NetBackup 7.6 Feature Briefing

Accelerator support for Virtual Machines

Version number: 1.0

Issue date: 2nd August 2013

This document describes a feature introduced in NetBackup7.6 and available in this and higher releases.

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Feature Description

NetBackup Accelerator was introduced in NetBackup 7.5 for file system backups and provided a dramatic reduction in the amount of time required for full backups to disk, such that it is similar to the amount of time required for an incremental backup. In NetBackup 7.6, this capability is extended to VMware virtual machines (VMs), including SharePoint, Exchange and MS SQL databases that are residing within a VM.

NetBackup Accelerator uses VMware's Changed Block Tracking (CBT) functionality to provide Accelerator with a list of blocks that have changed on the virtual disk since the last backup.

NetBackup Accelerator transfers only the changed blocks, along with the extent information that was previously backed up, enabling the synthesis engine on the media server to generate an optimized synthetic full backup. The resulting synthetic full backup image is identical to traditional VMware backups supporting all NetBackup image operations for duplication, verification, and imports.

Business Value

Customers are having difficulty completing their full backups within their backup window, which can lead to not being able to meet Recovery Time Objectives (RTO) or Recovery Point Objectives (RPO) or worse case, data loss.

The use of Accelerator for full backups provides the following benefits compared to a traditional full backup:

- Full backups are completed in a substantially reduced amount of time. The initial full backup time will be similar to a standard full VMware backup. Subsequent full backups will perform equivalent to a traditional VMware incremental backup.
- Reduced I/O within the VM
- Reduced CPU overhead within the VM
- Reduced network bandwidth required for transferring data
- Reduced storage capacity for the backup image
- VMware Instant Recovery (also new in NetBackup 7.6) can be used with both Accelerator full and incremental backups.

Accelerator provides a substantial reduction in time to complete a full backup, reducing the I/O and CPU overhead within the VM, the network bandwidth consumption required for the backup.

The Accelerator for VMware provides application support for SharePoint, SQL, and Exchange running within a VM. This capability provides efficient protection of applications with significantly improved backup performance. Granular Restore Technology (GRT) is fully supported for full backup schedules providing database administrators with finer control of restores.

Accelerator incremental backups can also be performed and will utilize the VMware CBT functionality. Only the changed data blocks are sent to create a synthetic full backup. Only the incremental changes will be added to the NetBackup catalog.

Underlying Principles

Virtual machines running on ESX/ESXi hosts can track disk sectors that have changed using a feature called Changed Block Tracking (CBT). Virtual disk block changes are tracked from outside virtual machines, in the virtualization layer. When Accelerator performs a backup, it requests transmission of only the blocks that changed since the last backup. The CBT feature is accessed by Accelerator as part of the vSphere APIs for Data Protection (VADP). Accelerator calls VADP to request that the VMkernel return blocks of data that have changed on a virtual disk since the last backup snapshot.

The primary mechanism for reducing the amount of time required for the full backup is that Accelerator requests CBT to send the disk blocks that have changed since the previous backup. This means there is no enumeration of the file system and only changed blocks are transferred to Accelerator. Therefore, Accelerator does not have to read all the files, which would occur with a traditional full backup.

Figure 1 shows the architecture used with Accelerator and VMware. Accelerator requests and obtains the changed blocks (for each virtual disk included in the backup) from the ESX host. Accelerator combines those changed blocks with the list of already backed up extents, which are obtained from a state file, stored on the master server. Accelerator then transfers this data and information to a Symantec dedupe engine and generates the optimized synthetic full backup.

The state file is updated by the media server and transferred to the master server after each virtual disk backup completes.

Accelerator generates only catalog data for the changes, however, when the media server generates the synthetic full backup, it transfers catalog information for a full backup to the master. Therefore, an Accelerator full backup consumes as much catalog space as a traditional full backup.
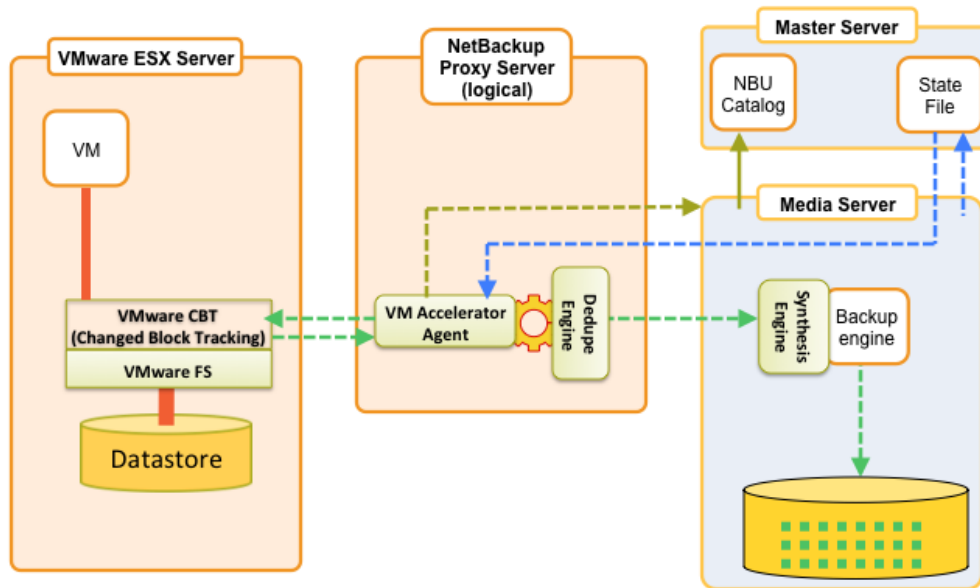
Figure 1 – Accelerator for VMware Architecture

Test Drive

When a VMware policy type is specified, Accelerator full backups are enabled by selecting the box titled "Use accelerator" in the Attributes tab. This is shown in Figure 2 below.
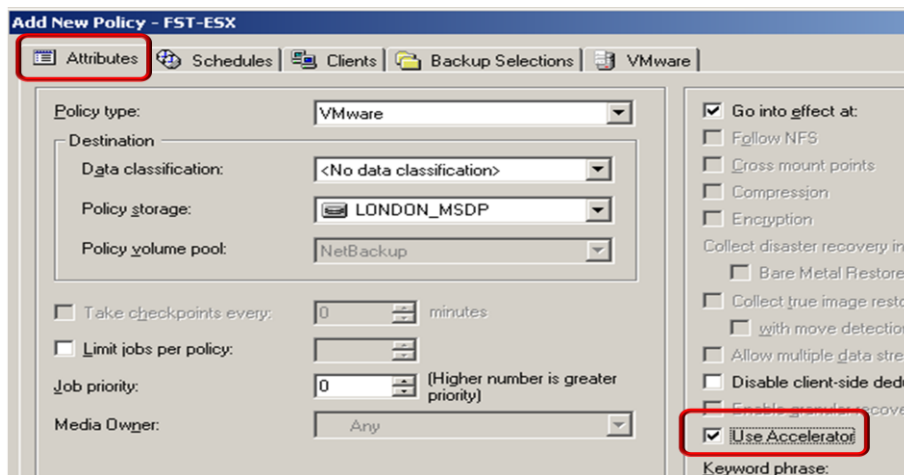
Figure 2 - Backup Policy Accelerator Attributes

If Accelerator is enabled for a VMware policy, the "Enable block-level incremental backup" Optimization in the VMware tab of the policy configuration is automatically enabled and is also greyed-out. If an Exchange, MS SQL Server or SharePoint instance is being protected within the VM, the Enable Exchange Recovery, Enable SQL Server Recovery or Enable Sharepoint Recovery box should also be selected within the VMware tab. These are shown in Figure 3.
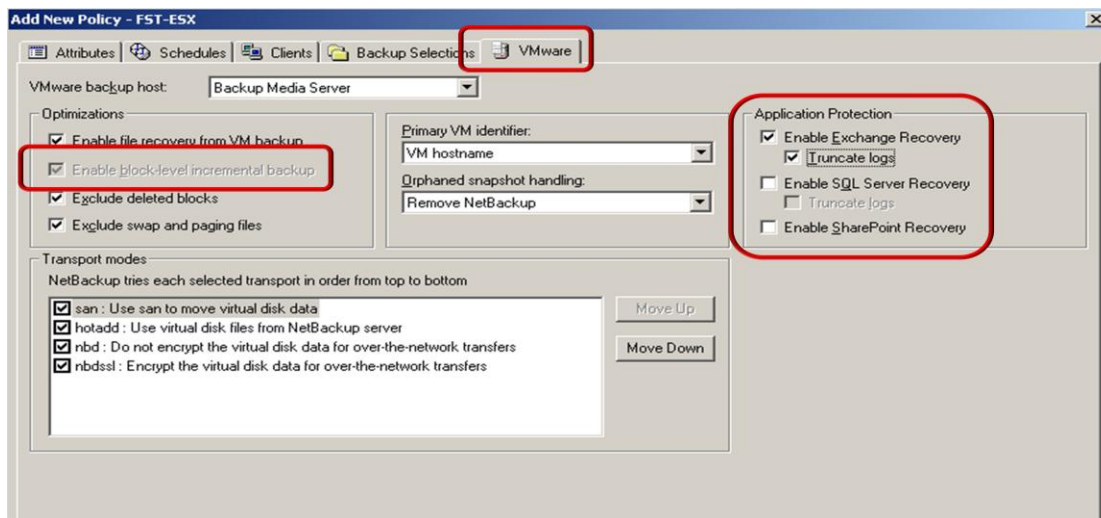

Figure 3 - Accelerator VMware Policy Configuration

Within the Schedules tab of the policy configuration, shown below in Figure 4, is an optional setting called Accelerator forced rescan. This is basically a safety net to make certain nothing has gone awry with VMware CBT. Accelerator relies on CBT to accurately provide a list of changed blocks and if something goes amiss, it's possible some blocks might not get backed up. We have not seen any issues with VMware CBT, but a customer may want to configure a policy to do a full backup with Accelerator forced rescan enabled every six months. This will result in an initial Accelerator full backup being performed and all data will be read and transferred.
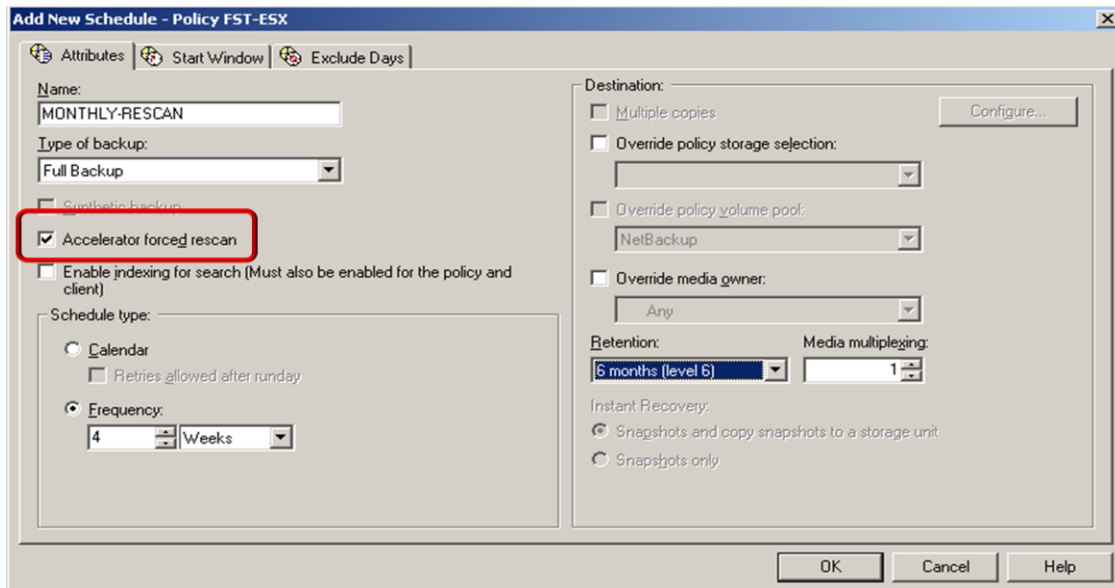
Figure 4 - Optional Accelerator Forced Rescan

Licensing and support considerations

The NetBackup Data Protection Optimization Option is required to enable Accelerator. A customer must also purchase a database license if they are using Accelerator to backup an Exchange, MS SQL Server or SharePoint instance within a VM.

The Accelerator for VMware is supported with Symantec Dedupe Storage Servers including PDDO, MSDP, and NetBackup Appliances.

Exchange, MS SQL Server and SharePoint instances must be in a VM (support for physical machines is planned for future release of NetBackup). Applications must be in VMDK volumes; RDM volumes are not supported.

Related documents

NetBackup Administrator's Guide volume I

NetBackup 7.5 Feature Briefing - Application Protection for VMware Virtual Machines

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