

# Backup and Recovery Best Practices With CommVault Simpana Software



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## Intended Audience

This Tintri Best Practices Guide for Backup and Recovery will assist individuals who are responsible for the design, deployment, and DR of Tintri VMstore™ Systems. This document will encompass vStorage APIs for Data Protection (VADP) for backups and the use of Tintri's SnapVM™, CloneVM™ and ReplicateVM™ features to complement data protection of virtual machines and critical applications hosted on Tintri's VMstores with CommVault Simpana.

## Introduction

Deploying storage into your virtual environment should be a straightforward process. What if you didn't have to do LUN masking on a storage array? What if you didn't have to worry about raid levels or queue depth settings ever again? What if you could just connect a datastore to an ESXi host, discover the datastore and start deploying your virtual machines? Tintri VMstore™ is designed so that IT administrators with a working knowledge of vSphere can successfully deploy Tintri's purpose-built VM storage with ease.

Tintri VMstore delivers extreme performance and VM density, and a wide variety of powerful features, which are seamlessly integrated with vSphere. Examples include snapshots, clones, instant bottleneck visualization, and automatic virtual disk alignment. Tintri VMstore extends and simplifies the management of virtual machines (VMs) through an intrinsic VM-awareness that reaches from the top of the computing stack, all the way down into the flash (SSD) and disk (HDD) drives.

This best practice guide highlights the following when using CommVault Simpana to protect VMs on a Tintri VMstore:

- Architectural overview of a VMware environment with Tintri VMstore and CommVault Simpana Servers.
- The simplicity of protecting VMs using VMware VADP with CommVault Simpana Software.
- The simplicity of protecting Microsoft application servers such as Microsoft Exchange 2013 DAG and Microsoft SQL 2012 servers with CommVault Simpana Software.
- The use of Tintri VMstore data protection features as a complement to CommVault Simpana Software.

**NOTE:** In this document, Simpana will be used as reference to CommVault Simpana Software.

## Consolidated list of practices

The table below includes the recommended practices in this document. Click the text in the *Recommendation* column or see the section later in the document that corresponds to each recommendation for additional information.

Tags	Recommendation
Environment	"DO: Use the FQDN of the vCenter Host Name when configuring the vCenter Client."
Environment	"DO: Use the OVA template that is supplied by Simpana software to create a Linux Media Agent for file recovery."
Environment	"DO: Deploy Simpana MediaAgent hosted on Tintri VMstores with thin provision VMDKs. In addition to the O/S VMDK, thin provision VMDKs should include the local disk library storage for backup."
Environment	"DO: Deploy Simpana MediaAgent local deduplication databases with thin provision VMDKs if a Simpana MediaAgent, as a VMware proxy server, is installed on a Tintri VMstore."
Environment	"DO: Make use of Simpana Aux Copy to create additional copies for data protection purposes."
Configuring Backup	"DO: Determine the best feature to use for discovering VMs to be backed up on a subclient basis base on your data center requirements and resources. CommVault Simpana software is flexible and provides options so that the best solution can be configured base on your data protection requirements."

Tags	Recommendation
Configuring Backup	"DO: Use Tintri VMstore UI (Dashboard and Virtual Machines tab) to monitor latency and resource usage on a Tintri VMstore. This provides an advantage that a VM administrator can monitor resources and issues on a per VM basis or on a per virtual disk basis to determine where bottlenecks can occur."
Configuring Backup	"DO: Deploy more than one proxy server per data center."
Restore	"DO: Use CommVault Simpana's virtual appliance template if Live Recovery for virtual machines is required."
Restore	"DO: Ensure that the network connection between the ESXi server, the proxy server, and the Simpana MediaAgent is 10GigE so that NBD transport can utilize a larger network pipe for backup I/O and restore I/O."
Restore	"DO: Ensure that the proxy server has more than one SCSI controller if HotAdd transport mode is required for every restore operation. Follow CommVault's recommended system requirements for deploying proxy servers and MediaAgents."
Restore	"DO NOT: Oversubscribe the number of VM disks that can be attached using HotAdd to a proxy server. Backup operations with 'Transport mode for VMware: Auto' will select other available transport for backup of multiple VMDKs. Restore operations will select other available transport mode for restore operations if a proxy server is oversubscribed for HotAdd transport."
Restore	"DO: Remove the database from the SQL Availability Group before attempting a SQL database restore."
CommVault Simpana Aux Copy	"DO: Use DASH Copy with source side cache enabled for more efficiency."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO: Execute Recover Deduplication Database on the storage policies and data verification on the backup jobs of the MediaAgent that is restored using Tintri's CloneVM feature before executing new backup jobs on the MediaAgent."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO: Protect a CommServe using CommVault's recommended data protection solutions."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO: Protect a deduplication database using CommVault's recommended data protection solutions."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO: Use CommVault Simpana Aux Copy to create multiple backup copies on other MediaAgents for data protection."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO: Use CommVault Simpana replication to replicate recovery points for additional data protection."
Tintri VMstore SnapVM, CloneVM, and ReplicateVM	"DO NOT: Replicate a virtual machine MediaAgent offsite without the CommServe being available for recovery."

# Backup

## Environment

In this document, the referenced VMware vCenter architecture manages 3 ESXi hosts that have been configured with standard networks and distributed port groups. Simpiana servers and application servers, referenced in this document, are deployed as the following:

Server	Operating System
CommVault CommServe/CommCell console	Windows 2012 R2
CommVault Windows MediaAgent/ Proxy Server A (VM)	Windows 2012 R2
CommVault Linux MediaAgent – physical server	RHEL 6
Proxy Server B (VM)	Windows 2012 R2
Microsoft Exchange 2013 Server A	Windows 2012 R2
Microsoft Exchange 2013 Server B	Windows 2012 R2
Microsoft SQL 2012 Server A	Windows 2012 R2
Microsoft SQL 2012 Server B	Windows 2012 R2

The Microsoft Exchange 2013 DAG servers and the Microsoft SQL 2012 Always on Availability Group servers, in this reference architecture, are example of Tintri VMstore supported applications. Tintri VMstores also supports other Microsoft applications that CommVault Simpiana supports as virtual machines. The recommendations provided in this document apply to any other applications supported by CommVault Simpiana Software that are deployed as virtual machines on Tintri VMstores.

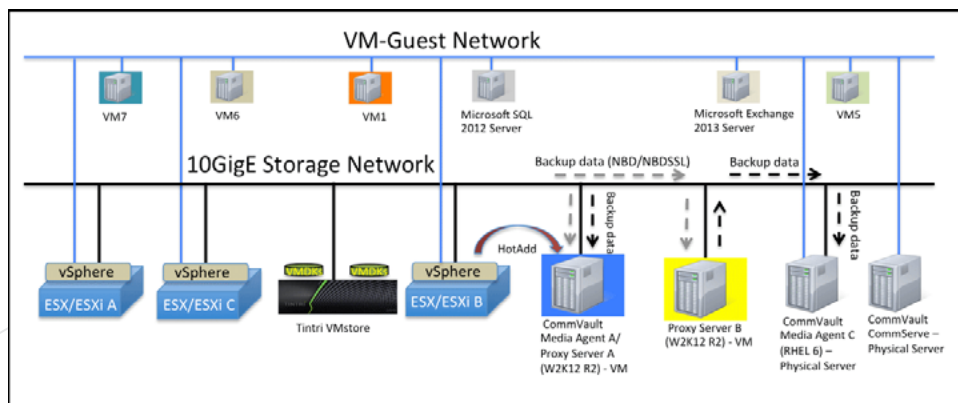
CommVault Simpiana Software version 10 was used in this reference architecture. Earlier versions of Simpiana Software is also supported by Tintri VMstores as long as the Simpiana Software version is licensed, supported by CommVault, and has not been end of support or end of life by CommVault.

*VirtualServer Agent* is required for Simpiana to utilize VADP. In this example, Simpiana VirtualServer Agent is installed on virtual machines:

- Proxy server A
- Proxy server B

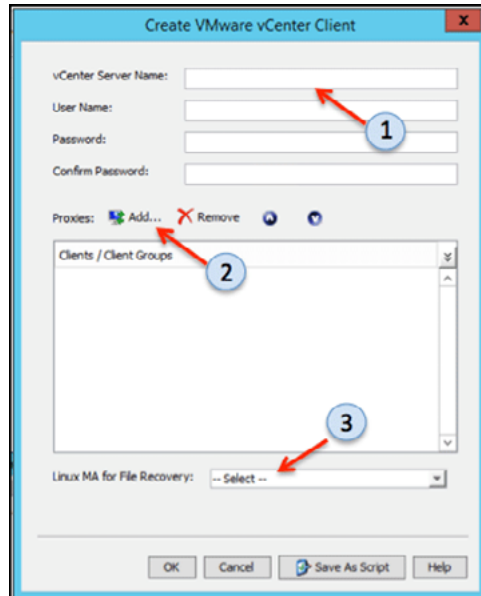
Proxy server A is also a CommVault MediaAgent. This allows for efficient use of HotAdd transport mode to backup to and restore from MediaAgent A. CommVault MediaAgent C is a physical RHEL server. A physical MediaAgent allows auxiliary copies to be created on virtual tape library or physical tape library for extended retention. It is recommended to create copies of backups for disaster recovery purposes.

**NOTE:** HotAdd transport mode can also be utilized with proxy server B as long as the proxy server is in the same data center and has access to the Tintri VMstore that the ESX/ESXi server has access to.



Configure the vCenter host from the CommCell console by providing the FQDN of the vCenter Server Name. Use the *Create VMware vCenter Client* window to add any new proxy servers that have been installed with the Simpana *VirtualServer Agent*.

**DO:** Use the FQDN of the vCenter Host Name when configuring the vCenter Client.



The Linux MA for File Recovery is also used for live recovery of a VM from a backup without having to wait for a full restore of a VM. Use the OVA template that is supplied by Simpana to create a VM that contains the Linux MediaAgent for file recovery.

**DO:** Use the OVA template that is supplied by Simpana software to create a Linux Media Agent for file recovery.

**DO:** Deploy Simpana MediaAgent hosted on Tintri VMstores with thin provision VMDKs. In addition to the O/S VMDK, thin provision VMDKs should include the local disk library storage for backup.

**DO:** Deploy Simpana MediaAgent local deduplication databases with thin provision VMDKs if a Simpana MediaAgent, as a VMware proxy server, is installed on a Tintri VMstore.

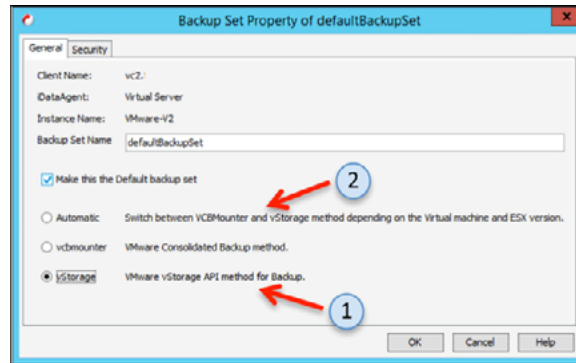
In the client computer properties of the vCenter, ensure the following are checked:

- Enable Backup
- Enable Restore
- Enable Data Aging

By enabling data aging, old backup data that is past the required retention period can be removed and the associated media can be used for future backup. For backups that require longer retention period, it is recommended to use Simpana's Aux Copy feature to create additional copies for data protection purposes.

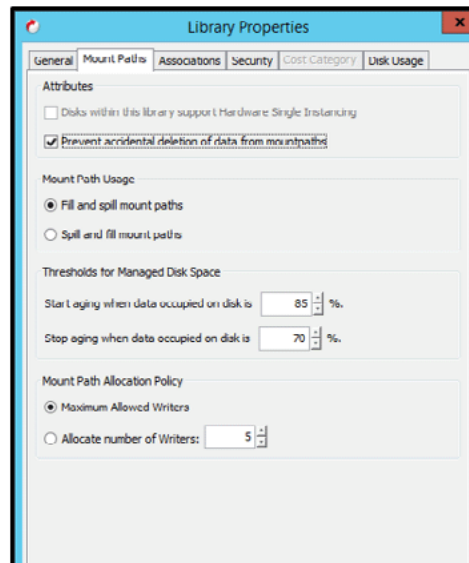
**DO:** Make use of Simpana Aux Copy to create additional copies for data protection purposes.

In the backup set, if *VMware vStorage API method for Backup* is selected, VADP will be used for backing up VMs in vSphere 4.0 environments or later for all subclients within the same backup set. By selecting *Automatic* in the backup set property, CommVault Simpana will determine the best mode (VCB/VADP) to use depending on the ESX version.



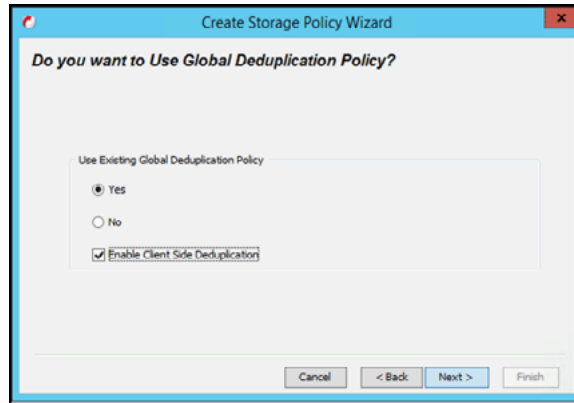
### Configuring Storage

When creating a disk library, use the Mount Path Allocation Policy to set the number of writers. This determines the maximum number of concurrent operations to the disk library. Set this to *Maximum Allowed Writers* for the disk library.

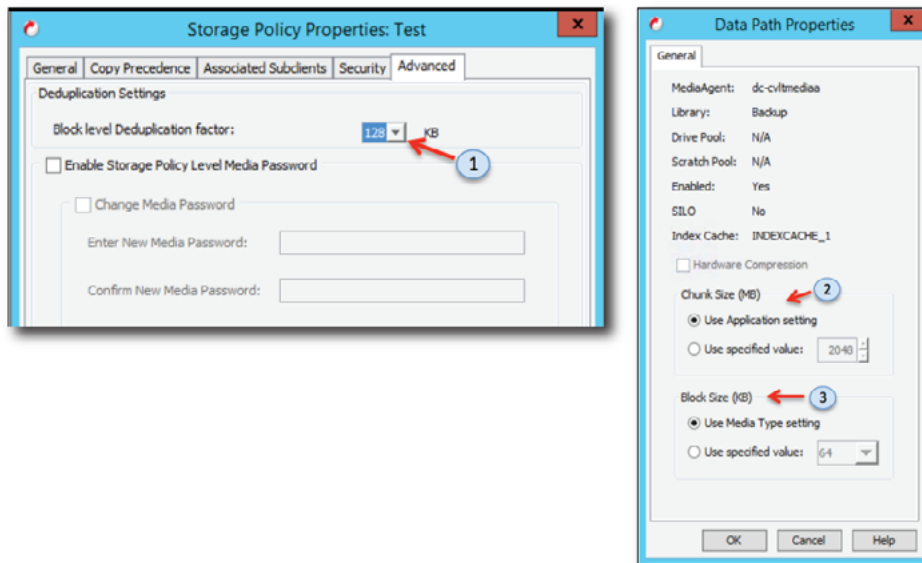


Use the *New Storage Policy* wizard to create storage policies for your backups. CommVault Simpana supports global deduplication. If this option is selected, a global common deduplication database is shared by multiple storage policies.

This option allows multiple copies to be deduplicated against each other and improves deduplication across copies. You must create a global deduplication policy before the *Use Existing Global Deduplication Policy* can be selected.



In the storage policy properties pop-up window, the block level deduplication factor is 128KB and this is CommVault's recommended block level deduplication factor for all agent types (CommVault Simpana 10 or later) with CommVault Simpana deduplication storage. Refer to [CommVault's documentation](#) for deduplication factor recommendations of earlier Simpana versions. In the data path properties of the disk library, disk libraries have a default chunk size of 2GB and a default block size of 64K. These parameters can be tuned for performance at the storage policy level.

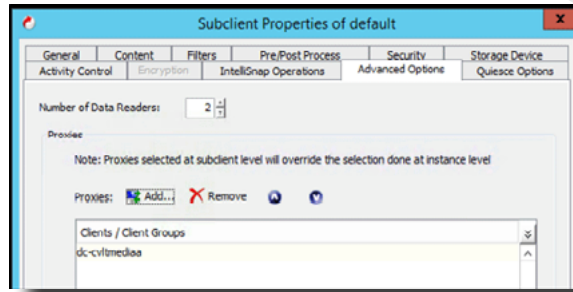


## Configuring Backup

In the subclient properties of the backup set, the *Number of Data Readers* determines the parallelism of the backup for the particular subclient. By default, the value is 2. This means that 2 backup data streams are used for this subclient.

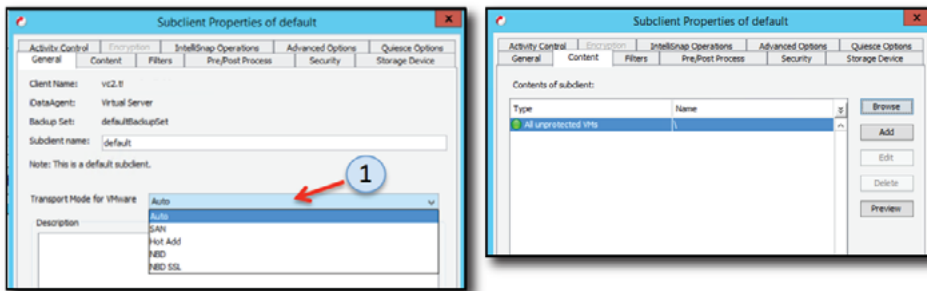


Use this parameter for tuning multiple streams for backup performance.



Additionally, for resource tuning to improve performance of data transfers from the subclient properties, select the *Storage Device* tab and select the *Data Transfer Option* sub tab. The *Network Agents* and the *Throttle Network Bandwidth* can be used to set the number of network agents for data transfer and throttling of the network traffic from the subclient.

For *VirtualServer Agent* backups, the VADP transport mode options is also available, auto will enable CommVault Simpana to determine the best transport mode to use for backup of VMs that are configured in the subclient policy.



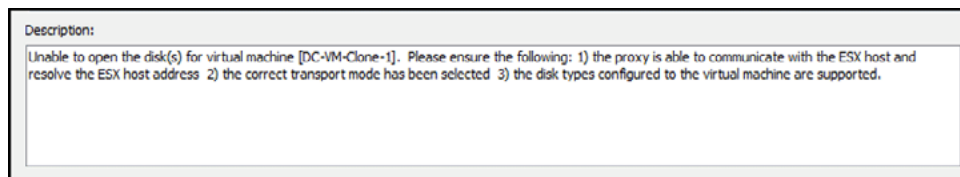
When configuring the content for backups, use the *Browse* option to add target VMs by *Hosts and Clusters*, *VMs and Templates* or by *Datstores and Datastore Clusters*. Use the *Add* option to add target VMs by using rules.

**NOTE:** If contents are defined in the subclient, auto detection is disabled for automatically discovering and adding new VM to be backed up.

**DO:** Determine the best feature to use for discovering VMs to be backed up on a subclient basis base on your data center requirements and resources. CommVault Simpana software is flexible and provides options so that the best solution can be configured base on your data protection requirements.

### Backup

When attempting a backup using the *VirtualServer Agent*, in addition to the job log, make use of the CommVault Simpana *Event Details* for troubleshooting. For example, the following shows a backup attempt that failed with "Unable to open the disks...". The description of the error is always useful and provides additional checks that can be followed to complete a successful backup operation.



During a CommVault Simpana backup or any other operation of virtual machines hosted on Tintri VMstores, it is recommended to use the Tintri *Dashboard* and *Virtual Machines* view to troubleshoot latencies or low

flash hit issues. If a virtual machine experiences low I/O performance, the *Virtual Machines* view allows the data center administrator to drill down to the virtual machine level or the virtual disk level to determine the source of the I/O latency. For example, the following shows a temporary affect on the Simpana MediaAgent latency during a CommVault verify data operation. As cold data is pulled in from HDD storage for read or verify operations, there is a temporary affect on latency for the data protection operation.

VM	IOPS	MBps	Reserves %	Latency ms	Flash hit %	Provisioned Gi	Used Gi
DC-CVLTMediaA	85	17.6	1.4	6.6	100	2,218	
MCSLoginVSI-002	0	0.0	0.1	0.1	100	42	
MCSLoginVSI-017	0	0.0	0.1	0.1	100	42	

host 0.0 | network 0.5 | storage 6.1 | disk 0.0

**DO:** Use Tintri VMstore UI (Dashboard and Virtual Machines tab) to monitor latency and resource usage on a Tintri VMstore. This provides an advantage that a VM administrator can monitor resources and issues on a per VM basis or on a per virtual disk basis to determine where bottlenecks can occur.

**DO:** Deploy more than one proxy server per data center.

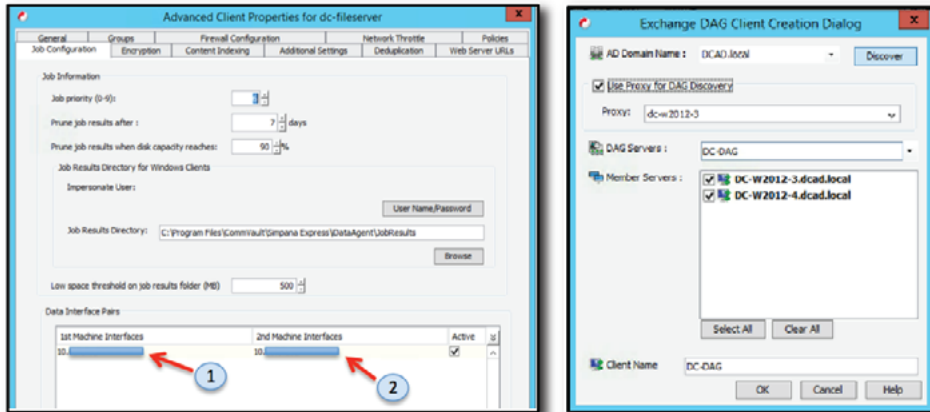
In the *Simpana Backup Job Details* window, the administrator can verify the VADP transport mode and the use of changed block tracking (CBT) on the backup jobs.

VM Name	Host	Status	Failure Reason	Proxy	Backup Size	Backup Start Time	Backup End Time	VM Size	VMware Tools	Guest Size	Powered Off by current job	Operating System	Transport Mode	CBT Status	Hardware Ver.
DC-VM Clone 1		In-Progress		dc-cvltmedia	0 Bytes	2014/06/12 13:43:41		79 GB	Current	0 Bytes	No	Microsoft Windows Server 2012 (64-bit)	hostdd	Used	vmw-08

CommVault Simpana supports VMware VADP backup of application servers such as Microsoft Exchange 2013 servers, Microsoft SQL 2012 servers, etc. Application aware backup for item based recovery with truncate database logs with VMware VADP requires IntelliSnap.

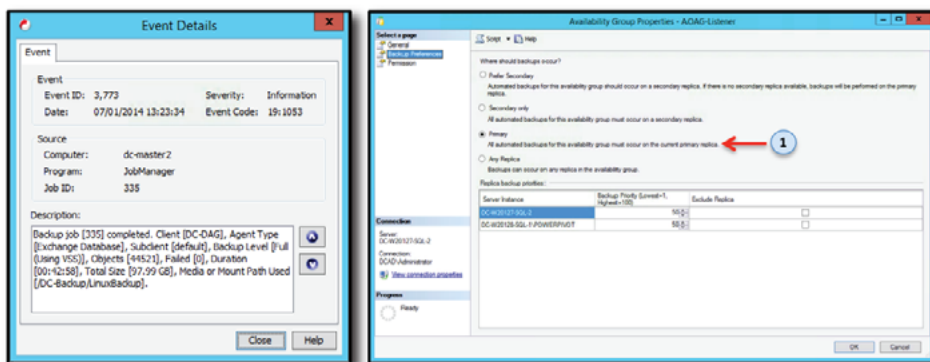
CommVault Simpana also supports application server backups using Simpana installed agents. This is also a feasible alternative in protecting application servers such as Microsoft SQL servers using a traditional method that most data center administrators are already familiar with. Using application and database agent approach allows for application log truncation for supported applications and databases for backups.

This requires installing the correct application agent on the virtual machine. In this case, the backup of a virtual machine is treated as a physical server. Therefore, ensure that the network connection between the CommVault MediaAgent and the client has the network bandwidth for serving I/O and for backup. In the Advanced Client Properties, it is also possible to define data interface pairs between the client and the MediaAgent for backup I/O. In addition to segregating backup I/O from data I/O that the application server is serving, using data interface pairs can help isolate and troubleshoot backup performance issue that could be network related.



CommVault Simpana support Microsoft Exchange DAG server backup. When configuring the Exchange DAG client, use a proxy for DAG discovery. You can specify automatic server selection in the subclient properties and allow CommVault Simpana to run backups from the next available passive server for performance purposes. Select the *Use last activation preference to select passive copy* to avoid backup jobs from running on an active Exchange server as that may slow down other database processes.

From the CommCell console, monitor the Microsoft Exchange DAG backup to completion from the Job Controller tab. Application servers that have the Simpana application agent installed allows for CommVault Simpana to perform log truncation, if selected, on the application servers.



In addition to Microsoft Exchange DAG server support, CommVault Simpana also supports backup of Microsoft SQL 2012 AlwaysOn Availability Groups.

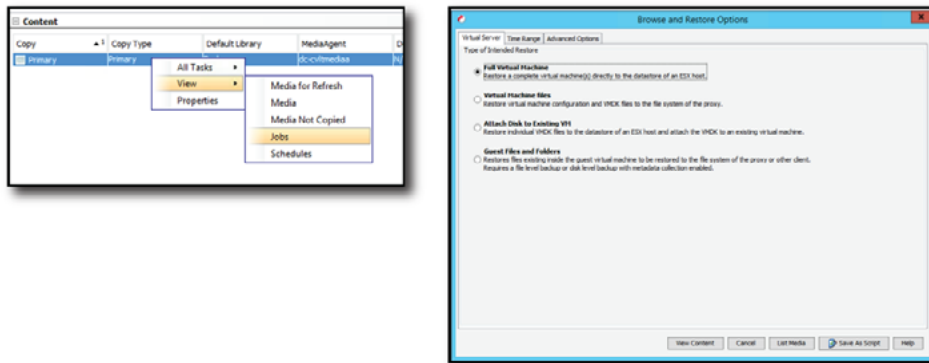
In the SQL Management Studio's Availability Group Properties, specify primary as the location where backups should occur. This allows incremental backup options to be available for use with CommVault Simpana.

**NOTE:** Tintri VMstores support HotAdd, NBD and NBDSSL transport modes. However, with HotAdd transport mode, be aware that some application servers may be paused for a long time during the snapshot removal phase in a backup process. For these application servers that may not be able handle long pause periods, it is recommended to change the transport mode for these application servers to use NBD for backups. With CBT enabled, after the initial full, backups of virtual machines with NBD transport mode will only transfer change blocks and it is efficient. Review [VMware's KB](#) for additional details on snapshot removal. Symptoms of application servers experiencing long pauses during snapshot removal

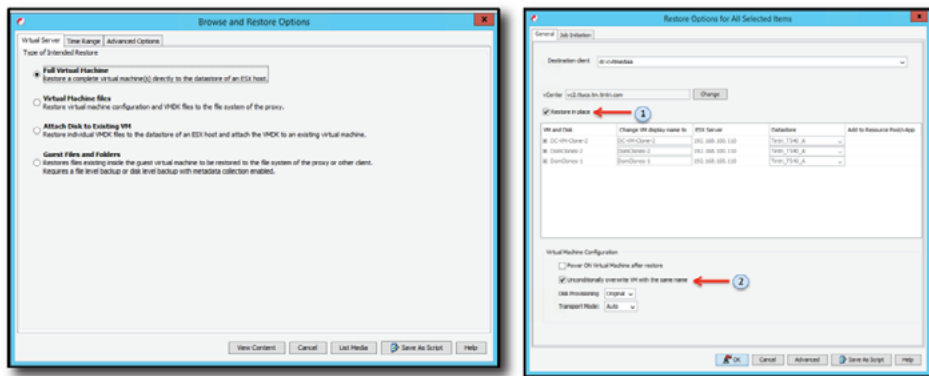
includes the end user losing connectivity to the remote desktop or the end user losing connection to the application on the virtual machine.

## Restore

CommVault Simpana provides many options for restore operations. A restore operation can be attempted at the client level by performing a *Browse and Restore* from the subclient level or by selecting View Jobs at the storage policy level.

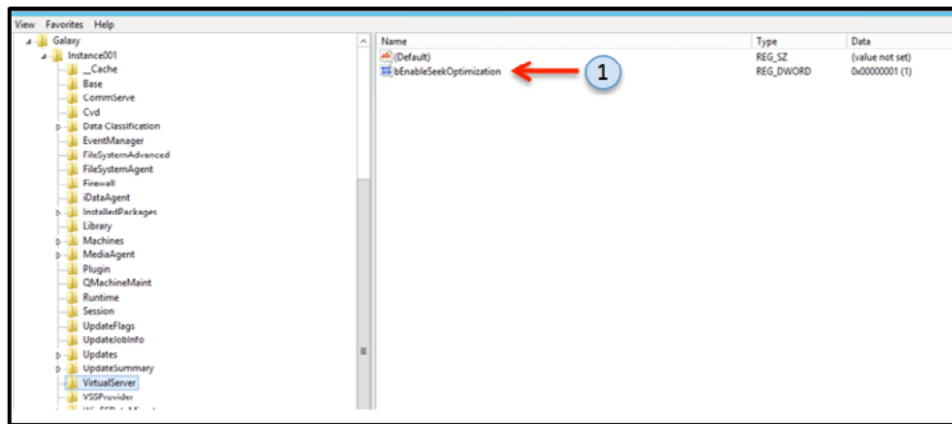


With VirtualServer Agent restore, there are many options that are available to the data center administrator as well. One of the options is to restore a VM as a full virtual machine.



With a full virtual machine selection, the data center administrator has the option to restore in place or restore to a different location. If the restore in place is unchecked, the full VM can be restored to any ESX server, datastore and/or resource pool.

An additional feature that is also supported by CommVault Simpana is VM restore with Changed Block Tracking (CBT). This feature efficiently restores only changed blocks to the original virtual machine. To utilize CBT for restore, set *bEnableSeekOptimization* using the registry editor on the proxy server.

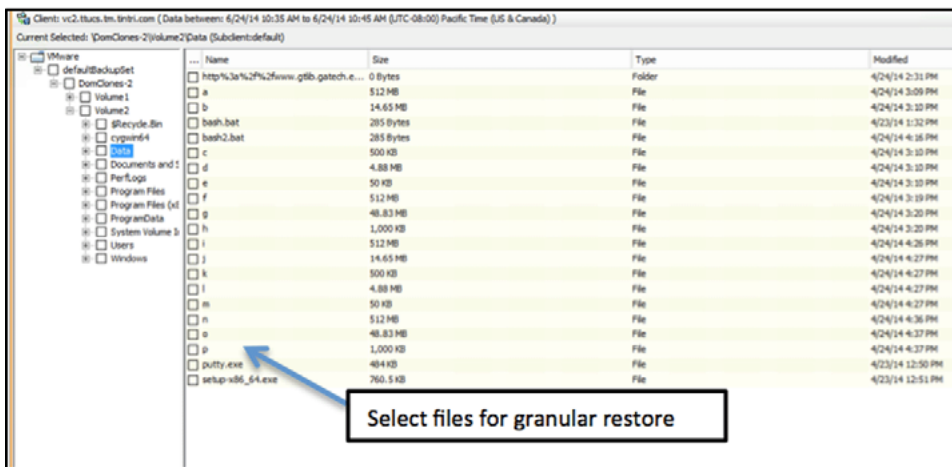


**NOTE:** VM restore with CBT is available on the first restore of a virtual machine to the original VM location. To utilize restore with CBT after the initial restore operation, a new backup of the VM must be executed.

```

4176 f08 06/30 17:00:49 309 CVMWareInfo::GenerateUniqueDiskNameForRestore() - Disk [DCv2012_4CLNG.vmdk] will be created as [[Tintri_T540_A] DomClones-2_1/DCv2012_4CLNG.vmdk]
4176 f08 06/30 17:00:49 309 CVMWareInfo::_InitRestore_2(1) Mode() - Powering off VM [DomClones-2] to perform CBT restores
4176 1 06/30 17:00:52 309 ### PowerOffVM --- Power Off VM Successful
  
```

CommVault Simpana also provides granular recovery from a backup that takes advantage of VADP. This provides a data center administrator options to perform restore of files or folders rather than restoring an entire virtual machine.



In addition, CommVault Simpana backup with VMware VADP provides a data center administrator the option to restore files or folders directly from a backup. The use of a Linux MA for file recovery is required but it provides a data center administrator the option to perform an instant recovery of a VM and allow the VM to be powered on from a backup without first, having to restore the entire VM. This is an efficient option that CommVault Simpana also provides to a data center administrator.

**DO:** Use CommVault Simpana's virtual appliance template if Live Recovery for virtual machines is required.

If a restore operation is attempted from a MediaAgent that is also a VM on a Tintri VMstore, the latency and flash hit ratio will be temporarily affected as cold data could be pulled from HDD storage for read operations. This also includes data verification operations.

When performing restore operations of multiple virtual machines, ensure that the proxy server has the resources to perform restore. For example, a proxy server with a single SCSI controller allows up to 15 devices for HotAdd transport. If the restore operation requirement is to utilize HotAdd only, ensure that the proxy server has more than one SCSI controller for disk attachment.

```

4868 4a8 07/08 12:39:06 438 CVMWareInfo:Connect() - limiting transport mode selection as thin disks are present
4868 4a8 07/08 12:39:06 438 CVMWareInfo:Connect() - Selecting default transport mode: hotadd:robd
4868 1 07/08 12:39:06 438 ## GetDSInfoForOS --- HostName:192.168.1.100 HostRef:host-146
4868 4a8 07/08 12:39:09 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [[HQM-650] DC-Exchange2/DC-Exchange2.vmdk] as [[DC-Exchange2.vmdk]
4868 4a8 07/08 12:39:09 438 CVMWareInfo:OpenHostDiskHandle() - Opening disk [DC-Exchange2.vmdk] on VM [DC-Exchange2] path [[HQM-650] DC-Exchange2/DC-Exchange2.vmdk] flags [ ]
4868 4a8 07/08 12:39:41 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.vmdk] using Transport mode: [hotadd]
4868 1 07/08 12:39:41 438 ## GetDSInfoForOS --- HostName:192.168.1.100 HostRef:host-146
4868 4a8 07/08 12:39:46 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [[HQM-650] DC-Exchange2/DC-Exchange2.1.vmdk] as [[DC-Exchange2.1.vmdk]
4868 4a8 07/08 12:40:11 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.1.vmdk] using Transport mode: [hotadd]
4868 1 07/08 12:40:11 438 ## GetDSInfoForOS --- HostName:192.168.1.100 HostRef:host-146
4868 4a8 07/08 12:40:15 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [[HQM-650] DC-Exchange2/DC-Exchange2.2.vmdk] as [[DC-Exchange2.2.vmdk]
4868 4a8 07/08 12:40:15 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.2.vmdk] using Transport mode: [hotadd]
4868 4a8 07/08 12:40:29 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [DC-Exchange2.2.vmdk] on VM [DC-Exchange2] path [[HQM-650] DC-Exchange2/DC-Exchange2.2.vmdk] flags [ ]
4868 4a8 07/08 12:40:32 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.2.vmdk] using Transport mode: [nbd]
4868 1 07/08 12:40:30 438 ## GetDSInfoForOS --- HostName:192.168.1.100 HostRef:host-146
4868 4a8 07/08 12:40:32 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [[HQM-650] DC-Exchange2/DC-Exchange2.3.vmdk] as [[DC-Exchange2.3.vmdk]
4868 4a8 07/08 12:40:46 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.3.vmdk] using Transport mode: [nbd]
4868 1 07/08 12:40:46 438 ## GetDSInfoForOS --- HostName:192.168.1.100 HostRef:host-146
4868 4a8 07/08 12:40:48 438 CVMWareInfo:OpenDisksForRestore() - Opening disk [[HQM-650] DC-Exchange2/DC-Exchange2.4.vmdk] as [[DC-Exchange2.4.vmdk]
4868 4a8 07/08 12:40:48 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.4.vmdk] using Transport mode: [nbd]
4868 4a8 07/08 12:41:05 438 CVMWareInfo:OpenHostDiskHandle() - Opened to [DC-Exchange2] [DC-Exchange2.4.vmdk] using Transport mode: [nbd]
4868 4a8 07/08 12:41:05 438 vxfRestore:InitVM() - InitRestoreVM [DC-Exchange2] completed successfully

```

**DO:** Ensure that the network connection between the ESXi server, the proxy server, and the Simpana MediaAgent is 10GigE so that NBD transport can utilize a larger network pipe for backup I/O and restore I/O.

**DO:** Ensure that the proxy server has more than one SCSI controller if HotAdd transport mode is required for every restore operation. Follow CommVault’s recommended system requirements for deploying proxy servers and MediaAgents.

**DO NOT:** Oversubscribe the number of VM disks that can be attached using HotAdd to a proxy server. Backup operations with ‘Transport mode for VMware: Auto’ will select other available transport for backup of multiple VMDKs. Restore operations will select other available transport mode for restore operations if a proxy server is oversubscribed for HotAdd transport.

The following combination will result in very slow restore operations:

- Proxy server is oversubscribed for HotAdd.
- The network connection between the ESXi server, the proxy server and the Simpana MediaAgent is not 10GigE for NBD transport mode.

When performing restore operations on Microsoft Exchange server applications, it is good practice to restore to a recovery database (RDB) to minimize the risk of corrupting a production database. For example, with a Microsoft Exchange 2013 server, the data center administrator can restore the Microsoft Exchange database to a RDB and restore individual mailboxes without interrupting user access to the current data.

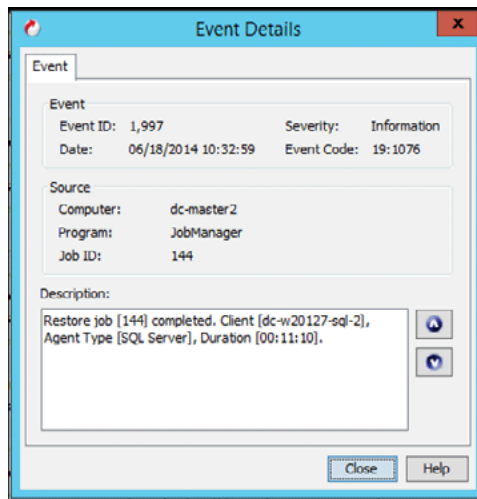
```

[PS] C:\Windows\system32>mount-database dc-rdb
[PS] C:\Windows\system32>New-MailboxRestoreRequest -sourcetable dc-rdb -sourcestoremailbox "DC-W2012-3 7353BCCD-1G008
8686" -targetmailbox "Yusuke" -AllowLegacyDNMismatch
Name TargetMailbox Status
MailboxRestore dcad.local/Users/Yusuke T Queued
[PS] C:\Windows\system32>_

```

With Microsoft SQL AlwaysOn Availability Groups, it is recommended to remove the database from the Availability Group before a database restore operation.

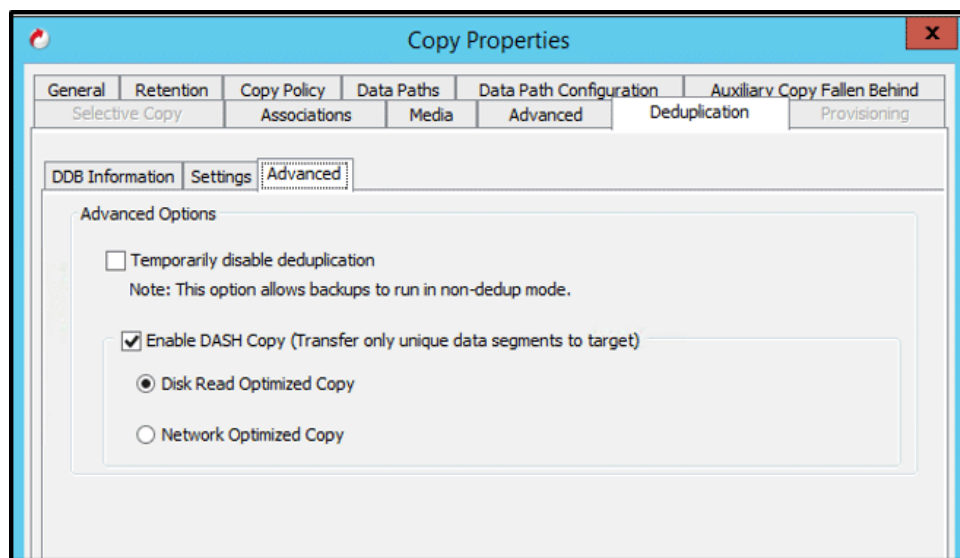
When the database is restored, the database can be added back into the Availability Group.



**DO:** Remove the database from the SQL Availability Group before attempting a SQL database restore.

## CommVault Simpana Aux Copy

With CommVault Simpana, use Aux Copy to make backup copies for local and off-site extended retention. It is recommended to enable DASH Copy in the Copy Properties. This ensures that only unique blocks are used for the copy process. CommVault Simpana does not recommend using DASH copy with WAN accelerator appliances as DASH copy is already efficient.



**DO:** Use DASH Copy with source side cache enabled for more efficiency.

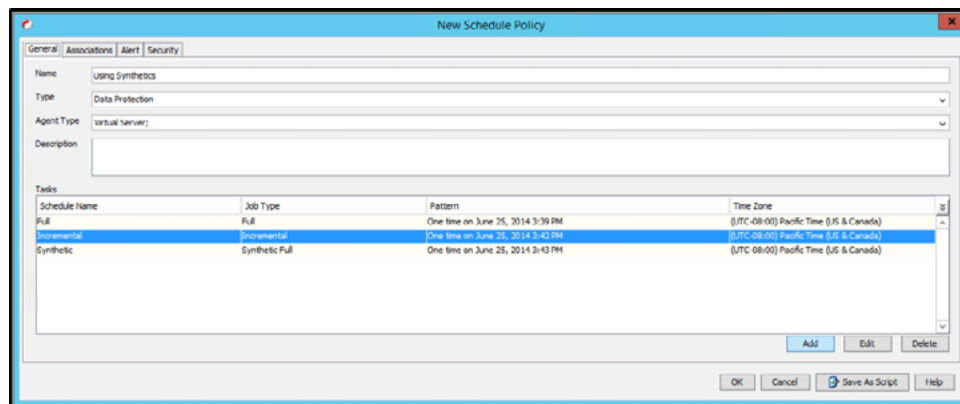
With aux copy operations, be aware that cold backup data has to be pulled in from HDDs storage. In some cases, there is a temporary affect on the latency and flash hit ratio during the aux copy operations when a Simpana MediaAgent is hosted as a virtual machine on a Tintri VMstore. It is recommended to aux copy to a physical server so that backup copies for extended retention can be copied onto physical tape libraries. It is also recommended to create backup copies from virtual MediaAgents onto physical MediaAgents for additional data protection purposes.



With Aux Copy, CommVault recommends enabling dynamic stream allocation when large amount of data is to be copied to a tape library. Ensure that the same MediaAgent is used for both primary and inline copy to tape media.

## CommVault Simpana DASH Full

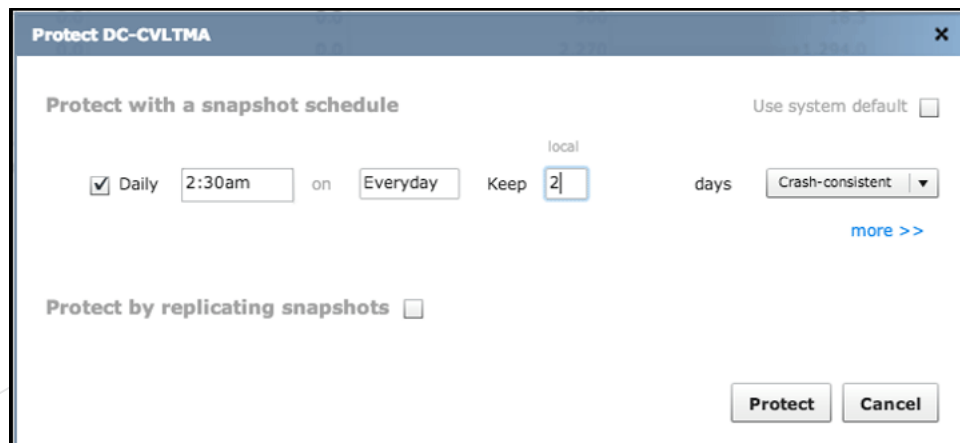
DASH Full utilizes CommVault's Simpana deduplication feature to ensure that a synthetic full backup is created without requiring movement of data. When the first full backup is created, changed blocks are protected for incremental and differential backups. Rather than a traditional full where data is actually moved, DASH Full does not move data but rather update the index information and the deduplication database to create a synthetic full backup. The use of DASH Full significantly reduces the amount of time to perform additional full backups. In the schedule policy, also ensure that the synthetic full schedule is created to take advantage of Simpana's DASH Full feature.



**NOTE:** With MediaAgents hosted as virtual machines on Tintri VMStores, there is a temporary affect on the latency and flash hit ratios as data is read from cold storage for DASH full operations on the virtual machine MediaAgent.

## Tintri VMstore SnapVM™, CloneVM™, and ReplicateVM™

Tintri's SnapVM™ and CloneVM™ can be used with CommVault Simpana software for protection of virtual machines and virtual machines with application servers. In addition, SnapVM and CloneVM can also be used to protect a Simpana MediaAgent for DR purposes. For example, a CommVault Simpana MediaAgent virtual machine can be protected using Tintri's SnapVM. In the following example, a Windows MediaAgent is protected daily with a Tintri snapshot that will be kept for no more than 2 days locally. It is recommended to keep no more than 2 days of snapshots of MediaAgents as each snapshot could grow large.





There is no Simpana Disk Volume Reconciliation operation for deduplicated storage policy copies. This means that if a virtual machine MediaAgent is restored from a Tintri CloneVM operation, the backup jobs that were executed after the snapshot was taken and before the restore operation cannot be reconciled. This will leave orphaned volumes that cannot be reconciled with the CommServe with deduplicated storage policies. It is highly recommended to use Simpana Aux Copy to make additional backup copies on other storage policies on other physical MediaAgents for additional data protection.

A Tintri VMstore SnapVM and CloneVM operation for a Simpana MediaAgent is also dependent on the CommServe that it is licensed on. A restore of a Simpana MediaAgent without the corresponding CommServe is not effective if the CommServe is not available. Ensure that the CommServe and metadata on the CommServe is protected using CommVault Simpana's recommended DR solution for protecting a CommServe and its metadata.

When a virtual machine MediaAgent is restored on a Tintri VMstore using CloneVM, set Customization: None to ensure that the virtual machine is not customized or the MediaAgent restore will be corrupted if it is customized. In addition, before continuing to use the virtual machine MediaAgent for new backup operations, it is recommended to execute *Recover Deduplication Database* and to run data verification of existing backup jobs. This will help verify that the existing backup jobs are still valid and the deduplication database is valid and no corruption was introduced with the MediaAgent restore using Tintri CloneVM.

If a global deduplication policy is utilized for some of the storage policies on the virtual machine MediaAgent, it is recommended to run *Disk Volume Reconciliation* and data verification before running new backup jobs using the storage policies on the virtual machine MediaAgent.

**DO:** Execute *Recover Deduplication Database* on the storage policies and data verification on the backup jobs of the MediaAgent that is restored using Tintri's CloneVM feature *before* executing new backup jobs on the MediaAgent.

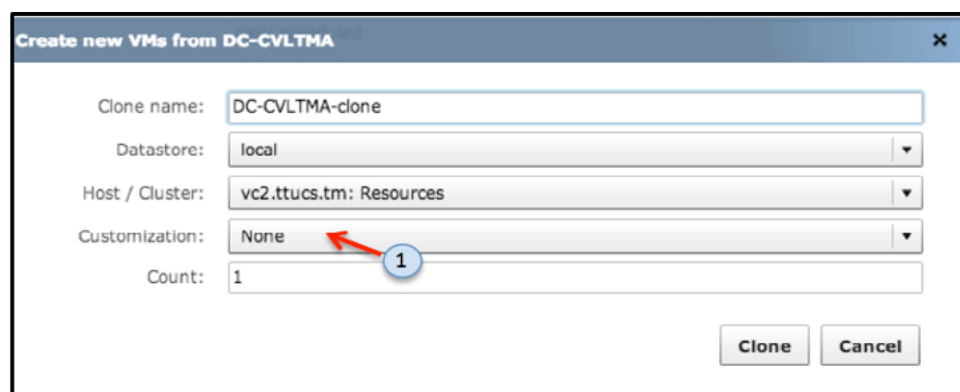
**DO:** Protect a CommServe using CommVault's recommended data protection solutions.

**DO:** Protect a deduplication database using CommVault's recommended data protection solutions.

**DO:** Use CommVault Simpana Aux Copy to create multiple backup copies on other MediaAgents for data protection.

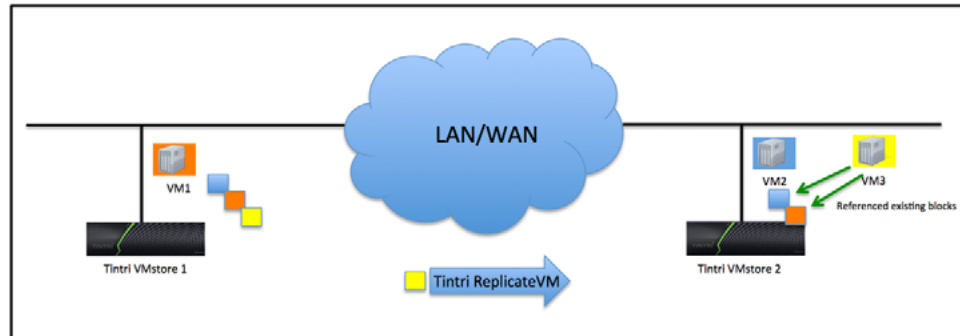
**DO:** Use CommVault Simpana replication to replicate recovery points for additional data protection.

**DO NOT:** Replicate a virtual machine MediaAgent offsite without the CommServe being available for recovery.



For virtual machines that are application servers, Tintri SnapVM, CloneVM, and ReplicateVM can be used to protect critical application servers. A Microsoft Exchange DAG server and its dependencies can be protected using ReplicateVM with other Tintri VMstores. Since Tintri VMstore ReplicateVM is very efficient,

only unique changed blocks are sent over LAN/WAN. This feature can reduce network bandwidth usage for replication by up to 95%. In the following example, to create VM3 that is dependent on 3 data blocks to create a full VM, only the unique data block is sent over LAN/WAN from VMstore 1 to VMstore 2 to create VM3. The other required blocks are referenced from the existing data blocks from VM2.



## Summary

Tintri VMstores with CommVault Simpana software solution is a strong combination for providing data protection of virtual machines locally and remotely. CommVault Simpana deduplication solution is very efficient and only stores unique changed block for backups. Tintri VMstores are designed, from the ground up, for hosting virtual machines. In addition, SnapVM, CloneVM, and ReplicateVM can ensure that virtual machines and application servers are protected locally and across data centers. It is also recommended that application server dependencies be protected using SnapVM, CloneVM, and ReplicateVM as an application server without its dependencies cannot be brought online into a live production environment. Follow CommVault's recommendation to protect the CommServe, the deduplication database, and the backup copies for DR purposes.

## References

- Tintri VMstore Overview - <http://www.tintri.com/resources>
- Managing VM Data with Tintri - <http://www.tintri.com/resources>
- Backup and Recovery Best Practices - <http://www.tintri.com/resources>
- CommVault Simpana Documentation - <http://documentation.commvault.com/hds/>
- VMware KB - [http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKc&externalId=1002836](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKc&externalId=1002836)



201 Ravendale Dr.,  
Mt. View CA 94043  
650.810.8200  
info@tintri.com | [www.tintri.com](http://www.tintri.com)