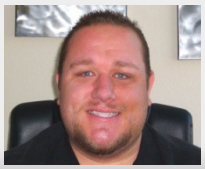
San Diego Data Processing Corporation

NetApp & VMware Strategic Planning



Presented by: Rick Scherer
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San Diego Data Processing Corp.

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About SDDPC

- **Founded in 1979 by The City of San Diego**
  - Wholly Owned and Operated as a Non-Profit Company
- **250+ Employees**
  - Fully Independent Company
  - Server/Application/Database Administrators, etc.
  - Programmers, Project Managers, Executive Management, etc.
- **7,000 sq. ft. Data Center Facility**
  - 450+ Windows Servers (HP)
  - 100+ UNIX Servers (Sun Microsystems)
  - 275+ TB of Storage (NetApp 6040, 6030, 960)
  - 25 VMware ESX 3.5 Hosts
- **Gartner Rated Top 10% of IT Service Providers**

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On-Going Technical Challenges

Server Sprawl

- One application per server is a bad design, but this is common for most vendors and applications

Resource Utilization

- Because we're deploying one application per server, we're only seeing 5-10% average CPU utilization

Deployment Time

- From design to deployment we would average a 2-3 week turnaround

Procurement Costs

- Your average x86 server costs between $4,000 and $10,000 – Not including your power, cooling, maintenance and other infrastructure costs

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Why VMware?

Industry Leader

- In 1999 VMware developed x86 Virtualization
- VMware is the Global Leader in x86 Virtualization
- The Advanced Capabilities in their software set them apart

Advanced Capabilities

- VMware DRS, High Availability, vMotion, Storage vMotion
- VMware Site Recovery Manager
- VMware Fault Tolerance (coming 2009+)

Deployment Time

- VMware VirtualCenter allows you to keep multiple Templates of your base Operating System installations, allowing you to deploy them within minutes

Better Performance!

- In some circumstances we're seeing BETTER Performance of running some applications within a Virtual Machine

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Why NetApp?

Prior success with NetApp storage

- Large Enterprise Oracle implementation
- Utilized storage for many other applications

Proven OnTap software features

- Flexclones, Snapshots, ASIS, SnapManager, SnapMirror

Proven Reliability

- 98%+ uptime since inception in 1998

Multi Protocol Support

- NFS, CIFS, iSCSI and FCP all in one appliance

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Why VMware on NetApp NFS?

Thin Provisioning

- Grow and Shrink your Datastore on the fly
  - Only use the storage your consuming
    - Thin Provisioning Volume and VMDK (automatic for NFS datastores)

Simplicity

- No more LUN IDs, FC Switches, Zones, HBAs
- No more SCSI Reservation Errors (No single disk I/O queue)

Better Performance

- Bandwidth matters little, IOPs and Response Time matter a lot
- Single Mount across multiple hosts (outside VMware ESX as well!)
- NetApp Filer supports IEEE 802.3ad Link Aggregation

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Why VMware on NetApp NFS?

Super Fast Restores

- All of our NFS Datastores have Snapshots taken every 4 hours
- Flexclone a snapshot in seconds and mount it to ESX Server
  - Mount the VMDK to a utility VM for file level restores, or;
    Register the flexclone'd VM for a 5-second Full Restore

SnapManager for VI

- Automate your NetApp snapshots complete with VM Quiescing
- Integrates with your SnapMirror schedule

Automated DR

- Site Recovery Manager w/ NetApp Site Recovery Adapter
- Works with SnapMirror for full recovery of your VM Datacenter
- Scheduled Automated DR tests quick and easily

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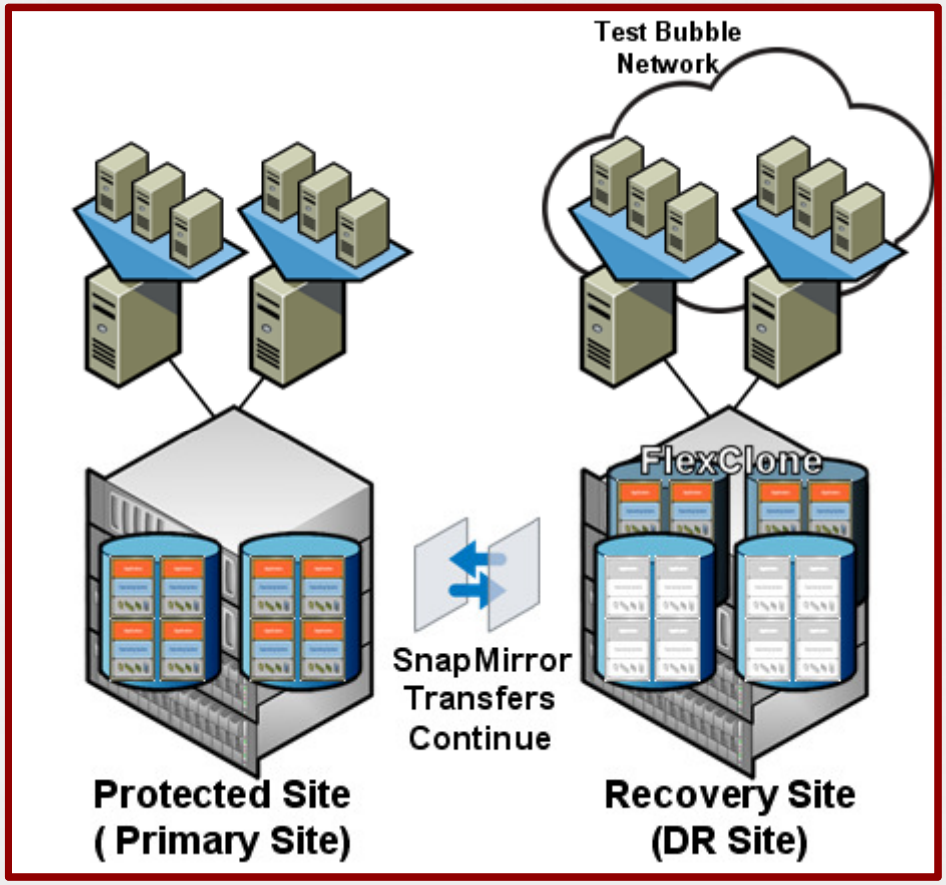
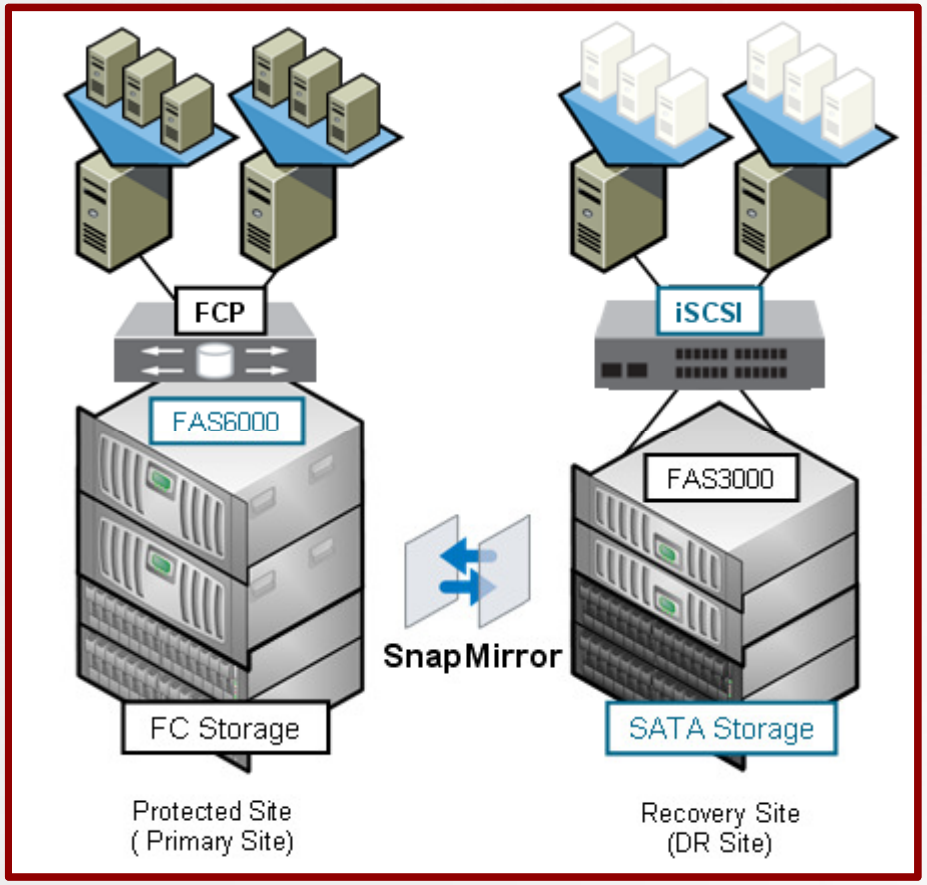
Why VMware on NetApp NFS?

Automated DR





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Why VMware on NetApp NFS?

Data De-Duplication (NetApp A-SIS)

- No additional cost
- Only supported on NetApp XXXX Series Filers (ie: 2050, 3100, 6030)
- Little to no performance degradation
  - None on data writes
  - Roughly 2-5% on reads based on data type
- Virtualization is the perfect candidate for Data De-Duplication!
- Achieve 60%+ Storage Savings!

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Real Savings in a Production Environment

```
[root@dpcrcvmesx1 root]# esxcfg-nas -l
samdoc is /vol/vol1/sam/doc/rick from gfas3 mounted
vmstore1 is /vol/vol501/dpcrcvmstore1 from sfas8 mounted
vmstore2 is /vol/vol507/dpcrcvmstore2 from sfas8a mounted
vmstore3 is /vol/vol154/dpcrcvmstore3 from sfas7 mounted
vmstore4 is /vol/vol155/dpcrcvmstore4 from sfas7a mounted
[root@dpcrcvmesx1 root]# ssh fas8

fas8> df -sh vol501
Filesystem               used      saved       %saved
/vol/vol501/             260GB     441GB          63%
fas8> df -sh vol507
Filesystem               used      saved       %saved
/vol/vol507/             172GB     571GB          77%
fas8> Connection to fas8 closed by remote host.
Connection to fas8 closed.
[root@dpcrcvmesx1 root]# esxcfg-nas -
[root@dpcrcvmesx1 root]# ssh fas7

fas7> df -sh vol154
Filesystem               used      saved       %saved
/vol/vol154/             139GB     247GB          64%
fas7> df -sh vol155
Filesystem               used      saved       %saved
/vol/vol155/             157GB     259GB          62%
fas7> df -kh vol154
Filesystem               total       used      avail capacity  Mounted on
/vol/vol154/             300GB     139GB     160GB      46%  /vol/vol154/
/vol/vol154/.snapshot      200GB       51GB      148GB      26%  /vol/vol154/.snapshot
fas7> snap list vol154
Volume vol154
working...

  %/used       %/total  date          name
----------  ----------  ------------  --------
  1% ( 1%)    0% ( 0%)  Nov 11 00:03  vmsnap.1
  6% ( 5%)    2% ( 1%)  Nov 10 00:03  vmsnap.2
 13% ( 7%)    4% ( 2%)  Nov 09 00:03  vmsnap.3
 15% ( 3%)    5% ( 1%)  Nov 08 00:03  vmsnap.4
 18% ( 4%)    6% ( 1%)  Nov 07 00:04  vmsnap.5
 20% ( 4%)    7% ( 1%)  Nov 06 00:03  vmsnap.6
 22% ( 4%)    8% ( 1%)  Nov 05 00:03  vmsnap.7
 25% ( 4%)    9% ( 1%)  Nov 04 00:03  vmsnap.8
 27% ( 4%)   10% ( 1%)  Nov 03 00:03  vmsnap.9
fas7>
```

Four NFS Datastores

Average 66.5% Savings

Nightly D2D Backups with SnapManager for VI

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Questions?

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