

NetBackup Solutions for VMware

1. Feature Description

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:



PureDisk for VMware – Utilizes PureDisk’s block level data-deduplication technology to efficiently backup virtual machines. PureDisk for VMware is easily implemented by placing a PureDisk client inside the virtual machine and backing up to the PureDisk server. Besides providing significant de-duplication of file-level backups data, PureDisk also provides application agents for Microsoft Exchange as well as SQL Server.

NetBackup for VMware – Part of the new NetBackup 6.5 Snapshot Client, NetBackup for VMware provides an alternate client backup technology for virtual machines with enhanced granular recover capabilities. Based on VMware’s Consolidated Backup off-host data protection technology, NetBackup 6.5 builds on and significantly enhances VMware’s approach by providing two restore capabilities from one backup. Powered by FlashBackup’s mapping technology, single file or entire virtual machines (vmdk) can be restored from a single backup pass. No other competitive VMware backup technology can combine the off-host performance advantages of VMware Consolidated Backup

NetBackup for VMware will be included as part of the NetBackup 6.5 Snapshot Client.

1.1. Components – NetBackup Solutions for VMware

PureDisk for VMware

By installing a PureDisk client in the VMware virtual machines, PureDisk’s dramatic data reduction abilities make client backup feasible for many VMware environments. Because the amount of backed up data is dramatically reduced (we’ve found 90-95% data reduction in tested VMware environments), backup time and processor overhead is reduced by 10x. For many VMware environments this decrease in backup processing overhead makes backing up virtual machine’s via a client based inside the virtual machine a viable backup solution.

NetBackup for VMware

FlashBackup’s patent-pending technology works with VMware Consolidated Backup (VCB) Framework to provide the ultimate in VMware backup and restore solutions. Let’s take a look at these technologies.

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VMware Consolidated Backup: At backup time VMware VMDK files are processed using VCB. VCB syncs the virtual machine file systems (Windows only), creates a snapshot of the virtual machine and copies it over the high-speed SAN to the Backup Proxy where NetBackup backup processing begins.

NetBackup for VMware: At this point, the vmdk files associated with the virtual machine have been copied to the Backup Proxy and are ready to be backed up. FlashBackup technology translates VMDK “blocks” into individual files. All aspects of the virtual system (single OS-level files and VMDK files) are cataloged, referenced to the original virtual machine, are searchable and restorable. Users have the option of restoring single OS-level files or the entire virtual machine (VMDK) using the same NetBackup restore process and (BAR) gui that customers are used to. Competitive solutions require two separate backup operations, twice the time spent backing up, twice the backup bandwidth, twice the backup impact on the ESX server and virtual machine and twice the storage space to provide this level of granular restore.

2. Business Value

The benefits of virtual environments are just now starting to be realized. Hoping to cash in on the many economic benefits of virtualization technologies, companies are anxious to reduce the IT financial and physical footprint associated with racks of computers. To this end, 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, NetBackup engineers have created 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.

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 de-duplication 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.

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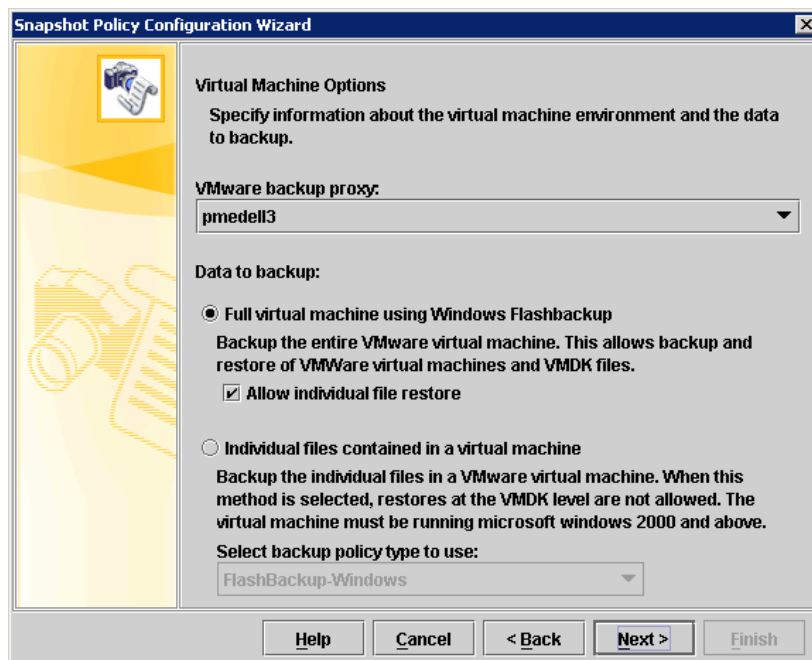
Other backup solutions either backup only at the vmdk (entire virtual machine) level or require two backup passes to be able to restore single OS file restores as well as vmdk restores. Recognizing the benefits of being able to perform either type of restore, customers prefer to have ultimate restore 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. ***From a competitive standpoint, this is a significant advantage. No other vendor offers this capability in VMware environments.***

2.1. Test Drive – Snapshot Client

- NetBackup 6.5 Snapshot Wizard for VMware

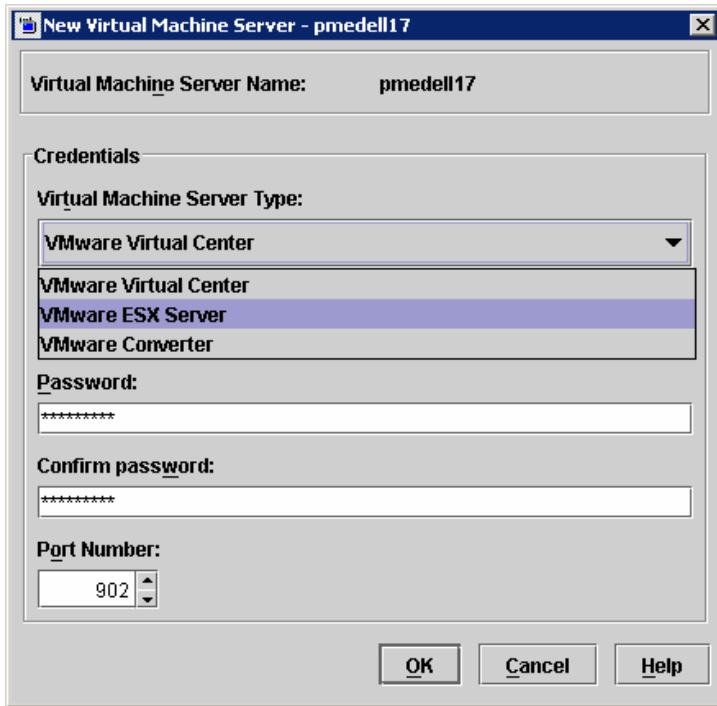
The configuration of an entire NetBackup VMware policy can be easily performed from the NetBackup Snapshot Policy Configuration Wizard. Besides basic policy configuration, the wizard is integrated with the VMware Virtual Center Server and can automatically discover virtual machines registered to any 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.



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- **VMware Virtual Center Integration**

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.

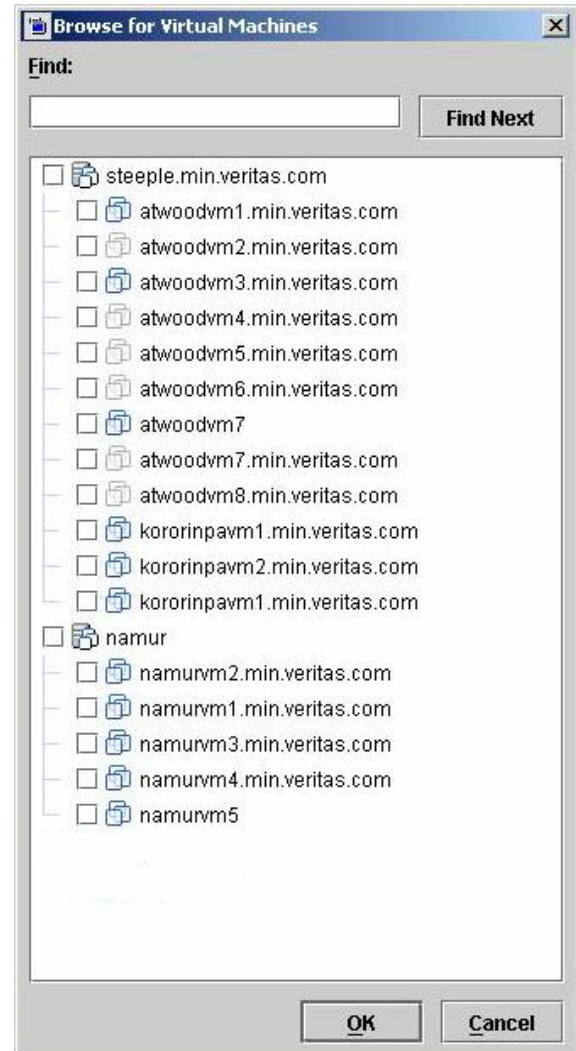


- **Virtual Machine Discovery**

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.



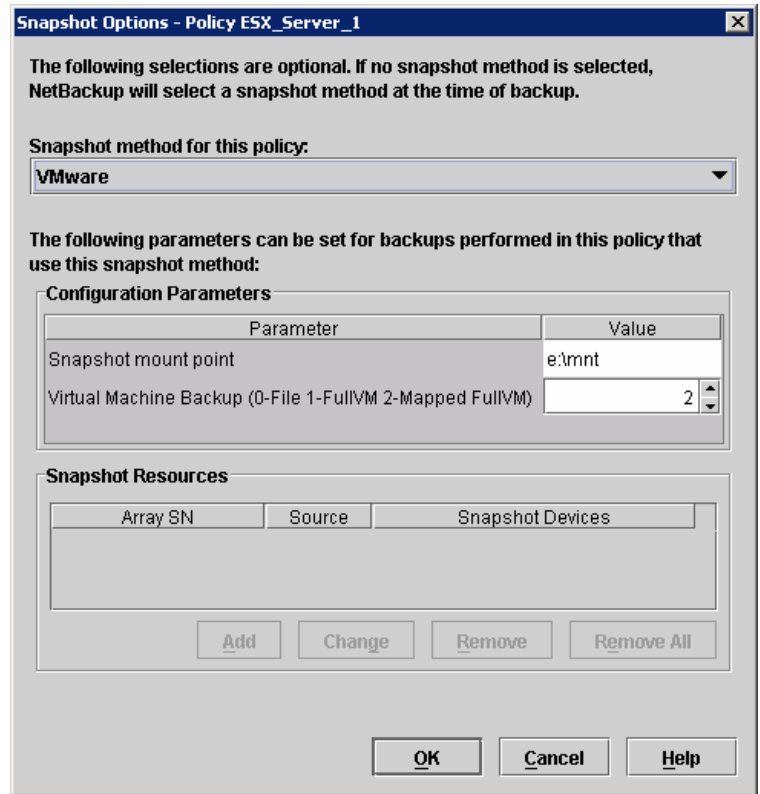
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- **VMware Policy Definition**

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:

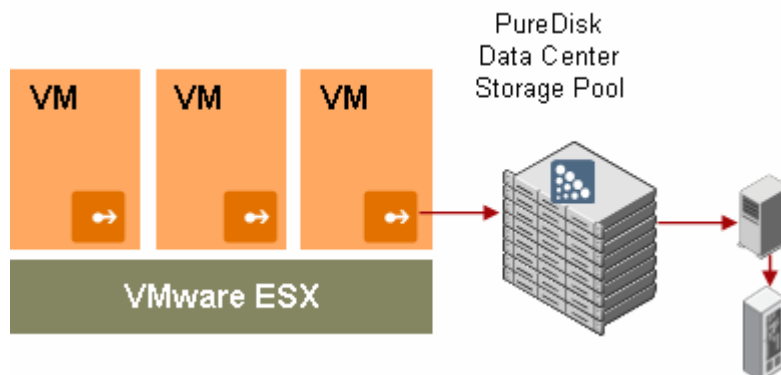
- File level backup and restore
- Vmdk (entire virtual machine) backup and restore
- Combination file-level and vmdk backup and restore



3. 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.

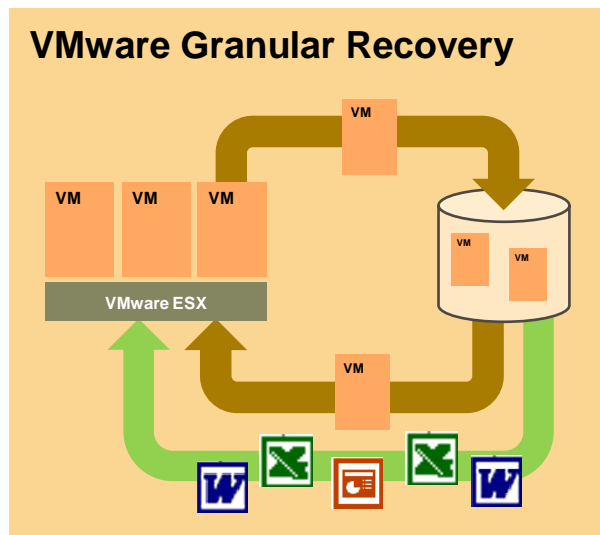


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Global, block-level de-duplication reduces duplicate data in the enterprise and NetBackup PureDisk allows all core NetBackup agents, VMware, and remote offices to all share common de-duplicated storage. Because of the dramatic de-duplication abilities 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.



So, whether you have high-end SAN based VMware environment, lower-scale deployments, or both, Symantec has unique solutions that can provide flexible VMware backup and restore options.

