Virtual Server Backup, Replication & Recovery

August 27, 2012
Gaylord National
Room: National Harbor 12,13
Washington, DC
Speakers:

• Jeff Silverman, Kraft Kenney, Moderator
• Jim McCue, Rodey Law Firm
• Steven Cotes, Perkins Coie
• Roy Koh, Kegler, Brown, Hill & Ritter
Industry Trends

Jeff Silverman
Senior Consultant
Kraft Kennedy
silverman@kraftkennedy.com
Industry Trends

Use of server virtualization continues to increase...

Data center is largely or completely virtualized

- 2011: 57%
- 2010: 44%
- 2009: 28%
Industry Trends

...as does use of SANs.

We don’t use SAN

- 2009: 31%
- 2010: 22%
- 2011: 17%
Industry Trends

Use of traditional backup systems like Backup Exec is declining...

WHAT BACKUP SOFTWARE DOES YOUR FIRM USE IN-HOUSE? (Check all that apply)

<table>
<thead>
<tr>
<th>Year</th>
<th>Symantec/VERITAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>48%</td>
</tr>
<tr>
<td>2010</td>
<td>52%</td>
</tr>
<tr>
<td>2009</td>
<td>55%</td>
</tr>
</tbody>
</table>
Industry Trends

...while firms increase use of disk-based backup,

**DO YOU USE “DISK-TO-DISK” BACKUP TECHNOLOGY FOR DATA RECOVERY?**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>76%</td>
<td>73%</td>
<td>71%</td>
</tr>
</tbody>
</table>
Industry Trends

...increase use of replication technology,

DO YOU USE REPLICA SOFTWARE TO AUTOMATE THE REPLICA OF CRITICAL DATA? IF SO, WHICH SOFTWARE? (Check one)

No/None

- 2011: 43%
- 2010: 49%
- 2009: 50%
Industry Trends

...and slowly begin to explore online backup.

<table>
<thead>
<tr>
<th>WHAT BACKUP SOFTWARE DOES YOUR FIRM USE IN-HOUSE? (Check all that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online backup service provider</td>
</tr>
<tr>
<td>10%</td>
</tr>
</tbody>
</table>
EqualLogic and Veeam

Jim McCue
Information Systems Manager
Rodey Law Firm
jmccue@rodey.com
Rodey Environment

- Overview
  - 75 attorneys/150 people/2 offices
  - 30 mb QMOE WAN

- Virtualization
  - 80% virtual
  - 2 datacenters (Albuquerque, Santa Fe)
  - 5 VMware 4.1 esxi hosts w H/A
  - 25 Guests
    - Exchange 2010
    - Aderant
    - Autonomy
    - BES, File Servers, DCs, MailMarshal
Rodey Environment

- EqualLogic SANS
  - Albuquerque 2 x PS6000XV
    - 13 TB usable
    - 3.5 TB data + replication
  - Santa Fe PS6000E
    - 11 TB usable
    - 3 TB data + replication
- Local disk backup storage
  - Albuquerque
    - Drobo B1200i: 12TB
  - Santa Fe
Rodey Goals

• RPO (Recovery Point Objective)=4 hour
• RTO (Recovery Time Objective)=4 hours, 8 hours
  – Tier one applications=4 hours
    • Network Authentication
    • E-Mail
    • Documents
    • Time Entry & Billing
  – Tier two applications=8 hours
    • E-discovery & Litigation DBs
    • BES
    • Citrix
Rodey Goals

• D/R
  – Move operations to one office
  – Replication
• Restores
  – VM Level Recovery
  – Application Level Recovery
• Files, SQL, Exchange, A/D
• Archive to tape
EqualLogic

- Thin provisioning
- Snapshots
- Replication
- EqualLogic Snapshot Manager/VMware Edition (ASM/VE)
  - VMWare Tools quiescence
  - VMWare consistent image
- EqualLogic Snapshot Manager/Microsoft Edition (ASM/ME)
  - Volume Shadow Copy: Exchange, SQL
  - Requires guest attached storage
  - Transactional consistent image
  - No log truncation
Veeam

- Deduplication
- Compression
- Changed Block Tracking (VMware CBT)
- Application aware processing: Exchange, SQL, AD, Sharepoint
  - Veeam agent -> MS VSS agents
  - No permanent guest agent
  - Transactional consistent image
  - Log truncation
Veeam 6 – distributed processing
Veeam (cont)

- **Backup**
  - Full, Incremental, Reverse Incremental

- **Replication**
  - Full + VMWare snapshots
Veeam

- **SureBackup**
  - Verification
- **Restores**
  - Instant Recovery
  - VM
  - Guest Files
  - Application Items
- **Replication**
  - Failover (what happens)
  - Failback (what happens)
EqualLogic & Veeam

- Implementation at Rodey
  - Backups
  - Replication
  - Snapshots
  - Screenshots
- Application specific tips/examples
- Things to watch out for
- Summary
Steven Cotes, CISSP
Senior Systems Engineer
Perkins Coie
scotes@perkinscoie.com
NetApp

- Overview: Perkins and NetApp
  - Using NetApp for almost 3 years
  - Initial deployment for Exchange and Supporting Applications (SQL, BES, etc.)
  - 3 - distinct blocks of data model (w/ snapshots)
    - Supports HA requirements
    - Meets BU / Recovery requirements
    - Provides DR Capabilities
NetApp

Perkins Virtual Environment

- Globally > 600 VMs (Prod, Test, Dev, etc.)
- 2 Data Centers: Seattle & Chicago
  - Seattle > 200  - Chicago > 30
- Protocols in use: CIFS, FC, iSCSI, NFS
  - ESX using FC and NFS
- Deduplication: 14% to >40% / datastore
- Replication: Block Level local and remote
NetApp

Configuration and Management: VSC

- VSC: Virtual Storage Console
  - VCenter Plug-in
    - Define Backup Jobs including Dataset (volume), Schedule, Retention and Warnings/Alarms
    - Verify and Correct if needed Host Connection Settings (Adapter, MPIO, NFS)
  - Other:
    - Data Collection
    - Provisioning
    - Optimization
NetApp

Functionality

• Backup – VSC Job
  Scheduled Block-level snapshot of VMWare snapshots followed by triggered SnapMirror replication(s)

• Restores
  ▪ Full System Rollback to a Backup Point
  ▪ Clone of any Snapshot with choice of recovery target
  ▪ Single File Restore from within a Snapshot

• DR
  ▪ Break Mirror, Mount Volumes, Power on VMs
  ▪ Other Details: Re-IP, Change CNAMEs
### Storage Controllers

<table>
<thead>
<tr>
<th>Controller</th>
<th>IP Address</th>
<th>Version</th>
<th>Status</th>
<th>Free Capacity</th>
<th>VAAI Capable</th>
<th>Supported Protocols</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc1esa02a</td>
<td>10.173.1.12</td>
<td>8.8.1.14</td>
<td>Normal</td>
<td>15.37TB (47%)</td>
<td>Enabled</td>
<td>FCoE</td>
</tr>
<tr>
<td>dc1esa02b</td>
<td>10.168.0.27</td>
<td>8.8.1.14</td>
<td>Normal</td>
<td>17.93TB (58%)</td>
<td>Enabled</td>
<td>FCoE</td>
</tr>
</tbody>
</table>

#### HA Pair: dc1esa04a/dc1esa04b

<table>
<thead>
<tr>
<th>Controller</th>
<th>IP Address</th>
<th>Version</th>
<th>Status</th>
<th>Free Capacity</th>
<th>VAAI Capable</th>
<th>Supported Protocols</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc1esa04a</td>
<td>10.168.0.226</td>
<td>8.0.2.14</td>
<td>Normal</td>
<td>16.91TB (50%)</td>
<td>Enabled</td>
<td>NFS, ISCSI</td>
</tr>
</tbody>
</table>

#### HA Pair: dc1esa05a/dc1esa05b

<table>
<thead>
<tr>
<th>Controller</th>
<th>IP Address</th>
<th>Version</th>
<th>Status</th>
<th>Free Capacity</th>
<th>VAAI Capable</th>
<th>Supported Protocols</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc1esa05a</td>
<td>10.168.0.228</td>
<td>8.0.2.14</td>
<td>Normal</td>
<td>30.22TB (64%)</td>
<td>Enabled</td>
<td>NFS, ISCSI</td>
</tr>
</tbody>
</table>

### ESX Hosts

<table>
<thead>
<tr>
<th>Hostname</th>
<th>IP Address</th>
<th>Version</th>
<th>Status</th>
<th>Adapter Settings</th>
<th>MPIO Settings</th>
<th>NFS Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc1appseq27</td>
<td>10.168.0.66</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq28</td>
<td>10.168.0.135</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq01</td>
<td>10.168.1.221</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq02</td>
<td>10.168.1.222</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq03</td>
<td>10.168.1.223</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq04</td>
<td>10.168.1.224</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>dc1appseq05</td>
<td>10.168.0.231</td>
<td>4.1.0</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Last update: Tue Jul 24 06:01:02 GMT-700 2012
## All Backup Jobs

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Schedule Type</th>
<th>Schedule Time</th>
<th>Schedule Recurrence</th>
<th>Last Run Status</th>
<th>Schedule Status</th>
<th>Retention</th>
<th>Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1_NFS_TEST_4A_...</td>
<td></td>
<td>daily</td>
<td>11:30 PM</td>
<td></td>
<td>success</td>
<td>active</td>
<td>30 days</td>
<td>Errors or Warnings</td>
</tr>
<tr>
<td>DC1_NFS_SA_4</td>
<td></td>
<td>hourly</td>
<td>12:15 AM</td>
<td>4</td>
<td>success</td>
<td>active</td>
<td>30 days</td>
<td>Errors or Warnings</td>
</tr>
<tr>
<td>DC1_NFS_SA_3</td>
<td></td>
<td>hourly</td>
<td>12:15 AM</td>
<td>4</td>
<td>success</td>
<td>active</td>
<td>30 days</td>
<td>Errors or Warnings</td>
</tr>
<tr>
<td>DC1 Daily BU - No Mirr... DC1 Standard ...</td>
<td>daily</td>
<td>9:30 PM</td>
<td></td>
<td></td>
<td>success</td>
<td>active</td>
<td>7 days</td>
<td>Errors</td>
</tr>
<tr>
<td>SEA_NFS_1B_SATA_... Every 4 hours</td>
<td>hourly</td>
<td>3:30 AM</td>
<td>4</td>
<td></td>
<td>success</td>
<td>active</td>
<td>30 days</td>
<td>Errors or Warnings</td>
</tr>
<tr>
<td>SEA_NFS_1A_SATA_... Every 4 hours</td>
<td>hourly</td>
<td>3:30 AM</td>
<td>4</td>
<td></td>
<td>success</td>
<td>active</td>
<td>30 days</td>
<td>Errors or Warnings</td>
</tr>
</tbody>
</table>

## Entities

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>UUID</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1_NFS_4A_5_Test_NoDR</td>
<td>netfs:///10.168.101:226i/voESX_Test_4a_vol1_10k_NoDR</td>
</tr>
</tbody>
</table>
NetApp

User Impacting Results

• Multiple Intra-Daily Restore Points
• Reduced Window of Potential Data Loss
• Relatively Fast Restores (multiple locations)
• Relatively Quick Restoration of Services
Microsoft Hyper-V

Roy Koh
Network Administrator
Kegler Brown Hill & Ritter
rkokh@keglerbrown.com
Our IT infrastructure in 2008

• Document Management System: netdocuments®

• Not Virtualized:
  – Exchange 2007
  – SQL Server
  – All other apps

• Tape Backup

• Data & Applications: on the same server
2008: Big (un)Organized Mess
Goals in 2008

1. Separate data from applications
   - Virtualize apps
   - Makes for easy backup and restore

2. Virtualize Exchange 2010
3. Virtualize SQL Server
4. Virtualize domain controllers
Columbus, OH
Marion, OH
Cleveland, OH
2011
Why Microsoft Hyper-V?

Why not VMWare?
Standardization of Hyper-V servers

C: \(\rightarrow\) Windows Server OS

D: \(\rightarrow\) VHDs for the VMS
Nightly and Weekly Backups

backup of D: using BackupAssist to a hard disk sitting in a docking station, attached directly to the server with an eSATA Cable.
2010: 4 Hyper-V servers with 40 VMs
SIMPLE!

2012:
9 Hyper-V servers with almost 100 VMs
GETTING COMPLICATED!
Hyper-V R2

Early 2012

• In search of a new backup strategy
  – Simple to use
  – Centrally monitor/manage
  – Remote Administration
  – Centralized Reporting
  – Network to disk backup
  – Automation
Microsoft Data Protection Manager 2012

- MS System Center 2012 family
- Not only backs up Hyper-V
  - File data from volumes, shares & folders
  - Application data
    - MS Exchange storage groups
    - MS SQL Server databases
  - System state for protected file and app servers
    - Standalone metal servers
  - Powershell scripting (power users)
Protection Groups

System Center 2012 DPM Administrator Console

Protection Group: Hyper-V (Total members: 115)
- Computer: akame.name.inside.ksbr.com
- Computer: atm.name.inside.ksbr.com
- Computer: baku.name.inside.ksbr.com
- Computer: irme.name.inside.ksbr.com
- Computer: nephela.name.inside.ksbr.com

Details: baku.name.inside.ksbr.com
- Domain: inside.ksbr.com
- Number of protected: 8
Monitoring

A System Center 2012 DPM Administrator Console is shown, with a list of alerts. The alerts include Warning and Information entries. The screenshot also shows the details of an alert, indicating a warning about an agent operation failure, along with recommended actions to resolve the issue.
Recovery

System Center 2012 DPM Administrator Console

Recovery points for: Backup Using Child Partition Snapshot\BEC Sync 2008

Available recovery points are indicated in bold on the calendar.

Select the date from the calendar and the time from the drop down list for the recovery points that you want. Click recover in the Actions pane to open the Recovery Wizard.

- Recovery date: June 06 2012
- Recovery time: 6:38 PM
- Recovery from: Disk

Path: All Protected HyperV Data

Search for recoverable items.
Reporting

You can use DPM reporting to:
- Track the status of jobs
- Review disk and tape usage
- Monitor usage trends

In addition to viewing reports, you can also schedule reports, and subscribe to receive them via email.

Details: Disk Utilization Report

- Description: Summarizes disk capacity, disk allocation, and disk usage in the DPM storage pool.
- Schedule: Run once on 9/7/2012 at 2:00 PM
- E-mail: 0 subscribers
- History: 1 copy available
Management
BYO Backup Box

- Built our own backup box using SATA HDs

- Backup box
  Norco DS-12D
  3 x SFF-8088 external connectors
  12 x 3.5" Drive Bays
BYO Backup Box

Interface card:
LSI LSI00276 4 x SFF-8088
mini-SAS controller
PCI-Express 2.0 x8
Up to 6Gb/s

Connect these to the Hypervisor hosting the DPM VM
BYO Backup Box

We use 3 TB drives times 12 = 36 TeraBytes of Raw Storage!

DPM 2012 in a VM with direct access to the backup drives.
Primary Site DPM (deployed) replicated to Satellite office (deploying?)
Q & A