Pulse

IBM SolutionsConnect 2013

Advancing Data Protection for VMware Environments

Track 2: Cloud and IT Optimisation

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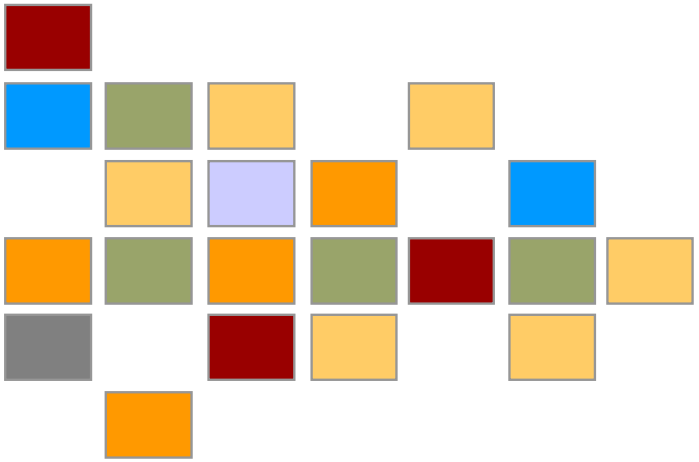
06/12/2013

IBM

Agenda

- IBM Tivoli Storage Manager (TSM) for Virtual Environments (TSM for VE) Overview
- TSM for VE 6.4 What's New
- VMware vCenter Client Plug-In
- IBM Tivoli Storage FlashCopy Manager (FCM) for VMware
- Customer Case Study:
  - Larry Kostopulos from Australian Bureau of Statistics (ABS)

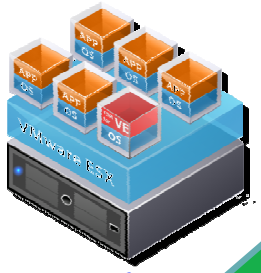


TSM for VE Overview

TSM for VE Architecture Overview

Support multiple recovery options from image backup & vStorage API Change Block Tracking (CBT):
- Block-level incremental-forever backups
- File/Volume/Disk/Full VM backups & restores from an image backup (multiple OSs are supported)

Added Value
-Single Source Backup
-Change Block Tracking (CBT)
-File-level Recovery for any OS
-Near-Instant Volume Recovery
-vCenter Client GUI Plug-In

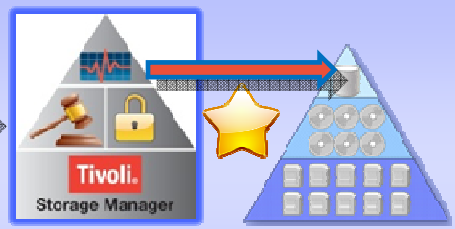


vStorage API

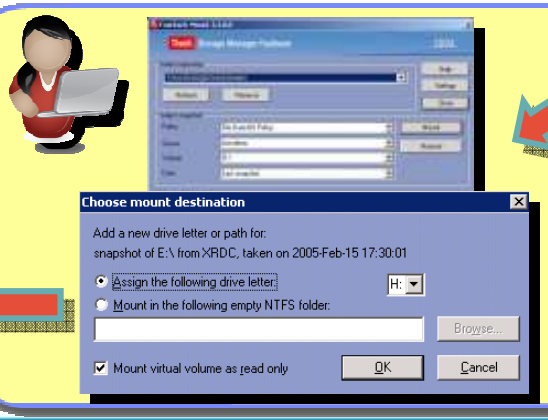
DP for VMware
Running on Windows proxy*

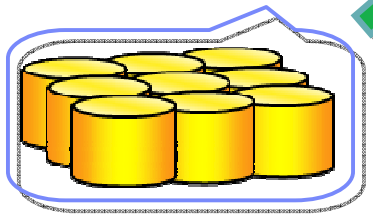
1 **Backup VM**

(can be physical or virtual)



Tivoli Storage Manager

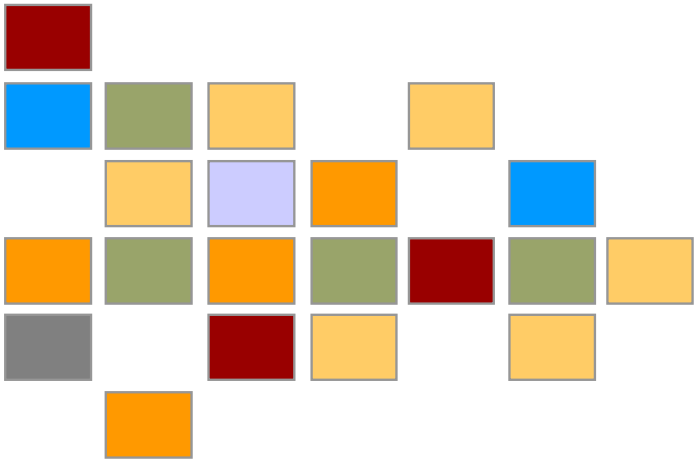




2 **Mount image directly from TSM disk storage pool as a virtual drive or using an iSCSI target interface**

3 **Restore single file directly to guest (or any other target)**

Data Deduplication



TSM for VE 6.4
What's New

TSM for VE 6.4 – What's New

Incremental forever backup processing
Data Protection for VMware 6.4 provides an incremental forever backup solution. Rather than scheduling weekly (periodic) full backups, this solution requires only one initial full backup. Afterward, an ongoing (forever) sequence of incremental backups occurs.

Configuration wizard
Key Data Protection for VMware vCenter plug-in configuration tasks no longer require manual input. Use the wizard for an initial Data Protection for VMware vCenter plug-in configuration or to change the Tivoli Storage Manager server, vCenter node, or VMCLI node.

Parallel backup from a single Tivoli Storage Manager instance
Protect VMware environments by implementing parallel processing sessions with only a single (instead of multiple) Tivoli Storage Manager client instance.

Expand VM backup criteria
Back up VMs by specifying the cluster, data store, or wildcard character.

Control which disks in the VMware environment are processed
When large virtual disks exist inside the virtual machines, or when another application protects these disks, you can exclude these disks during routine virtual machine backup or restore operations.

Protect applications that run in virtual machine guests
Data Protection for VMware protects Microsoft Exchange Server and Microsoft SQL Server applications that run inside virtual machine guests.

Preserving VMware configuration attributes
A list of VMware configuration attributes that are preserved by Data Protection for VMware is provided.

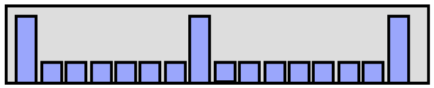
Virtual machine templates and vApps
Data Protection for VMware supports backing up and restoring virtual machine templates and vApps.

View virtual machine backup status reports
Use the Data Protection for VMware vCenter plug-in to generate reports about the backup status of the VMs managed in the specified VMware data center domain.

Secure Sockets Layer communication
Implement industry standard Secure Sockets Layer-based secure communications between the Data Protection for VMware vCenter plug-in and the Tivoli Storage Manager server.

Role-based usage
Different Data Protection for VMware vCenter plug-in functions are based on the authority level that is assigned to your administrator ID.

TSM for VE 6.4 Enhancements

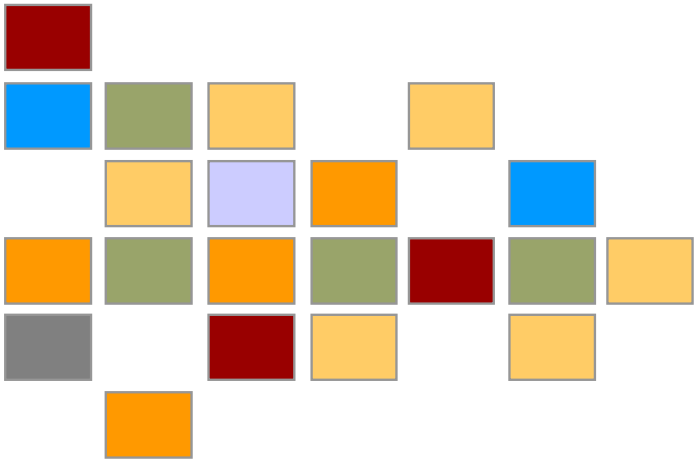


Periodic full + incrementals

Initial full + incremental forever

	Data Protection for VMware 6.3, and other VMware backup solutions	Data Protection for VMware 6.4
Backup methodology	Periodic full + incrementals	Initial full + incremental forever
Scheduling of backups	Separate schedules for full and incremental backups	One schedule for incremental forever backup
Restore methodology	Restore full and apply required incrementals (could be multiple restores of same block)	Restore required blocks only once
Restore operations	▪Full VM restore ▪Volume instant restore ▪File-level restore	▪Full VM restore ▪Volume instant restore ▪File-level restore
Retention of file versions	Applied to each backup chain (full backup and associated incrementals)	Applied to each backup version
Recovery of space from stored blocks	Full backup allows blocks from older backup chains to become eligible for deletion	Incremental backup allows consolidation of used blocks and removal of unused blocks

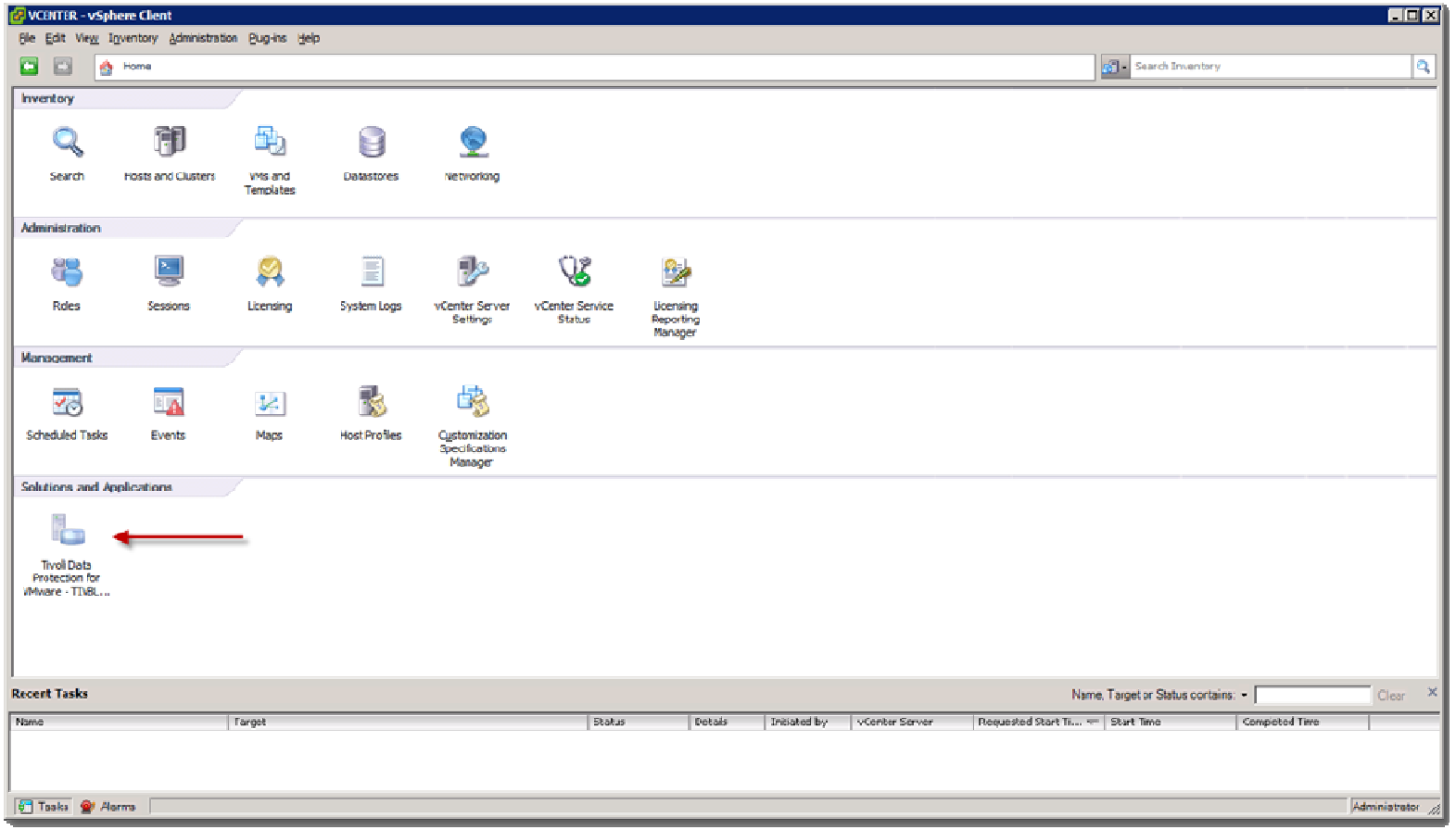
- Reduced backup time
- Simplified scheduling of backup operations
- Reduced resources for host/vStorage servers, network, storage pool



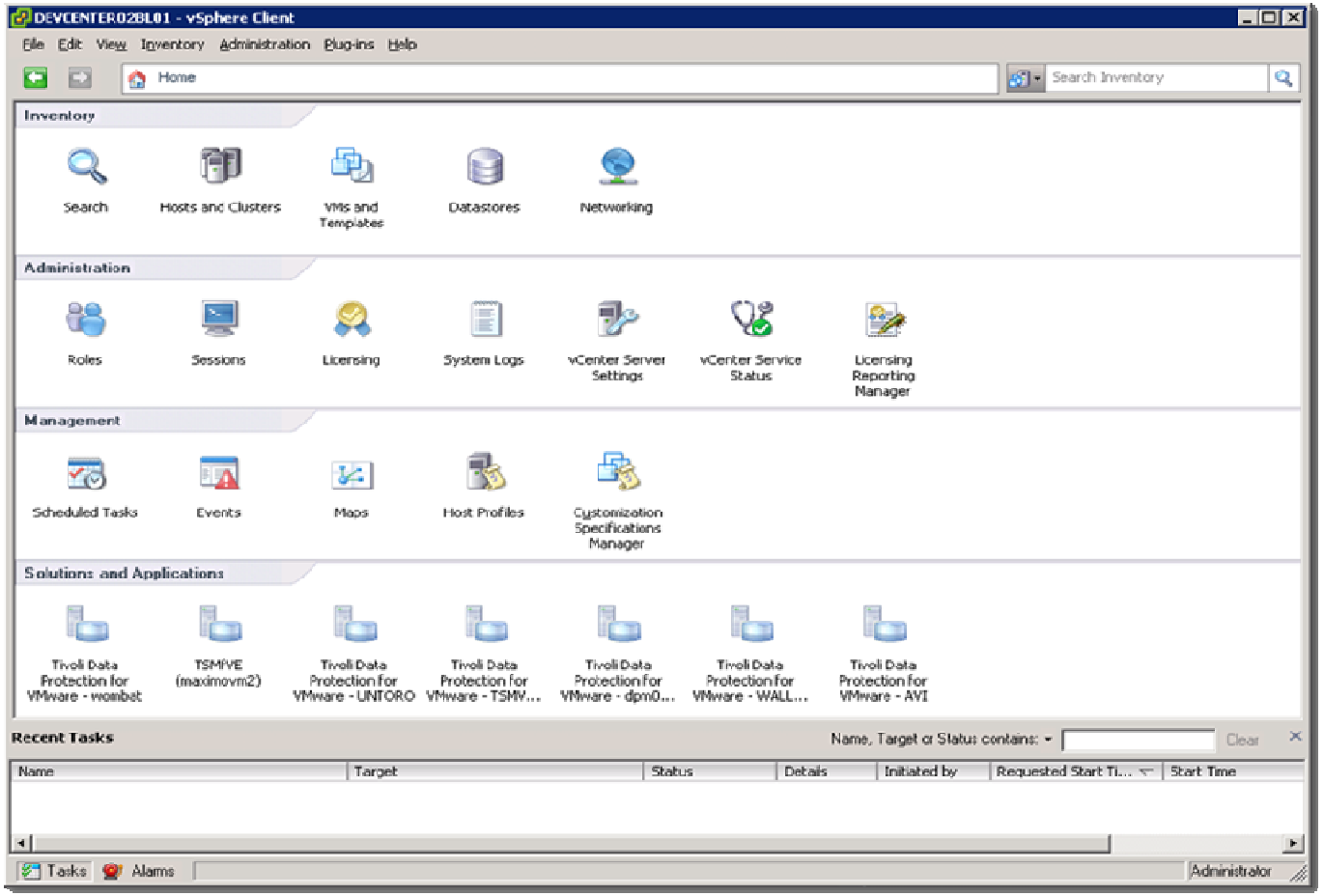
VMware vCenter Client Plug-In

VMware vCenter Client Plug-In

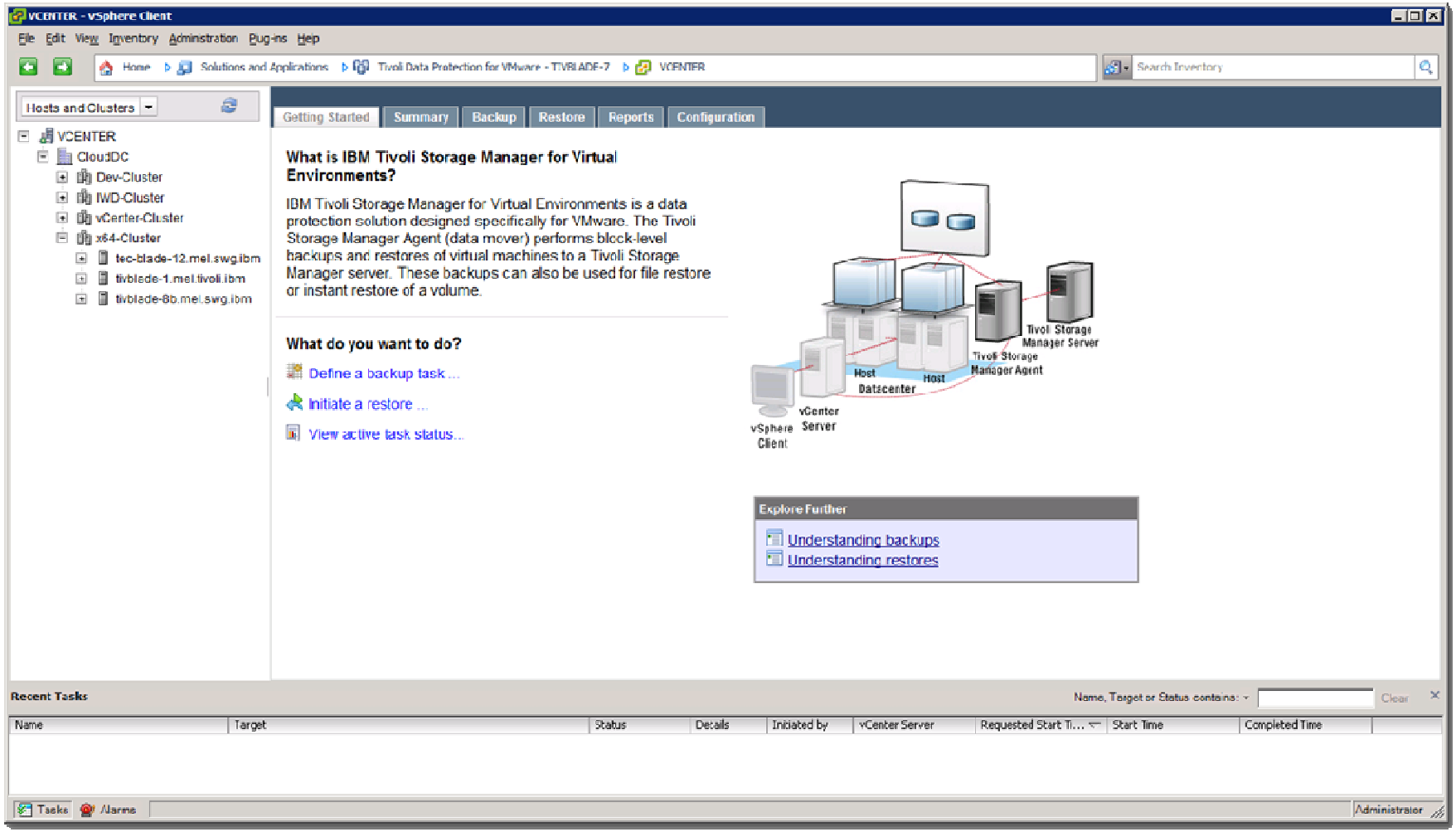
- Integrated into vCenter GUI
- No TSM Skills Required
- Ad-hock and schedule backup& restores
- Reporting
- Configuration



Multiple Plug-Ins for Multiple Proxies

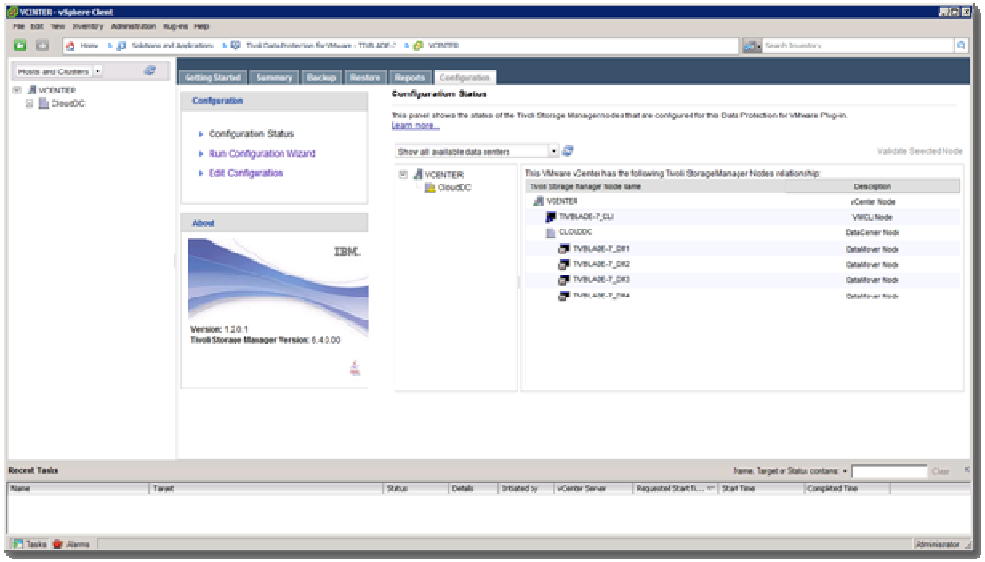


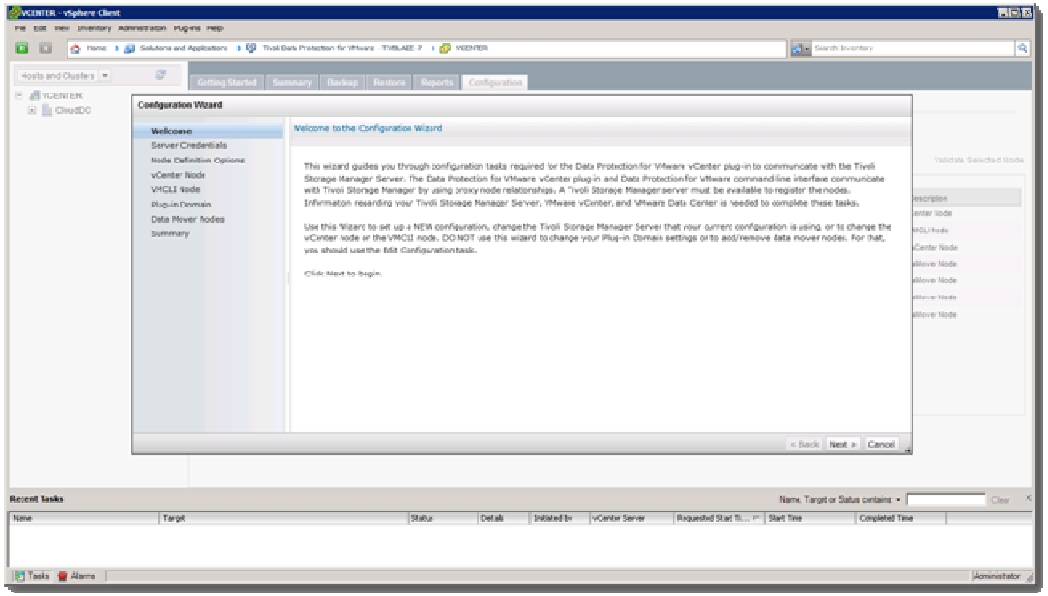
Getting Started



Configuration Wizard

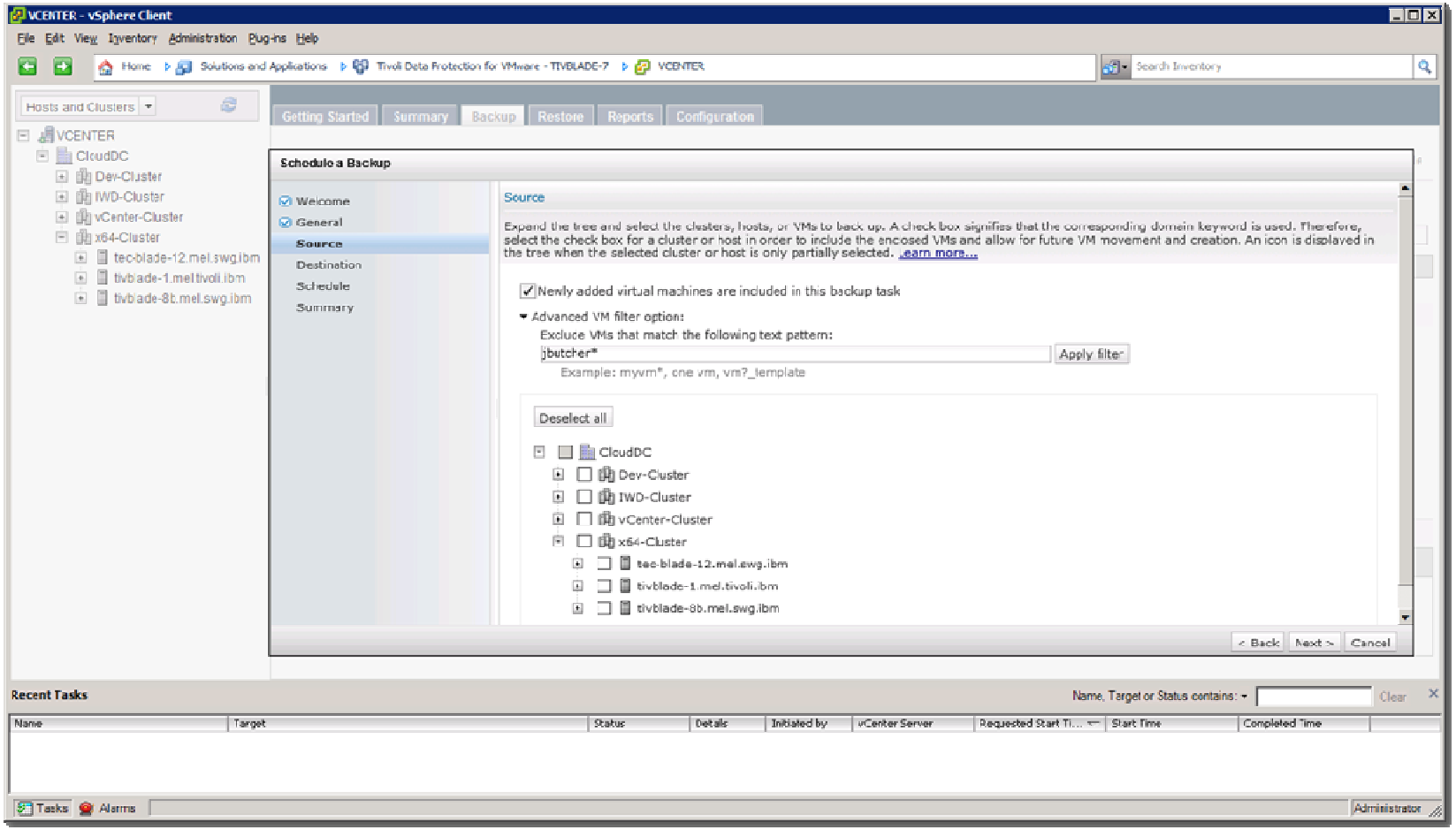
- Configuration Wizard
  - Automate most of the configuration and deployment steps to make protecting VMware more consumable
  - Configuration status will be checked to make sure all components are ready



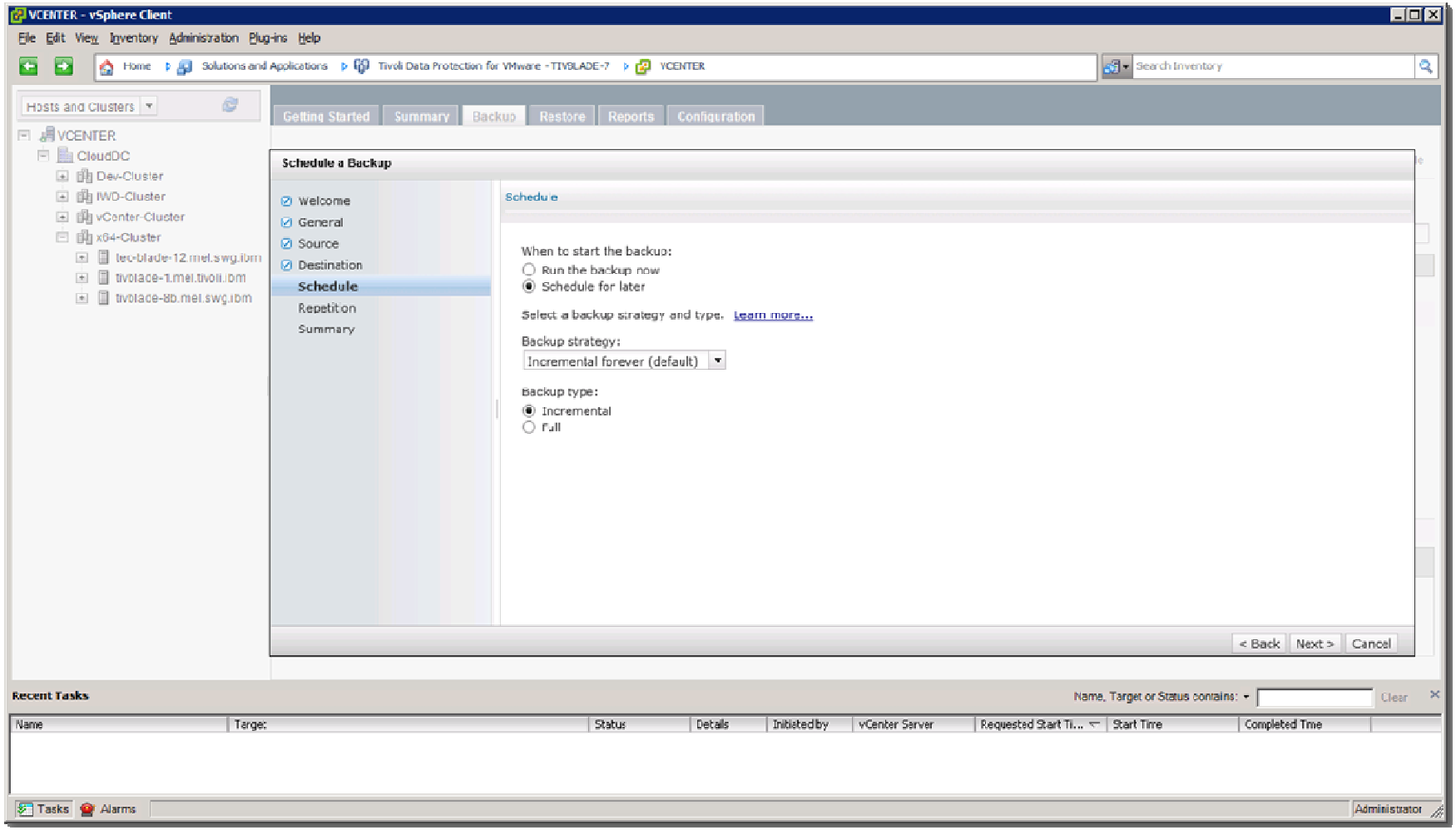


Source Selection Options

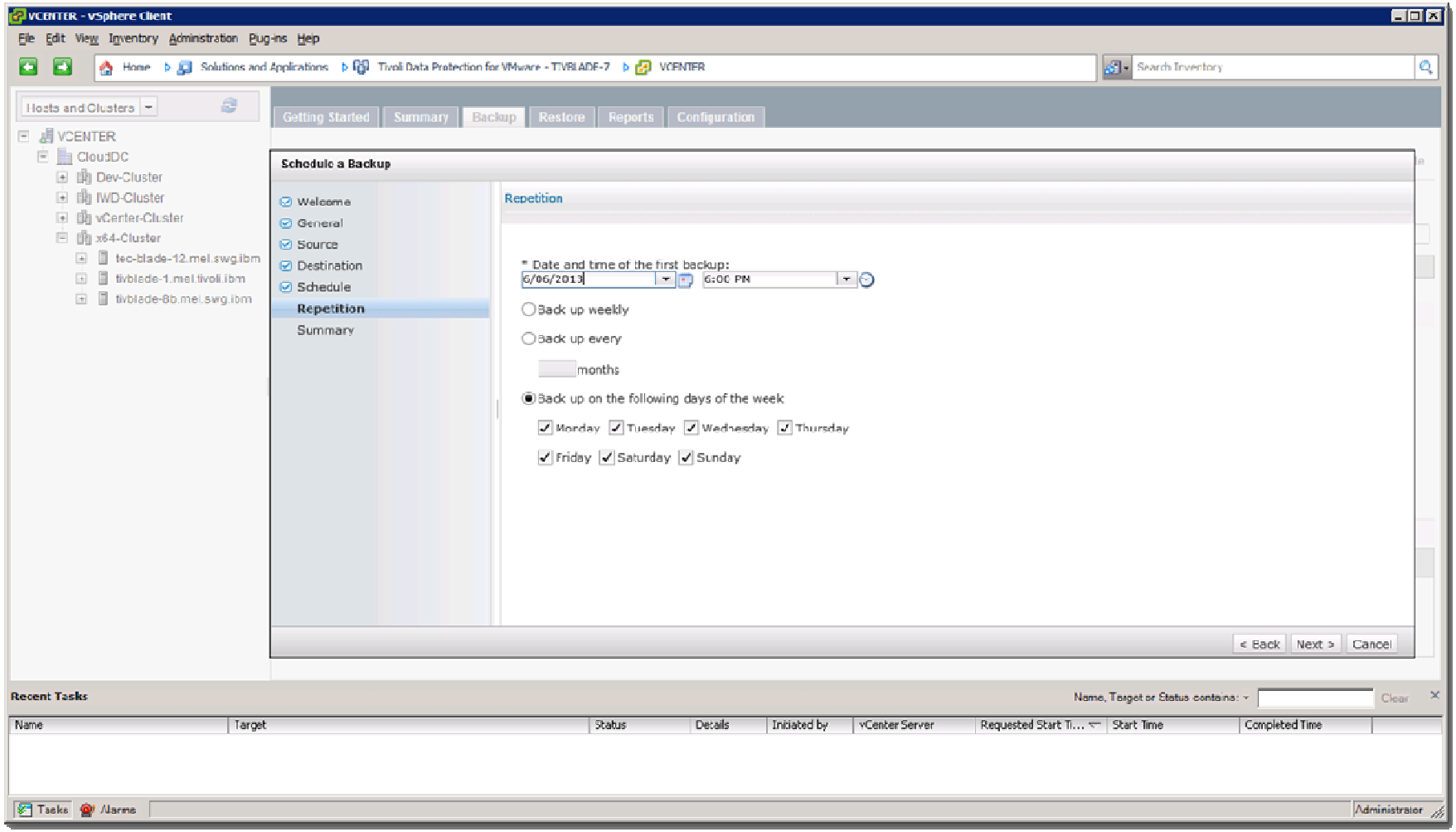
- Selection Options
  - By vApp
  - By cluster
  - By host
  - Newly added VMs
  - Wildcard Filter



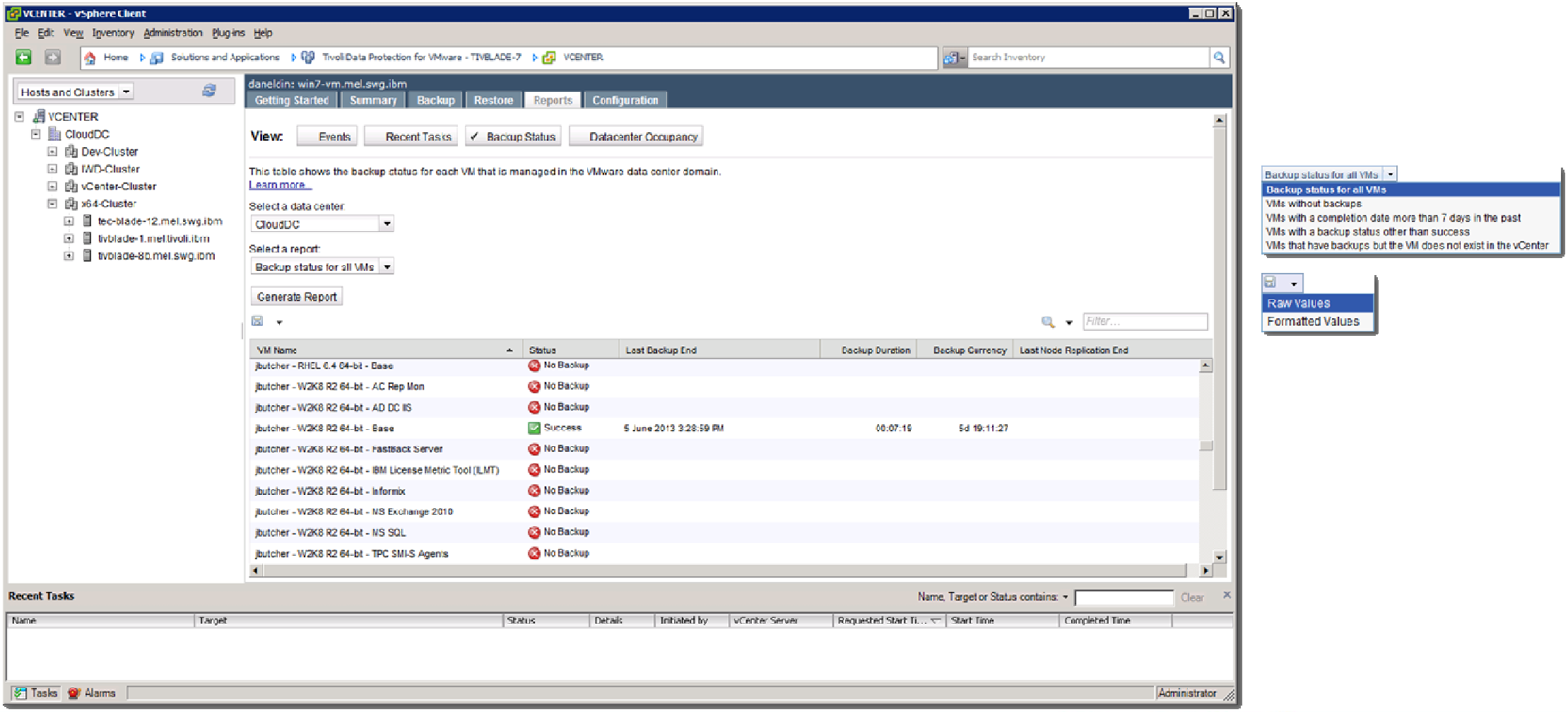
Scheduling Options



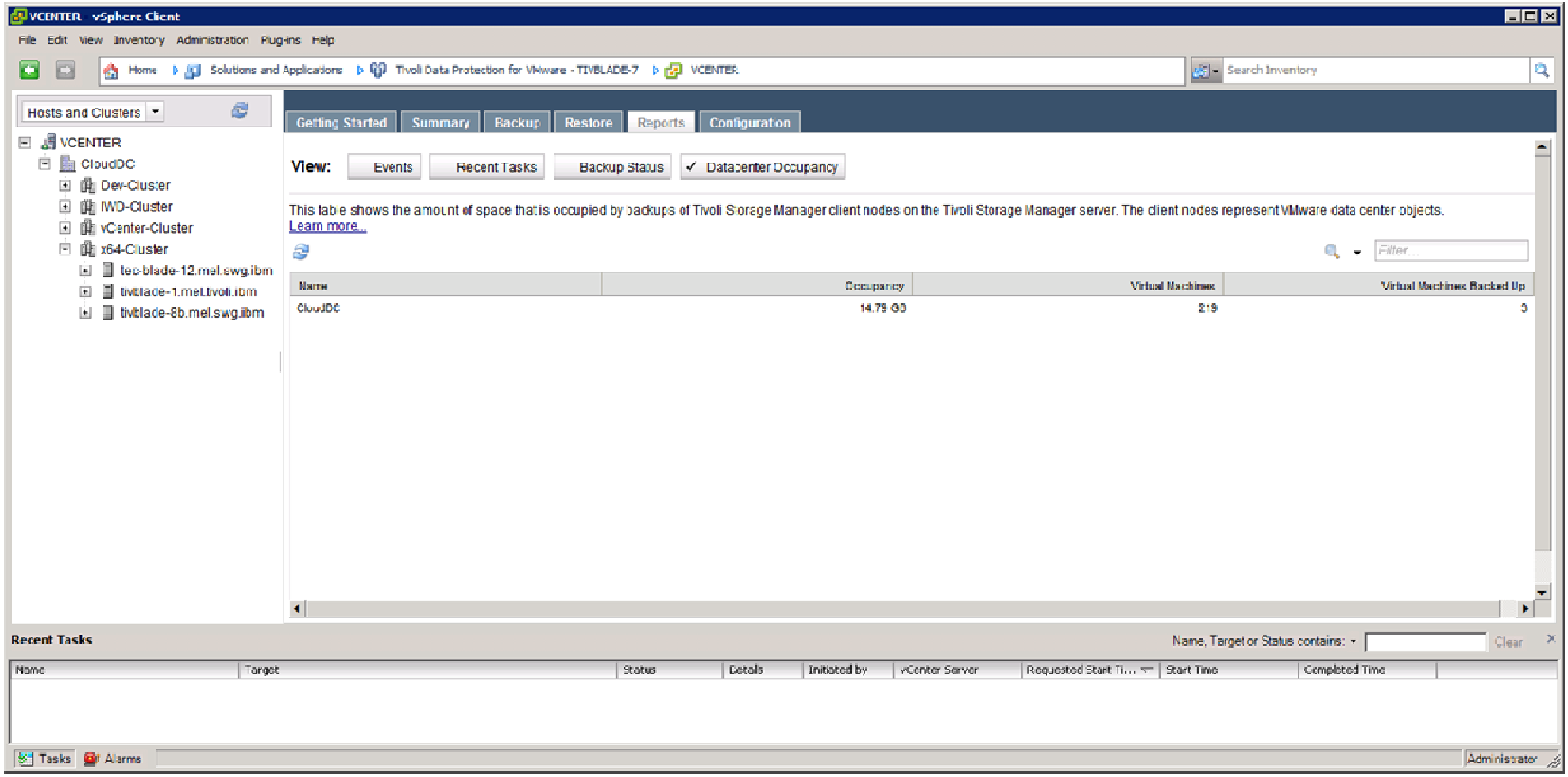
Scheduling Repetition Options



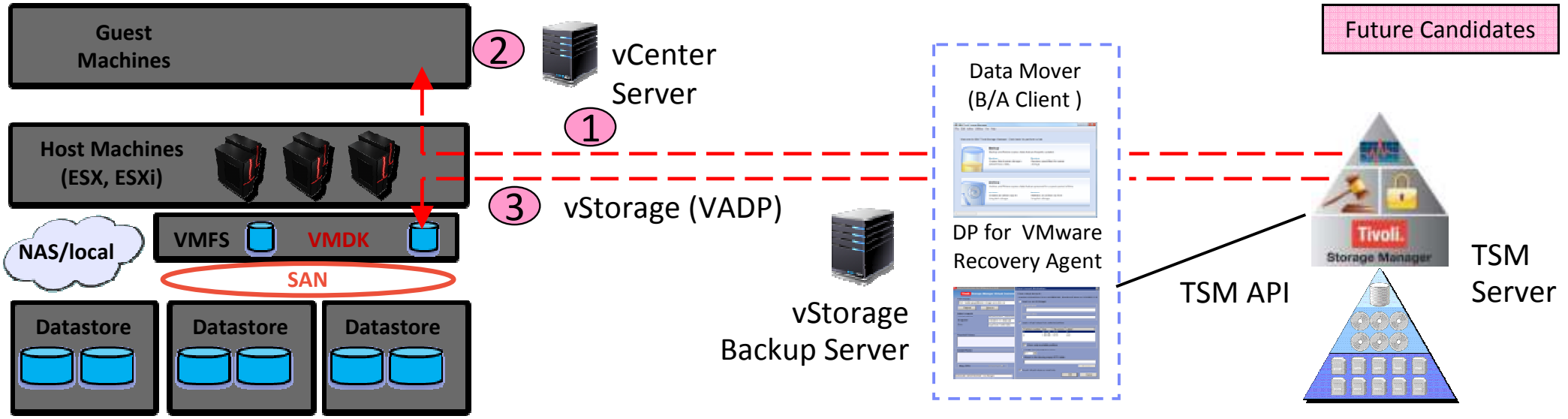
Backup Status Report



Backup Status Report



Integrated Restore Options



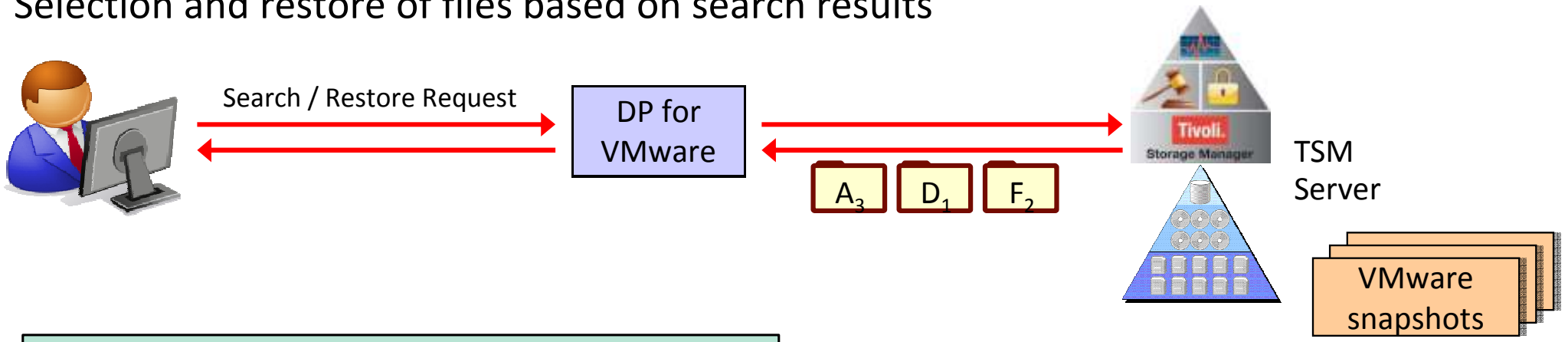
- TSM server acts as virtual datastore to allow access to a virtual machine stored in TSM hierarchy
- User can access the machine for verification purposes or to initiate recovery to the vSphere ecosystem
  1. Identify VM virtual disk(s) and expose the disk(s) as iSCSI target(s)
  2. User can now access machine to verify a backup
     - Read operations directed at TSM server “virtual datastore”
     - Write operations cached (non-persistent)
  3. User can optionally specify recovery to vSphere data store
     - VMware Storage vMotion initiated
     - Write operations cached and persisted

- Improved RTO for full-VM restore
- Restore verification by running VM from TSM backup

Cross Snapshot Browsing & File-Level Restore

Future Candidates

- Capability to do one or more of the following
  - See all versions of a file across multiple VMware snapshots
  - Search for a file by name across multiple VMware snapshots
  - Search for data in a file across multiple VMware snapshots
- Selection and restore of files based on search results



- Simplified search for file among multiple backups
- Simplified location and restore of deleted file

Roadmap

TSM 6.3 – 1H 2012

- TSM SUR - Archive Option
  - Additional tier for archive data on tape or VTL
- TSM SUR Entry
  - Offering for GB market capped at 100 TB

TSM 6.4 – 2H 2012

- Enhanced usability of the VMware solution
- Incremental forever backup of VMs
- Self-contained, application- aware backup for Exchange and SQL
- Backup configuration wizard
- Improved reporting for VM backups, vApp and VM template
- Seamless snapshot integration with Metro Mirror and Global Mirror (FCM 3.2)
- Extends snapshot management to nSeries (FCM 3.2)
- Integration with LDAP and stronger password support
- nSeries – enhanced support for vFiler & SnapMirror
- Enhancements to TDP for Databases for SQL "denali" release
- Enhanced MS Exchange DAG support

TSM 6.4.x - 1H 2013

User Experience

- Next Gen UI for unified recovery management with intuitive dashboard for simplified monitoring
- Enhanced Cognos reporting and VE reports

Big Data

- Enhanced support for SAP HANA via SAP API
- Support all SAP HANA appliances

TSM 7.x - 2H 2013

User Experience

- Simplified install with pre-configuration for improved time to value
- Easy TSM management with enhanced visibility and user actions

Virtualization Support

- Unified application protection for VMware environments
- Improved object level recovery for SQL and Exchange
- Instant recovery of virtual machines
- vApp support in VMware vCloud Director deployment

Snapshot Management

- Remote and centralized management GUI for windows platform
- Instant restore for VMFS datastore
- Co-existence with VMware Site Recovery Manager
- Integration with DB2 PureScale via GPFS snapshots
- Generic API to support non-IBM storage

Disaster Recovery

- Auto-failover/failback for client in replication scenarios

Scalability

- Cross platform TSM server migration
- Improved server performance
- Script to measure ProtecTIER deduplicated capacity

Future Candidates

User Experience

- Simplified daily management and self-service recovery
- Manage from mobile device and end user actions

Virtualization Support

- Continue VMware enhancements
  - Deeper integration with vCenter
  - Unified file recovery regardless data protection methodology used
  - Enhanced vCloud Director support
- Enhanced Hyper-V support
  - Incremental forever backup, file level recovery and application protection
- OpenStack and other hypervisors support

Snapshot Management

- Heterogeneous storage support (EMC, HDS, HP)
- Improved integration of Snapshot management and TSM
- Deeper integration with VMware

Data Lifecycle Management

- Dissimilar policies for node replication
- Multiple retention criteria with single ingest of data
- Classification of client data

Disaster Recovery

- Failover/failback for application data
- Transparent client access to replicated data
- Replication to multiple targets and always on replication

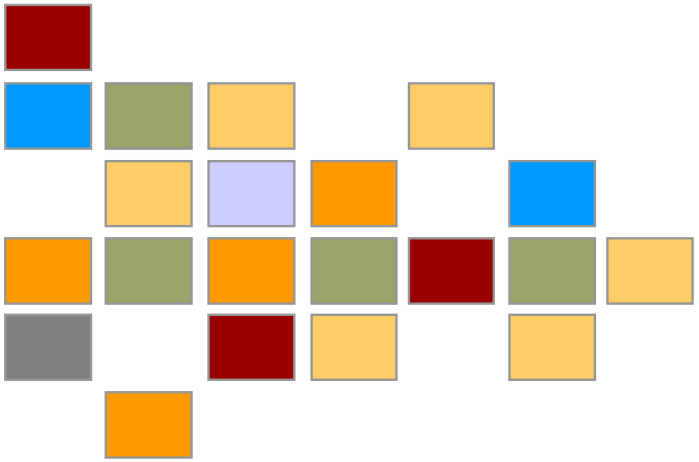
Scalability

Big Data

- MongoDB, Hadoop, GPFS, Exadata, Netezza, pureSystem

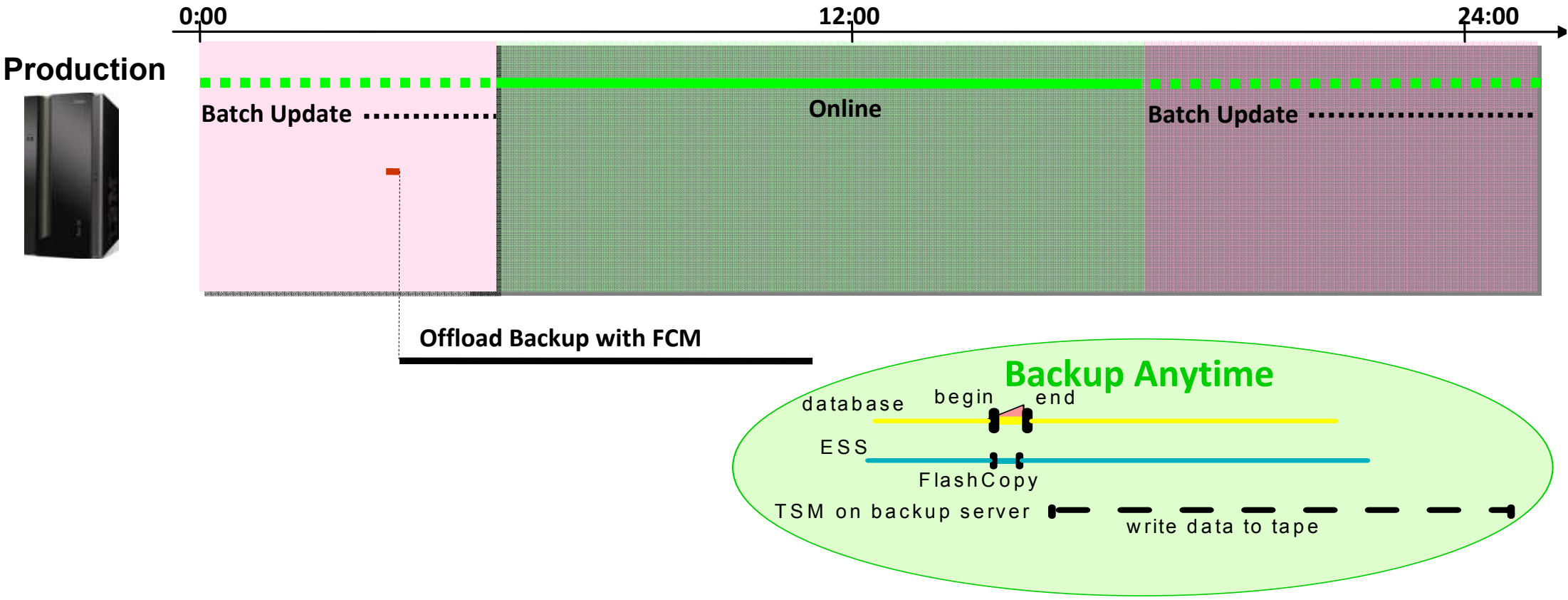
Global Data Management

- Orchestrated client restores across TSM servers
- Workload balancing across TSM servers

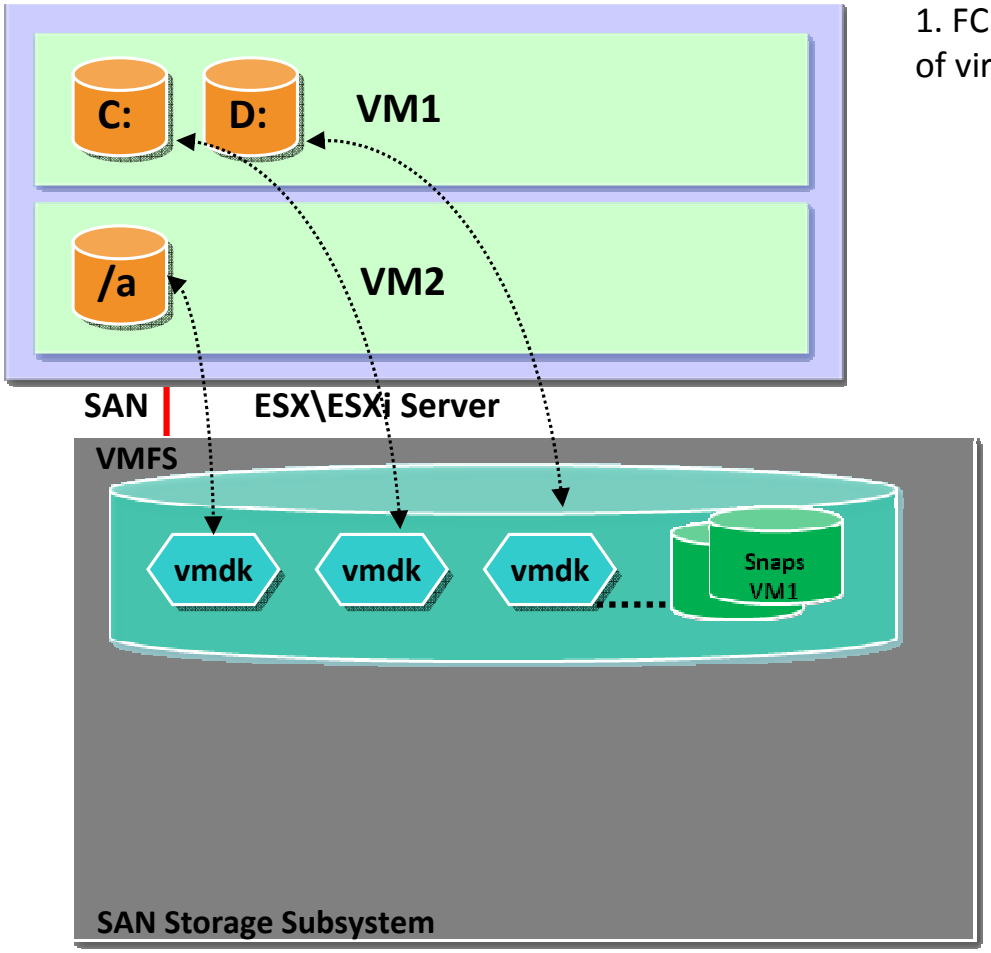


FCM for VMware

Reduce Production System Impact



FCM for VMware

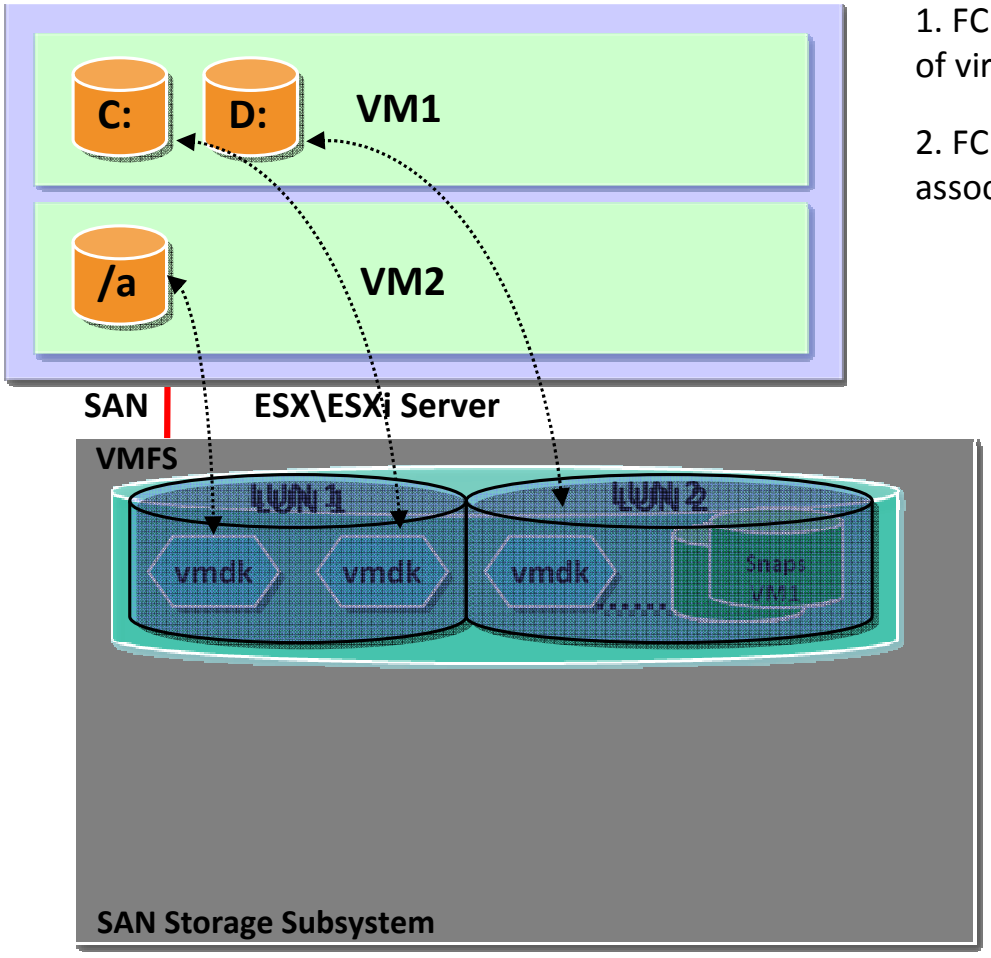


1. FCM initiates a software snapshot of virtual guest volumes (vSphere API)

Linux Proxy Server (physical or virtual machine)

FlashCopy Manager for VMware

FCM for VMware



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2. FCM determines which LUN(s) are associated with virtual machines

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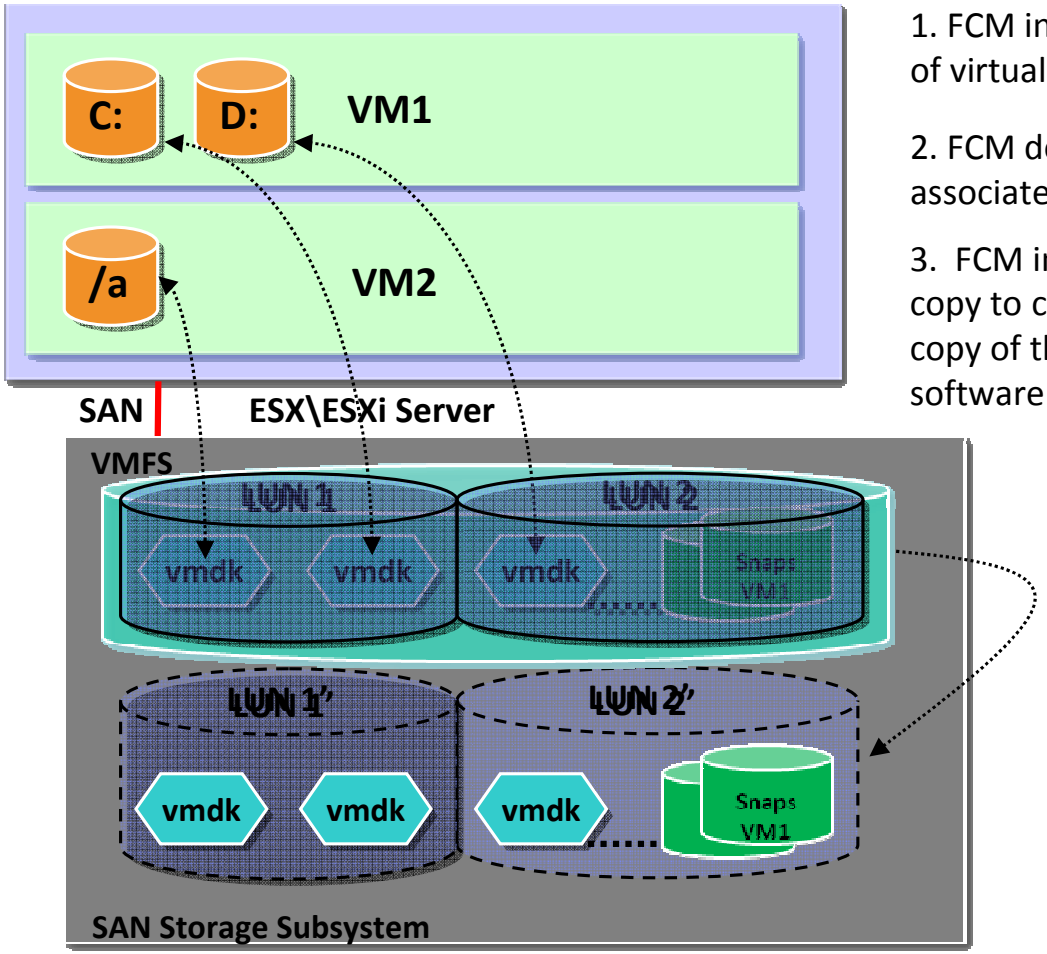

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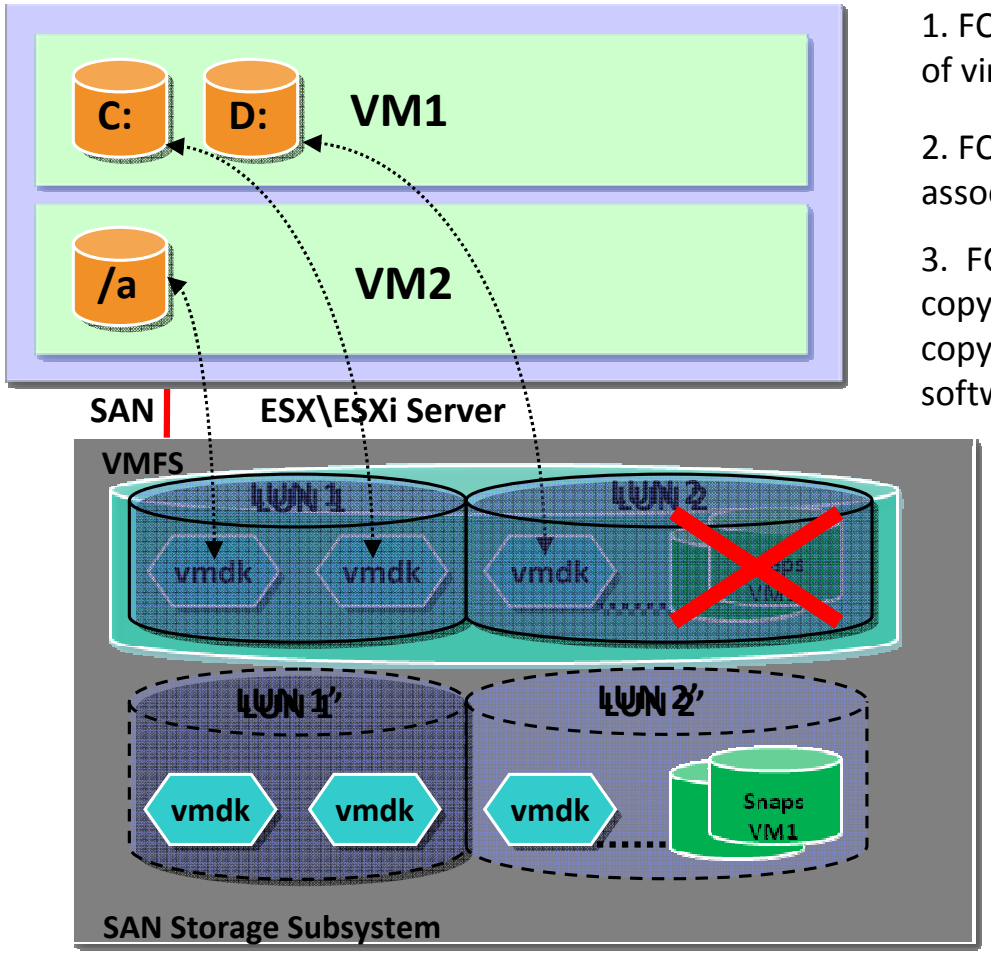
2. FCM determines which LUN(s) are associated with virtual machines

3. FCM invokes hardware instant flash copy to create a persistent snapshot copy of the LUN(s) hosting the .vmdk and software snapshot

Linux Proxy Server (physical or virtual machine)

FlashCopy Manager for VMware

FCM for VMware



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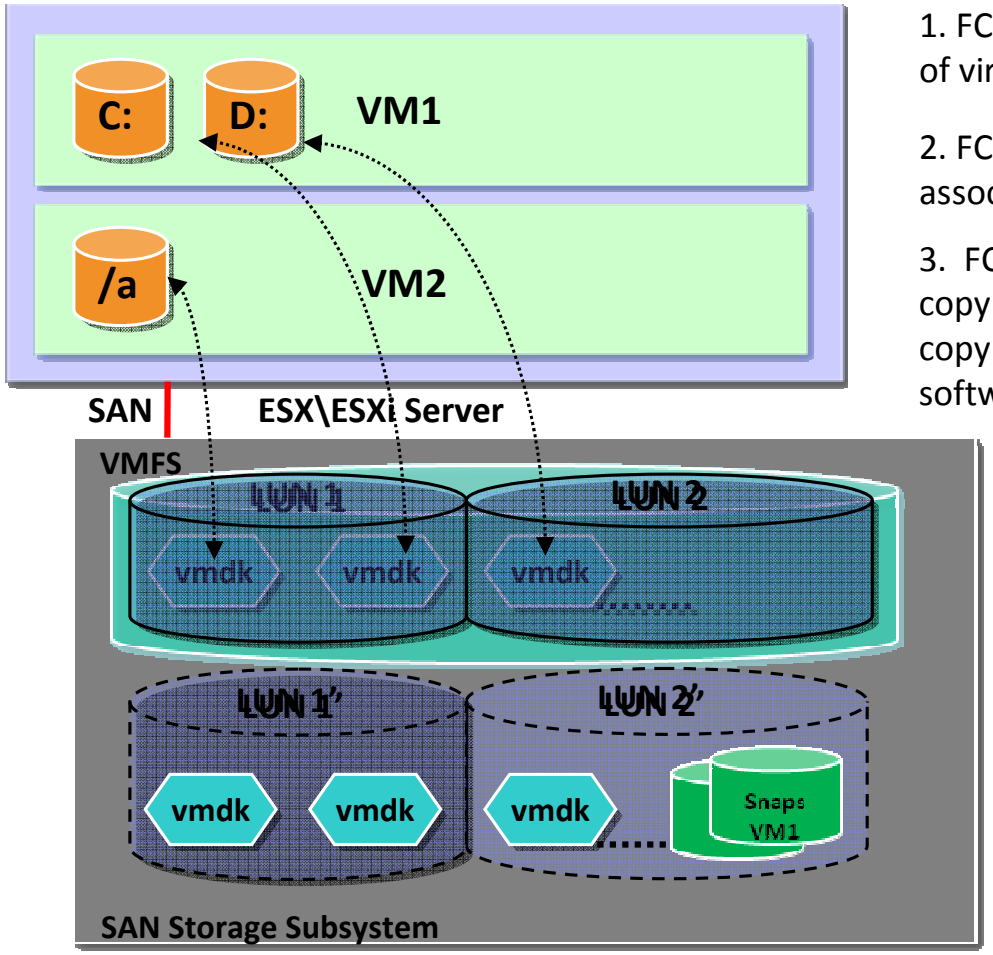
Linux Proxy Server (physical or virtual machine)

FlashCopy Manager for VMware

4. Hardware snapshot is persisted for use as source for recovery operation, software snapshots are deleted.

FCM for VMware



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Linux Proxy Server (physical or virtual machine)

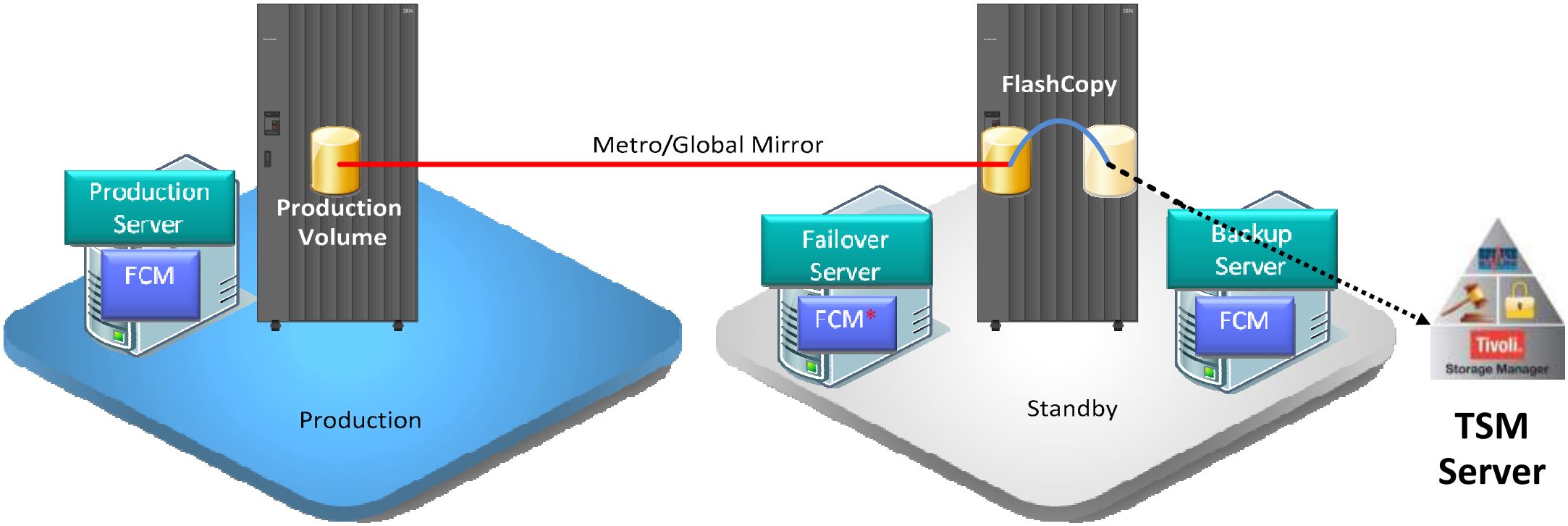
FlashCopy Manager for VMware

4. Hardware snapshot is persisted for use as source for recovery operation, software snapshots are deleted.

5. FCM optionally creates additional copy of data on TSM server (Objects saved in common data format to enable individual file recovery using Recovery Agent Mount)

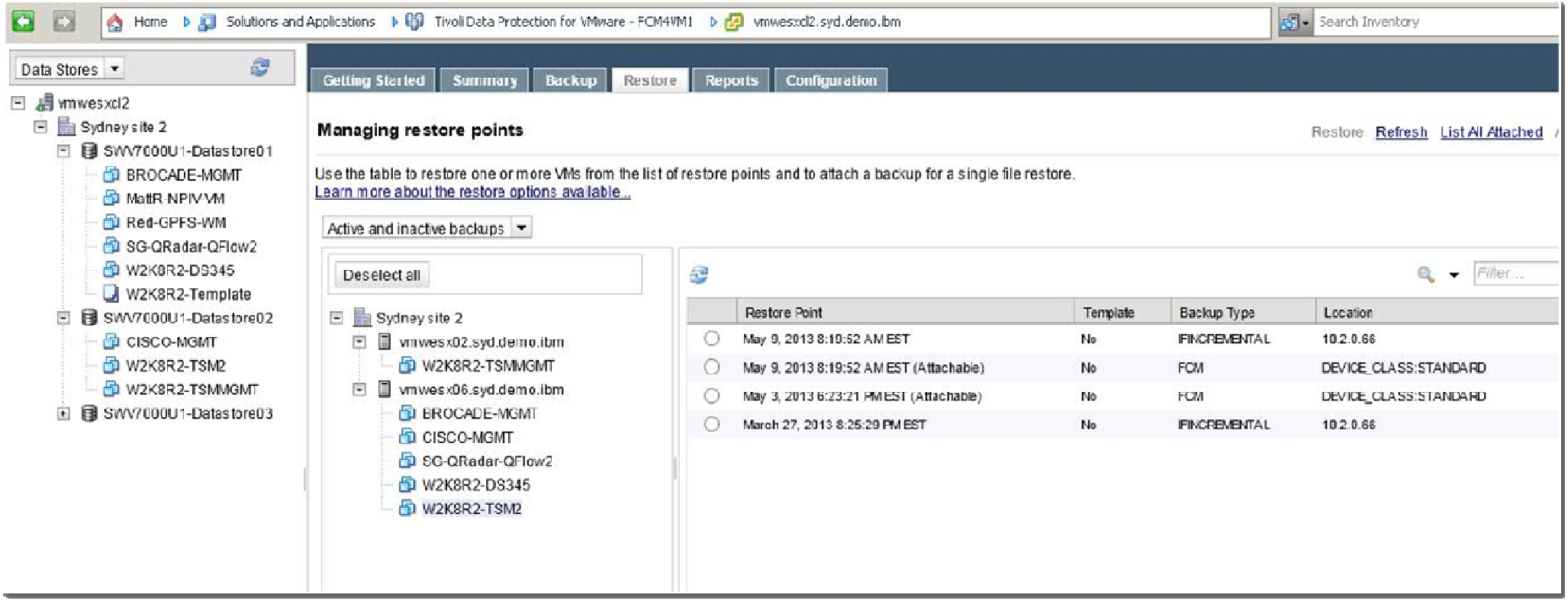
TSM Server

Remote Site Application-Aware FlashCopy



* Only required for restore at DR Site

Integrated Restore Options



Key VMware Integration Benefits

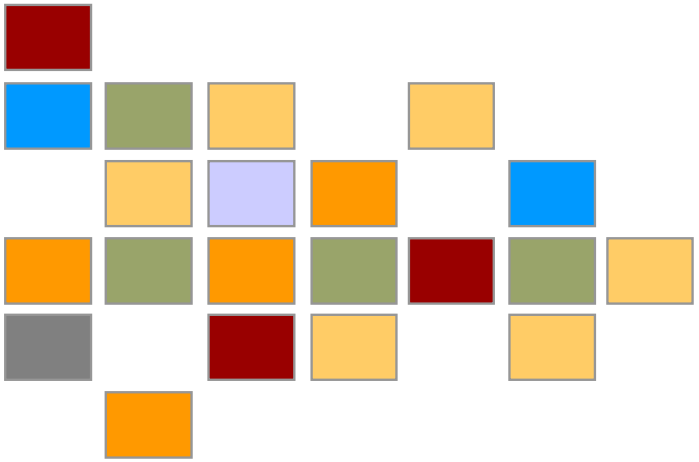
- **VMware snapshot-based**
- **Storage subsystem snapshot-based** (with FCM)
- **Incremental-forever block-level backups:** Backup of volume changed blocks only
- **Reduces Backup Windows:** Eliminates object-level scanning within guest
- **Reduces Resource Requirements:** Saves network bandwidth & TSM storage pool requirements
  - TSM client-side deduplication & compression further reduces bandwidth & TSM storage pool requirements
- **Improved RPOs:** Faster backups means backups can be taken more often.
- **Improved RTOs:** Near-instant volume recovery feature.
- **Saves Time:** no clients or agents need to be deployed & maintained on majority of VMs
- Provides Bare Metal Restore (BMR) points
- Self-contained, application-consistent backup for MS Exchange & MS SQL with log truncation (no agents required)

Key VMware Integration Benefits (continued)

- **Simplified backups:**
  - vCenter client plug-in
  - New configuration wizard
  - Less schedules to define & manage
  - In-guest agents reduced
  - VMs parallel backups
- **Scalability:** Protect more VMs & keep backups for longer.
- **More granular control:** can choose which volumes to back up & recover.
- **Reporting:** VM backup coverage reporting from vCenter plugin & TCR & improved data in activity log and summary table.
- **Other enhancements:** Support backup & recovery of VM templates & preserve additional attribute information upon restore.

Other Sessions of Interest

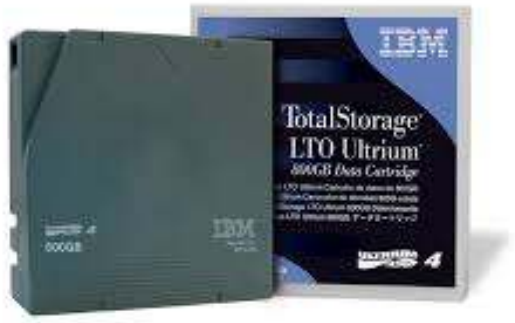
- **Demo Theatrette:** Jacques Butcher from IBM Tech Sales – today during break 20 minutes after this session
- **Key Considerations in Modernising Your Backup:** Andrew Seddon from IBM UK – today 15:45 to 16:30
- **Backup as a Service:** Steve Brown from Tardis – today 16:40 to 17:30
- **What's new in Tivoli Storage:** Steven Mann from IBM C&SI Tech Sales- tomorrow 11:00 to 11:45
- **Best Practice Procedures for Upgrading to TSM 6.3:** Koos du Plessis from IBM SGS – tomorrow 13:30 to 14:15
- **Butterfly:** Rick Terry – tomorrow



Customer Case Study: Larry Kostopulos from ABS

Current ABS Environment

- Over 2,000 virtual servers.
- 1.4Pb Data Backup.
- HP backup server hardware.
- IBM Tape libraries (Onsite & Offsite)
- Emerging Internal Cloud.
- Backup of SAS, Oracle, SQL and Lotus Domino environments.
- Backup of many other proprietary applications.



History

- ABS backed up key VMs only.
- ABS introduced vRanger to backup all other production VMs.
- Service requests for Held Backups were executed with vRanger.
- ABS decision to backup ALL VMs.
- vRanger became inadequate due to numbers of VMs, sizing and time used.

Overview

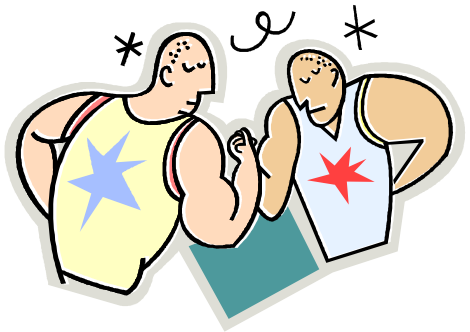
- Update backup strategy to include ALL virtual machines in the environment.
- Key VMs still to be backed up with TSM.
- All other VMs to be backed up with another product.
- Research into available products that integrated with VMware and ABS hardware in current use.

Criteria - Essentials

- Integrate with current backup and recovery infrastructure.
- Do block-level incremental backups.
- Individual file/folder restore availability.
- Must be cheaper than current software.
- Easier to manage, scale out, and out perform our current software package.

Criteria – Nice to Haves

- Single console for control.
- Disaster Recovery option sets.
- Backup set of applications.
- Comprehensive backup job reports.



Research

- Marketplace keyed to proprietary solutions.
- Solutions could not backup MS Windows Server 2012 VMs.
- Many solutions could not use existing tape libraries.
- Solutions offered could not cope with the size of the ABS virtual environment.

Solution Testing

- Sample VM backup and restores using vRanger and TSM for VE.
- Timings and transfer rates compared for both backups and restores.
- Features and performance comparison.
- Cost comparison.
- Vendor service level comparison.

Australian Bureau of Statistics

Results

- TSM for VE was:-
  - ✓Cheaper overall, using the TSM Unified Product volume purchase (by the Petabyte) .
  - ✓Faster than vRanger for incremental backups.
  - ✓Incremental backups possible – vRanger failed on all incremental restores.
  - ✓Integrated well into our ICT environment

Installation Challenges

- Incremental backups supported on VMware hardware v7.0 and above.
- Separate VM(s) needed for deduplication.
- Integrating VE into TSM architecture.

Questions & Answers

- Please ask…

Session Feedback Form

- **Online Evaluations:** Please remember to complete your on-line evaluations:
  - IBM Event Companion (mobile app available via Play Store)
  - iPads (in foyer)
- **Networking Drinks:** This afternoon after event @ 17:30 to 19:00

Thank You

THANK YOU

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