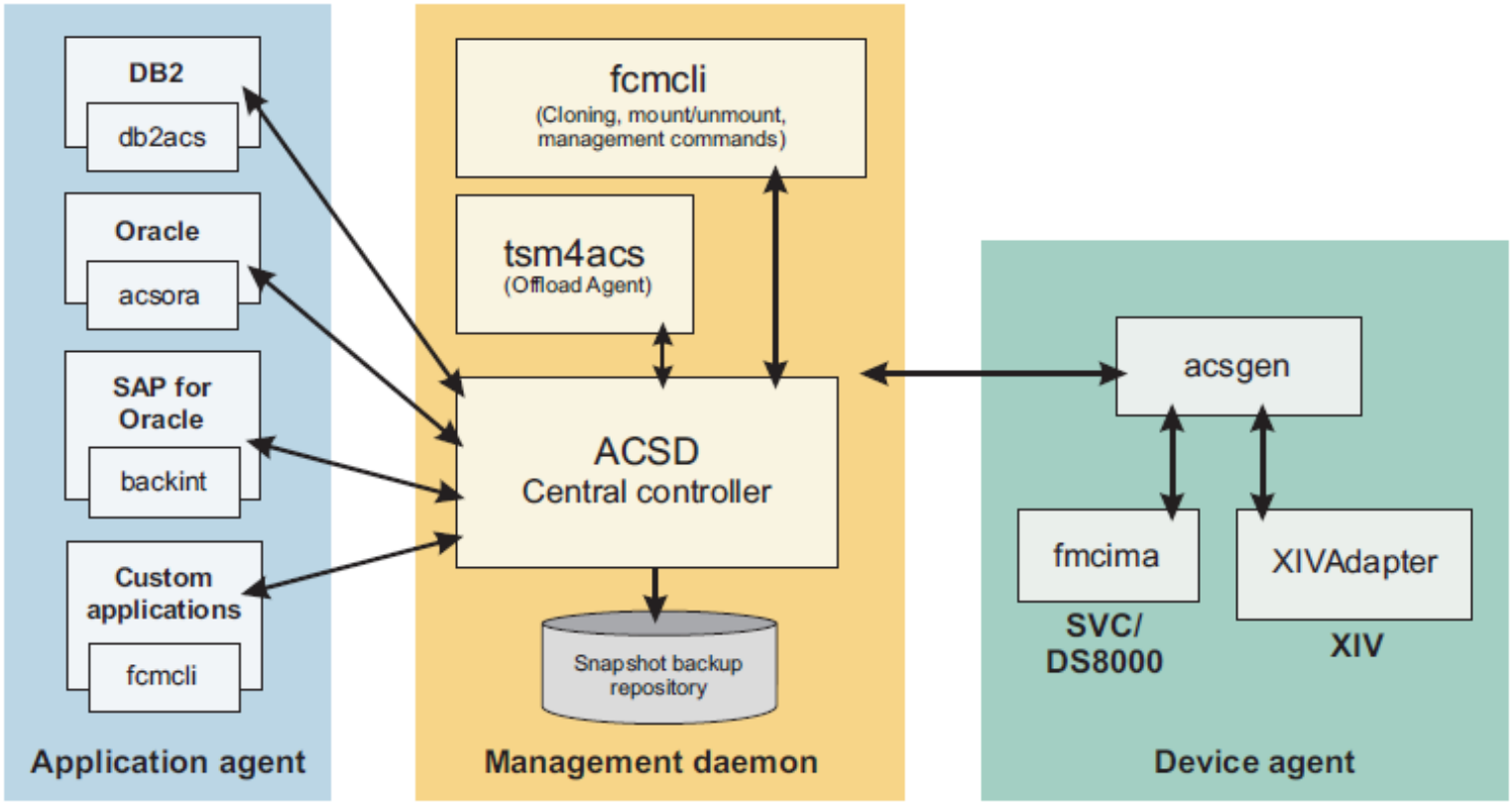
- Backups can be done on the Active node or the Passive Node (replica)
- Only VSS backups are supported on the Passive Node
- Restores can only happen to the Active Node
  - Suspend the storage group copy before beginning the restore
- Restores can be made to an alternate location
- Microsoft does not support backup of a Passive Node (replica) in Standby Continuous Replica (SCR)

FCM Backup and Restore of Database Availability Groups
Exchange 2010

- Database Availability Groups (DAG) are a replication technique similar to LCR and CCR
  - **FCM will backup Active or Passive database**
  - **Restore only to Active database**



Flashcopy Manager Components (AIX, Linux, Sola...)



- Applications use native interfaces (DB2 Backup, RMAN, BRBackup
- Snapshot directory contains all FCM configuration and snapshot meta-data

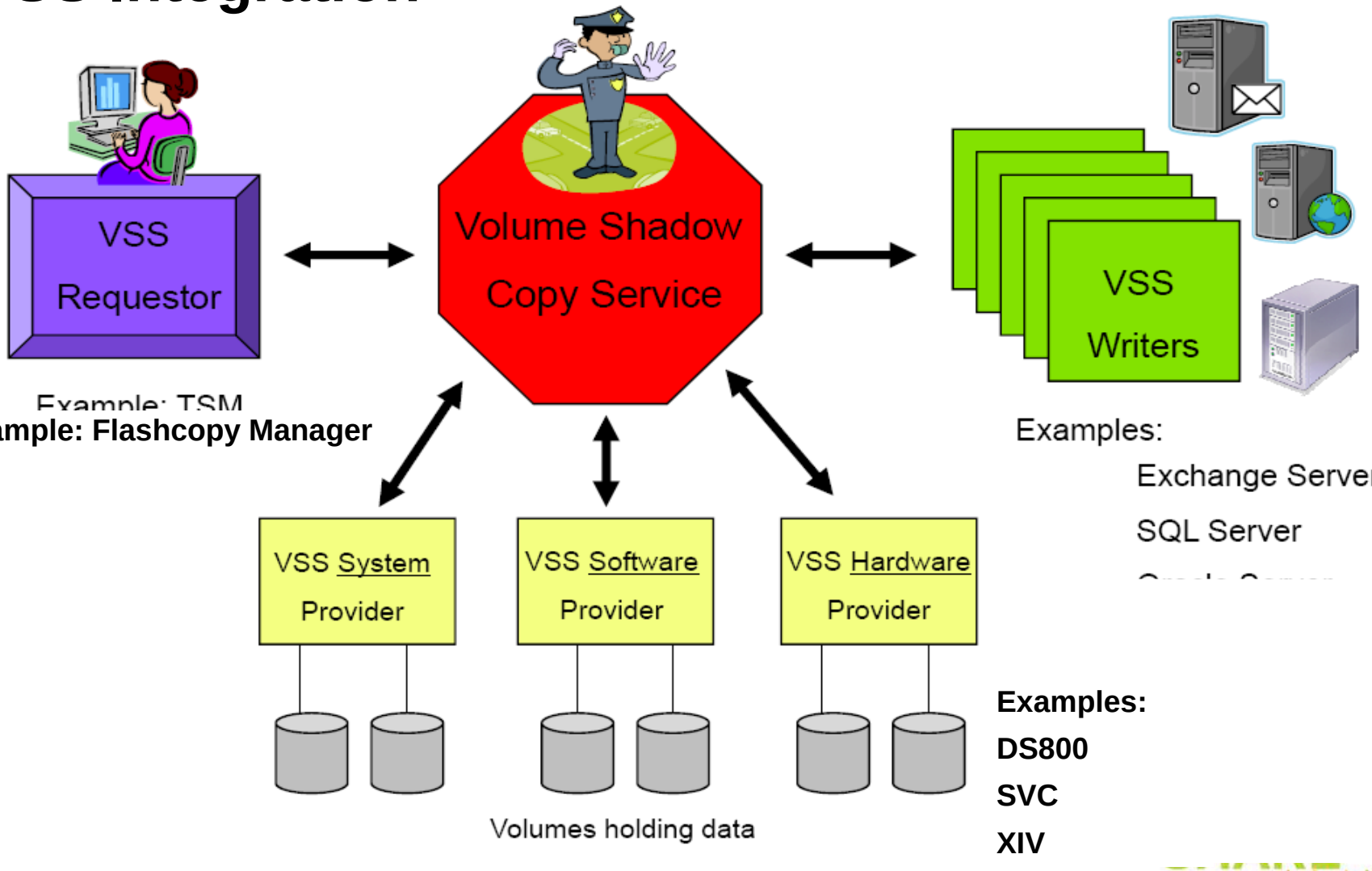
Target Volumes on DS8000, SVC and XIV (AIX, Linux, Solaris)

- DS8000
  - Manual target LUN creation using the target volumes file (xxx.fct) with VOLUMES_FILE or VOLUMES_DIR parameter
- SVC
  - Manual target LUN creation using the target volumes file (xxx.fct) with VOLUMES_FILE or VOLUMES_DIR parameter

    or

  - Naming convention using TARGET_NAMING parameter
- XIV
  - Automatic target LUN creation without using target volumes file (xxx.fct)

FCM Backup for Exchange and SQL-Server: VSS Integration



Example: TSM

Example: Flashcopy Manager

Examples:

Exchange Server

SQL Server

Examples:

DS800

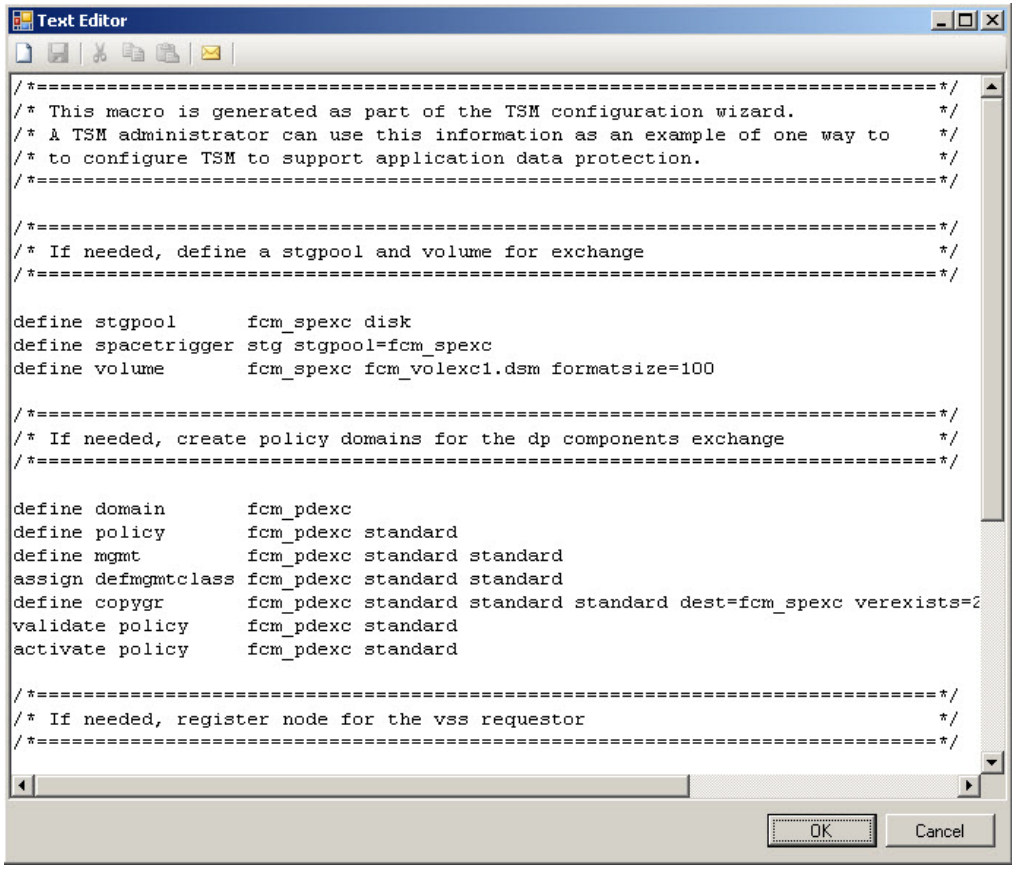
SVC

XIV

Understanding VSS Providers

- VSS Providers can be hardware or software
- Hardware Providers create snapshots using the capabilities of the disk subsystem (Flashcopy, Snapshot Volume, etc.)
- Hardware vendors provide a VSS “driver” that allows their hardware to function properly in a VSS environment
  - These drivers must be properly installed and configured
  - For DS8800 and SVC, source and target volumes must be configured
- Microsoft provides a software provider with Windows called the “System Provider”
  - No configuration is necessary
  - The System Provider stores snapshots on the local disk. These snapshots are “write on change” type snapshots that only store the changes to the base data.
- Be sure to plan for the snapshot disk requirements

TSM Configuration for Flashcopy Manager



- FCM creates a TSM administrative command line macro for all the necessary TSM constructs
- This macro can be run automatically, run later, or used as a guide to create the TSM constructs

Flashcopy Manager DB2 Backups (AIX)

Configuration	Snapshot Backup Only	Backup to TSM		
		From Production DB	Integrated with Snapshot	From Existing Snapshot
DB2 (Native)	db2 backup…use snapshot	db2 backup…use tsm	db2 backup…use snapshot[1]	fcmcli –f tape_backup[2]
DB2 (SAP)	db2 backup…use snapshot	db2 backup…load <library> or backom	db2 backup…use snapshot[1]	fcmcli –f tape_backup[2]

- Notes: [1]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is running in daemon mode on the production server. [2]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is not running in daemon mode.
- Partitioned DB2 databases are also supported

Flashcopy Manager Native Oracle Backups (AIX)

Snapshot Backup Only	Backup to TSM		
	From Production DB	Integrated with Snapshot	From Existing Snapshot
ascora –f backup	RMAN using Data Protection for Oracle	'acsora -f backup' with profile parameter TSM_BACKUP set to YES and Offload Agent (tsm4acs) running in daemon mode on the production server	'tsm4acs -f tape_backup' with profile parameter TSM_BACKUP set to YES and Offload Agent (tsm4acs) not running in daemon mode

Flashcopy Manager SAP with Oracle Backups (AIX)

Snapshot Backup Only	Backup to TSM		
	From Production DB	Integrated with Snapshot	From Existing Snapshot
brbackup –d util_vol	brbackup –d util_file	brbackup –d util_vol[1]	fcmcli –f tape_backupl[2]

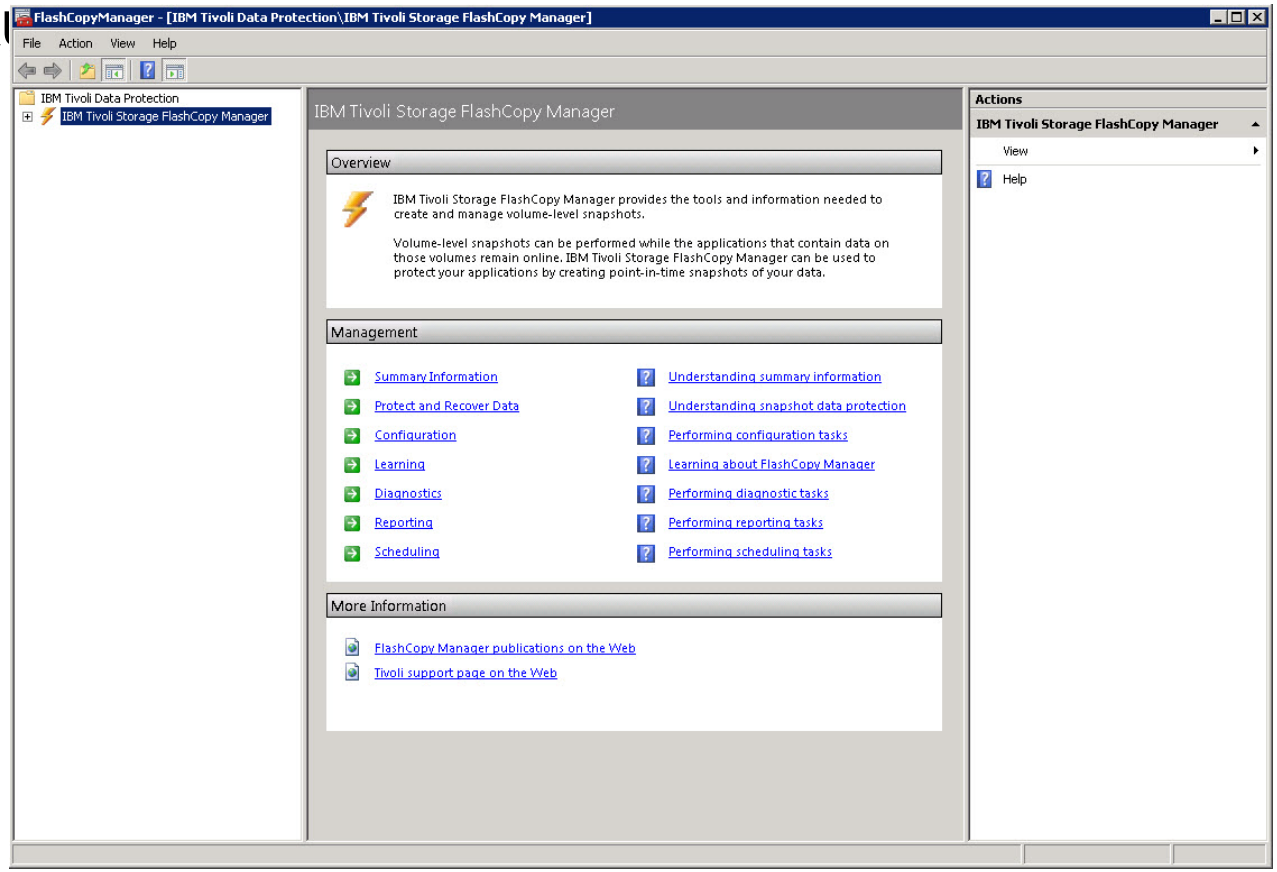
- Notes: [1]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is running in daemon mode on the production server. [2]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is not running in daemon mode.

Flashcopy Manager Custom Applications (AIX, Linux, Solaris)

Snapshot Backup Only	Backup to TSM		
	From Production Filesystem	Integrated with Snapshot	From Existing Snapshot
fcmcli -f backup	Backup/Archive Client	fcmcli -f backup[1]	fcmcli -f backup[2]

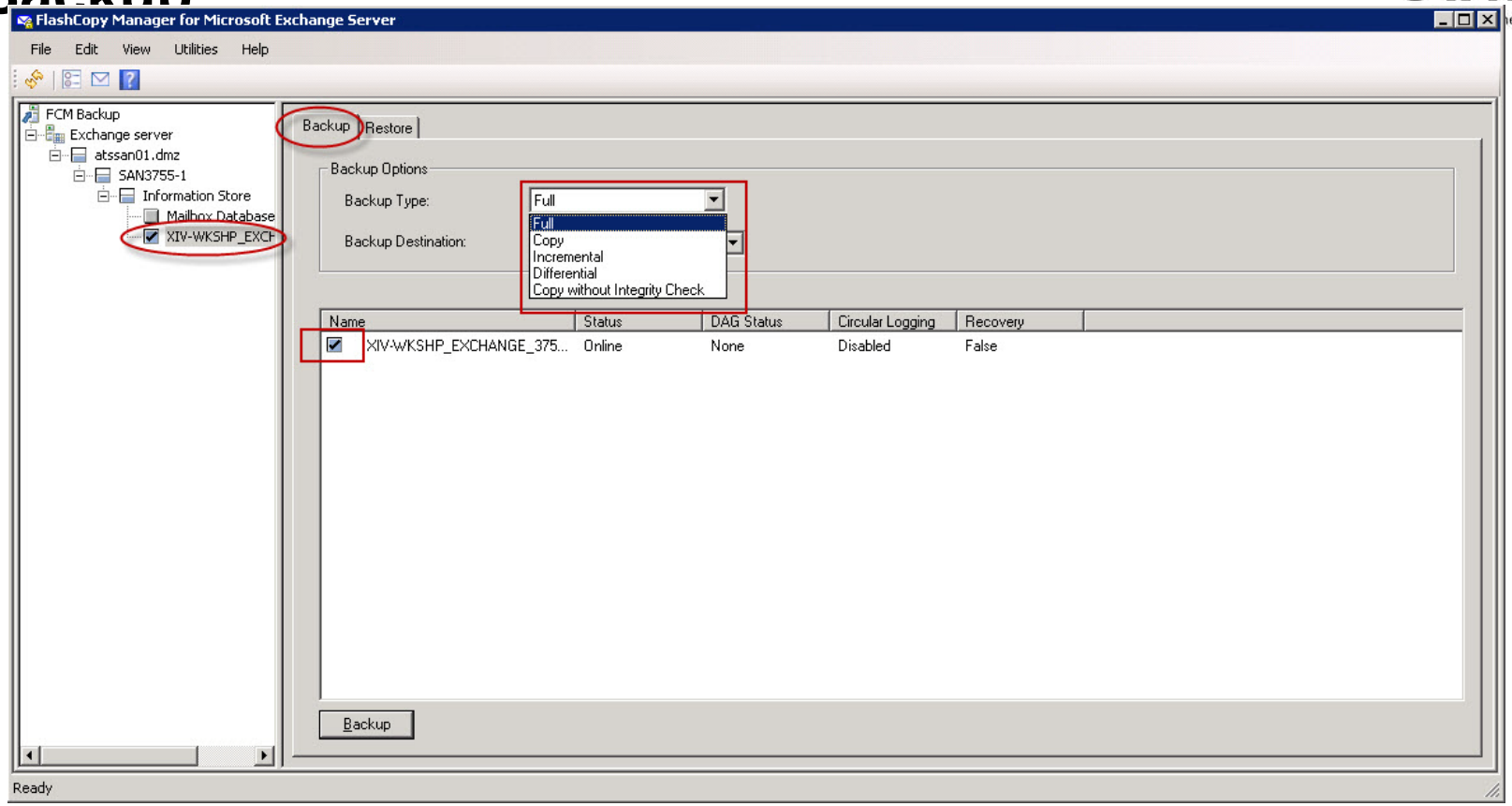
- Create a list of files and directories that need to be backed up. Reference this list with the INFILE parameter in the CLIENT section of the FCM profile
- Specify the preflash and postflash script file with the PRE_FLASH_CMD and POST_FLASH_CMD parameters in the CLIENT section of the FCM profile
- Notes: [1]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is running in daemon mode on the production server. [2]In addition, the profile parameter TSM_BACKUP is set to YES and the Offload Agent (tsm4acs) is not running in daemon mode.

Flashcopy Manager Exchange and SQL-Server Backu



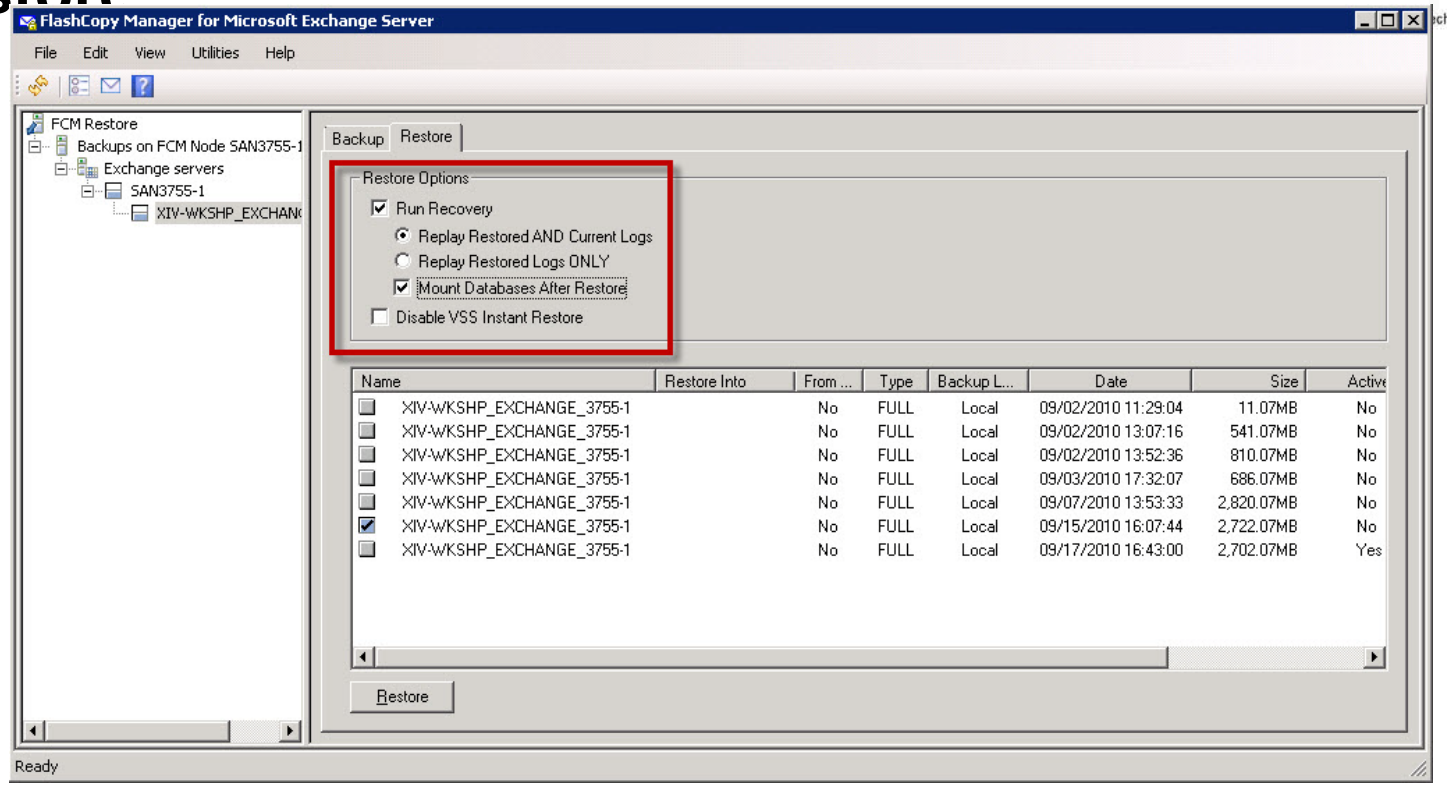
- Look and feel of Exchange Management Console
- Note quick links to major functions

Flashcopy Manager Exchange and SQL-Server Backup



- Directory tree allows selection of domain, server, Information Store and Database
- Database is lowest level of backup granularity

Flashcopy Manager Exchange and SQL-Server Restore



- FCM presents the available backup snapshots
- Local VSS backups will perform a VSS Fast Restore or a VSS Instant Restore (if available)
- TSM Restore will perform a network/SAN restore

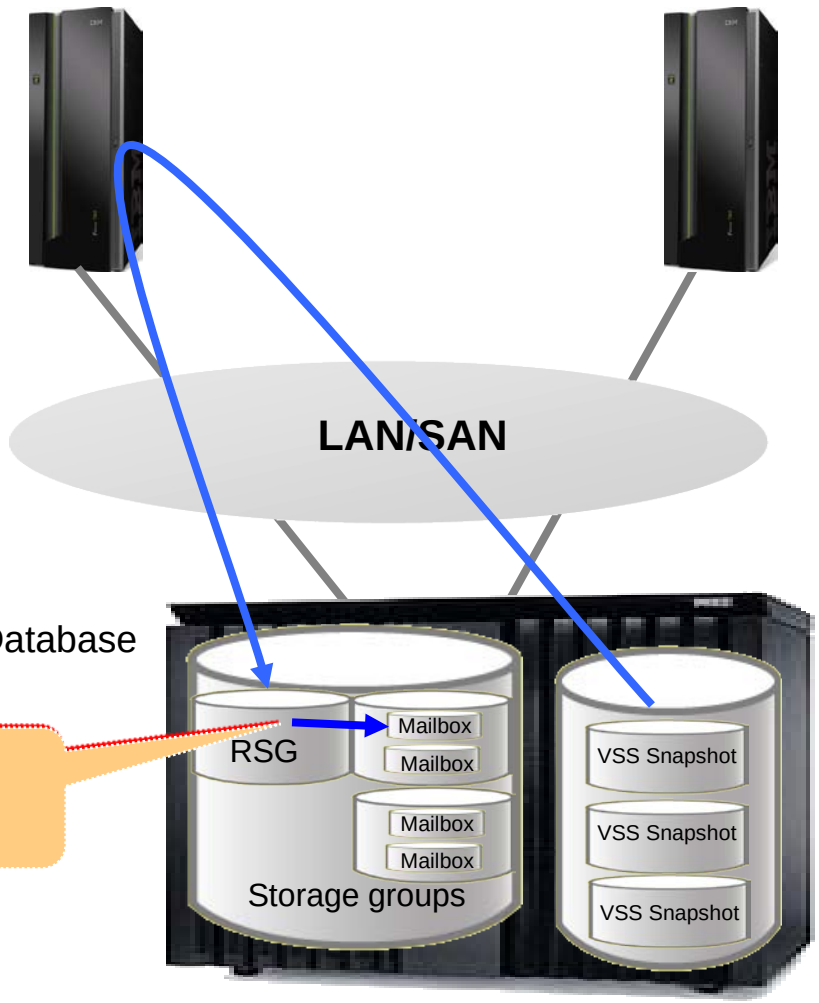
Flashcopy Manager Restore Types (Exchange and SQL-Server)

- VSS Fast Restore
  - Restore data is copied from a VSS Backup that resides on local shadowcopy volume
  - Restores are fast because data does not need to be transferred from the TSM server
  - Supports Full, Copy, Differential, and Incremental backup types for Exchange
  - Restores at database granularity
- VSS Instant Restore
  - Restore data is copied from a VSS Backup that resides on a local shadowcopy volume using a hardware assisted function (e.g. Flashback)
  - Data must reside on DS8000, SVC or XIV Gen 2 storage device
  - Only Full and Copy (Exchange) backup types are supported
  - Must restore all databases on the VSS shadowcopy volume
  - Restores are very fast because data does not need to be transferred from the TSM server and hardware assisted copies avoid the file copy

Flashcopy Manager: Individual Mail Recovery (IMR)

MS Exchange

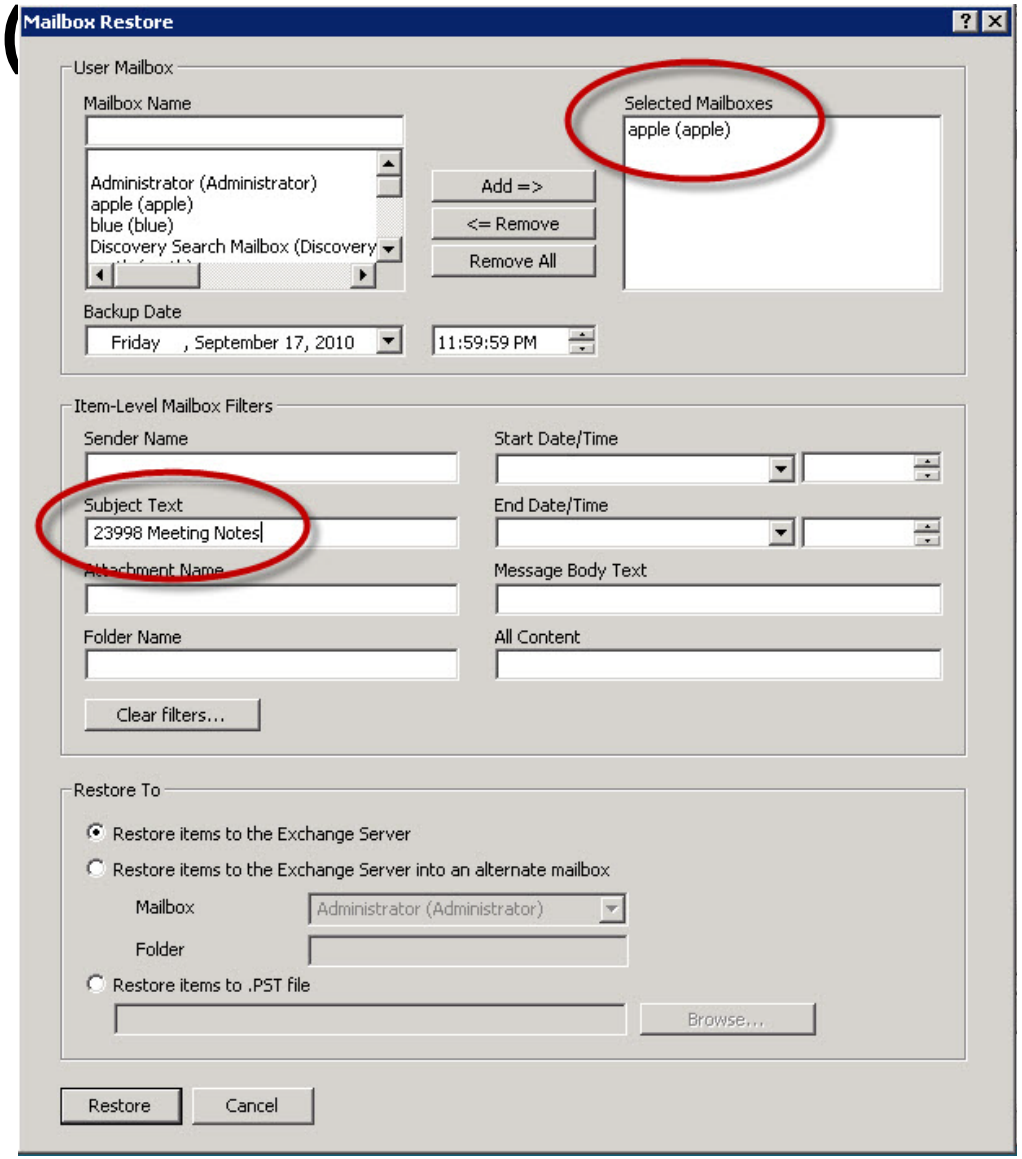
TSM Server
Policy-based snapshot management



Mail/Mailbox Restore

No additional licences for IMR from FlashCopies

Performing Individual Mailbox Restores



- Filter by Mailbox, Sender, Subject, Dates, Body Text, Attachments, Folder, etc.
- Return one or more mailboxes, one or more items
- Restore to same location, alternate location or .PST file

Flashcopy Manager Demonstration

- Demo Configuration
  - Windows 2008
  - Exchange 2010
  - XIV Storage
  - Flashcopy Manager V2.2
  - No TSM Server

- Exchange Setup
  - Mailbox Database – ”XIV-WKSHP_EXCHANGE_3755-1”
  - Mailbox – “Grape”
  - Outlook Web App

Summary

- Use Flashcopy Manager to create Flashcopy/snapshot backups of applications on Windows, AIX, Linux and Solaris and eliminate or reduce the effect of backups on applications.

- Exploit hardware Flashcopy/snapshot techniques on DS8000, SVC and XIV to improve restore times for Exchange, SQL-Server, DB2, Oracle and SAP applications.

Storage Flashcopy Manager