Implementing Effective Backup Strategies For Disaster Recovery

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Overview

- VMware backup options
- 3rd party backup options
- Disaster recovery – which backup options work best
- Case Study
- VI3 Disaster Recovery options

VMware Backup Options

- ESX 2 Backup Options
  - Internal virtual machine backups
  - Service Console backups to local device
  - Service Console backups to network device
  - SAN Imaging
  - vmsnap/vmres
- ESX 3 Additional Backup Option
  - Consolidated Backup
    - Proxy based backup from SAN
    - Preconfigured scripts for major 3rd party backup products

3rd Party Options – Supported Backup Tools

- Symantec Backup Exec
  - Versions 10.0, 10d
- VERITAS Netbackup
  - Versions 5.0, 5.0 MP4, 5.1, 5.1 MP2 MP3, 6.0
- IBM Tivoli Storage Manager
  - Versions 5.2.1, 5.2.3, 5.3
- EMC Networker
  - Versions 7.0, 7.1.x, 7.2, 7.3
- CA, BrightStor ARCServe
  - Versions r11, r11.1, r11.5
- CommVault Galaxy
  - Version 5.9, 6.1

3rd Party Options – VMware Oriented Solutions

- Vizioncore esxRanger
- esXpress
- Vmts.net – vmbk.pl
  - Image based backups – vms are treated as a set of files
  - Tools are vm aware – support features such as REDO logs, suspend/resume of vms, export of vmdk files

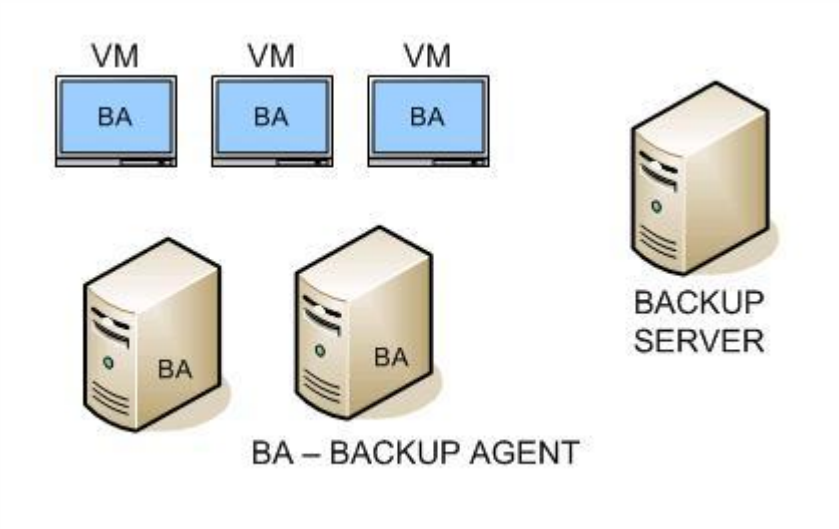
Disaster Recovery – Which Strategy Works Best?

- What is the disaster?
  - A file in the virtual machine needs to be restored
  - A virtual machine is not functioning
  - An ESX server has gone down
  - The SAN has gone down
  - Catastrophic outage (entire site/region down)

- Disaster recovery is more than backups and restores
  - It is important to develop a strategy for using backups and restores
  - A combination of solutions will often produce the best results

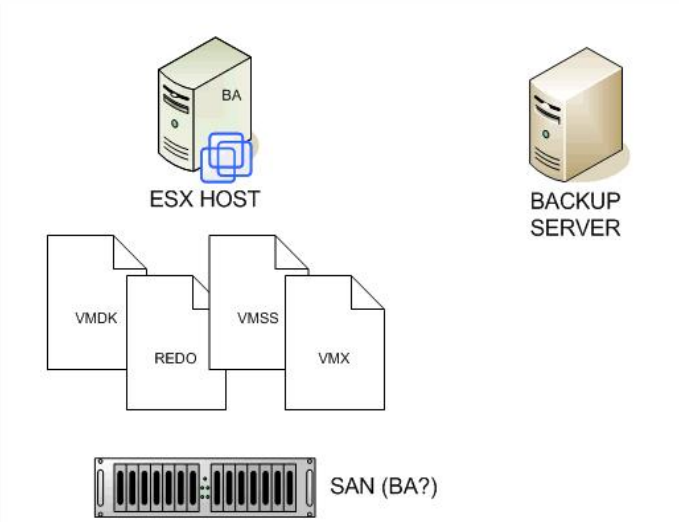
Disaster Recovery – Internal Backups

- Internal virtual machine backups considerations
  - Same strategy for virtual machines and physical servers
  - ‘Bare metal restore’ features have become easier to use
  - Can use disk imaging based tools for backups
  - Some servers do not restore well from this type of backup
  - Can allow for a V2P restore strategy



Disaster Recovery – External Backups

- External virtual machine backups are simple
  - File level backups
  - Simple restore process
  - Require down time for virtual machine or REDO files
  - Require VMware based host for restore



Disaster Recovery – Best of Both Worlds

- Combination of internal and external backups of virtual machines provides maximum flexibility
- Example
  - Monday – external based backup of virtual machine
  - Daily – internal based backup using 3rd party software
- Can perform simple file restore inside virtual machine for restoration of corrupt or deleted file
- Can perform complete server restore by restoring virtual machine from last external backup, with the ability to restore any internal backups that occurred on subsequent days

Disaster Recovery – Other Considerations

- Backup Storage – Onsite and Offsite
- Hardware for recovery
- Software for recovery
- Location for recovery
- Instructions for recovery
- How does the virtual machine strategy tie in to the rest of the environment?

Case Study – Disaster Recovery Strategy

- Utility in Alaska
- Multiple ESX server (2.5.x) on SAN
- Single Site
- Majority of servers running as virtual machines
- Network based backup solution already in place (IBM Tivoli)

- Goal – one solution that works for all backups, including virtual machines

Case Study – Disaster Recovery Levels

- Missing or corrupt files on a server
- Service failure on a server
- Single server failure
- Site level failure

- All recoveries must work for both physical and virtual machines

Case Study – Site Level Disaster Recovery

- Identify critical services that must be restored
- Identify and collect necessary software and store securely
- Identify critical contacts and store securely offsite
- Store all critical data offsite
- Arrange offsite hardware
- Develop documentation for recovery process and store securely offsite
- Test recovery process

Case Study – VMware backup strategy

- Centralized backup strategy using IBM Tivoli
- Combination of internal and external virtual machine backups
- Schedule outage of virtual machines for external backup
- Use different namespace in Tivoli for hosts than for external virtual machine backups
- Use same namespace in Tivoli for all external virtual machine backups

Case Study – Tivoli Configuration

- Each ESX server backed up separately
  - Tivoli client installed
  - No vmfs partitions included
- All virtual machines run Tivoli client internally
  - Internal backup performed nightly
- All virtual machines backed up as files through scripts
  - Separate dsm.opt file
  - Separate section in dsm.sys
  - Separate node name

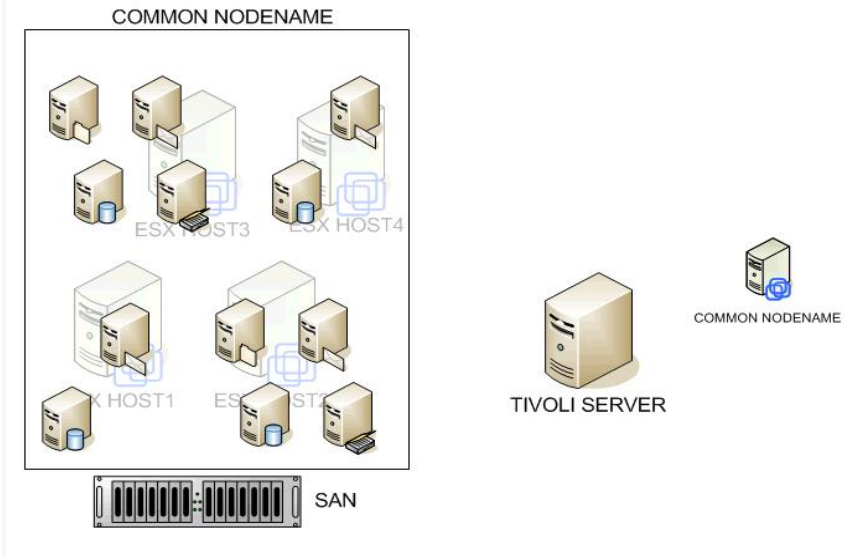
Case Study – dsm.sys file

```
Servername esxserverx
CommMethod tcpip
TcpPort 1500
TcpServerAddress tivoli.server.address

Servername virtualmachines
CommMethod tcpip
TcpPort 1500
TcpServerAddress tivoli.server.address
MAKESPARSEFILE NO
NODENAME virtualmachines
VIRTUALMOUNTPOINT /vmfs/san
VIRTUALMOUNTPOINT /vmfs/local
```

Case Study – Why Use Tivoli Nodenames?

- Nodename used to track files
- Regardless of number of ESX servers, same nodename can be used for backing up virtual machines
- If virtual machine is moved to another ESX server, manually or using VMotion, file will be consistently tracked.
- Restores of virtual machines can include prior versions using Tivoli storage features.



Case Study – When To Back Up Virtual Machines

- Suspends for backups were acceptable for all virtual machines
  - It was simply a matter of timing
  - Did not impact the view in the organization of server downtime
  - Monitoring software modified to allow server to be down without triggering events
- Backups were scheduled based on size and when services could be down
  - Tried to keep total amount of data backup up each day steady
  - Gigabit connection – able to backup 1GB/min

Case Study – Scheduling Backups

- Perl script used to perform backups
- Scheduled to run hourly
- Master file of all vms was created and used to control backups
  - Day of week and time of day controlled in file
  - Multiple days could be selected
- If virtual machine was moved from one host to another, backup schedule not affected
- Script could also be used for manual backups
- Tivoli logs parsed and used to create web based report of results

Case Study – Backup Script Overview

- List of registered virtual machines on host created
- List compared to master file to flag any not in file
- For each virtual machine, identify if time to backup
  - Read vmx file to determine vmdk files to backup and suspend location
  - Suspend virtual machine
  - Use Tivoli to backup vmdk files, REDO files (if any), suspend file, and corresponding home directory
  - Resume virtual machine
- Collect log files for reporting
- Copy of script available – kurt@cncsinc.com

Case Study – Disaster Recovery Plan

- Create Tivoli server
- Restore Tivoli database
- Load tapes into system
- Create ESX server
- Install Tivoli client
- Restore virtual machine drives (and home dirs if needed)
- Register or create virtual machines using restored drives
- Restore physical servers using Tivoli bare metal restore functions

- Prior to VMware - success rate was very low – over 5 days with no access to data actually available
- Using VMware in DR strategy, in 3 days they can have most critical systems up and completely functional

Case Study – Benefits of Approach

- Simple approach
- Eliminates the use of redo files for backups
- Perl script approach could be adapted for other uses, such as database and other file backups
- Disaster Recovery plan kept simple
- Solution works well for site disaster, SAN disaster, and server or service disaster

Virtual Infrastructure 3 – Disaster Recovery

- Consolidated Backup
- Controlled using /etc/vmware/backuptools.conf
- Additional Information at VMworld 2006
  - LAB3801 - VCB for Disaster Recovery
  - BCT9552 - VI3 Capabilities for Improving Disaster Recovery
  - BCT4540 - Integrating VCB into Your Backup Infrastructure: Best Practices for Implementation and Customization
  - BCT5070 - Leveraging VMware ESX Server in Disaster Recovery Solutions
  - TAC4016 - Integrating ESX Server 3 with Data Protection Software
  - TAC9816 - Hot Backups and Restores for VMware ESX Server: A '1-2' Punch Backup Methodology
  - TAC9912 - Nondisruptive Backup of VMware Environments Using VERITAS NetBackup
  - MDC9870 - Backup and Recovery of Virtual Machines

Conclusion

- For an effective disaster recovery plan
  - Identify scope of disaster
  - Determine acceptable down time for virtual machines
  - Implement a strategy that is simple and flexible
  - Document process
  - Have 3rd party test process

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