



VADP AND VMWARE BACKUP APPLIANCE (VBA) GAP ANALYSIS

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NEMO

Introduction to NEMO

NetWorker VMware Protection is a NetWorker-integrated VMware backup and monitoring solution introduced with NetWorker 8.1. This solution enables creation of backup and cloning policies for a VMware Backup appliance (VBA) using NMC and assigns those policies to VMs to perform backup and recover.

This solution becomes available when you deploy a VBA in the vSphere server and register the VBA with NetWorker and vCenter. After performing VM backups, you can then perform full recoveries of these backups from the vSphere Web Client, or file-level recoveries from the EMC Data Protection Restore Client interface.

Benefits of EMC Backup and Recovery (EBR)

- Fast and efficient data protection for all of your virtual machines, even those powered off or migrated between ESX hosts.
- Significantly reduces disk space consumed by backup data using patented variable-length deduplication across all backups.
- Reduces the cost of backing up virtual machines and minimizes the backup window using Change Block Tracking (CBT) and virtual machine snapshots.
- All backups apart from the first backups are incremental and all these incremental backups are virtual SF backups.
- Allows for easy backups without the need for third-party agents installed in each virtual machine.
- Uses a simple, straight-forward installation as an integrated component within EBR, which is managed by a web portal.
- Provides direct access to EBR configuration integrated into the vSphere Web Client.
- Protects backups with checkpoint and rollback mechanisms.
- Provides simplified recovery of Windows and Linux files with end-user initiated file-level recoveries from a web-based interface.

FLR limitations

The following limitations apply to file-level restore

- For best results, ensure that all virtual machines are running the latest available version of VMware Tools. Older versions are known to cause failures when browsing during the file-level restore operation.
- The following virtual disk configurations are not supported:
 - Unformatted disks
 - Dynamic disks
 - GUID Partition Table (GPT) disks
 - Ext4 file systems
 - FAT16 file systems
 - FAT32 file systems
 - Extended partitions (Types: 05h, 0Fh, 85h, C5h, D5h)
 - Two or more virtual disks mapped to single partition
 - Encrypted partitions
 - Compressed partitions
- ACLs are not restored.
- Symbolic links cannot be restored or browsed.
- No more than 5,000 folders or files can be restored in the same file-level restore operation.
- No more than 14,498 folders or files can be browsed in the same file-level restore operation.
- The following limitations apply to logical volumes managed by Logical Volume Manager (LVM):
 - One physical volume (.vmdk) must be mapped to only one logical volume
 - Only ext2 and ext3 formatting is supported
- When partitions are created, the lower ordered indices must be filled first. That is, you cannot create a single partition and place it in the partition index 2, 3, or 4. That single partition must be at partition index 1.

- When performing file-level restores of Windows 8 and Windows Server 2012 virtual machines, the following file systems are not supported:
 - Deduplicated NTFS
 - Resilient File System (ReFS)
 - EFI boot loader

VBA/EBR limitations and unsupported features

The NetWorker VMware Protection solution has the following limitations:

- Solution cannot detect if there is another VBA in vCenter, leading to possible redundancy in VM backups.
- Backups can only be performed to VBA internal storage or DDR.
- Backups to VBA internal storage cannot be cloned.
- Recovery of VM to different/multiple Virtual center(s) is not supported.
- No automatic migration tool to move from the previous VM backup solution to this solution.
- Supports only hotadd and nbd transport modes. The hotadd mode is the default transport mode.
- Only image-level backup is supported; individual folder or drive-level backup cannot be performed.
- Disaster recovery of data backed up to GSAN is not supported if the internal AFTD metadata is lost.
- For concurrent backups, a maximum of 26 VM sessions per VBA is supported. If there are more than 26 VMs, the remaining VMs will be queued for backup. For best performance, one VBA with 25 VM sessions per vCenter is recommended. Deploying more than one VBA per vCenter may result in exceeding the recommended maximum number and lead to performance issues and errors.

VADP-based backup and recovery

Introduction to VADP

NetWorker for VMware provides an alternate client backup technology for VMs in conjunction with vStorage APIs for Data Protection (VADP) technology from VMware. VADP helps to perform backups from a VADP backup proxy server, which can be a physical or virtual machine, using the VMware snapshot technique (A point in time copy of the virtual machine). VADP can be used with a vCenter Server.

Advantages of VADP backup

- VADP backups offload backup processes from the ESX server to a VADP proxy server.
- Eliminates the need for a backup window by using VMware virtual machine snapshot technology.
- Supports backups of all files residing in VMs running a Microsoft Windows guest operating system using save set ALLVMFS.
- Supports backups of specific files or folders for VMs running a Microsoft Windows guest operating system.
- Supports incremental and non level-0 backups for VMs running on a Microsoft Windows guest operating system.

*Note: The incremental and non level-0 backups allow recovery of files. Recovery of the full VM is only supported for level-0 *FULL* save set backups.*

- Supports image level backups for VMs running any guest operating system supported by VMware.
- Supports the ability to recover individual files from an image level backup (Windows NTFS only).
- Supports deduplication across VMs and servers.
- Minimizes backup impact on the target virtual machine and other VMs hosted on the same server.
- No need to install NetWorker software on each virtual machine.
- Provides LAN-free backup because the VADP proxy server can be connected to the SAN through a Fibre Channel adapter.

- Advanced VMware features and configurations, i.e. Distributed Resource Scheduling (DRS) and VMotion, do not impact NetWorker performance.

Limitations/Disadvantages

Disadvantages of VADP backup and recovery:

- File level recovery from Image level backup of non-NTFS system is not possible.
- Image recovery of an entire VM from an incremental CBT backup is not possible.

VADP vs Nemo

The table below compares the features for VADP and Nemo.

Feature	VADP	Nemo
Image-based backups with FLR for windows (NTFS)	Yes	Yes
Image-based backups with FLR for non-ntfs (Linux VMs)	No	Yes
CBT(incremental)	File level	Block level
Backup Targets	Tape/DDR/Disk	Disk(VBA's internal storage)/DDR
Cloning	Yes	Yes (only from DDR)
Incremental VM restore	No	Yes
vCenter-centric view	Yes (NMC topology map and Table view)	Yes (vCenter UI)
VM as a client	Yes (in NetWorker)	Yes (in VBA only - MC)
NW VM Protection Policies	No	Yes
VM containers – resource pools, ESX, Data Center, etc. (except templates)	Yes	Yes
vCenter auto discovery	Yes	No. (But can be done via policies)
Transport mode supported	Hotadd/SAN/NBD/NBDSSL	HOTADD (default), NBD (fallback)
Deduplication support	Yes (Data Domain and Avamar)	Internal storage and Data Domain

Maximum number of parallel backups per VC	100 concurrent operations supported per VC	100 concurrent operations supported per VC as per VMware limitation.
Maximum number VC that can be added in NW	No limitation for addition of Virtual center for VADP backup	No limitation for addition of Virtual center.
Maximum number of concurrent Sessions (backups/restore)	User can have up to 100 backups for VADP (hard limit set by VC)	Concurrent backups; maximum of 26 VM sessions per VBA is supported.
Configuration	Proxy and virtual machine as NetWorker client will be configured through NetWorker Client Configuration wizard	VBA registration through web interface.

NEMO and VADP performance comparison

Nemo and VADP performance numbers are shown below.

Nemo Performance numbers

Size of VM	Back-end target device	Backup/Recover type	Time taken for backup/recover in seconds	Throughput in MB/Sec
40	DDR	FULL	358	114
40	GSAN	FULL	576	71
40	DDR	Incremental (i.e. 5%)	133	308
40	GSAN	Incremental (i.e. 5%)	250	164
40	DDR	Recover	311	131
40	GSAN	Recover	540	76

VADP performance numbers

Size of VM	Back-end target device	Backup/Recover	Time taken for backup/recover in seconds	Throughput in MB/Sec
40GB	Data Domain	Backup using hotadd transport mode	310	132
40GB	Data Domain	Backup using NBD transport mode	2400	17
40GB	Data Domain	Recover using NBD transport mode.	586	69.92

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