



NetApp™

Go further, faster™

NetApp Replication-based Backup

Peter Stempel
Systems Engineer



Data Protection Requirements



- Solid reliability



- Backup in minutes



- Recover in minutes



- Simple to deploy and manage

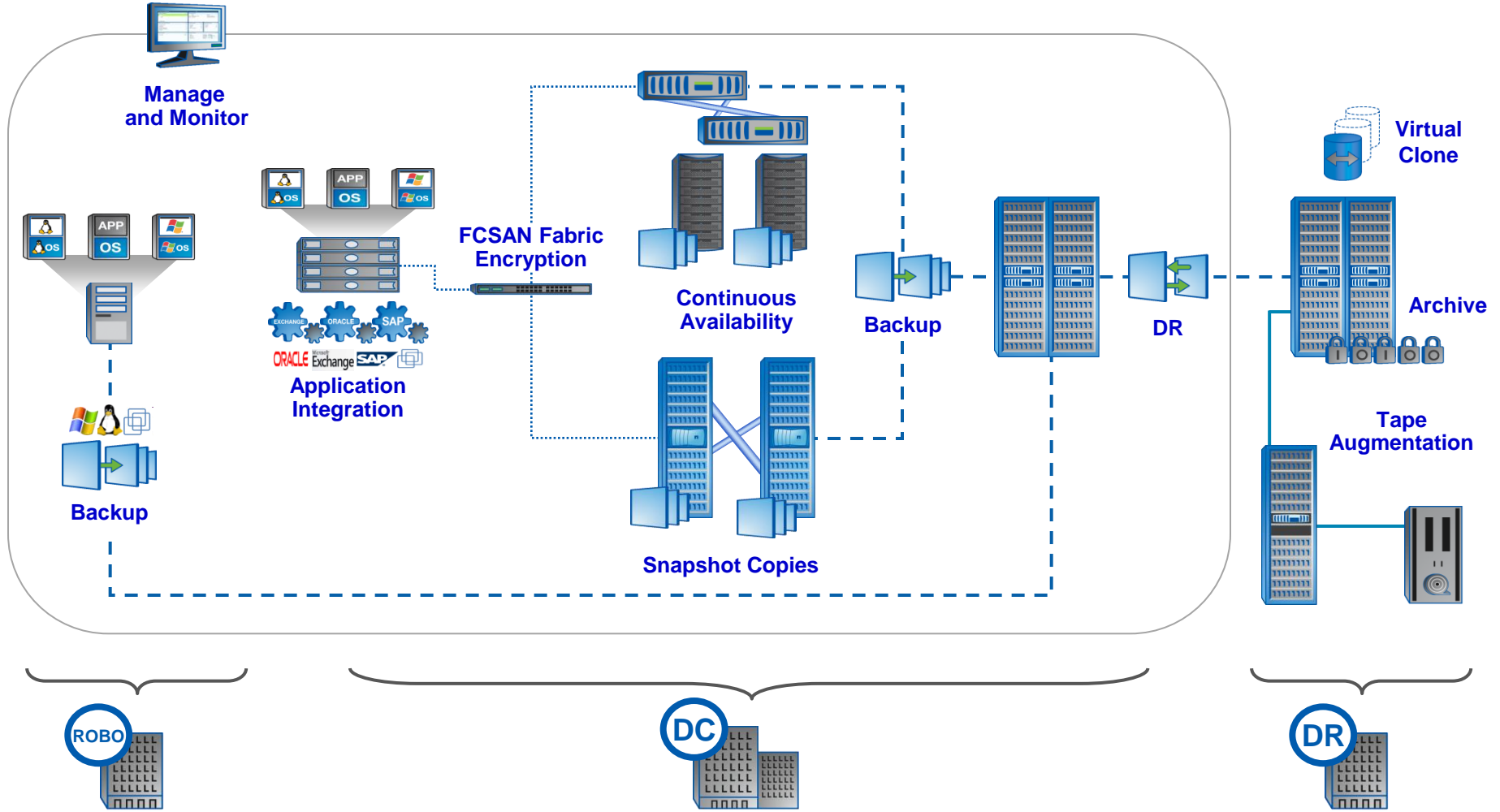


Design Principles

- **Efficiency** Maximize performance, Minimize storage footprint
- **Integration** *DataONTAP* + Oracle, Exchange, SAP, VMware
- **Simplicity** Automate policies, protection and provisioning
- **Flexibility** Create policies across backup, archive, HA, DR
- **Optimization** Reduce capital and operating costs by >50%

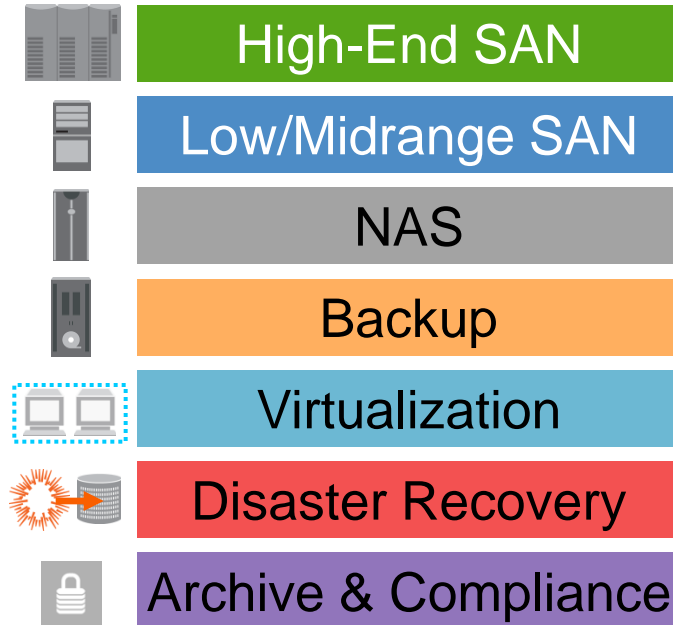


Data Protection In Action



Unified Architecture

Industry Approach



Different hardware
Different software
Different people
Different processes

NetApp®



FAS family
Data ONTAP®

Flexibility
Efficiency
Agility
Value

Same hardware
Same software
Same people
Same processes

Unified Architecture

Competitors

High-end
SAN



Replication
Product **A**



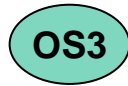
Low-end
SAN



Replication
Product **B**



NAS



Replication
Product **C**

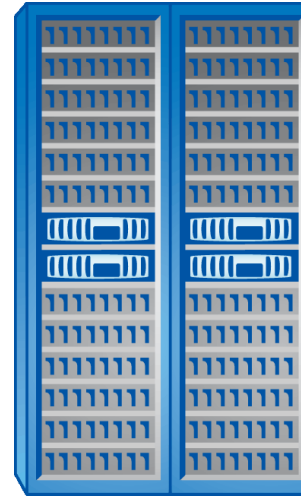


Compliance



Replication
Product **D**

NetApp



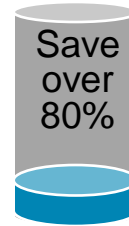
NetApp
Secondary
Storage

- Single platform
- SAN & NAS
- Integrated Backup
- Any-to-any
- Less training

Efficiency: Key Components



RAID 6 Protection
Protects against double disk failure with no performance penalty.



Snapshot™ Copies
Point-in-time copies that write only changed blocks. No performance penalty.



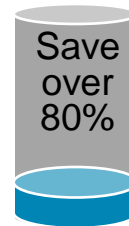
Thin Provisioning
Flexible volumes appear to be a certain size but are really a much smaller pool.



Deduplication
Removes data redundancies in primary and secondary storage.



Thin Replication
Disk-to-disk data protection saves up to 95%

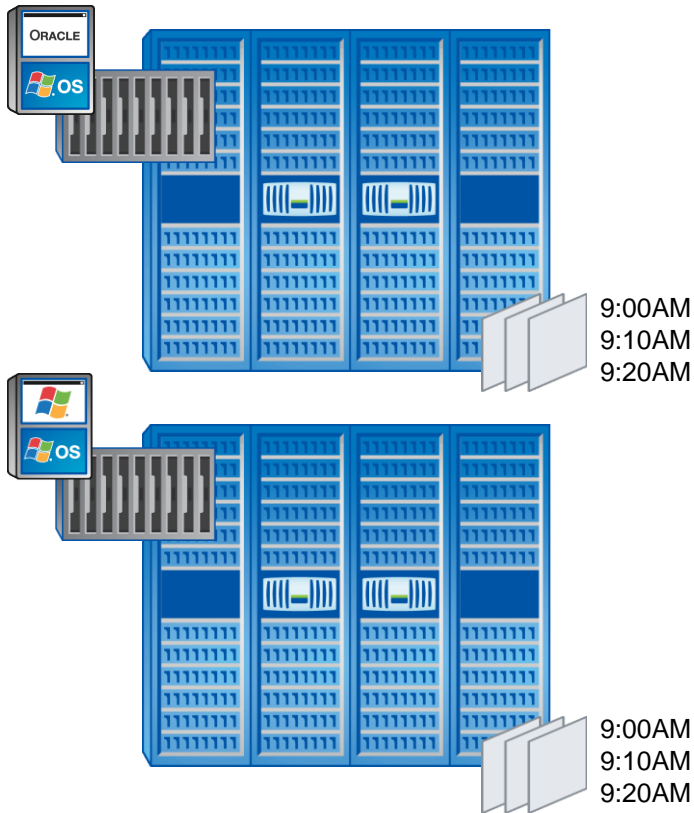


Virtual Clones
Near-zero space, instant “virtual” copies. Only subsequent changes in cloned data set get stored.

Efficiency: Compounding Across Tiers

Efficient Primary

- Thin provisioning
- Deduplication



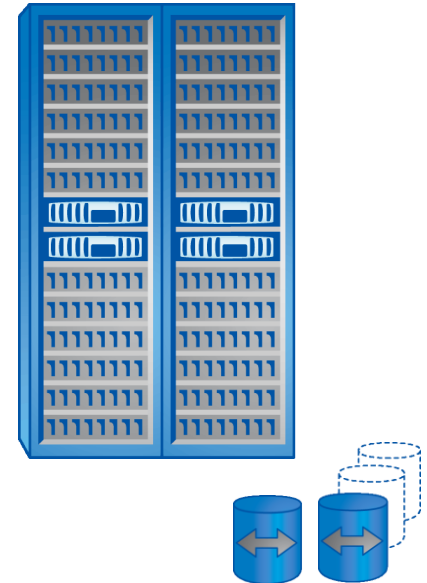
Efficient Replication

- Changed data transfer
- Network compression



Efficient Secondary

- Virtual Clones
- Deduplication

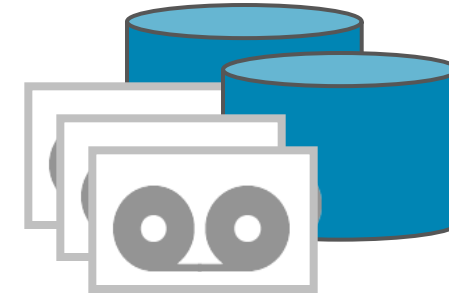
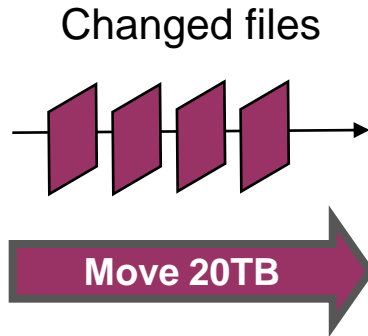




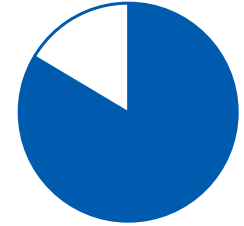
SnapVault and Open Systems SnapVault

Backup in Minutes. Store Less Data.

Traditional Backup

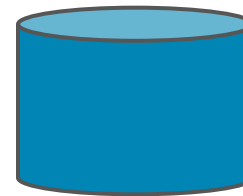
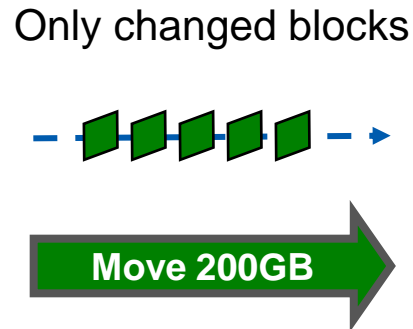


Tape or Disk

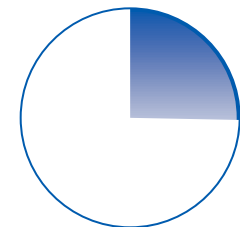


Hours

NetApp® Backup



NetApp
Storage



Minutes

[and less data stored!]

SnapVault and Open Systems SnapVault

Optimized D2D Backup Reduces Tape Costs

Space savings versus tape

- ▶ 12TB data
- ▶ Weekly fulls, daily incrementals
- ▶ 90-day retention
- ▶ 10% daily file-level changes
- ▶ 2% daily block-level changes
- ▶ Day 90: 34TB on disk; 250TB on tape.

 SnapVault®

 Tape

12TB 12TB



Day 1

13.5TB 19TB



Day 7

19TB



Day 30

76.8TB



34TB



Day 90

250TB





Customer Response to Mr. Backup

<http://blogs.netapp.com/exposed/2010/02/as-one-can-expect-from-curtis-very-through-overview-based-on-first-hand-experience-theres-not-much-to-argue-with--httpww.html>

Comments

We've been using NetApp snapshots and SnapVault for backup/recovery, DR & archives for years now. When I last left the project there were multiple petabytes installed.

However my favorite feature was the self-directed end-user restores. Since all snaps are read only, there was no risk in letting users recover their own data. Many figured out they could recover data granularly from the secondaries without even restoring their data back to the primary storage.

That was a major boost in both end-user and storage admin productivity. Glad to see the rest of the industry coming around to this approach!

I guess today this would all be called "Restore as a Service" :-D

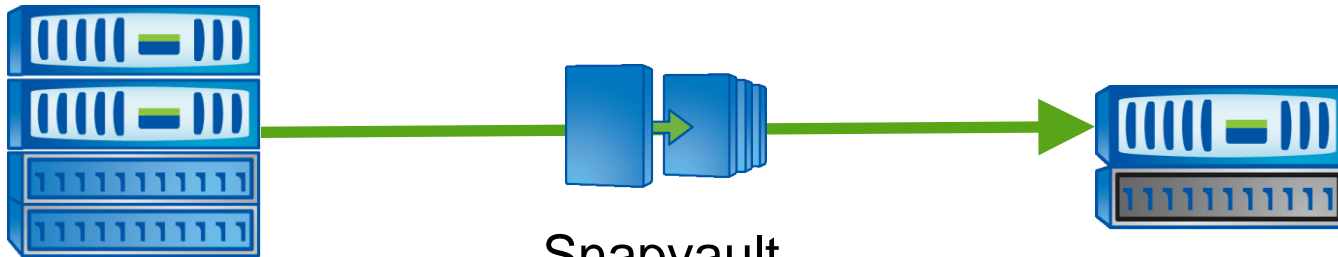
Posted by: [Rick](#) | [February 05, 2010 at 11:19 PM](#)

<http://www.citibank.co.uk/>

Healthcare Customer: Exchange



8000 Mailboxes
4.5TB Exchange DB
2TB Exchange logs



Snapvault
~0,2% per day

30 daily
4 each day

90 daily
40 weekly

Space used for Snapshots (Backup)

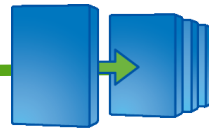
15%
975GB

35%
2.2TB

Financial Customer: CIFS




home- and group directories
for 30k users
100TB primary data



Snapvault
~2% per week



 Space savings
with Dedupe
28%

14 hourly
12 daily
4 weekly



4 weekly
10-20 monthly

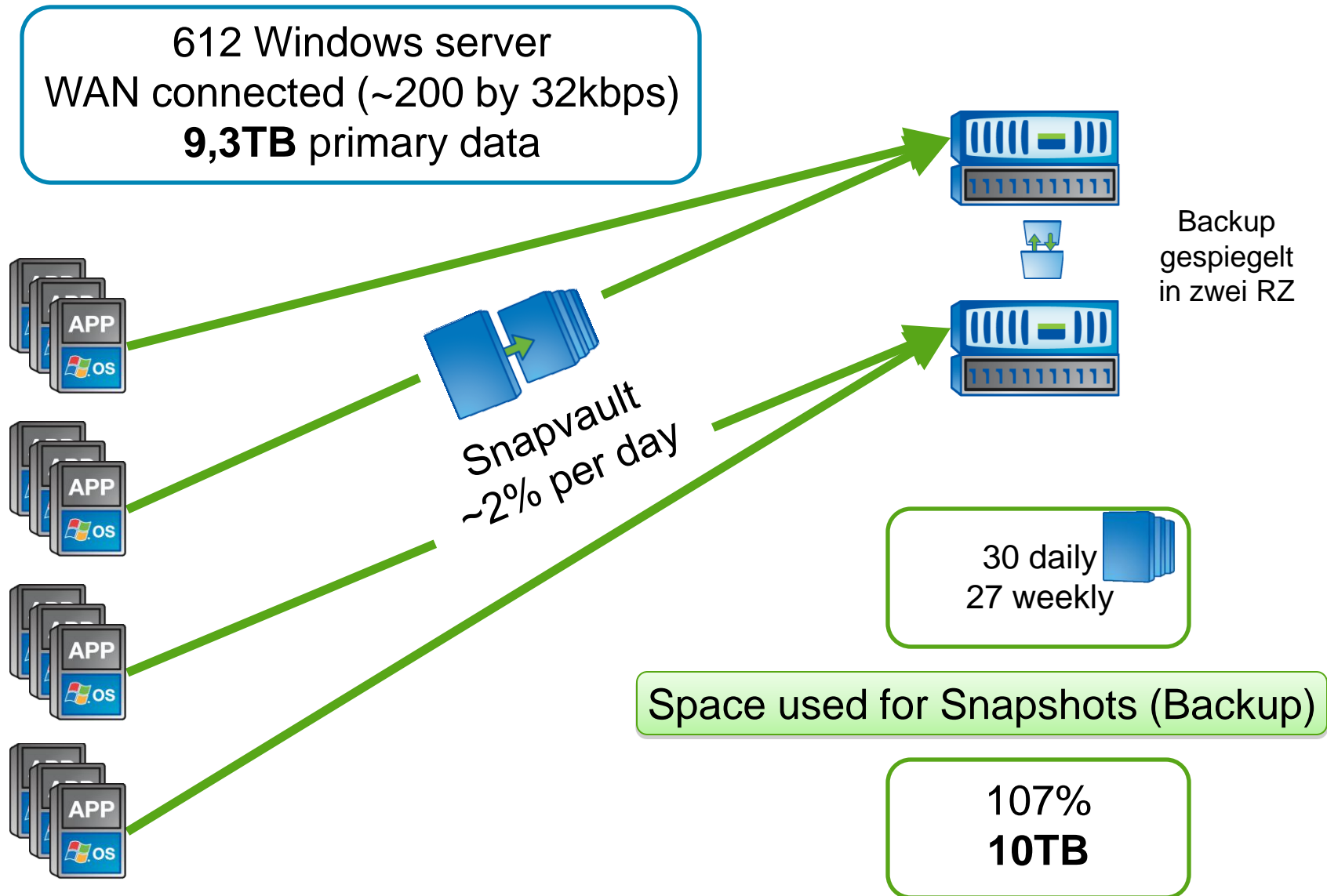


Space used for Snapshots (Backup)

13%
13TB

45%
45TB

Financial Customer: OSSV Windows



Financial Customer: VMware



9 ESX Servers
60 Server / 30 Wks (VDI) VMs
2TB primary data

Space savings
with dedupe
65%




Snapvault
~3% per day



Space savings
with dedupe
65%

7 daily 

100 daily 

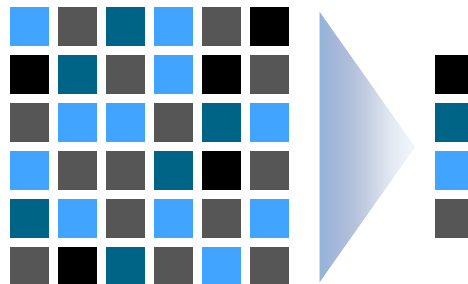
Space used for Snapshots (Backup)

30%
600GB

319%
6.4TB

Dedupe in Switzerland

- Analysis over 3364 dedupe enabled volumes with over 1,5PB of data
 - Average Space savings overall: 37%
 - Average Space savings on VMware Vols: 74%
- Enabled on over 395PB on 30'000 systems worldwide!



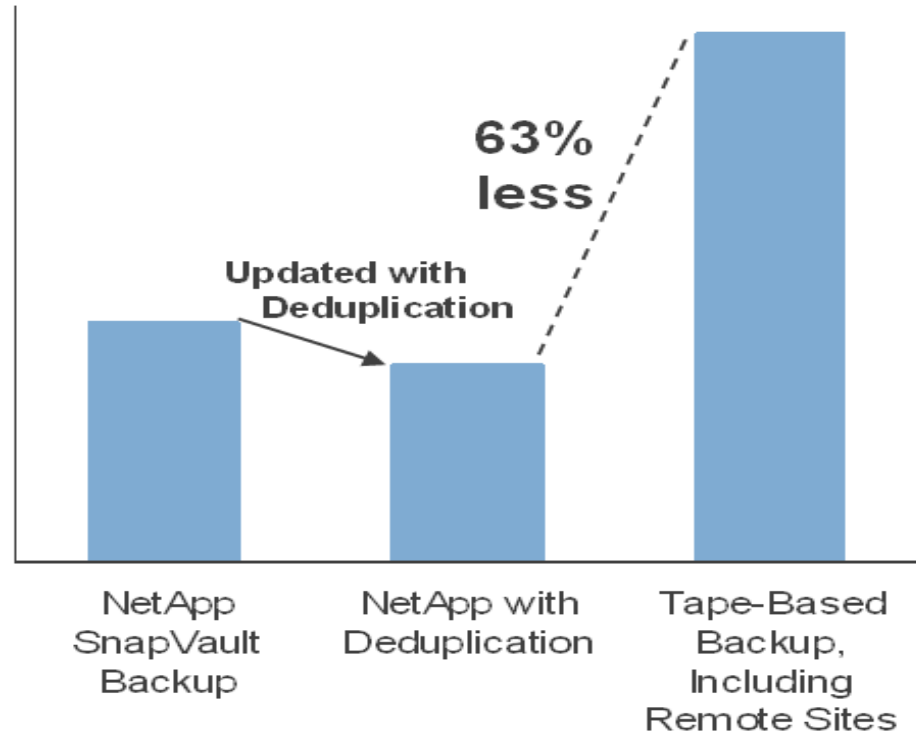


Oliver Wyman TCO Study

SnapVault + dedupe: 63% less expensive than tape-based backup

Total Cost Index

Acquisition, operations, support, and media costs normalized to overall total cost of NetApp® SnapVault® disk-to-disk backup



63% Cost Savings

1. Administrative overhead reduction
2. Tape acquisition and storage cost reduction
3. 10x increase in restore speed → downtime cost reduction
4. Dedupe + block incrementals → speed, reliability, consistency, efficiency



NetApp D2D Backup



- 16x faster backups, 6x faster restores
- 80% storage space savings
- Eliminated new tape infrastructure spending
- Budget re-allocated to SnapMirror tapeless DR

- 1PB backed up across 80 field offices, 6 design centers, 5000 employees
- 100% successful backups & restores
- Eliminated all future tape library purchases

- \$500,000 in administrative savings (2 FTEs)
- 100% system uptime with five nines availability
- 70% tapeless storage environment
- Reduced backup times from 2 days to 30 minutes
- Backup failure rate reduced from 25% to <1%



“If the data is online, NetApp OSSV gets it backed up. That kind of reliability is priceless. And since OSSV uses incremental updates, jobs complete in 30 minutes instead of two days. It’s rock solid.” Karl Konnerth, Director of Enterprise Operations, Affymetrix, 9/08

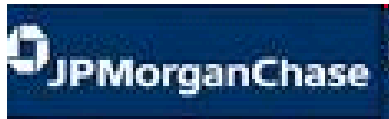
Delivering Value for Remote Office Backup



- 170+ systems forward deployed in operations
- 128Kb links used for agent-based replication



- 442 remote offices have eliminated tape
- 88% faster backups – nightly backups take 15 minutes

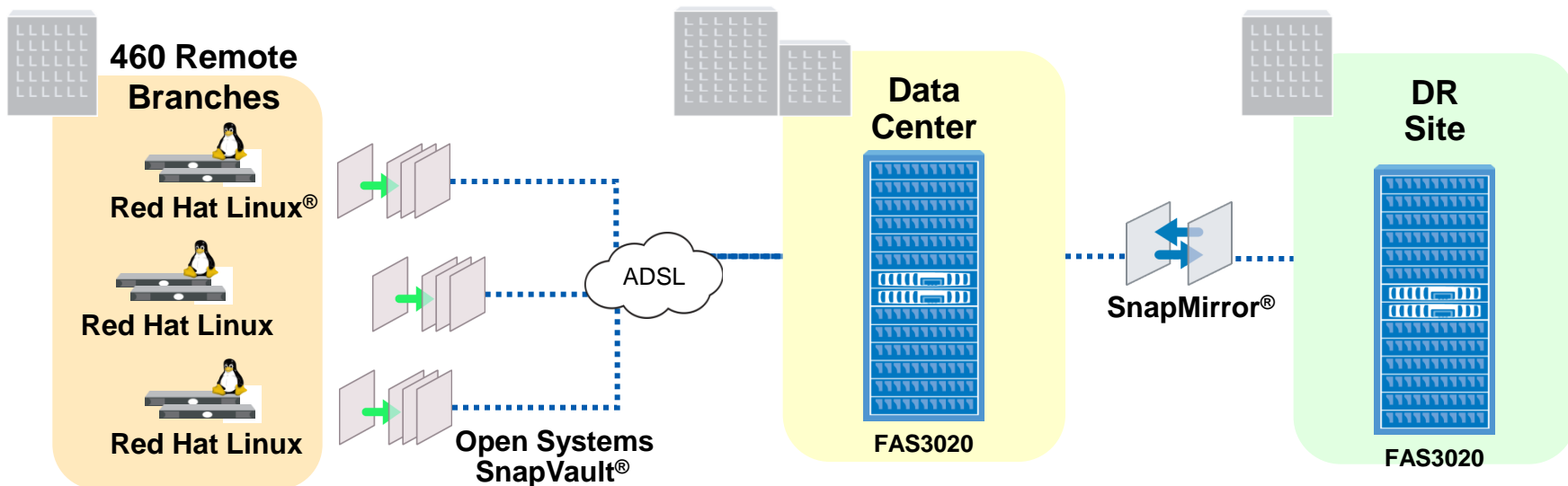


- 700 branch and remote offices
- 400 using smaller applications with replication
- 300 using agent-based backups



- 100s of offshore oil rigs backing up over 56K links

ROBO Backup Case: Swinton Insurance



- 460 locations—OSSV backup; SnapMirror DR; Protection Manager management
- Nondisruptive backups; 88% faster recoveries
- Eliminated tape at remote sites
- Replicating over 256kbp/sec ADSL lines (OSSV limits its consumption to 60%)

“With NetApp, we can **back up each office in 15 minutes** and can run 32 backups in parallel. And instead of 2½ to 3 hours of downtime every night for our sales applications, **we have reduced downtime to zero.**” - Rob Davidson, head of IT Infrastructure at Swinton

Simplicity: Protection Manager

Dashboards **Protection**

Failover Readiness

Normal

Ready 1

Total Data Sets 1

Top Five Events

Event	Source
Global Status: Critical	beany.lab.netapp.com
Host Down	bl-fas270c-3a.iop.eng....

Data Set Protection Status

Protection Failure	0
Lag Error	1
Lag Warning	0
Protection Suspended	0
Protection Uninitialized	0
Protected	1

Protected Data

Data Sets	2
Volumes	7
Qtrees	17
OSSV Directories	0

Unprotected Data

Data Sets	2
Volumes	98
Qtrees	143

Data Set Lags

manchester	4m 39s
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Resource Pools

Name	Total Size	Utilization
Silver_Pool	454.08 GB	99%
Gold_Pool	510.84 GB	39%
Bronze_Pool	20.69 TB	26%

Failure Readiness

SnapMirror / SnapVault Events

Protection Status

Unprotected Data

Logs

Efficiency



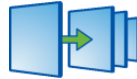
NetApp D2D Backup Value



Protection Manager



Open Systems SnapVault



SnapVault



SnapMirror



Thin Replication

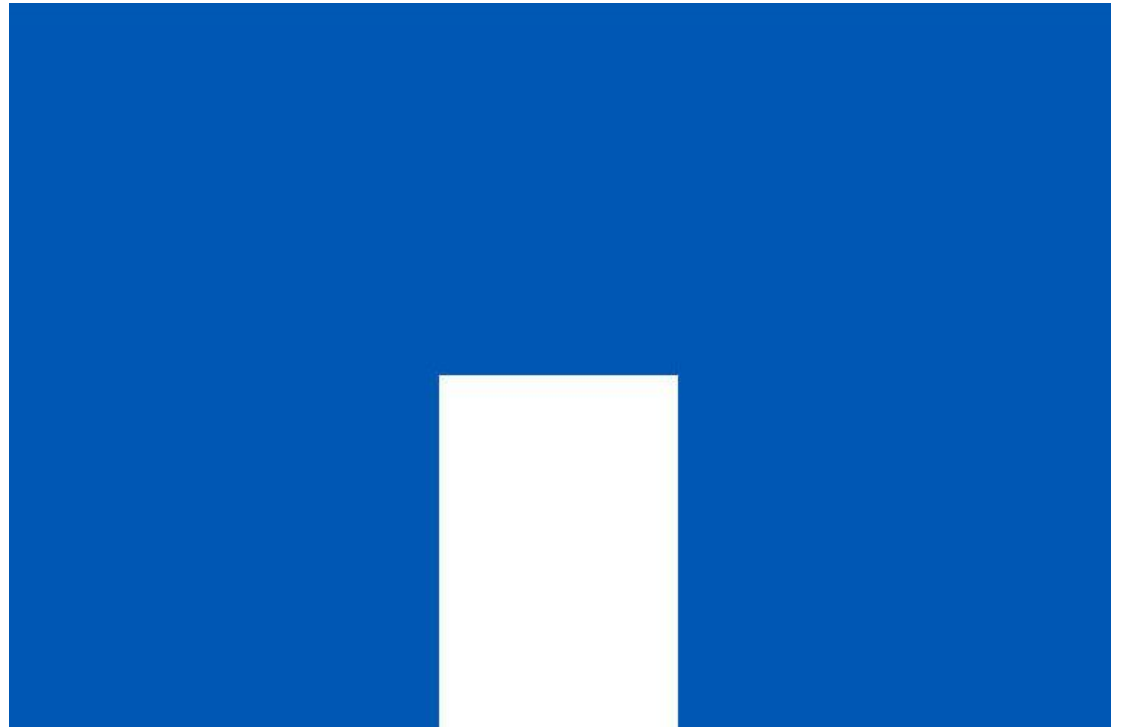


NetApp Deduplication

- **Faster** Backup in minutes
- **More Reliable** Consistently achieve 100% success rates
- **Easier to Manage** Autodiscover, autoprovision, autoprotect
- **Network Efficient** Thin Replication
- **Storage Efficient** 90% space savings w/ deduplication
- **Cost Effective** 63% less expensive than tape backups



Thank You



Data Protection Products





What is it?

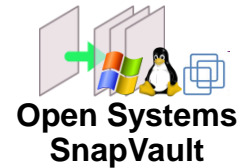
- Backup license
 - NetApp[®] storage via Data ONTAP[®]

What does it do?

- Back up NetApp storage to NetApp storage
 - Creates backups in seconds
 - Block-level incrementals
 - Centralizes ROBO backups over WAN; eliminates remote site tapes
 - Keeps multiple backups online and available
 - Enables self-service restore



Open Systems SnapVault



What is it?

- Backup agent
 - Windows[®], Linux[®], UNIX[®], VMware[®] ESX

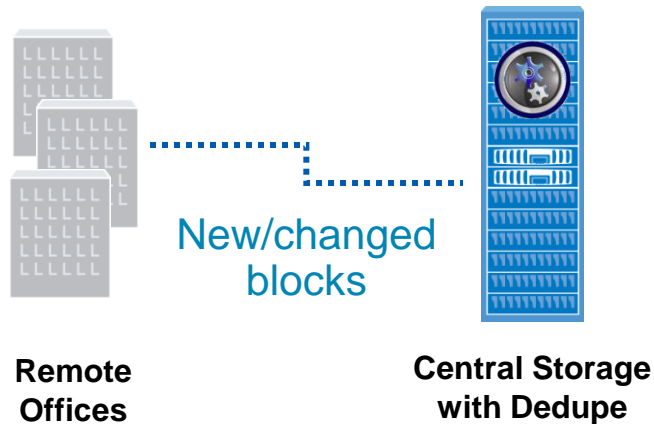
What does it do?

- Back up any storage to NetApp[®] storage
 - Block-level incrementals (only changed blocks are transferred/stored)
 - Reduce network traffic and storage footprint
 - Centralize ROBO backups over WAN
 - Eliminate remote site tapes
 - Protect data center file systems and virtual servers

Open Systems SnapVault

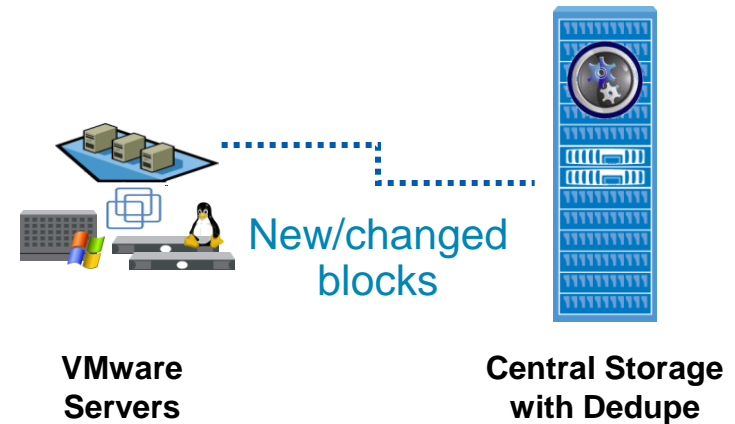
Remote Offices and VMware

Remote Office Solution



- Eliminate remote site complexity
- Scales to thousands of sites

VMware Solution



- Full VMDK level restore
- VMotion support (via VirtualCenter)

- Bandwidth *and* storage efficient
- Simple, easy to use, fast, reliable!
- Centralized management



SnapVault and SnapMirror

■ SnapVault®

- Backup and Restore
 - Destination always read-only
- Can backup every hour
 - RPO is 1 hour or more
- Long-term retention
 - Keeps multiple file versions
- Many recovery points online
 - CIFS/NFS accessible
- One-way transfers*
 - IP connections

■ SnapMirror®

- Disaster recovery
 - Destination can be read-write
- Can mirror every minute
 - RPO usually minutes
- True mirroring technology
 - Deletions reflected in mirror
- Low RTO
 - Supports failover/failback
- Bi-directional transfers
 - IP or FC connections



What is it?

- Backup agent / Management agent
 - Exchange, Oracle, SQL

What does it do?

- Consistent Backups, Automated Management for NetApp Storage
 - Automated, application consistent backup
 - With SnapMirror, SnapVault, Protection Manager
 - ‘Single button’ failover and failback
 - Application and database recovery in minutes
 - Large scale deployments and migrations



NetApp™

Protection Manager



Protection
Manager

What is it?

- Management application
 - SnapMirror®, SnapManager®, SnapVault®, Open Systems SnapVault

What does it do?

- Simple policy-based management
 - Automatically discovers new data
 - Automatically provisions secondary storage
 - Automatically executes data protection policies
 - Eliminates manual configuration
 - Provides automated exception reporting
 - Streamlines management for up to tens of thousands of relationships

“We’ve grown our disk capacity by some 700% and yet have actually reduced our department size by more than 30%.” –Bradley Lauritsen, Apache Corporation team lead



Our Credentials

> **500,000**

Terabytes protected for disaster recovery or backup purposes

> **45,000**

Deduplication-enabled systems

> **65,000**

Systems use replication-based data protection

> **60,000**

Servers backed up using our open systems backup technology

> **60%**

F100 companies use NetApp replication-based data protection

Strategic Direction

- Convergence of disk-based disaster recovery and backup
- Transparent protection for scale-out architectures
- Advanced protection for fully virtualized, cloud-based deployments





Thank You

