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Top 10 Do's/Don'ts of Data Protection for VMware vSphere



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Agenda

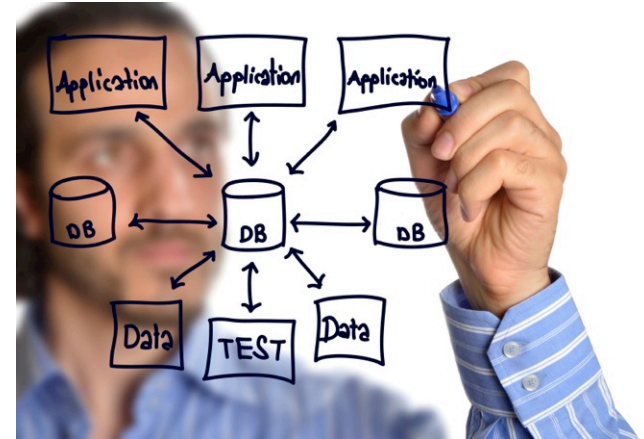
- Exploring Data Protection for VMware vSphere
 - vSphere Snapshots, Cloning, and Replication
 - Guest level backups
- vStorage APIs for Data Protection (VADP)
 - Data Protection Applications
 - VMware VDP
- VADP Transport Modes and Do's and Don'ts
- Summary

Exploring Data Protection for VMware vSphere



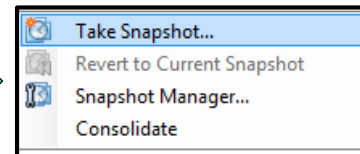
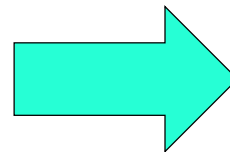
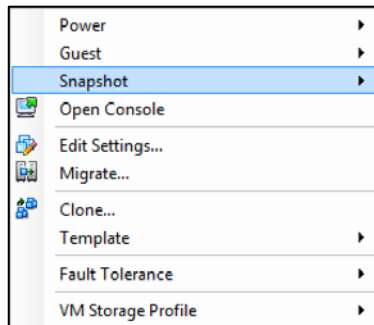
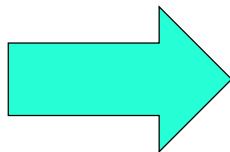
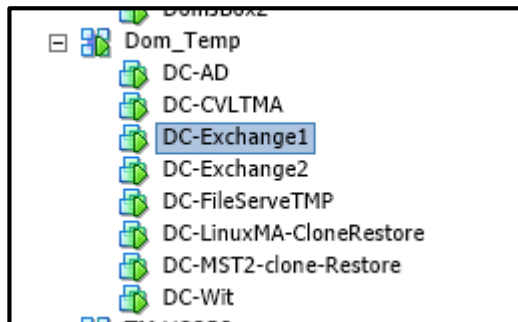
Exploring Data Protection for VMware vSphere

- Platform Native mechanisms
 - vSphere Snapshots, Cloning and Replication
- Application Native tools
 - Oracle RMAN etc.
- Data Protection Applications
 - Inbuilt - vSphere Data Protection (VDP)
 - 3rd Party Apps - Veeam, CommVault etc.



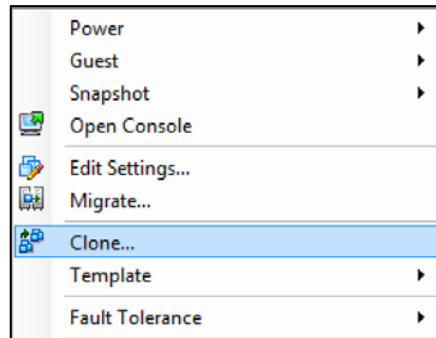
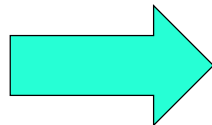
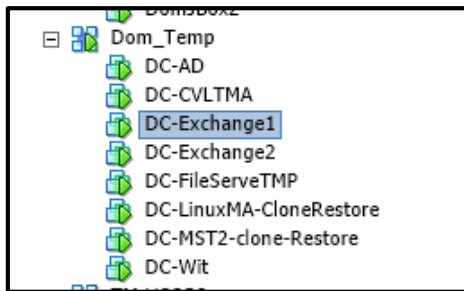
vSphere Snapshots

- Captures a point-in-time state of the virtual machine (VM)
 - VM's memory, power settings
 - Point-in-time of the contents .vmdk files



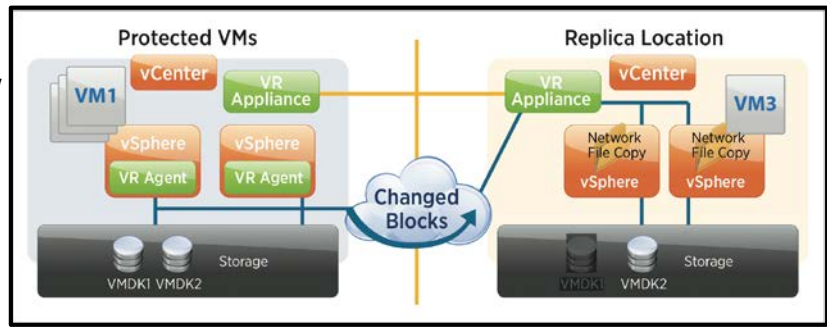
vSphere Cloning

- Creates a duplicate of the existing VM
 - Same computer name and network settings
 - Copy of original .vmdk and .vmx files
 - Copy of contents on original virtual disks



vSphere Replication

- *Asynchronously* replicates virtual machine to another location
- Integrated with Microsoft Volume Shadow Copy Service (VSS)
- Customizable retention of replicated historical points for VM recovery
- No application agent required



Source: VMware vSphere Replication

vSphere Snapshots, Cloning, Replication: Summary

What do I have for data protection and disaster recovery?	YES	NO
Point-in-time snapshot	✓	
Multiple copies	✓	
VSS application consistency	✓	
Business Continuity	✓	
Application Log Management		✗
Legal Hold and E-Discovery		✗
Archive Indefinitely		✗
Extended Retention	?	?

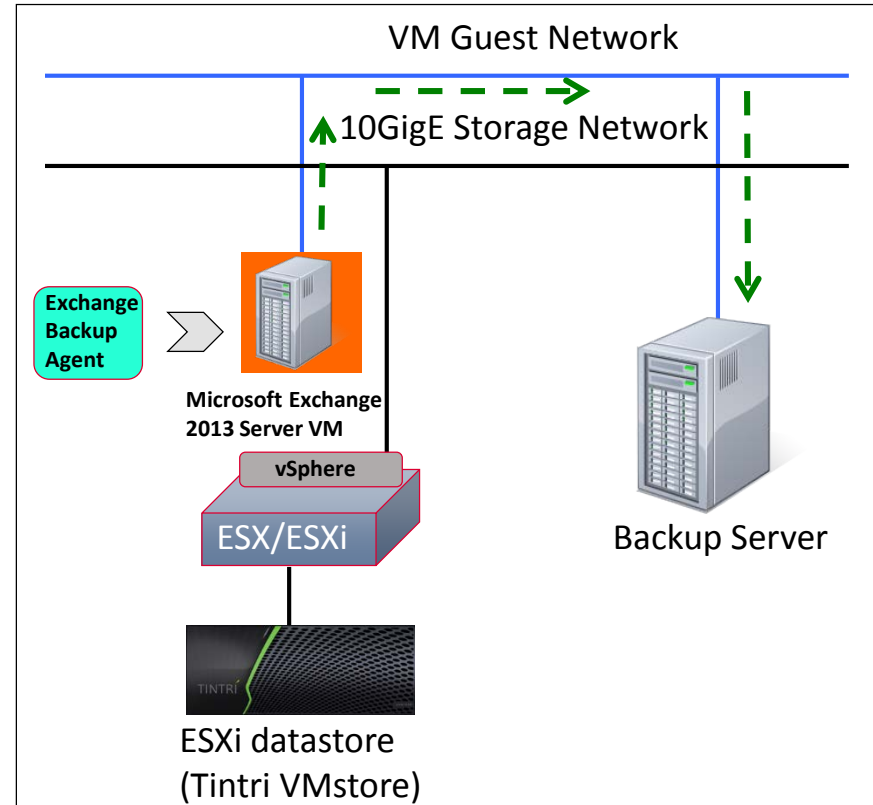


Data Protection Applications

- Data Protection and Recovery Software Market
 - Total \$5.6B in 2013, 9.2% annual growth*
- Key Players/Solutions
 - vSphere Data Protection (VDP)
 - EMC Avamar, EMC NetWorker
 - Symantec NetBackup, Symantec Backup Exec
 - CommVault Simpana
 - Veeam Backup Management Suite
 - Others : HP, CA, Microsoft, Dell, Acronis, PHD Virtual

Guest Level Backups

- Requires backup agents on application servers
- Similar to *backing up a physical server*
- Data protection solutions that support client-direct backups
 - EMC NetWorker
 - Symantec NetBackup



vStorage APIs for Data Protection (VADP)

- Enables full VM image backup and restore
- Enables file level restore
- Allows use of vStorage Changed Block Tracking for more efficient backup and restore

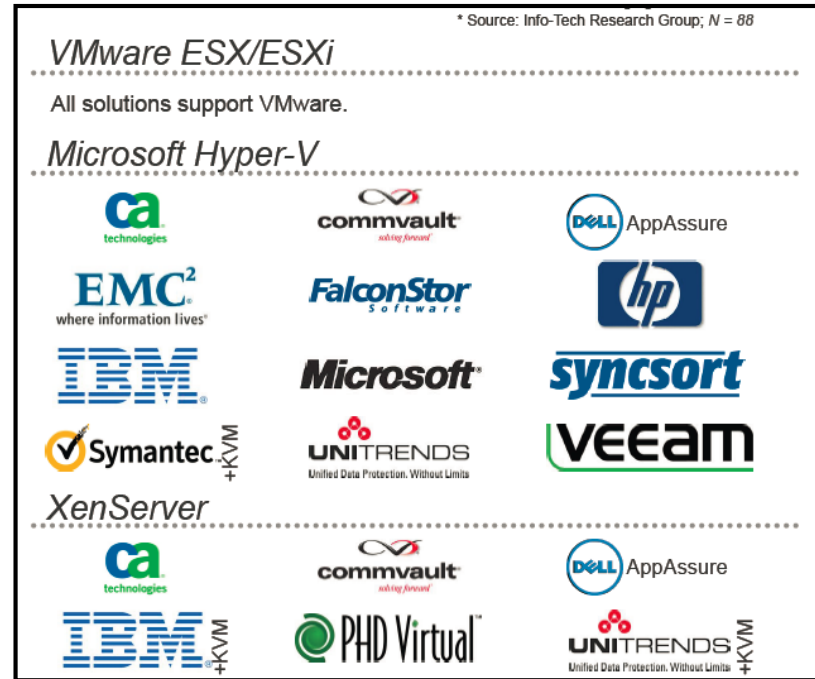
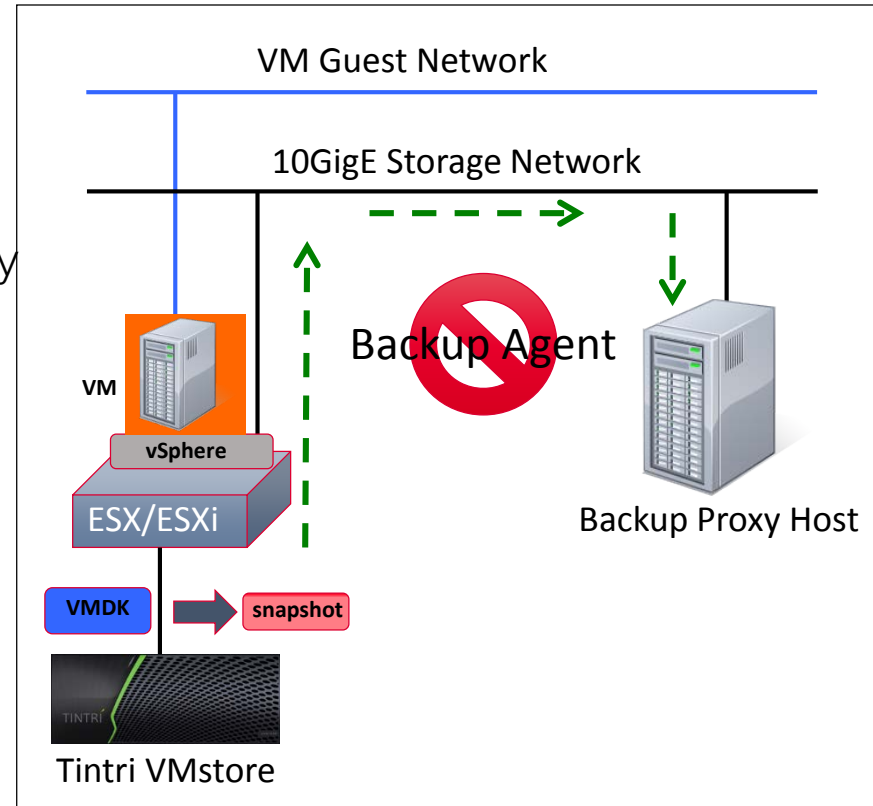


Image Level Backups

- Leverage VMware's VADP without any backup agents
- Use backup proxy for offload functionality
- VADP transport modes:
 - HotAdd
 - NBD/NBDSSL
 - SAN



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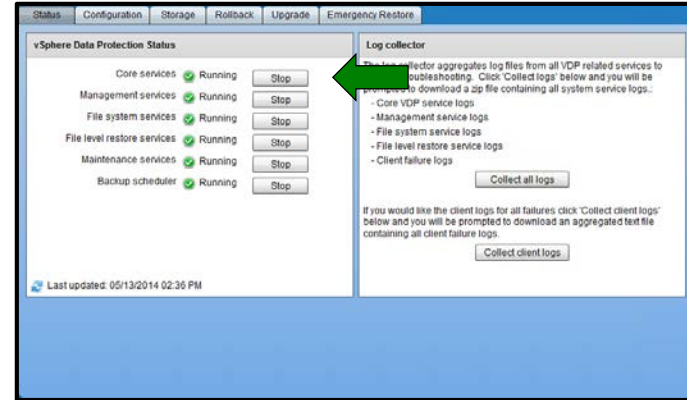
Data Protection Applications – Key Capabilities

What do data protection solutions have in common?

- Support for VMware vStorage APIs for Data Protection (VADP)
 - Image-level backups
- Application data protection support
 - Guest-level backups
- Create multiple local or off-site copies
- Allow legal holds and e-discovery
- Extended retention periods (1 year, 5 years, 7 years, indefinitely)

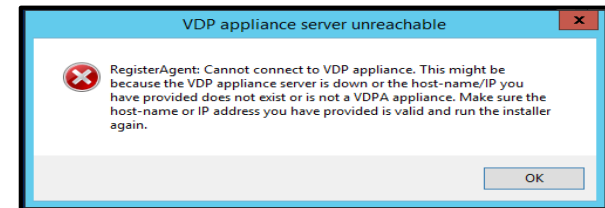
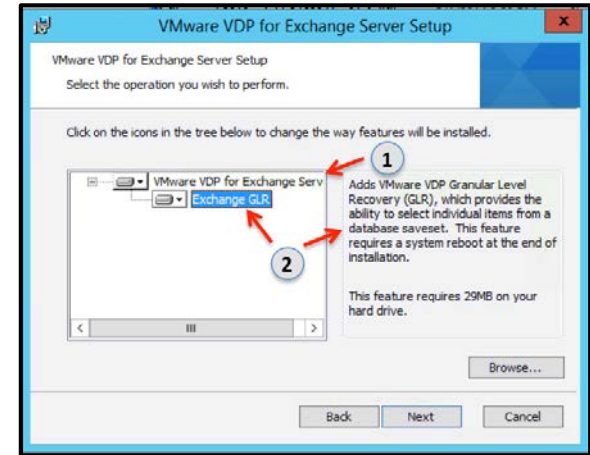
VMware VDP Advanced Best Practices

- Use Thin Provisioning for VDP Appliance OVF and backup storage deployment
- Use Static IP address entry for VDP Appliance
- Do vCenter Registration – test connection is mandatory
- Use FQDN entry on DNS Server
- Use port 53 DNS for proxy node access
- Provision user account with admin privileges on vCenter root node



Example: Exchange Backup/Recovery with VDP Advanced

- For Guest level backups, must install VDP for Exchange Server agent
- Must have network route from VDP Advanced to Exchange server
- Exchange VSS GLR requires Exchange MAPI/CDO kit installed
- Recommended one exchange server per backup job



Example: Exchange Backup/Recovery with VDP Advanced

- Restore to original
- Restore using RSG/RDB

Restore backup

1 Select Backup
2 Set Restore Options
3 Ready to complete

Set Restore Options
Set the restore options for each backup that you are restoring.

Advanced options

Allow database overwrite

Do not replay transaction logs

Move logs path

Restore into RSG/RDB 1

Overwrite existing RSG/RDB

RSG/RDB name: restore.edb 2

RSG/RDB database path: J:\recover

RSG/RDB log path: J:\recover

Advanced options (Support Only):

Back Next Finish Cancel

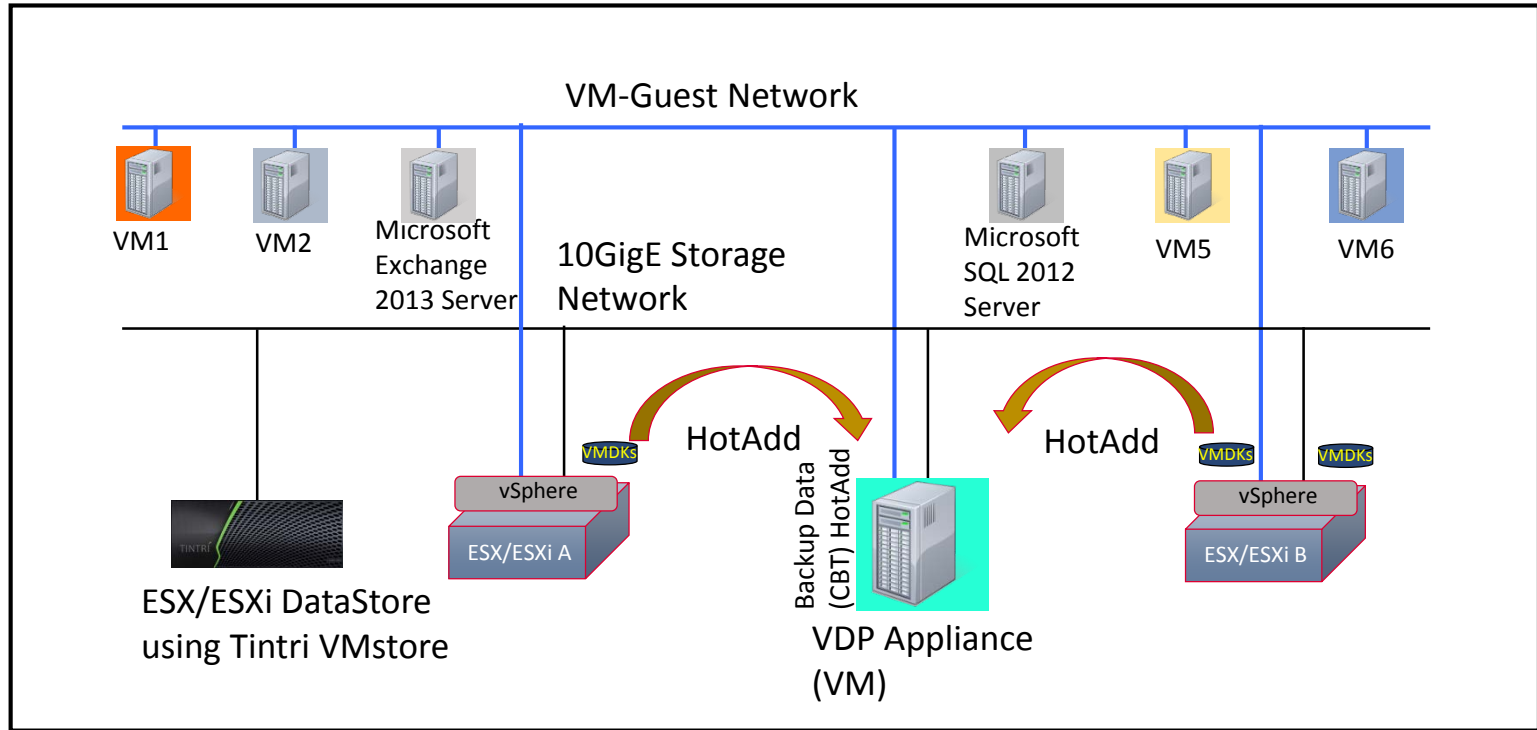
VADP Transport Modes: Do's and Don't's



1. VADP HotAdd Transport Mode

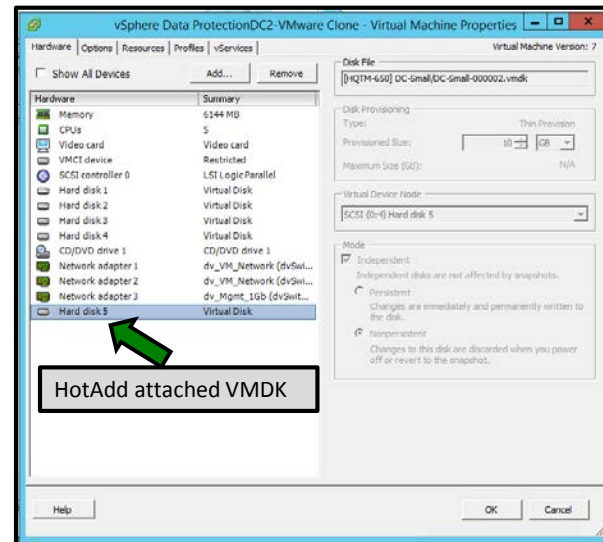


HotAdd Transport Mode Overview









Best Practices

- Use 10GigE for storage network
- Proxy server must be a virtual machine
- Proxy server can also be a Backup Server



HotAdd Transport Mode: Pitfalls

Exploring some common VADP HotAdd failures:

Name	Target	Status	Details
 Remove snapshot	 DC-Small	 Completed	
 Backup/Restore VM	 DC-Small	 Completed	Error 10055: VixDiskLib_Open attempt to connect to virtual disk failed

```
2014-07-07T13:27:32.471-7:00 avvcbimage Info <16041>: VDDK:VixDiskLibVim: Request GetVMFiles diskKey = 2000, readOnly = 1, openSnapshot = 1.
2014-07-07T13:27:39.005-7:00 avvcbimage Info <16041>: VDDK:NBD_ClientOpen: attempting to create connection to vpxa-nfc://[HQIM-650] DC-Small/DC-Small-000002.vmdk@192.168.100.111:902
2014-07-07T13:27:41.976-7:00 avvcbimage Info <16041>: VDDK:CnxOpenTCPSocket: Cannot connect to server 192.168.100.111:902: No route to host
2014-07-07T13:27:41.977-7:00 avvcbimage Info <16041>: VDDK:CnxAuthdConnect: Returning false because CnxAuthdConnectTCP failed
```

What is the following error an indication of?

```
ConsolidateVMDisks Task for VM DomClones-2 failed. Reason Unable to access file since it is locked
1060 1 06/24 10:16:54 ### ## ConsolidateVMDisks --- ConsolidateVMDisks Task for VM
DomClones-2 failed. Reason Unable to access file since it is locked
```

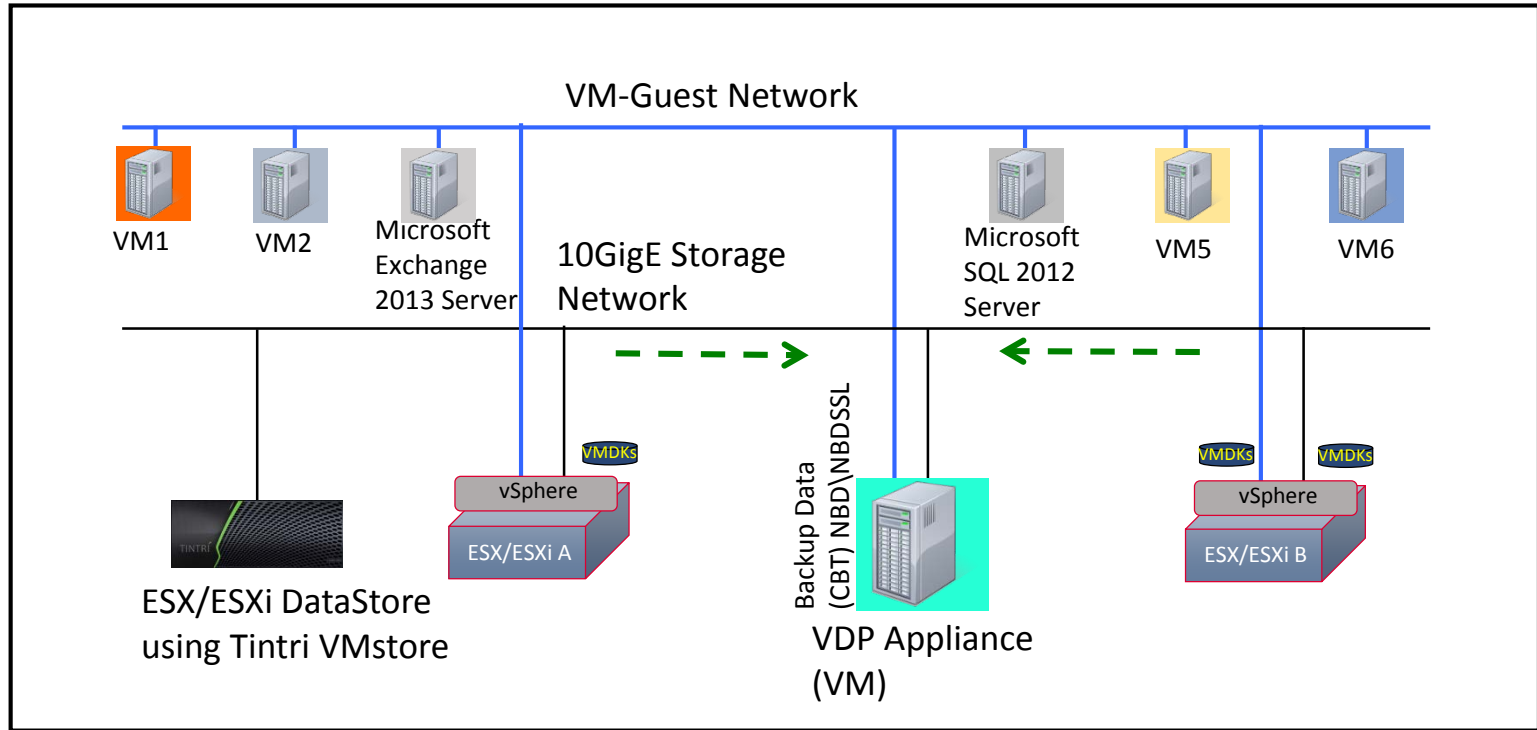
HotAdd Transport Mode: Do's and Don'ts

- **Do** ensure proxy host has network access to ESXi/ESXi server
- **Do** deploy additional proxy server for HotAdd on ESX/ESXi server
- **Do** manually remove .vmdk files from proxy server before new backups
- **Don't** use HotAdd for independent disks
- **Don't** migrate target virtual machines during backups
- **Don't** use HotAdd if VMFS block size of VM < VMFS block size of proxy server

2.VADP NBD/NBDSSL Transport Mode



NBD/NBDSSL Transport Mode Overview



Deployment Best Practices

- Use 10GigE for storage and backup network
- Proxy server must have network access to ESX/ESXi Server
- Proxy server can be a physical server or a virtual machine
- Proxy server can be a Backup Server

NBD/NBDSSL Transport Mode: Pitfalls

VMware VADP NBD/NBDSSL Transport Mode:

```
[NFC ERROR] NfcCheckAndReserveMem: Cannot allocate any more memory as NFC is already using 31457329 and allocating 2097152 will make it more than the maximum allocated: 33554432. Please close some sessions and try again
```

VM restore operation using a 3rd party backup solution:

```
Opening Disk [[HQTM-650] DC-Exchange2/DC-Exchange2_1.vmdk] as [DC-Exchange2_1.vmdk]
Opening disk [DC-Exchange2_1.vmdk] on VM [DC-Exchange2] path [[HQTM-650] DC-Exchange2/DC-Exchange2_1.vmdk] flags [
Opened to [DC-Exchange2] [DC-Exchange2_1.vmdk] using Transport mode: [hotadd] ←
68.100.110 HostMoref:host-146
Opening Disk [[HQTM-650] DC-Exchange2/DC-Exchange2_2.vmdk] as [DC-Exchange2_2.vmdk]
Opening disk [DC-Exchange2_2.vmdk] on VM [DC-Exchange2] path [[HQTM-650] DC-Exchange2/DC-Exchange2_2.vmdk] flags [
Opened to [DC-Exchange2] [DC-Exchange2_2.vmdk] using Transport mode: [nbd] ←
```

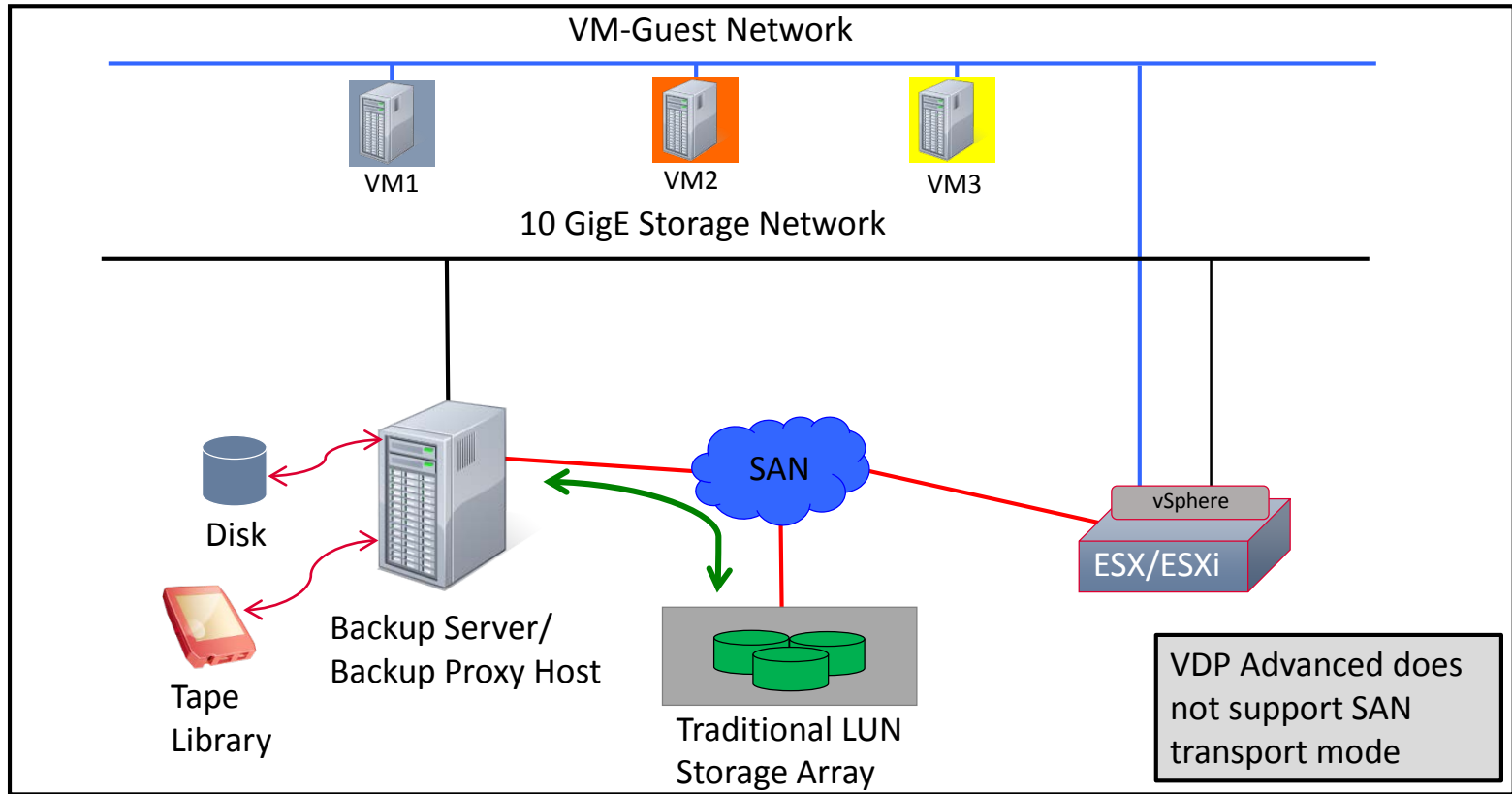
NBD/NBDSSL Transport Mode: Do's and Don'ts

- **Do** use 10GigE for backup network
- **Do** ensure network connectivity between proxy server and ESXi server
- **Do** ensure TCP port 902 is open between proxy server and ESXi server
- **Don't** exceed the NFS connection limits on an ESXi server
- **Don't** use NBDSSL if over-the-wire encryption is not required
- **Don't** forget to check and update network connection if proxy is vMotioned

3. VADP SAN Transport Mode



SAN Transport Mode Overview



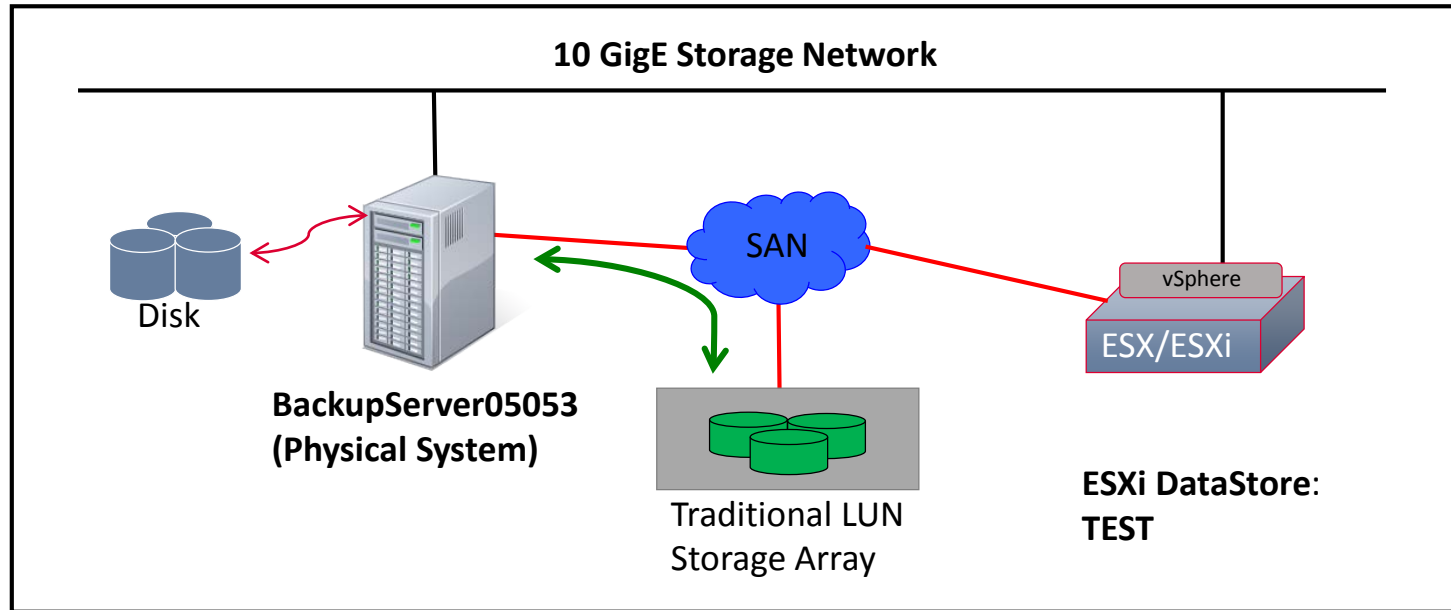
Deployment Best Practices

- Validate compatibility for Initiator FC HBA and Target FC HBA
- Configure and verify initiator and target zoning on SAN switch
- Proxy server should be a physical server

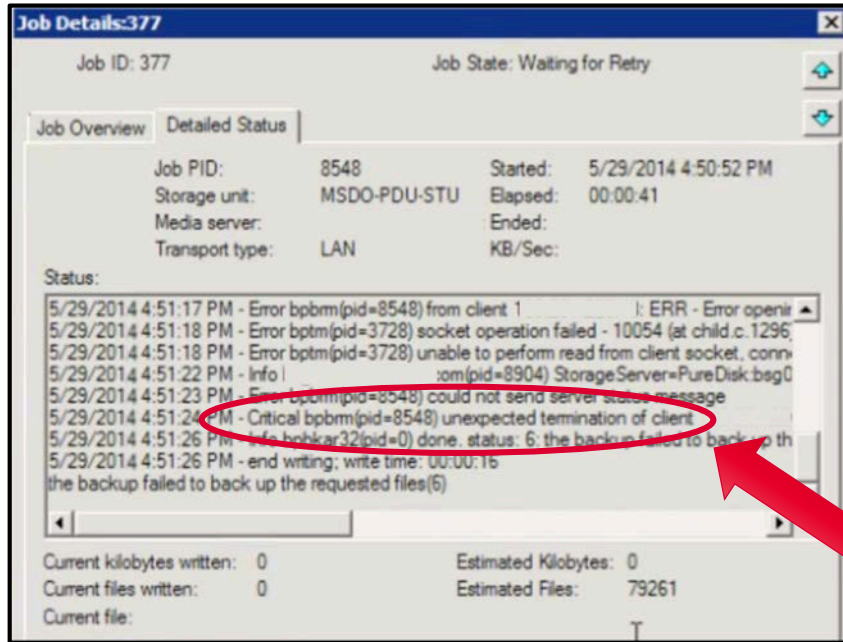
SAN Transport Mode: Do's and Don'ts

- **Do** ensure FC HBA port on the proxy server discovers the LUNs
- **Do** set SAN policy on Windows proxy server to onlineALL
- **Do** use host-based management software for device mapping
- **Don't** use for restore of thin provisioned disks
- **Don't** initialize disk on proxy server
- **Don't** delete disks from the proxy server disk management

Demo: SAN Transport Mode – Initialize LUN



SAN Transport Mode: Pitfalls



Job ID: 377 Job State: Waiting for Retry

Job Overview Detailed Status

Job PID: 8548 Started: 5/29/2014 4:50:52 PM
Storage unit: MSDO-PDU-STU Elapsed: 00:00:41
Media server: Ended:
Transport type: LAN KB/Sec:

Status:

```
5/29/2014 4:51:17 PM - Error bpbm(pid=8548) from client 1 : ERR - Error openi
5/29/2014 4:51:18 PM - Error bptm(pid=3728) socket operation failed - 10054 (at child.c.1296)
5/29/2014 4:51:18 PM - Error bptm(pid=3728) unable to perform read from client socket, conn
5/29/2014 4:51:22 PM - Info | com(pid=8904) StorageServer=PureDisk.bsg0
5/29/2014 4:51:23 PM - Error bpbm(pid=8548) could not send server status message
5/29/2014 4:51:24 PM - Critical bpbm(pid=8548) unexpected termination of client
5/29/2014 4:51:26 PM - Info | fo.hobkkr32(pid=0) done, status: 6: the backup failed to back up th
5/29/2014 4:51:26 PM - end writing; write time: 00:00:16
the backup failed to back up the requested files(6)
```

Current kilobytes written: 0 Estimated Kilobytes: 0
Current files written: 0 Estimated Files: 79261
Current file:



1. Corrupted ESXi datastore LUN.
2. Failed backup
3. What's next?

NetBackup Job Detail

Summary – Top 10 Do's and Don'ts

Number	Transport Mode	DO's
1	SAN	DO ensure FC HBA ports on proxy server discovers datastore LUNs
2	SAN	DO set SAN policy on proxy server to onlineALL
3	HotAdd/NBD/NBDSSL	DO ensure proxy server has 10GigE backup network access to ESX/ESXi server
4	HotAdd	DO manually remove .vmdk files from proxy server before new backups if consolidate VM disk fails
5	NBD/NBDSSL	DO ensure TCP port 902 is open between proxy server and ESX/ESXi server

Summary – Top 10 Do's and Don'ts (cont'd)

Number	Transport Mode	DON'Ts
6	SAN	DON'T initialize/delete disk on proxy server if in doubt of LUN ownership
7	SAN	DON'T forget to use host-based device management software for device mapping
8	HotAdd/NBD/NBDSSL	DON'T forget to update network connections if proxy server is vMotioned
9	HotAdd	DON'T use HotAdd if VMFS block size of VM < VMFS block size of proxy server
10	NBD/NBDSSL	DON'T exceed NFS connection limits on an ESX/ESXi server

Resources

<http://www.tintri.com/resources/whitepapers>

- VDP Advanced and Tintri Backup and Recovery Best Practices
- Backup and Recovery Best Practices
- Veeam and Tintri Backup and Recovery Best Practices

<http://www.vmware.com/support.html>

- vStorage APIs for Data Protection (VADP) FAQ
- vSphere Data Protection 5.5 Administration Guide

THANK YOU

