

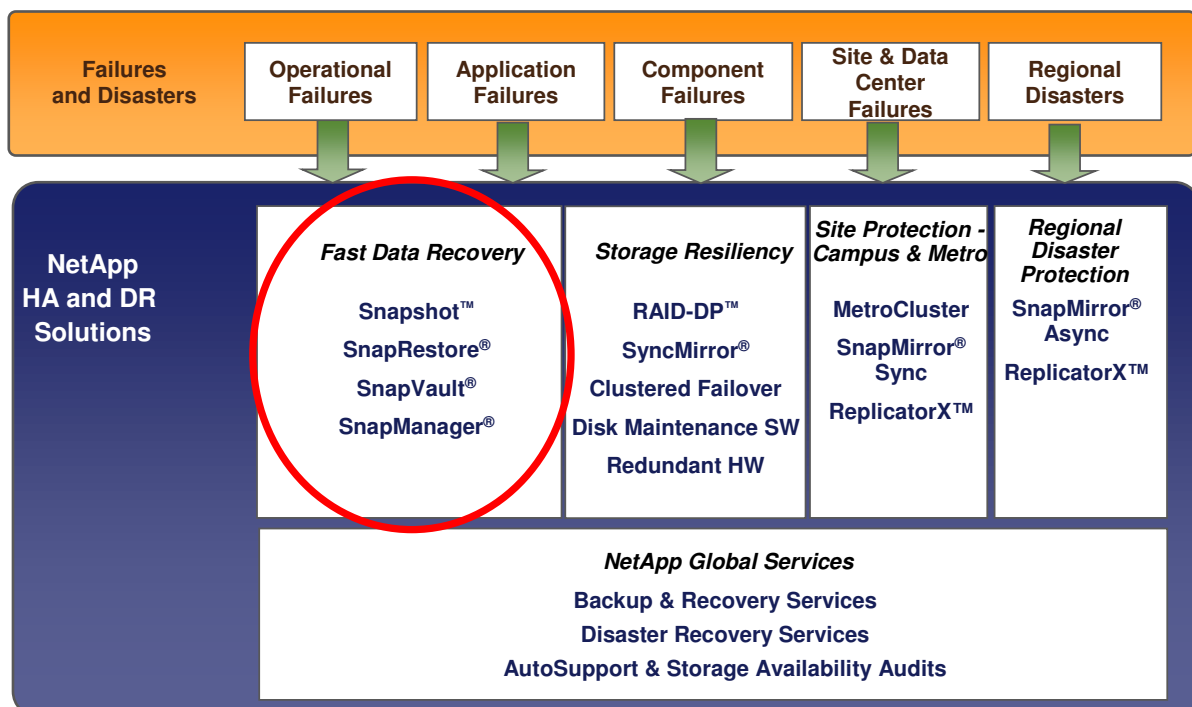


# Effective SnapShot Backups

Christian Rubitzko  
Systems Engineer



## NetApp HA and DR Solutions





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- ▶ Up to 255 Snapshots per Volume
- ▶ not the „common“ way (no „Copy-on-write“)
- ▶ No performance degradation
- ▶ More space efficient
- ▶ integral (native) part of our Filesystem / OS
- ▶ no license costs

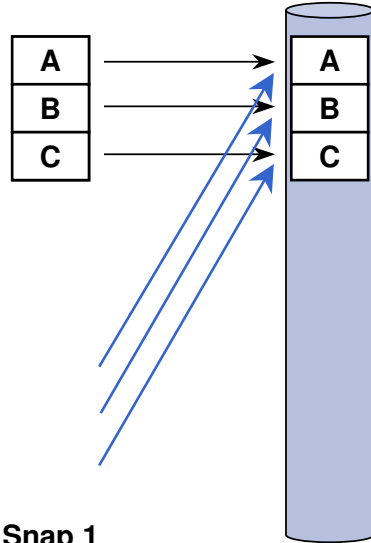
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Blocks in LUN or File

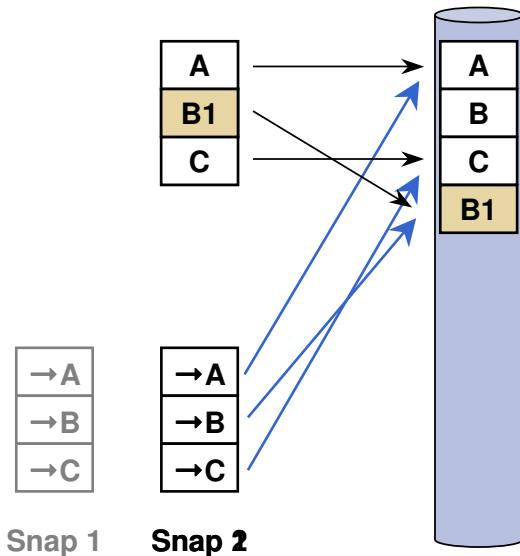
Blocks on the Disk



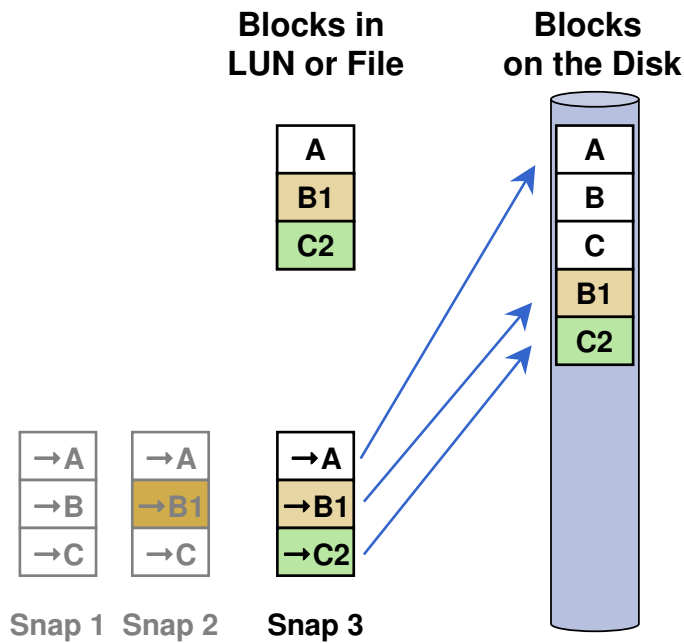
- ▶ Take snapshot 1
  - Copy pointers only
  - No data movement

Blocks in LUN or File

Blocks on the Disk

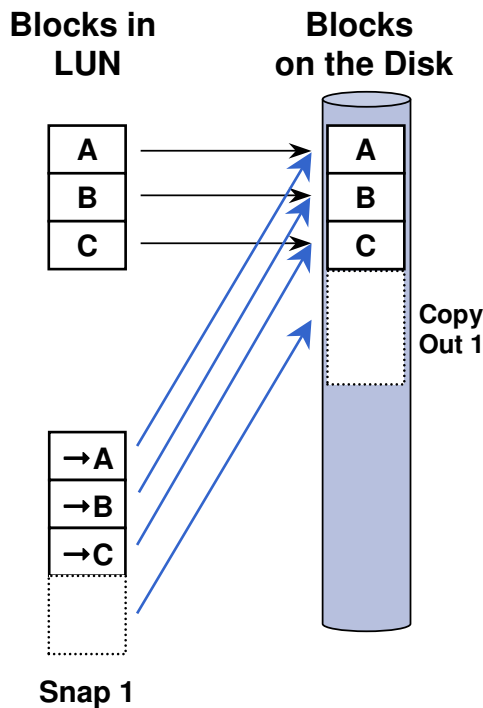


- ▶ Take snapshot 1
- ▶ Continue writing data
- ▶ Take snapshot 2
  - Copy pointers only
  - No data movement

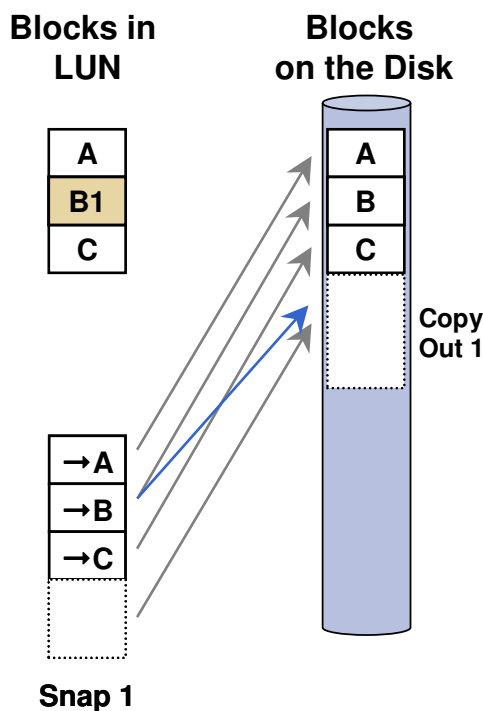


- ▶ Take snapshot 1
- ▶ Continue writing data
- ▶ Take snapshot 2
- ▶ Continue writing data
- ▶ Take snapshot 3
- ▶ Simplicity of model =
  - Best disk utilization
  - Fastest performance
  - Unlimited snapshots

## Everybody Else's Snapshots



- ▶ **Take snapshot 1:**
  - Create copy out region 1
  - Create pointers to old blocks and copy out



- ▶ **Take snapshot 1**
- ▶ **Continue writing data**
  - Block changes
  - Read old block; write to copy out region
  - Update snap pointer to copy out region
  - Update block on disk
- ▶ **One write requires:**
  - 1 read (old data)
  - 1 write (old data)
  - 1 write (new data)
- ▶ **3x overhead**

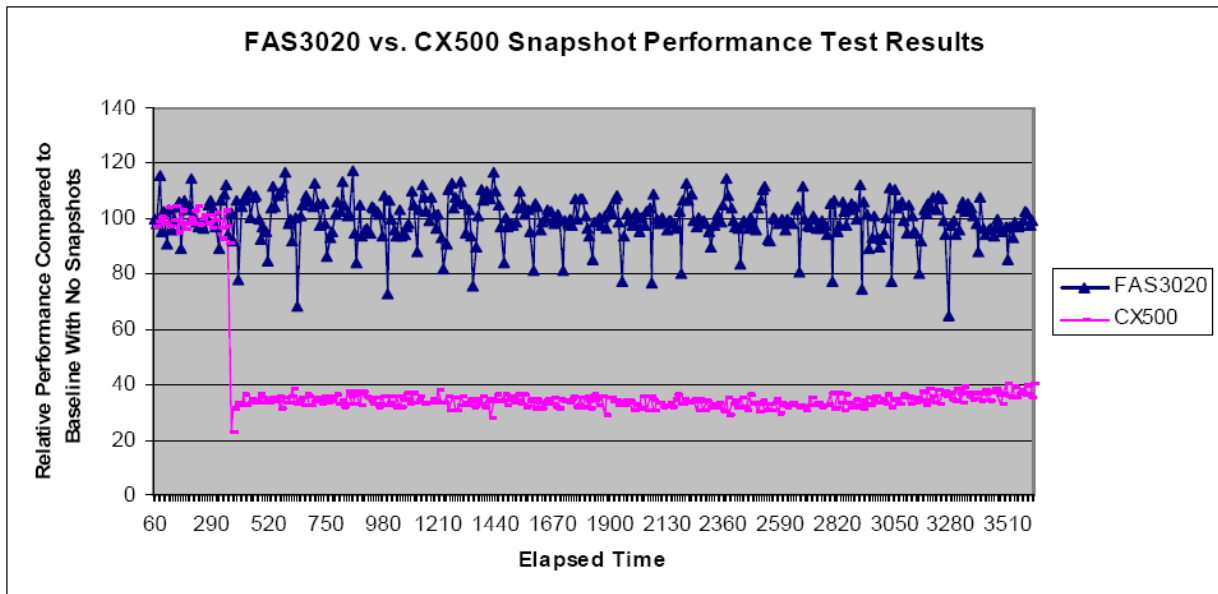
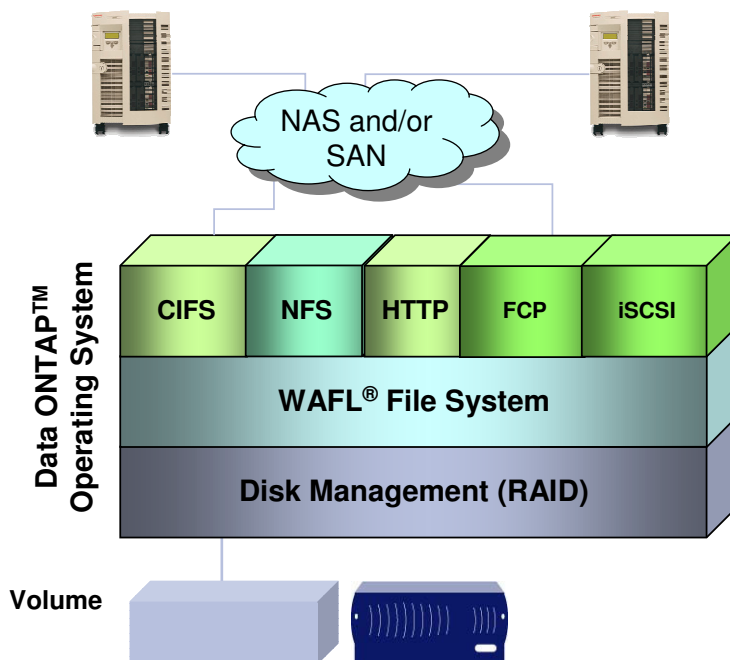


Figure 3: Test Results for Snapshot Performance Tests Using Provisioned 100GB OLTP LUN





# SnapManager for Exchange, SQL, Oracle

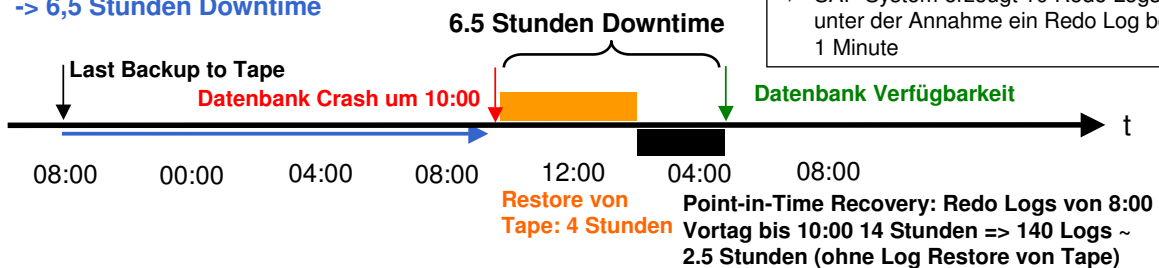


## Anwendungsbeispiel: Systemausfall

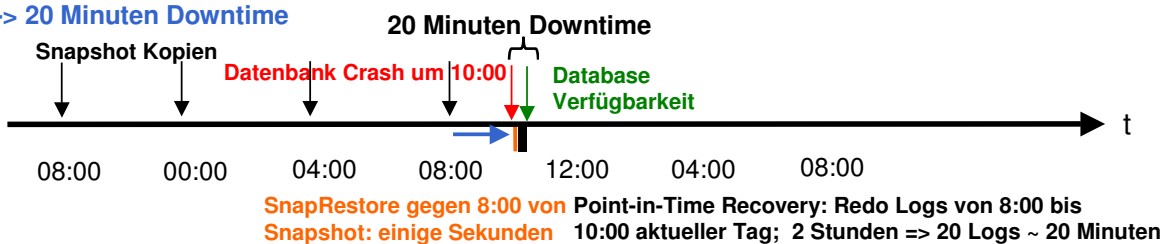
### Annahmen:

- ▶ Datenbankgröße 700GB, Tape Restore mit 50MB/s = 175GB/h
- ▶ SAP System erzeugt 10 Redo Logs/Hour, unter der Annahme ein Redo Log benötigt 1 Minute

### Konventionelles Tape Restore / Recovery -> 6,5 Stunden Downtime

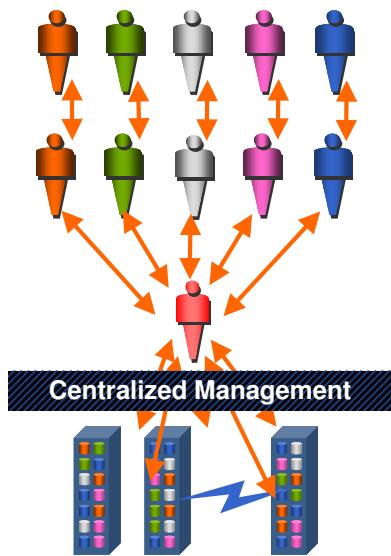


### Restore / Recovery mit NetApp SnapShot/SnapRestore -> 20 Minuten Downtime



⇒ Recovery/Systemwiederherstellung wird auf ein Minimum reduziert

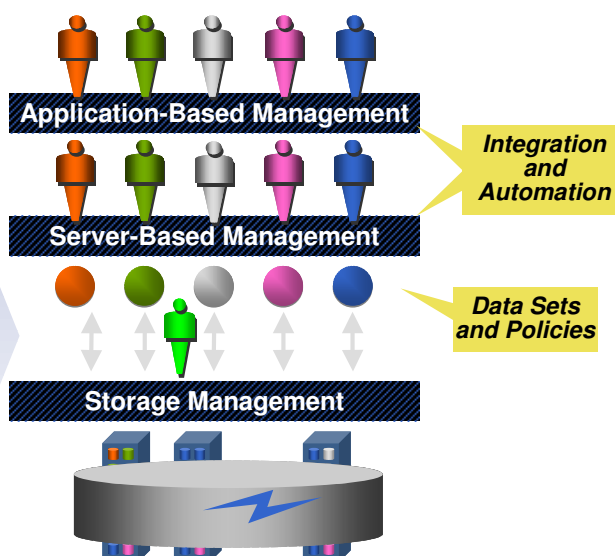
Go from this...



- X High cost of management
- X Long process lead times
- X Rigid structures
- X Low productivity

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...to THIS

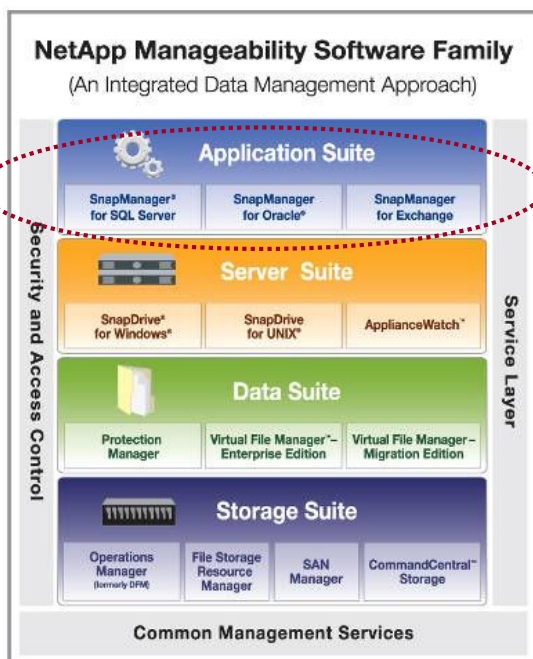


- + Administrator productivity
- + Storage flexibility
- + Efficiency
- + Response time

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**Customer Challenge: Backing up, recovering and cloning application data results in a lot of complex, manual work across the application and storage support teams**



► **Overview: Integrated and automated storage and data management for Exchange and Oracle admins**

► **Customer Benefits:**

- Appln. and DB admins can quickly backup and recover data on their own
- SnapManager for Exchange 4.0
  - Simplify upgrade to Exchange 2007
  - Support for x64
  - No performance impact on Exchange server during data verification
- SnapManager for Oracle 2.0
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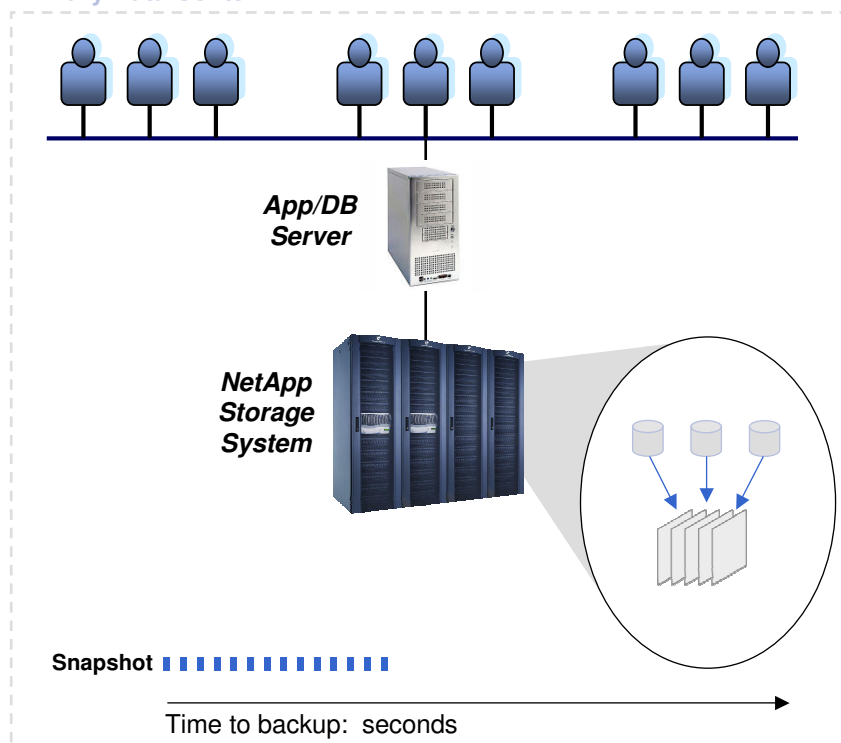
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- ▶ **Provides wizard-based GUI**
- ▶ **Integrates with MS Exchange Server 2003 and MS Exchange Server 2007**
- ▶ **Automates complex manual effort**
  - Online Backup
  - Point and Click Restore
  - Rapid Recovery (minutes versus hours/days)
- ▶ **Provides ability to manage backup policies**

Primary Data Center

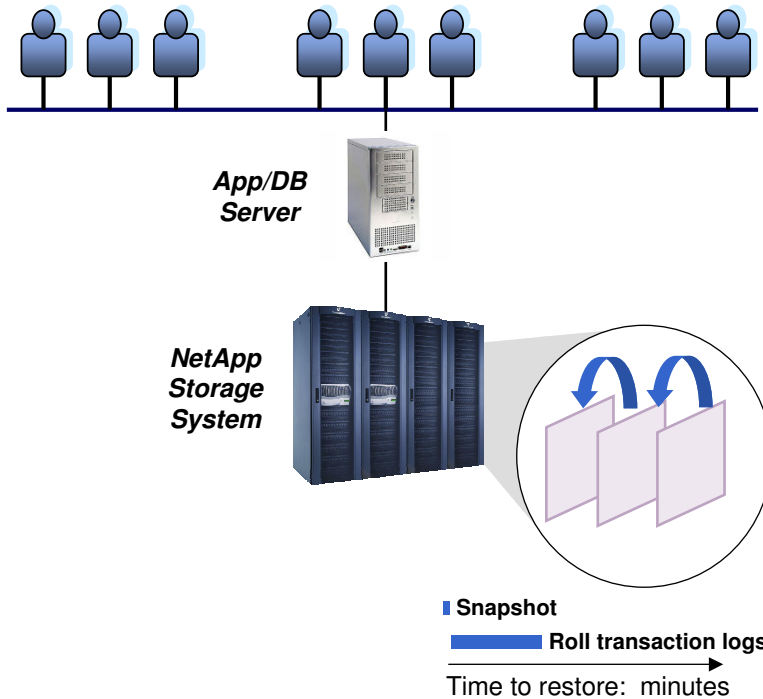


- ▶ **SnapManager backs up in seconds**
- ▶ **Snapshot copies verified for integrity and stored**

**Benefits:**

- ▶ Fastest and most storage efficient backups
- ▶ More frequent backups due to speed and efficiency
- ▶ No performance degradation from online backups
- ▶ Instantaneous access to backup data
- ▶ Automation eliminates manual errors

## Primary Data Center

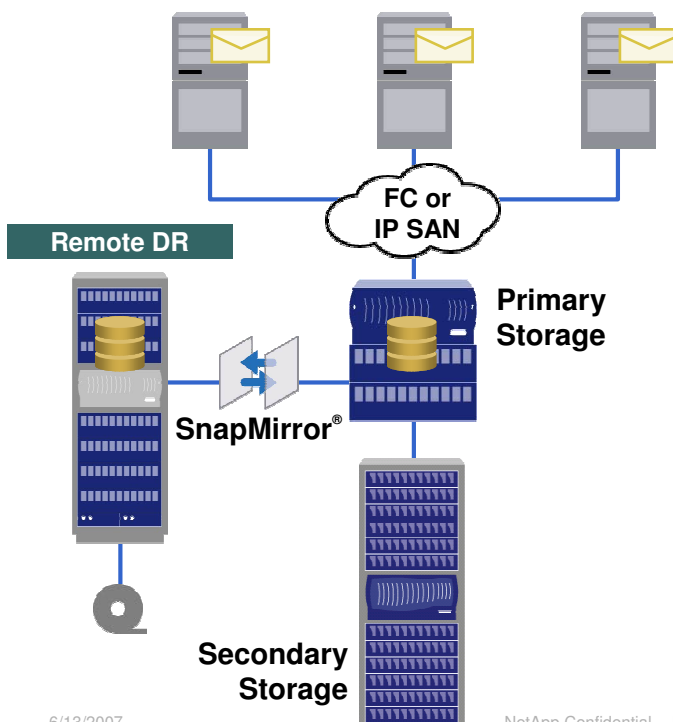


- ▶ Near instantaneous restores from Snapshot
- ▶ Dramatically shortened recovery with automated log replays
- ▶ Automated recovery tasks

### Benefits:

- ▶ Extremely fast and accurate data restore and recovery
- ▶ Reduce downtime from outages
- ▶ Automation saves administrative time

## Exchange Environment

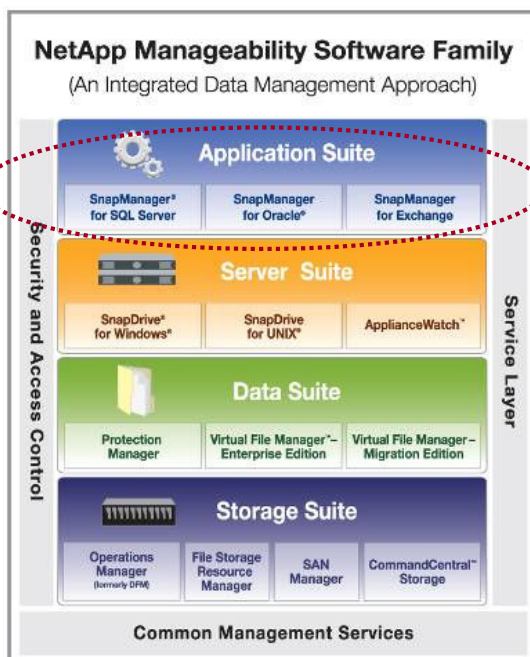


- ▶ Any-to-any mirroring; from low to high-end
- ▶ Scalable replication frequency
- ▶ Bandwidth efficient; mirror over existing WAN

- ▶ **NetApp is an Exchange Server Partner**
  - Storage listed in Exchange Solutions Reviewed Program
- ▶ **NetApp is an Exchange Server 2007 TAP & RDP Partner**
- ▶ **SnapManager for Exchange is:**
  - A Windows Certified Backup and Recovery application
  - A Microsoft SimpleSAN designated Backup & Recovery application
- ▶ **Over 2,000 Exchange customers on NetApp**
- ▶ **Over 6 million Exchange seats on NetApp**
- ▶ **Enterprise experience**
  - SAP
  - Siemens Business Services
  - US Department of State
  - US Army
  - Telstra
  - Blue Shield of California
  - Invesco Funds
  - KPMG
  - Telemundo
  - Southwest Airlines



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## SnapManager for SQL Server SQL Server Integration and Benefits

### Integration Points:

- ▶ SQL Server 2005
- ▶ Configuration, Backup, and Restore wizards with standard Windows® GUIs
- ▶ MS Cluster Server Support
- ▶ Premier MS technical support

### Benefits:

- ▶ Ability to automate & schedule the backups of SQL Server databases
- ▶ Simplified migration of existing databases to new NetApp storage systems
- ▶ Built in ability to grow databases online
- ▶ High availability using native windows clustering

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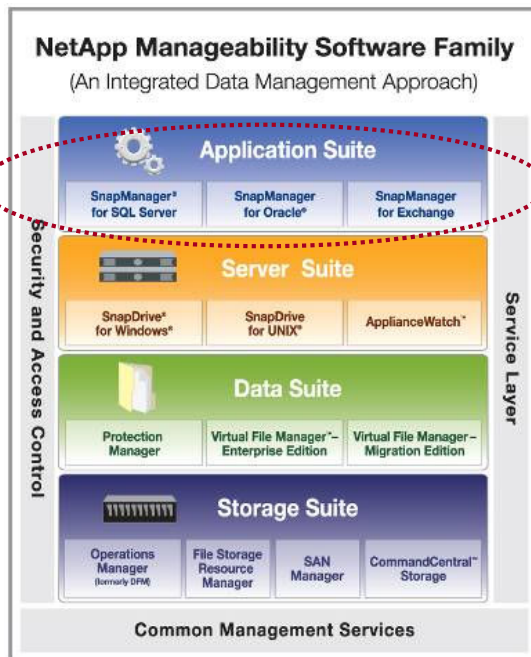
## Microsoft SQL Server - proofpoints

- NetApp is a [MS SQL Server Partner](#)
- NetApp is a SQL Server “[Always On](#)” Technologies Partner
- **Joint Marketing/Technical Integration**
  - NetApp was a SQL Server 2005 [Launch Partner](#)
  - NetApp/MSFT – published [TPC-C benchmark](#) case study
  - NetApp/MSFT SQL Server 2005 [DSS whitepaper](#)
  - NetApp/MSFT iSCSI/FCP [Comparison Performance whitepaper](#)
- **Over 1,000 SQL Server customers on NetApp**
- **Enterprise experience**
  - Visa - National Australia Bank
  - Mazda - First American Trust
  - Southwest Airlines - Anadarko Petroleum
  - BT - Telstra

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**Integration Points:**

- ▶ Oracle 9i and 10g
- ▶ RAC Cluster
- ▶ RMAN
- ▶ ASM – unique integration!

**Benefits:**

- ▶ Leverage backup, restore, and cloning benefits for ASM-based databases
- ▶ Realize SnapManager benefits for RAC configurations

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- ▶ **Nonstop** mission critical environment
- ▶ Hosting 1600 independent database environments
- ▶ Experiencing **30% higher utilization** and **faster application deployment**
- ▶ **Storage management overhead reduced 50%**
- ▶ **Seamlessly scaled** to 1000s of servers
- ▶ **2005 Data Center of the Year**