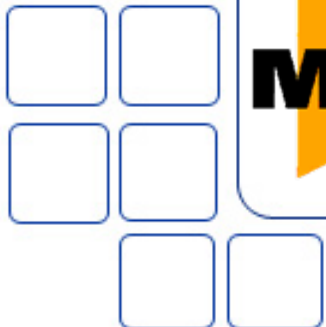




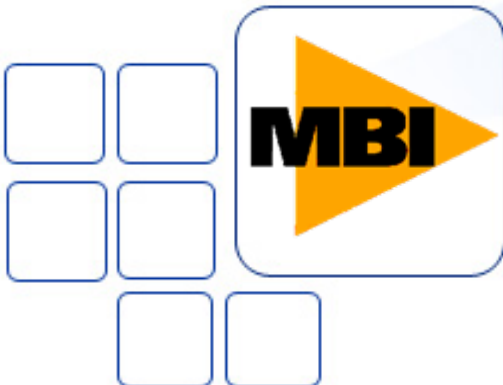
## Legato NetWorker - When Recovery Must Be Guaranteed

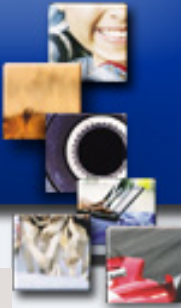
Mark Friedman, CTO





**NetWorker Dashboard**  
**Integrated Reporting, Alerting and Analysis**





Too much time spent troubleshooting  
what went wrong

Lack of readily available backup status  
information

No organized information for  
troubleshooting

The problem is not lack of reporting,  
but lack of real time, actionable  
information





Single place to get backup status information.

- **Success, failure and progress.**

Graphically represent the relationship between a backup and its major components

- **Clients, Devices, Tapes**
- **Dynamically change with the environment**

Correlation of failures in terms of backup

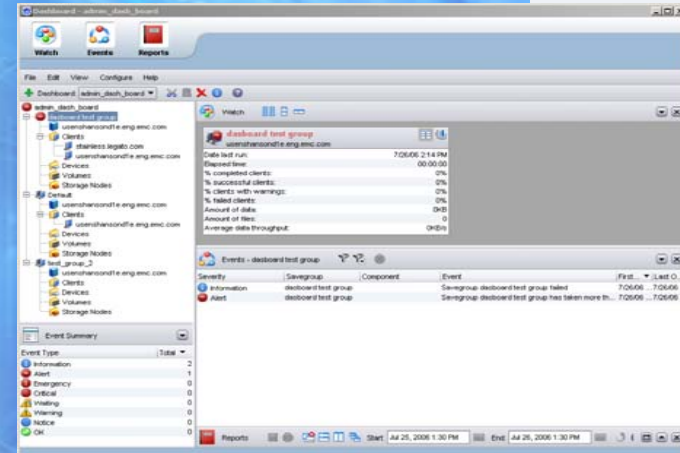
- **Backups affected by a tape failure, client failures, device performance, client performance, etc**



# NetWorker Dashboard Overview

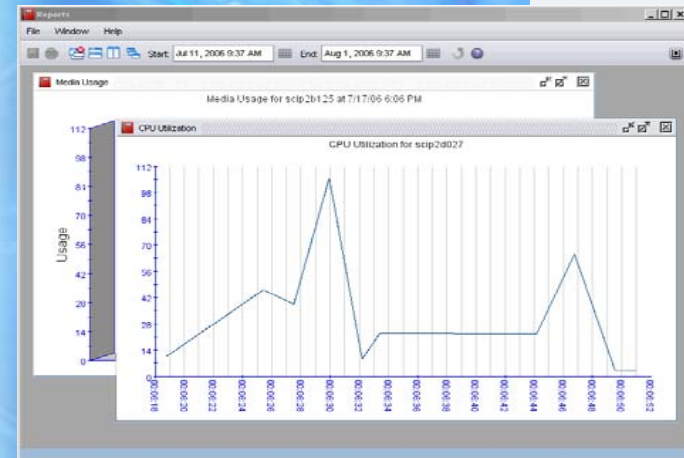


- An intelligent backup correlation and impact analysis tool
- An add-on module to NetWorker integrated directly into the management console
- Gathers information from NetWorker servers and the operating system on servers, storage nodes and clients
- Displays current status of a savegroup and it's components in real time
- Generates alerts when something may impact the success of NetWorker savegroups





- Integrated reporting, monitoring and alerting with NetWorker Management Console
- Access to NetWorker resources for rapid configuration changes
- Broadcasts status of savegroup components such as clients, devices and media
- Automatically updates when NetWorker configuration is changed
- Gathers host OS resource statistics for CPU, Disk and memory usage
- Customizable workspace - Drag and Drop
- Dashboard only user view - Monitor only - No access to NetWorker resources





**NetWorker Management Console - http://usenshansond1e.eng.emc.com:9000 - administrator**

Events Enterprise Libraries Reports Setup

File Edit View Enterprise Start Window Help

Dashboard - admin\_dash\_board

Watch Events Reports

File Edit View Configure Help

Dashboard: admin\_dash\_board

admin\_dash\_board

- dashboard test group
  - usenshansond1e.eng.emc.com
    - Clients
      - stainless.legato.com
      - usenshansond1e.eng.emc.com
    - Devices
    - Volumes
    - Storage Nodes
  - Default
    - usenshansond1e.eng.emc.com
      - Clients
      - usenshansond1e.eng.emc.com
        - Devices
        - Volumes
        - Storage Nodes
  - test\_group\_2
    - usenshansond1e.eng.emc.com
      - Clients
      - Devices
      - Volumes
      - Storage Nodes

**Main Browse Tree**  
Contains NetWorker savegroups that this dashboard is monitoring and the current state of all components within a savegroup (Clients, Devices etc.)

**Watch Area**  
Contains savegroups that the user wants to focus on. Displays detailed information in statistical and graphical format.

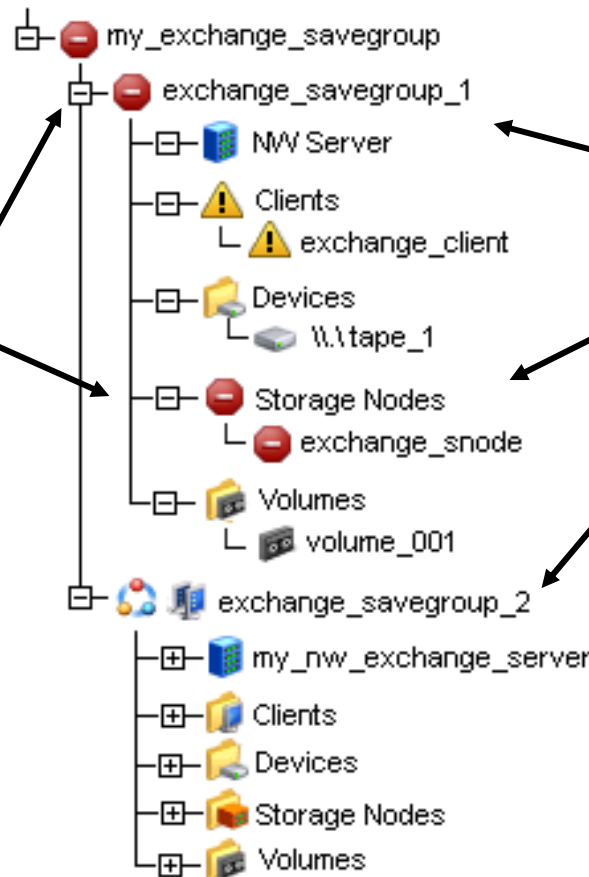
**Events Area**  
Lists detailed event information for any item selected in the browse tree or watch area.



Displays all savegroups and components for a given dashboard.

- Displays event status for all components in the savegroup.
- Provides access to Reports and NetWorker properties via right-click menus.

The most sever event status is propagated up the tree to the highest level.



Status is displayed for all components within a savegroup.





Displays detailed information on specific savegroups within the dashboard.  
Can display statistical, graphical or both information on a savegroup.

Savegroups status is displayed in real-time

The screenshot shows the 'Watch' application window. It displays three savegroups:

- HR Group 2** (typhoon.e...): Includes a context menu with options: Stop, Start, Restart, Properties...
- HR Group 1** (hyper.eng.wysdm.com):

% completed	50%	Average throughput	100MB/s
% completed successful	30%	Data backed up	1332GB
% completed with warnings	7%	Files backed up	123323
% completed in failure	13	Elapsed time	03:23
		Date last run	10/11/05 14:23
- AdminGroup 5** (hyper.eng.wysdm.com):

% completed	50%	Average throughput	100MB/s
% completed successful	30%	Data backed up	1332GB
% completed with warnings	7%	Files backed up	123323
% completed in failure	13	Elapsed time	03:23
		Date last run	10/11/05 14:23

At the bottom, a graph titled 'Success Rate for WysDM Server for 17/10/05 12:43 18/10/05 12:43' shows a success rate of 100% over time.

Savegroup information can be displayed in "icon", statistical, graphical, and a combination of all three.

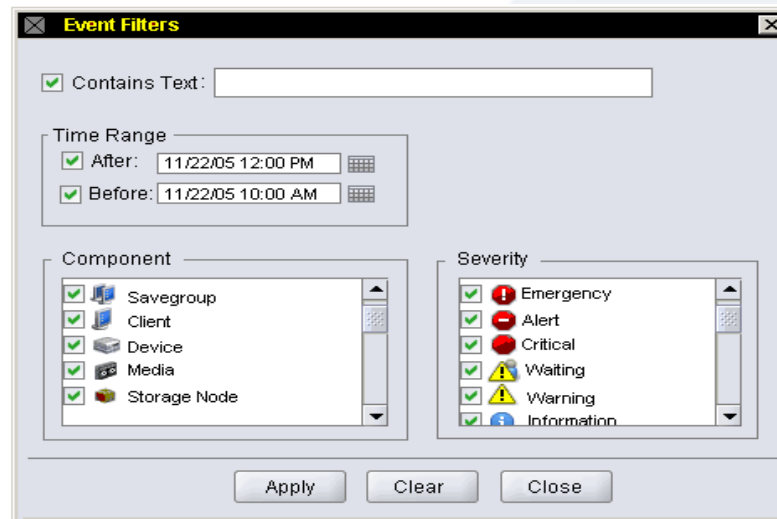


Displays all events that apply to the selected component from either the main browse tree or the watch area.

Events can be filtered to find specific problems.

Events for the selected components are displayed in tabular form.

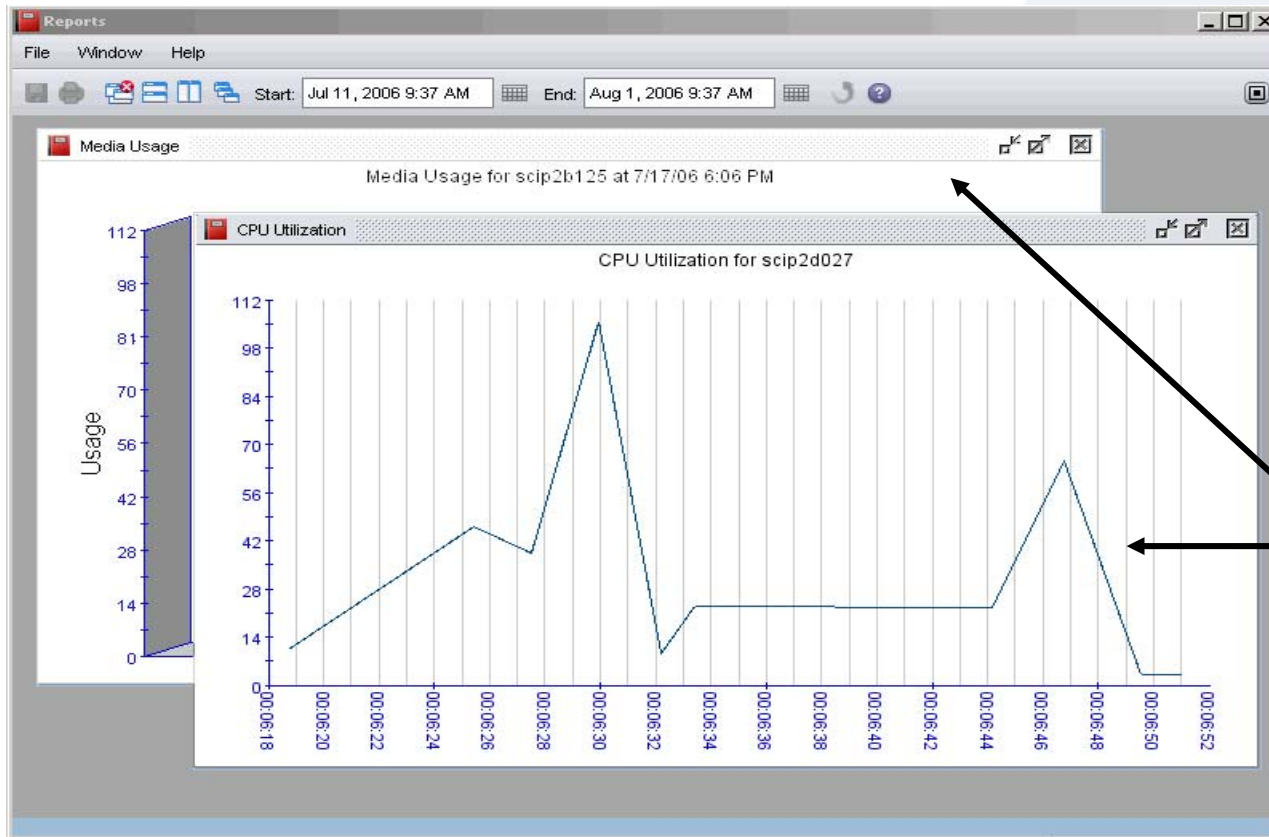
Events in the table can be filtered to isolate specific events



Severity	Savegroup	Event	First Occurrence	Last Occurrence
Alert	Default (NW_SERV_1)	Group 'Default' has failed on server mars.legato.com	18/10/05 12:32:12	18/10/05 13:21:52
Information	my_exchange_savegroups	Device errors on typhoon:\dev\0 have increased to 22	18/10/05 12:31:12	18/10/05 13:21:52
Information	my_exchange_savegroups	Group 'Default' has failed on server mars.legato.com	18/10/05 12:32:12	18/10/05 13:21:52
Information	my_exchange_savegroups	Group 'Default' has failed on server mars.legato.com	18/10/05 12:32:12	18/10/05 13:21:52
Warning	Default (NW_SERV_1)	Group 'Default' has failed on server mars.legato.com	18/10/05 12:32:33	18/10/05 14:20:42
Warning	Default (NW_SERV_1)	failed on typhoon.legato.com	18/10/05 12:32:12	18/10/05 13:21:52
Warning	Default (NW_SERV_1)	Group 'Default' has failed on server mars.legato.com	18/10/05 12:32:12	18/10/05 13:21:52
Critical	client_2	nsrexecd is not running.	18/10/05 12:32:12	18/10/05 13:21:52
Waiting	\\.\Tape1	errors have increased to 22	18/10/05 12:32:12	18/10/05 13:21:52



Displays reporting data on selected components in the main browse tree.  
Can be displayed within the main UI framework or as a separate window to help prevent clutter.



Window can be docked or undocked from the main framework.

Window can display multiple reports for multiple components in the main browse tree.



## Data Collector:

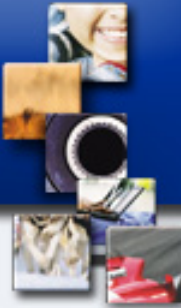
- **Collectors on NetWorker servers, clients and storage nodes gather data on file system, memory, CPU, and network utilization**
- **A collector on the Dashboard server gathers information on all NetWorker servers in the environment.**
  - **NetWorker configuration, group and save set status and device performance**

## Dashboard Server:

- **Contains the Analysis engine, which analyzes data returned by collectors.**
- **Generates events when conditions are met.**

## Dashboard Client GUI:

- **A JAVA-based interface launched from within NMC or directly from the NMC webpage**



## EMC Backup Advisor

- Customizable backup analysis and reporting tool that provides business as well as infrastructure views
- Support multiple backup products
  - NetWorker, NetBackup, BackupExec, TSM, HP Dataprotector
- Fully customizable
- Provides business views and SLA's, chargebacks and reports on RPO and RTO
- Any size installation

## NetWorker Dashboard

- Out of the box correlation & impact analysis tool that discovers relationships between groups and components
- Available only for NetWorker
- Initiate troubleshooting actions
- Allow users to define groups to “watch” and their properties
- Small/medium sites no greater than 200 clients running NetWorker



## Reduce labor costs

- Reduces time to troubleshoot
- Better utilization of personnel
- Automates reporting

## Optimize backup environments

- Pinpoint risks and bottlenecks in the backup environment

## More effective budgeting

- Analyze and forecast storage requirements

## Reduces unnecessary hardware spending

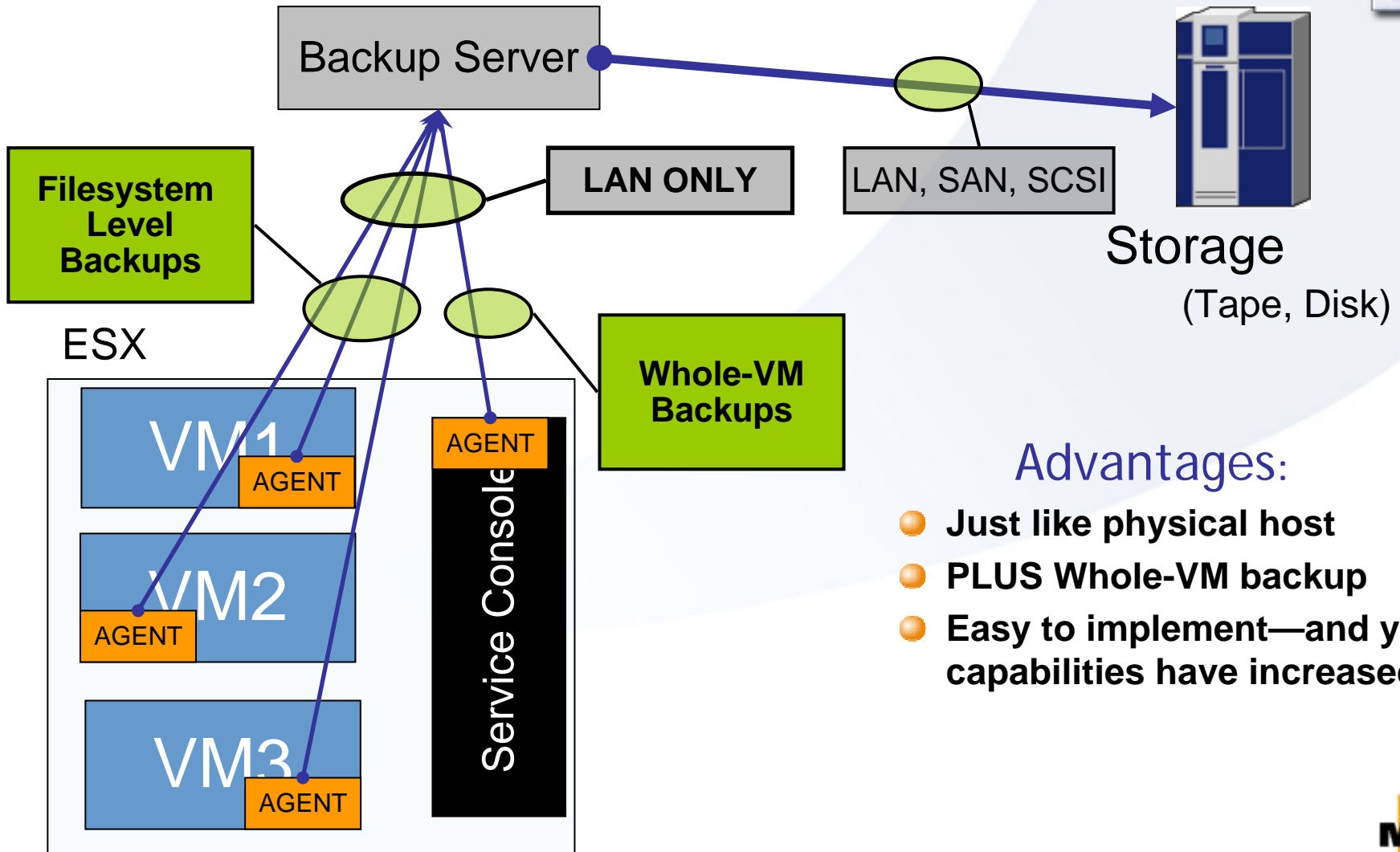




## VMWare Consolidated Backup (VCB) & NetWorker



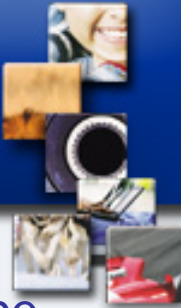
# Status (before VCB) Standard VM Backup techniques Backup agent installed in VM



## Advantages:

- Just like physical host
- PLUS Whole-VM backup
- Easy to implement—and your capabilities have increased.



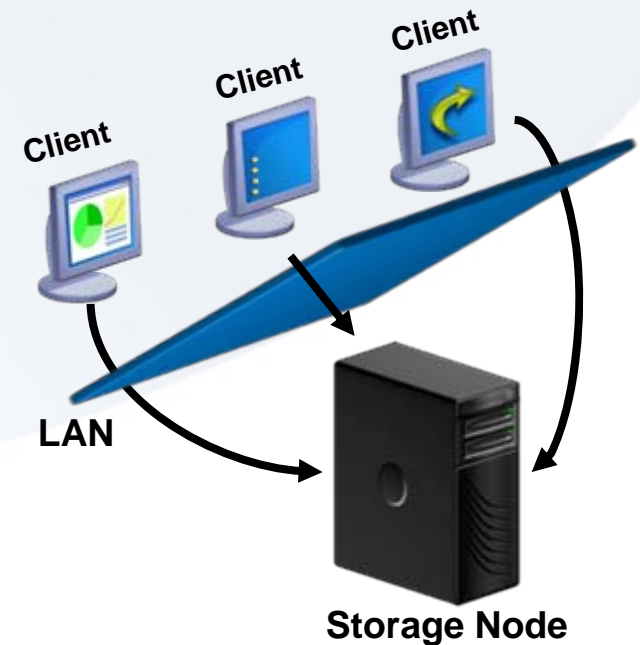


To protect data stored in a virtual machine *backup client software* has to be deployed on each host or guest

In ESX Server 2.x, the backup is sent across the network to a Storage Node during periods of low system use.

This only works well when:

- There is a window of low activity on the protected server during which backup can be performed
- Network bandwidth between the protected server and the media server is plentiful





## Agent-Based

- **Backup load is cumulative**
  - 5% CPU load is OK...
  - Until you have 20 virtual machines backing up at once
- **Backup load is very difficult to virtualize.**
  - Intense Disk I/O coupled with intense Network I/O
- **Backing up Disk images over the Service Console can be slow.**

# What is VCB?



VMware Consolidated Backup is a new backup solution in ESX Server 3

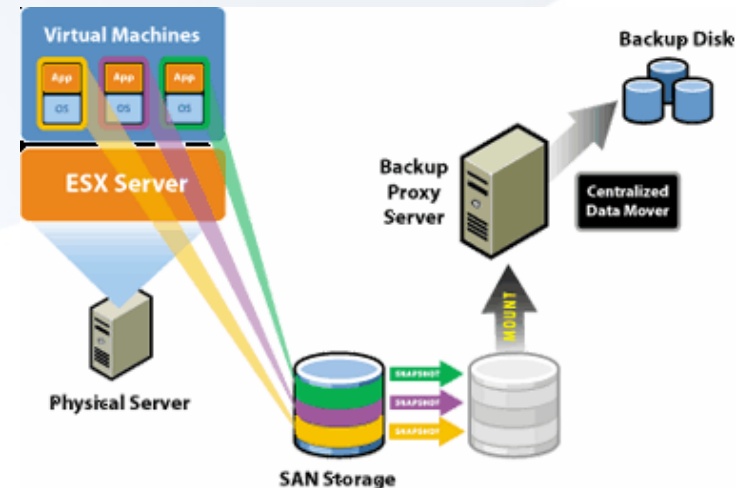
Backups are offloaded to a dedicated physical host.

- **Offloading to a dedicated physical machine solves many problems. For example, there is no resource contention on ESX Server host. Offloading also enables LAN-free backup and doesn't require backup agents in virtual machines**

This results in:

- **Better performance**
- **Shorter time requirement for backup**
- **Lower costs and easier management**

Consolidated Backup supports all types of guests



# VCB in action...



VMware  
Infrastructure  
3.0



NetWorker Server



SAN

Once configured properly the backups up the guest systems go directly from the SAN attached disk that they reside on, to the Storage Node via the VCB Proxy Host



Proxy Host/ Storage Node



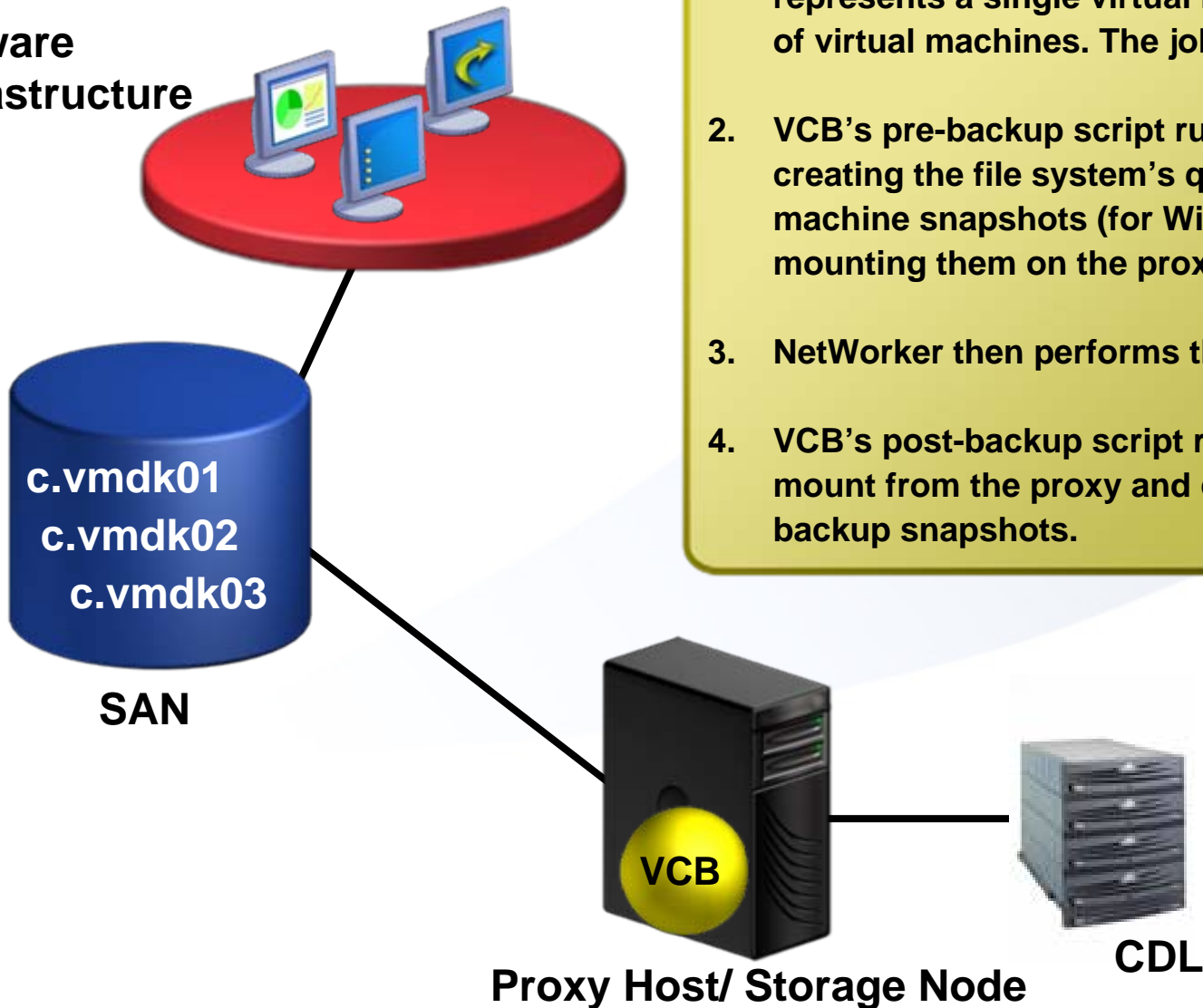
CDL



# The basic steps



VMware  
Infrastructure  
3.0



1. NetWorker schedules the backup job, which represents a single virtual machine or a group of virtual machines. The job runs on the proxy
2. VCB's pre-backup script runs on the proxy, creating the file system's quiesced virtual machine snapshots (for Windows only) and mounting them on the proxy.
3. NetWorker then performs the backup
4. VCB's post-backup script runs, removing the mount from the proxy and committing the backup snapshots.



Virtual machines to be protected are identified by using a special convention for the saveset on the VCB proxy. These savesets also determine whether a full VM or a file-level backup is being performed.

**Properties**  
General | Apps & Modules | Globals (1 of 2) | Globals (2 of 2) | Info & Licensing

**Identity**  
Name: trne114.legato.com  
Comment: VCB

**Index Management**  
Browse policy: Month  
Retention policy: Year

**Backup**  
Scheduled backup:   
Directive:   
Save set: VM:trne113.legato.com  
Group:  Unix\_Dev  
 UNIX\_FS\_Snapshots  
 UNIX\_FS\_SymmConnect  
 VCB Backups  
 Virtual Machine Group  
 Windows Clients  
 Windows\_FS\_Snapshots  
Schedule: Default





There are three options for backing up virtual machine data.

- **All files and directories within a VM**
  - **All files and directories within a VM**
    - **All files for TME113:**
      - *VM:tme113.legato.com*
- **A list of paths on the VM separated by : (colons)**
  - **Backing up C:\Data on TME113:**
    - *VM:tme113.legato.com:C\Data*
  - **Backing up C:\Documents And Settings and D:\OraData on TME113:**
    - *VM:tme113.legato.com:C\Documents And Settings:D\OraData*
- **Full VM backup.**
  - *VM:tme113.legato.com:\*FULL\**



There are three options for performing file-level restore for data backed up from virtual machines using VCB:

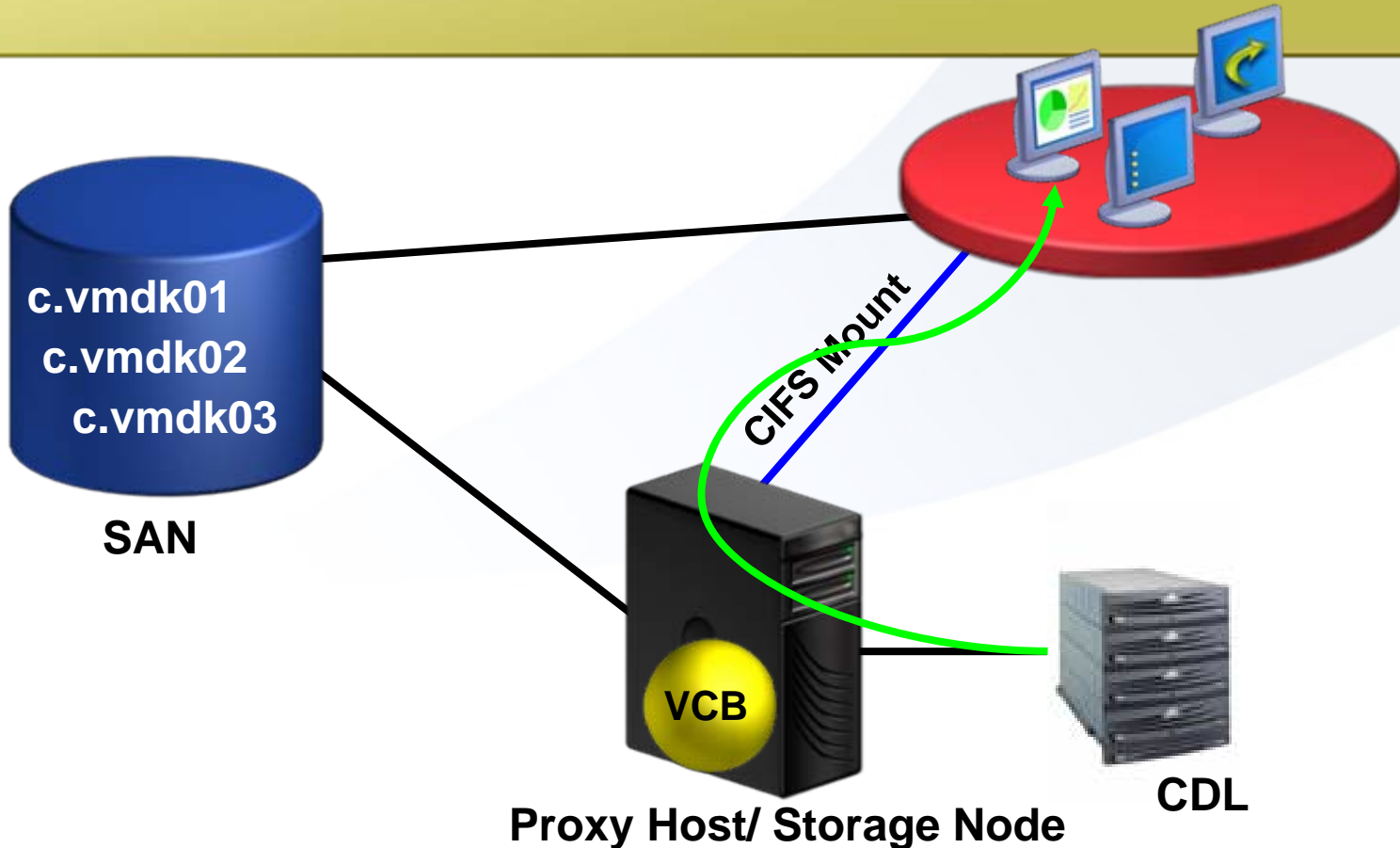
- **Centralized Restore**
- **Per-Group Restore**
- **Per-virtual machine Restore**



# Centralized Restore



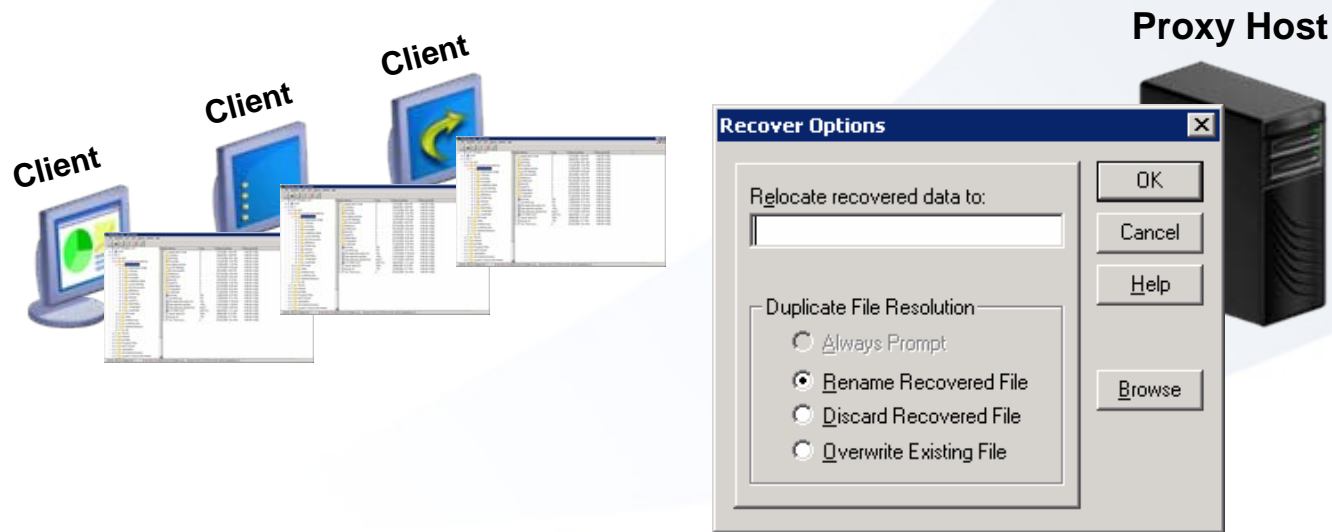
One way of implementing this is to expose the target directory of the virtual machine as a CIFS share to the backup proxy. Use Networker User on the VCB proxy to restore the desired file to this network share.



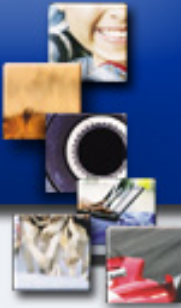


For Per-Group and Per-VM the Networker Client software has to be installed in some or all virtual machines

The proxy host indexes are then accessed by the NW User UI on the VMs to restore the data via the redirected restore capabilities of NetWorker



When restoring data for a virtual machine, keep in mind that the respective backups are associated with the VCB proxy and not with the virtual machine's DNS name.



Proxy Host must be W2K3 server configured for Consolidated Backup

File-level backup only supported on Windows virtual machines:

- **Full virtual machine backup (image) is supported for all guest operating systems**

SAN connected and LUN masked for vmdk files

Backup administrator account on the proxy with read access to the data



Can the ESX Server act as its own Proxy?

- **No- the proxy must be a W2K3 server and the ESX server runs a LINUX kernel**

Can the Proxy be a Storage Node itself?

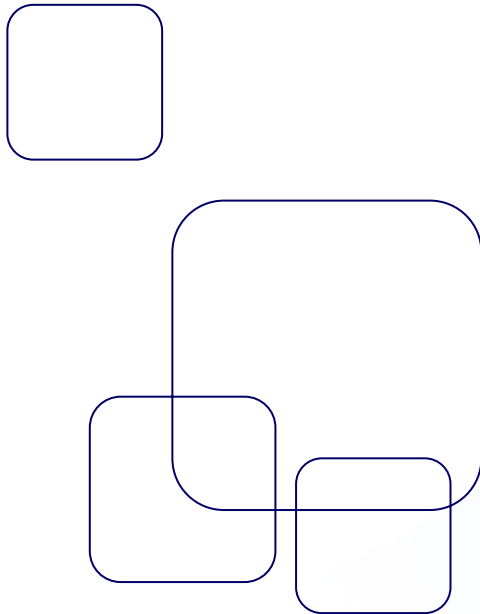
- **Yes, as well it can be your NetWorker server provided the resources are available**

How do I handle application like Oracle and Exchange running in VM?

- **In this case the traditional NetWorker VM support is reincorporated and you will require a client and NW Module on the VM.**

How do I get my hands on VCB for NetWorker?

- **VCB is delivered with VMware Infrastructure 3.0 and can be obtained at...**
  - **[http://www.vmware.com/download/vi/drivers\\_tools.html](http://www.vmware.com/download/vi/drivers_tools.html)**



***Thank You!***

