

VMware virtual infrastructure software is used by enterprises large and small to increase the efficiency and cost-effectiveness of their IT operations. Considered by Gartner to be a “mega-trend”, VMware is making its way into datacenters of every size. Recognizing this trend, the NetBackup team has been working hard to create industry-leading backup technologies engineered to provide unique backup solutions designed specifically for VMware environments. With the NetBackup 6.5 release, two new VMware related technologies will be introduced:

The benefits of virtual environments are just now starting to be realized. IT departments are aggressively embracing VMware virtualization technologies. Many elements of computer environments are relatively unchanged by virtualization but some are changed in profound ways. Data protection is an area where virtualization has radically changed the backup paradigm. Standard backup technologies that have been used for years do not translate well into the virtual world. Installing a traditional backup client inside the virtual machine is a valid way of protecting it but demands additional system resources needed by other virtual machines hosted on the same physical server. The disaster recovery advantages that are inherent in VMware’s architecture cannot be exploited with this backup methodology as restores at the virtual machine file (vmdk) level are not possible.

Realizing this need, Symantec has developed two solutions designed to provide enhanced backup and restore functionality specifically for VMware environments – PureDisk for VMware and NetBackup for VMware. There are two basic backup types associated with VMware: 1) backing up via a client inside the virtual machine and 2) an off-host technology based on VMware Consolidated Backup.

At this year’s VMworld 2007 in San Francisco, Veritas NetBackup 6.5, the newest version of Symantec’s market-leading data protection platform was presented with the Best of VMworld Gold Award for Data Protection. Winners were selected from more than 100 exhibitors at the conference, which was sponsored by VMware, the world’s leading provider of virtualization solutions. NetBackup was selected from an independent team of judges consisting of experts and editors from SearchServerVirtualization.com and honored for its innovative solutions for VMware data protection, which delivers granular file-level and image-level recovery from a single backup operation, as well as deduplication for VMware backups. This comprehensive approach enables fast, low-impact VMware backups that dramatically reduce server, network, and storage requirements for data protection, and provides unprecedented improvement in recovery time and reliability.



Client in Virtual Machine: This is the most straightforward method of virtual machine backups. Backup data is transferred from the client to the NetBackup or PureDisk server over the LAN. If the PureDisk client is used, the advantages of deduplication can be achieved. Database backup is more easily accomplished with this method. Besides comprehensive DB support with a standard NetBackup client, the PureDisk client supports Exchange and SQL Server environments.

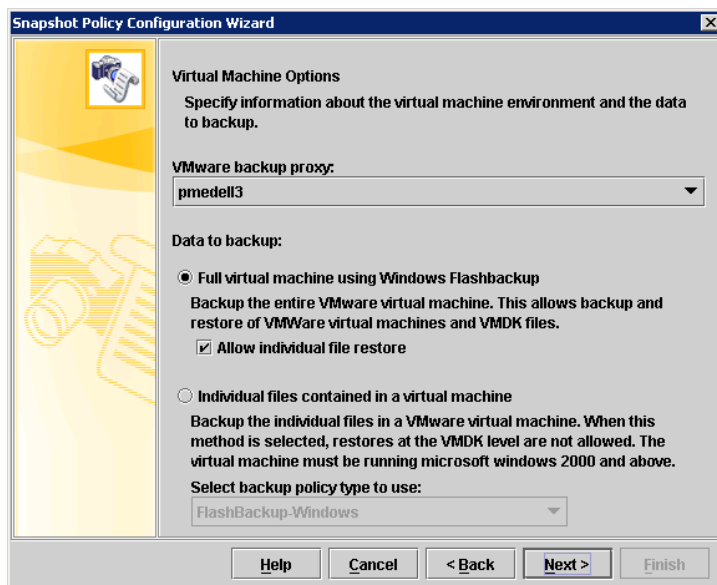
Off-host using Snapshot Client: With the introduction of VMware Virtual Infrastructure 3 (VI3), off-host backups of virtual machines are now possible. Frequent backups with minimal impact on the host ESX server is the holy-grail of ESX server backups. The enabling technology for this is VMware Consolidated Backup (VCB). Part of VI3, VCB orchestrates the virtual machine snapshot and transfer to the off-host client (Backup Proxy). The advantage of off-host backups is that the impact of backup processing on the ESX server and hosted virtual machines is significantly reduced. This allows for more frequent backups. VCB provides the ability to backup the underlying virtual machine vmdk files.

Other backup solutions either backup only at the vmdk (entire virtual machine) level or require two backup passes to be able to restore single OS file restores as well as vmdk restores. Recognizing the benefits of being able to perform either type of restore, customers prefer to have ultimate restore options when bad things occur. For example, if a virtual machine is infected with a virus or inadvertently damaged due to user error, a single file restore is of little use. The entire virtual machine needs to be restored. But if the user deletes and needs to recover a single file (the most common type of restore operation), restoring the entire virtual machine is overkill and requires downtime.

NetBackup's solution is to make possible either type of restore – single file or vmdk (entire virtual machine) restore while retaining the performance advantages of an off-host backup and a single backup pass. The technology that drives this ability is derived from FlashBackup. The FlashBackup technology backs up at the vmdk level and then maps, catalogs and backs up individual files as well. This provides the ultimate in restore options. **. No other vendor offers this capability in VMware environments¹.**

TECHNICAL OVERVIEW

NetBackup 6.5 Snapshot Wizard for VMware



The configuration of an entire NetBackup VMware policy can be easily performed from the NetBackup Snapshot Policy Configuration Wizard. Besides basic policy configuration, the wizard is integrated with the VMware Virtual Center Server and can automatically discover virtual machines registered to any Virtual Center environment. During policy configuration, several backup options are offered including vmdk level backups and single file backups performed during a single backup pass.

Figure 1: Snapshot Client

¹ Source: VMware, Inc.

VMware Virtual Center Integration

The key to NetBackup 6.5 support of VMware environments is a straightforward and easy to use GUI. A number of GUI enhancements have been included in NetBackup 6.5 including a VMware configuration wizard and direct integration with VMware's Virtual Infrastructure 3. This screenshot shows defining the VMware Virtual Center Sever including login credentials. Additionally types of virtual servers can be defined here. Optionally a VMware Converter Server (used for restores) and a standalone ESX server can be specified if no Virtual Center server exists.

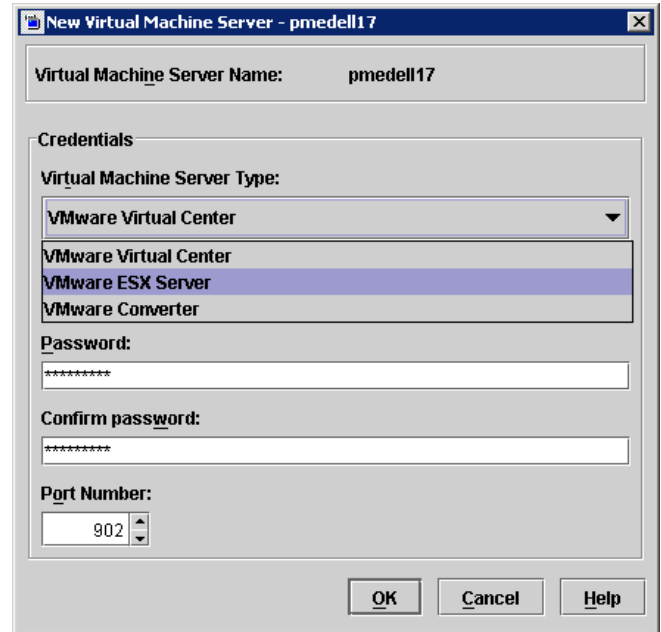
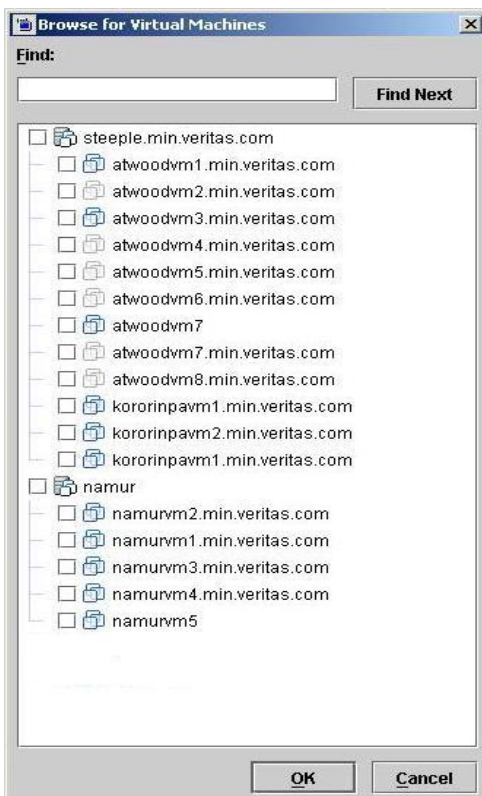


Figure 2: Virtual Server Selection

Virtual Machine Discovery



Once the Virtual Center Sever has been defined, automatic discovery of ESX servers and virtual machines can occur. When defining a NetBackup policy, specific virtual machines can be selected or all virtual machines associated with an ESX server can optionally be chosen for backup as seen here. This interface shows parent ESX servers and associated virtual machines that have been automatically discovered by NetBackup. The icon to the left of the virtual machine hostname indicates the power status. Powered-off virtual machines are faded out.

Virtual machines targeted for backup are simply selected via the checkbox next to each hostname. All virtual machines associated with an ESX server can be added to the backup policy by simply selecting the parent ESX server.

Figure 3: Virtual Machine Selection

VMware Policy Definition

As part of the VMware policy definition, a mount point used for imported vmdk files and type of backup can be defined and even changed for a specific VMware backup.

Also defined here are three types of backups that are possible with VMware environments:

- File level backup and restore
- Vmdk (entire virtual machine) backup and restore
- Combination file-level and vmdk backup and restore

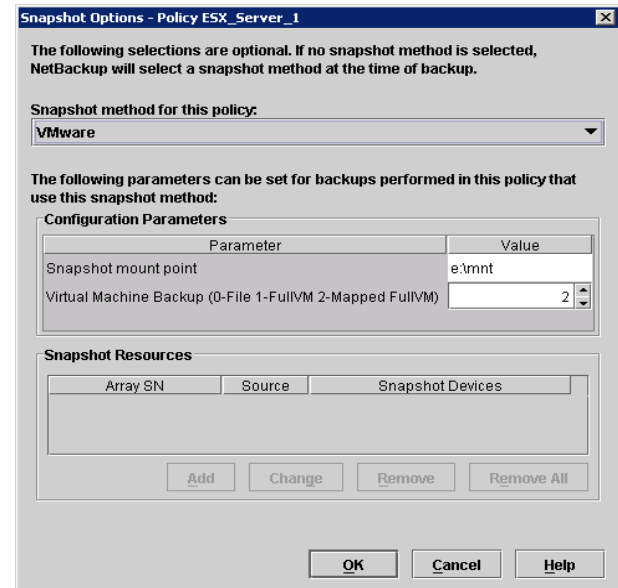


Figure 4: Snapshot Options

UNDERLYING PRINCIPLES

PureDisk for VMware

The first involves installing a NetBackup PureDisk client within each virtual machine. There are some VMware environments where a sophisticated SAN environment is not possible. However, the performance implications of virtual machine backup operations still exist. NetBackup provides a solution here with PureDisk for VMware. Implementation is as simple as installing the PureDisk client inside the virtual machine and registering the client to the PureDisk server.

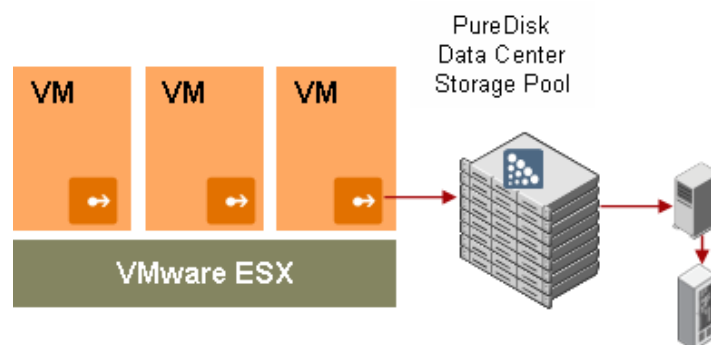


Figure 5: NetBackup PureDisk Implementation with VMware.

Global, block-level deduplication reduces duplicate data in the enterprise and NetBackup PureDisk allows all core NetBackup agents, VMware, and remote offices to all share common de-duplicated storage. Because of the dramatic deduplication abilities of PureDisk (tested to be 91%+ effective in VMware environments), client backup is now feasible for lower-scale VMware deployments that do not employ SAN technologies.

NetBackup for VMware – VMware Granular Recovery

For larger VMware installations based on shared storage (SAN), NetBackup has engineered an integrated solution with VMware's Consolidated Backup (VCB) technology. You can think of VCB like a snapshot within VMware. Just as NetBackup can manipulate and control array or software-based snapshots, NetBackup can also manage VMware-based snapshots. Snapshots of virtual machines are created and then mounted to the VMware Backup Proxy (a NetBackup Master, Media or client) for backup. This approach almost completely removes the backup processing overhead from the primary VMware ESX server, and allows for rapid backup of virtual machines. Many backup vendors offer integration with VCB, but Symantec is taking an extended step further to deliver a unique granular recovery solution for VMware.

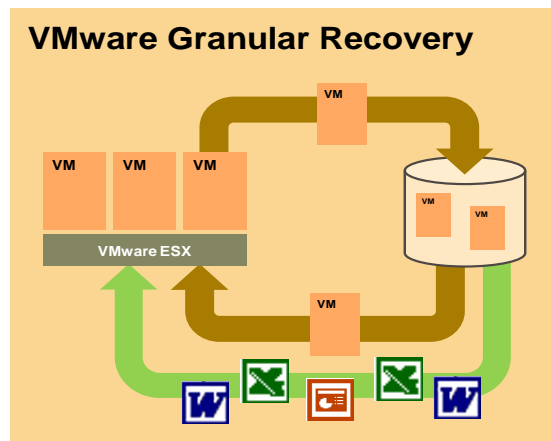


Figure 6: NetBackup Granular Recovery