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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

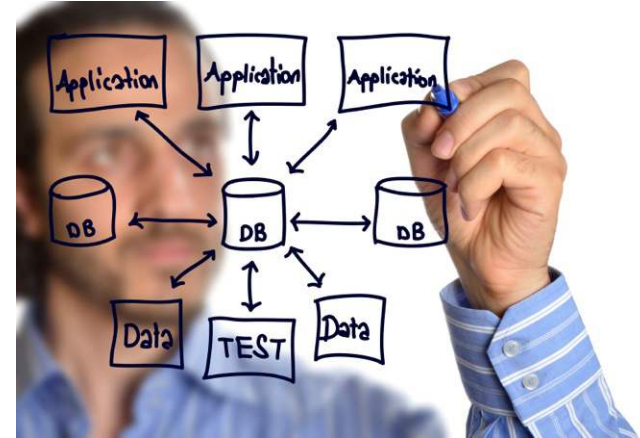
Exploring Data Protection for VMware vSphere



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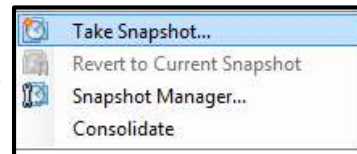
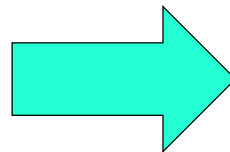
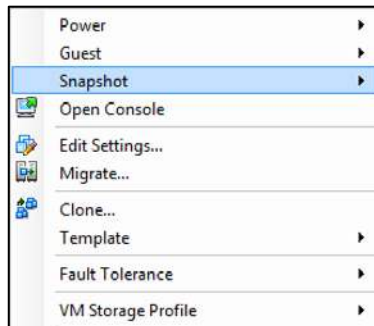
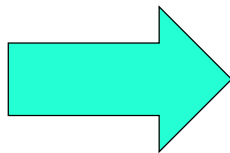
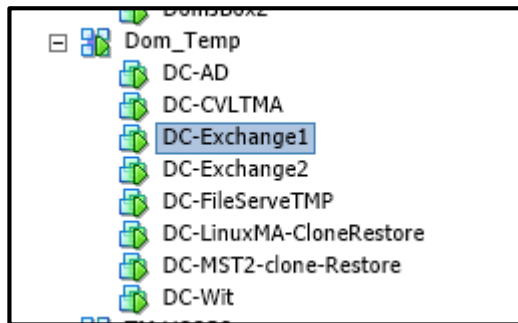
Exploring Data Protection for VMware vSphere

- 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.



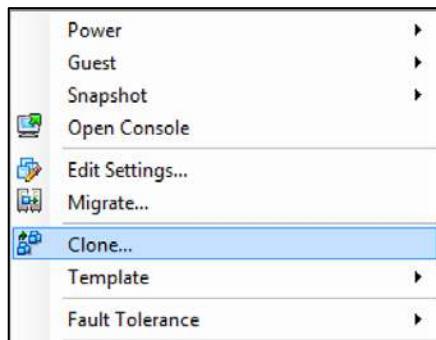
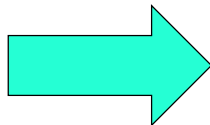
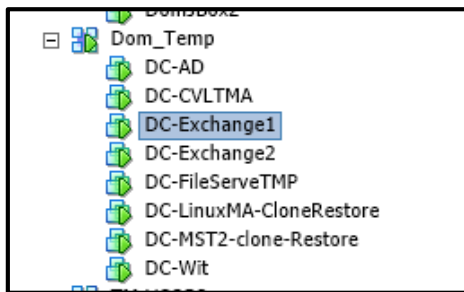
vSphere Snapshots

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



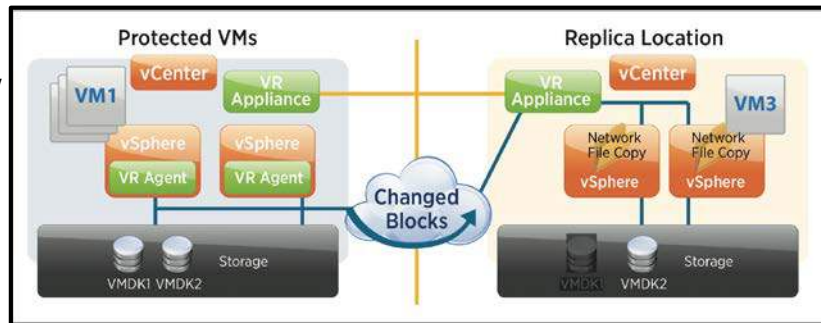
vSphere Cloning

- 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	?	?



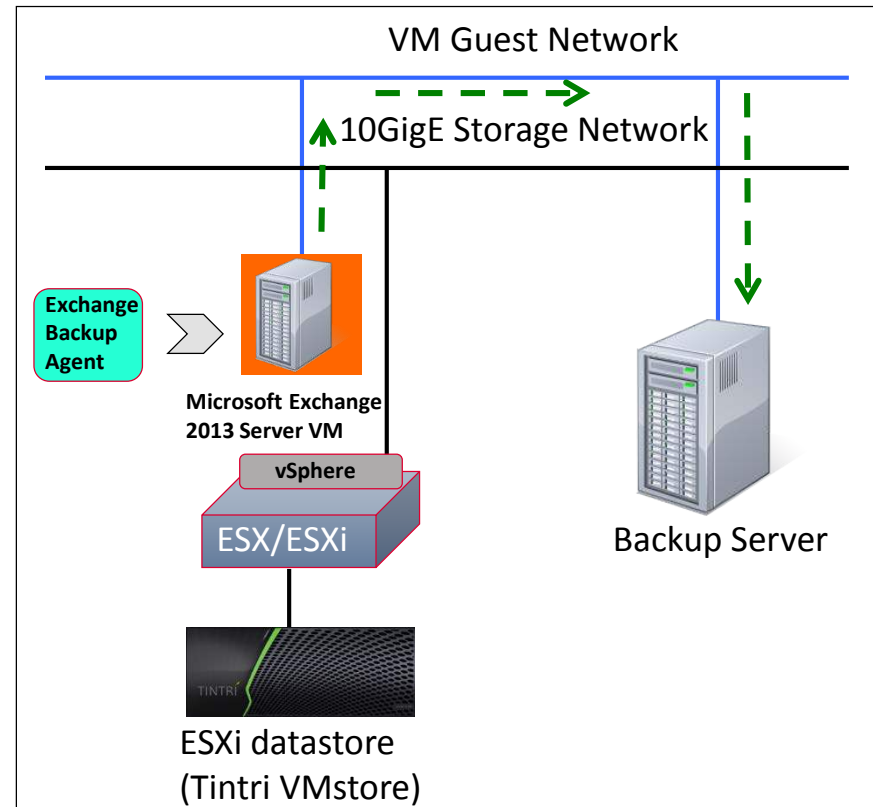
How do I get more data protection?

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

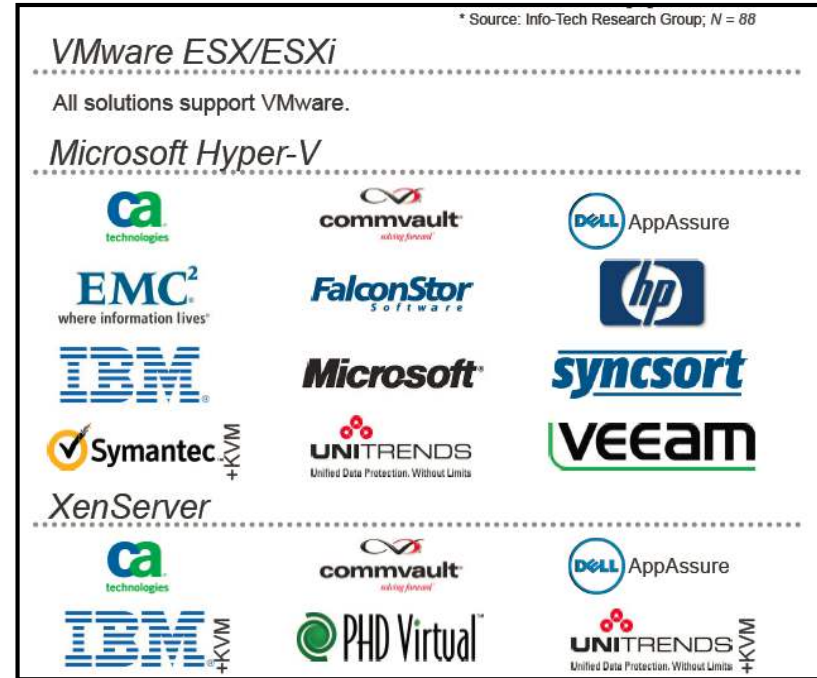
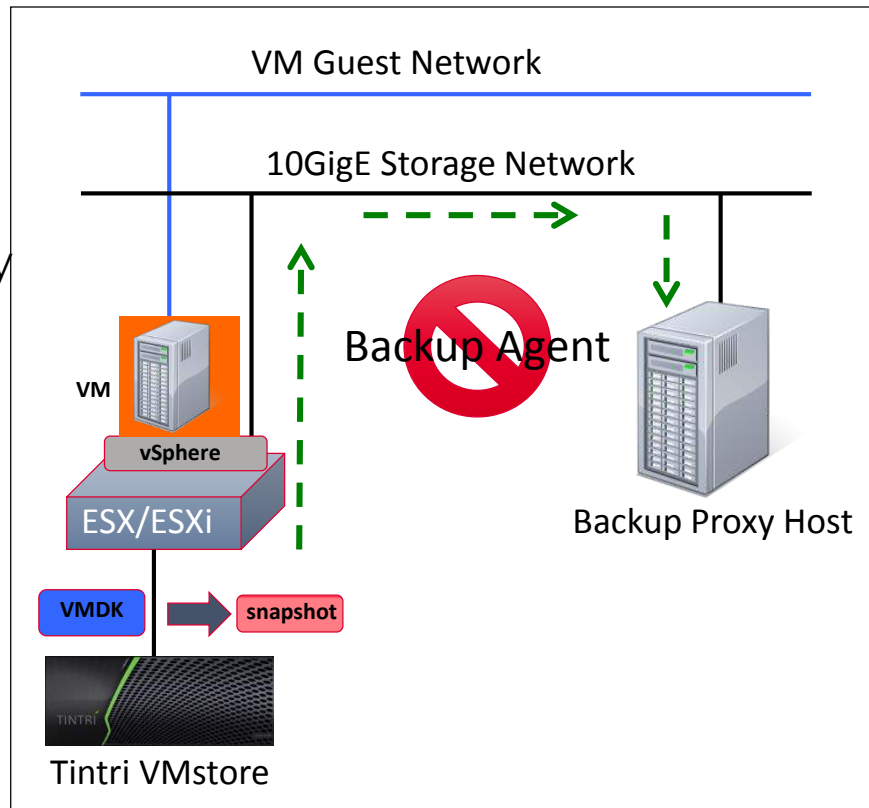


Image Level Backups

- 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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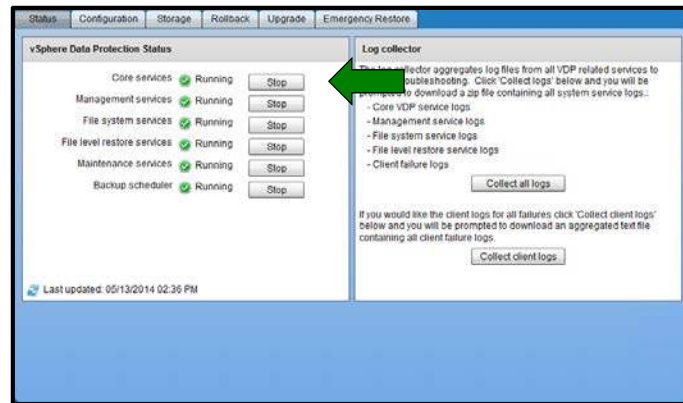
Data Protection Applications – Key Capabilities

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)

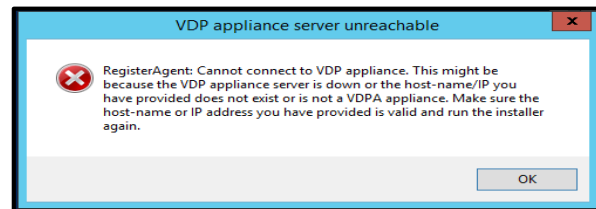
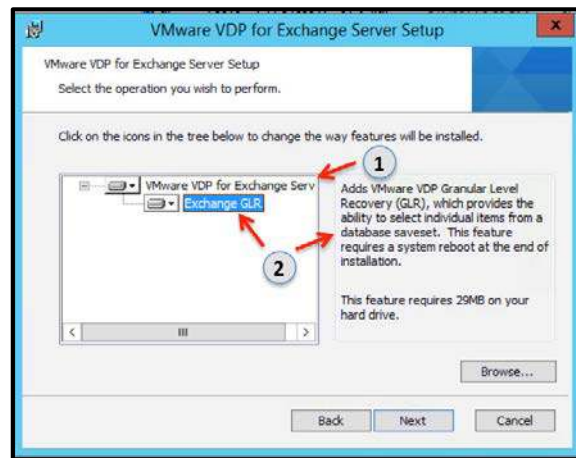
VMware VDP Advanced Best Practices

- 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

The screenshot shows the 'Restore backup' dialog box with the following components:

- Progress Bar:** Shows three steps: '1 Select Backup' (completed), '2 Set Restore Options' (current step), and '3 Ready to complete'.
- Set Restore Options:** A section titled 'Set the restore options for each backup that you are restoring.'
- Advanced options:** A section with the following options:
 - ☐ Allow database overwrite
 - ☐ Do not replay transaction logs
 - Move logs path
 - ☒ Restore into RSG/RDB (indicated by red arrow 1)
 - ☐ Overwrite existing RSG/RDB
 - RSG/RDB name: restore.edb (indicated by red arrow 2)
 - RSG/RDB database path: I:\recover
 - RSG/RDB log path: J:\recover
 - Advanced options (Support Only):
- Buttons:** Back, Next, Finish, and Cancel.

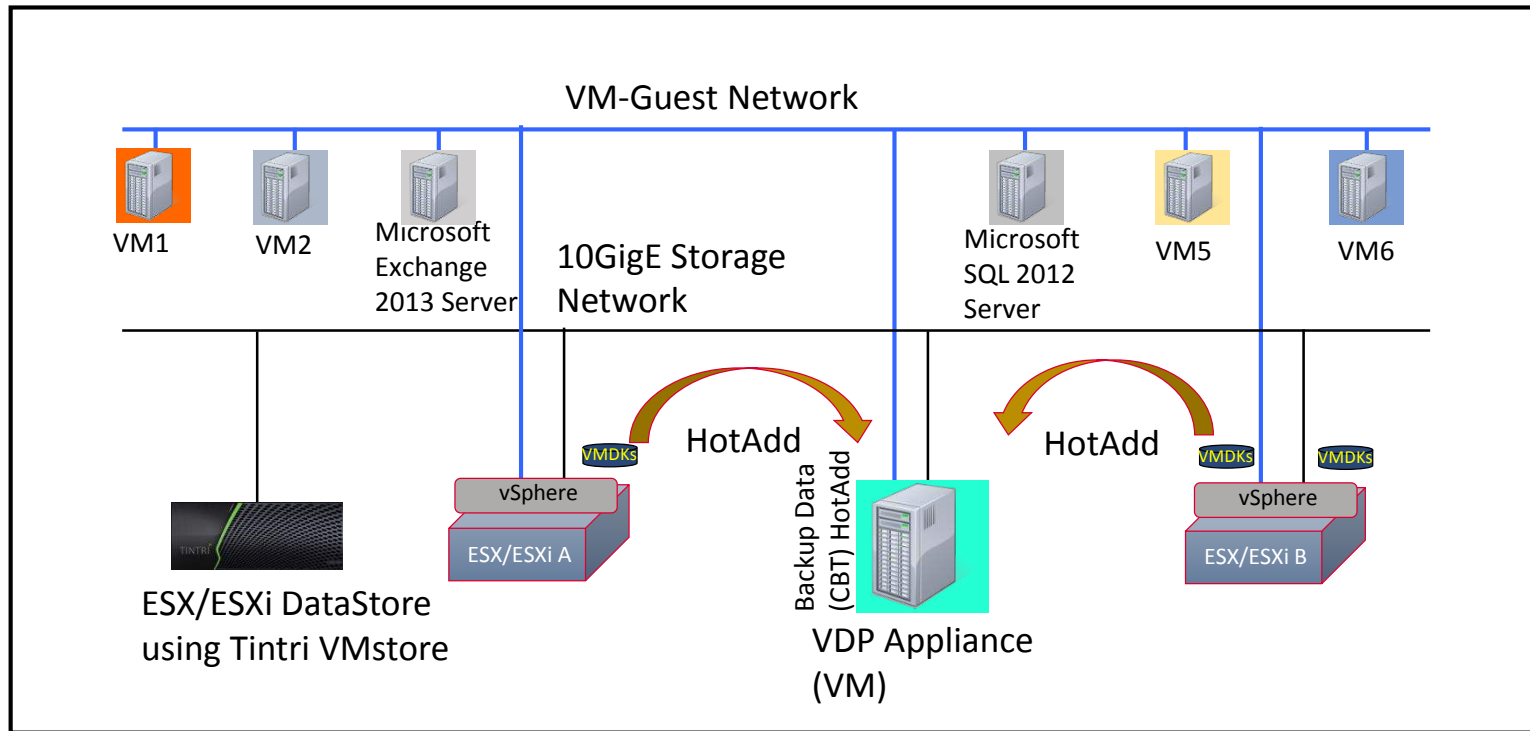
VADP Transport Modes: Do's and Don't's



1. VADP HotAdd Transport Mode

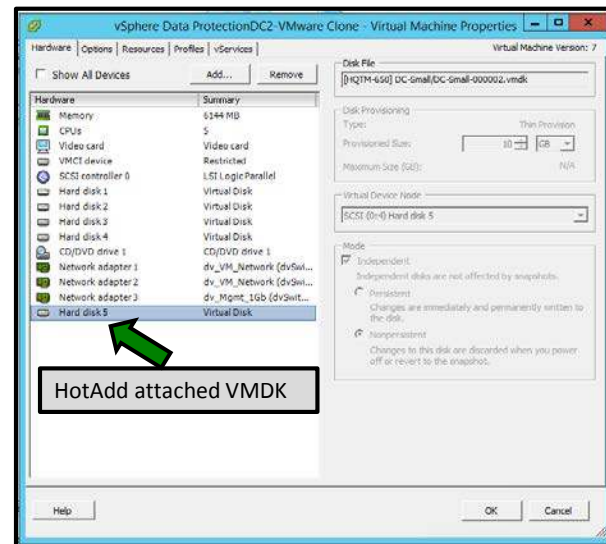


HotAdd Transport Mode Overview









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://[HQTM-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
```

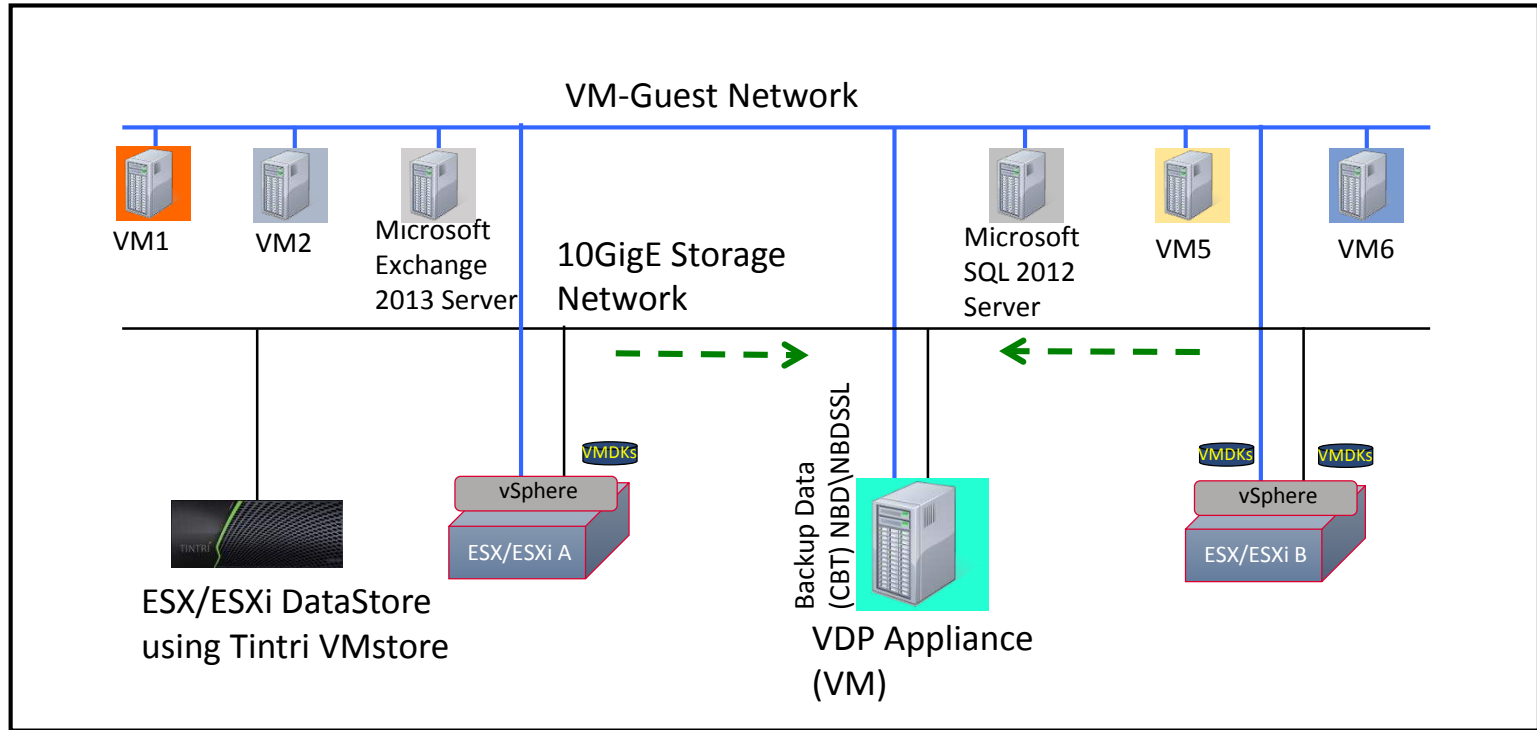
HotAdd Transport Mode: Do's and Don'ts

- **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 [r]  
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 [r]  
Opened to [DC-Exchange2] [DC-Exchange2_2.vmdk] using Transport mode: [nbd] ←
```

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

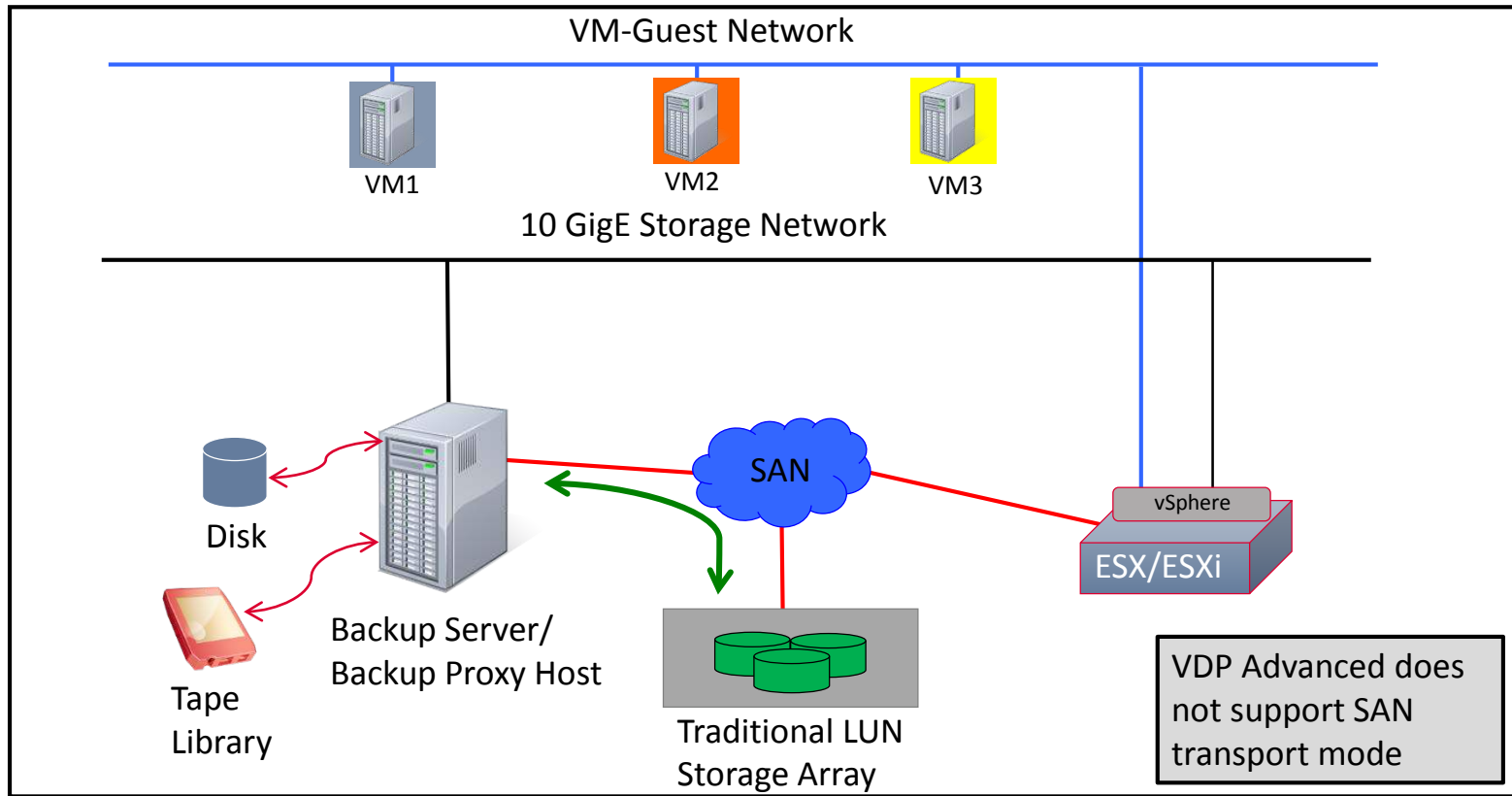
- **Do** use 10GigE for backup network
- **Do** ensure network connectivity between proxy server and ESXi server
- **Do** ensure TCP port 902 is open between proxy server and ESXi server
- **Don't** exceed the NFS connection limits on an ESXi server
- **Don't** use NBDSSL if over-the-wire encryption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

3. VADP SAN Transport Mode



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SAN Transport Mode Overview



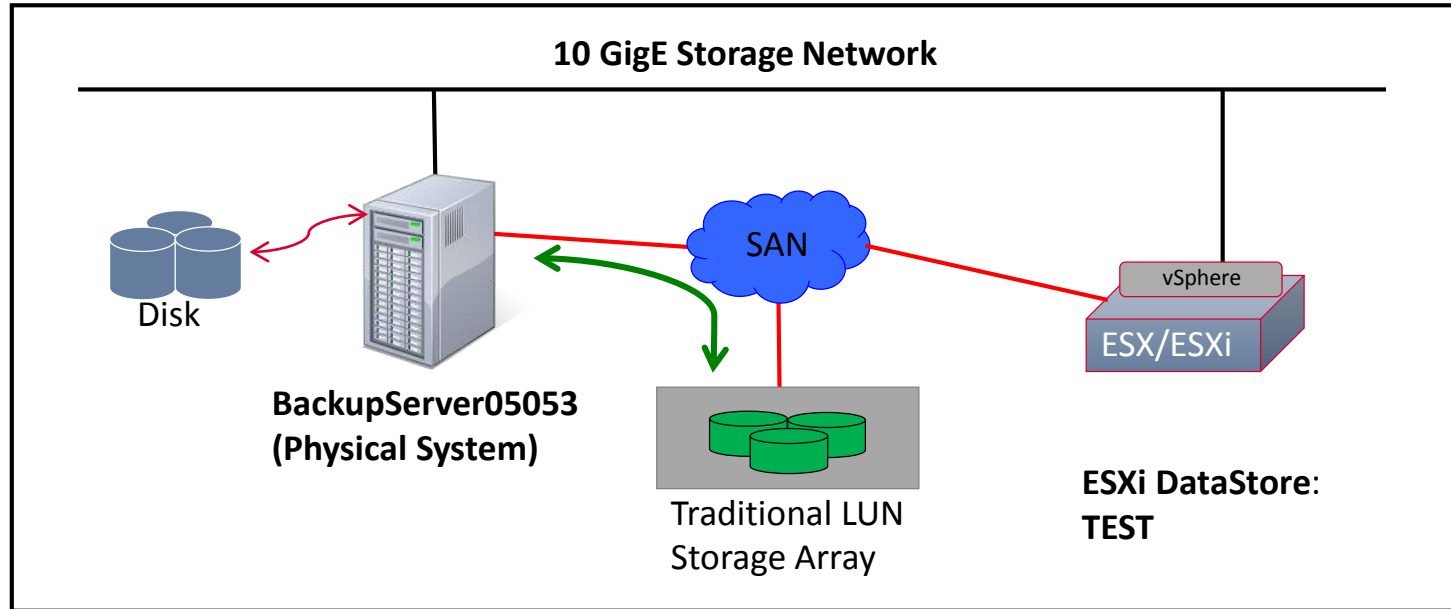
Deployment Best Practices

- 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

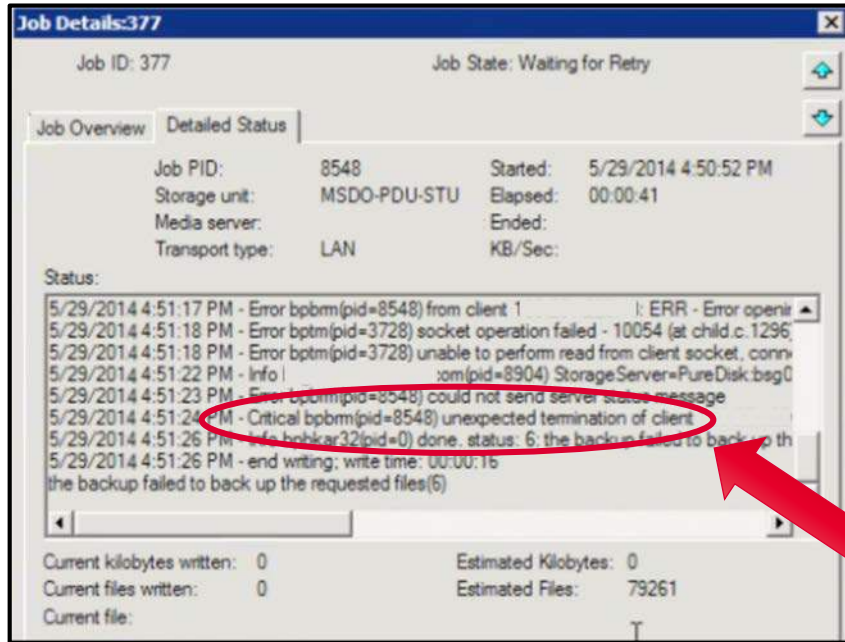
SAN Transport Mode: Do's and Don'ts

- **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



NetBackup Job Detail



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

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



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