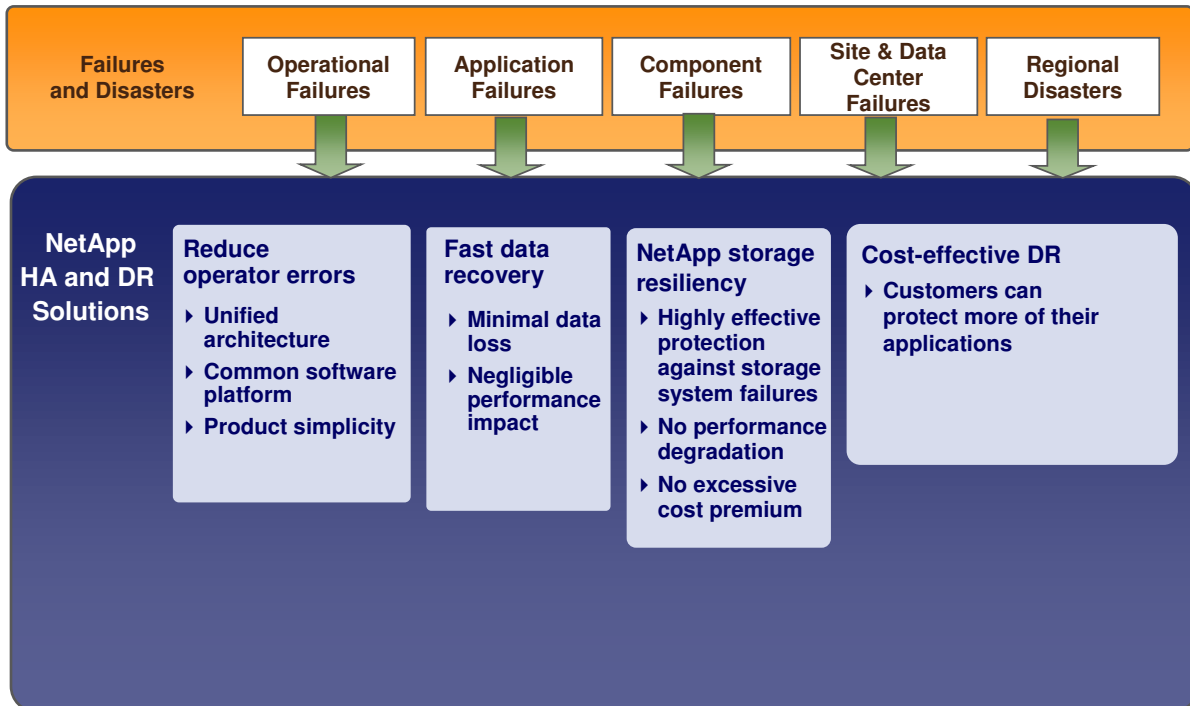


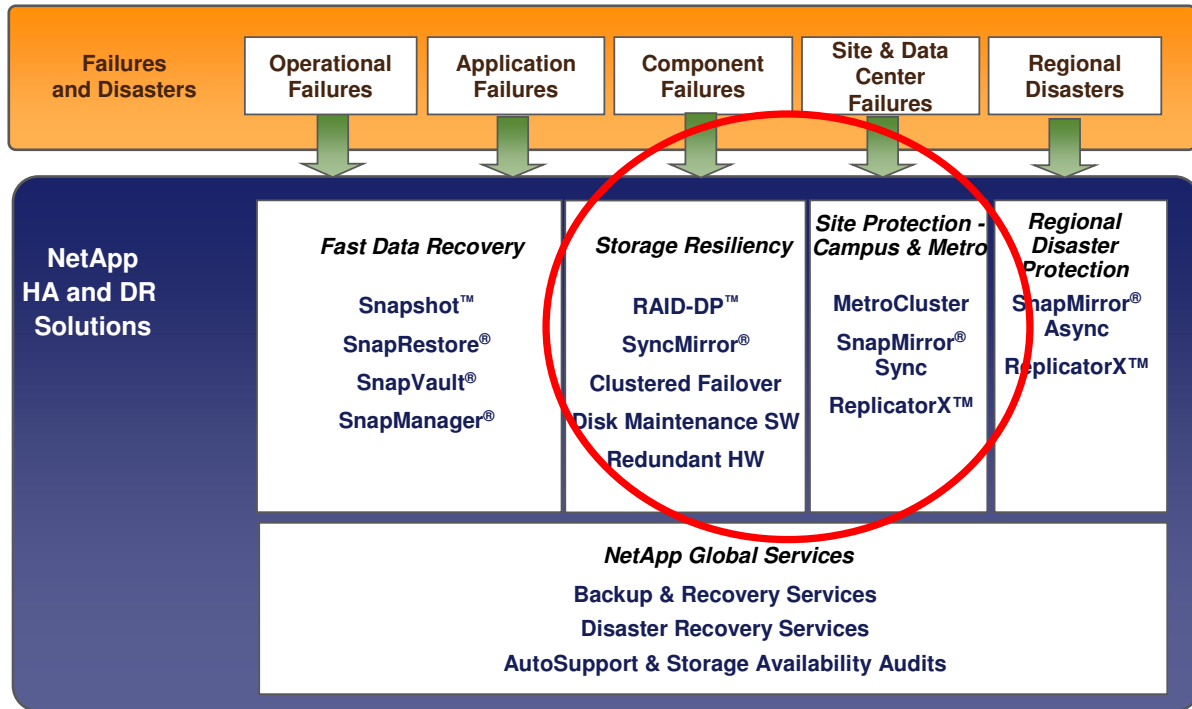
Failures, Disasters, and Causes



Failures and Disasters	Operational Failures	Application Failures	Component Failures	Site & Data Center Failures	Regional Disasters
	People and Process Issues Infrastructure Changes Configuration and Problem Management	Bugs Performance Issues Change Management Process	Controller Failure HBA/port Failure Disk Failure Shelf Failure FC Loop Failure	Terrorist Attacks Cyber Threats HVAC Failures Power Failures Building Fire Plumbing Accidents Architectural Failures Planned Downtime	Electric Grid Failures Natural Disasters: Floods Hurricanes Earthquakes
Causes					

NetApp HA and DR Solutions *Drive Superior Application Availability*





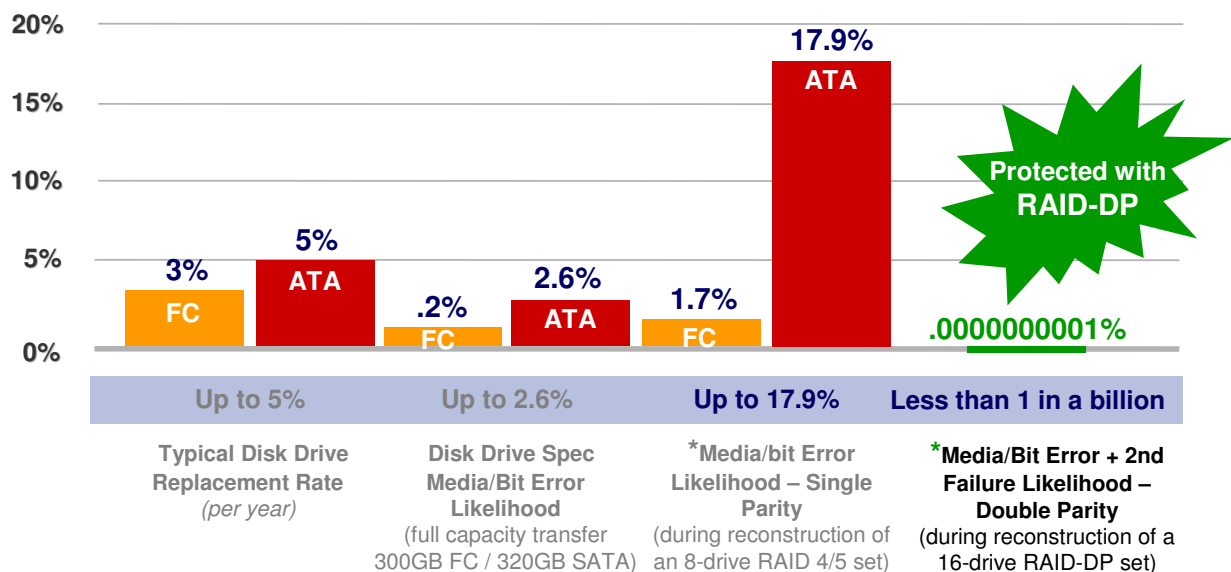
► Description

- Dual-parity RAID – *two* parity drives per RAID group
- An extension and enhancement of RAID 4

► Benefits

- >4,000X data protection compared to RAID 4 or 5
- Protects against 3 modes of double disk failure
 - Concurrent failure of *any* 2 disk failure (very rare)
 - 2 simultaneous disk uncorrectable errors (also very rare)
 - A failed disk and an uncorrectable error (most likely)
- Comparable operational cost to RAID 4
 - Equivalent performance for nearly all workloads
 - Equally low parity capacity overhead supported
- Less system impact during RAID reconstruction

Industry Statistics: Drive Replacements & Media Errors Increase with Drive Capacities



*Source: Network Appliance

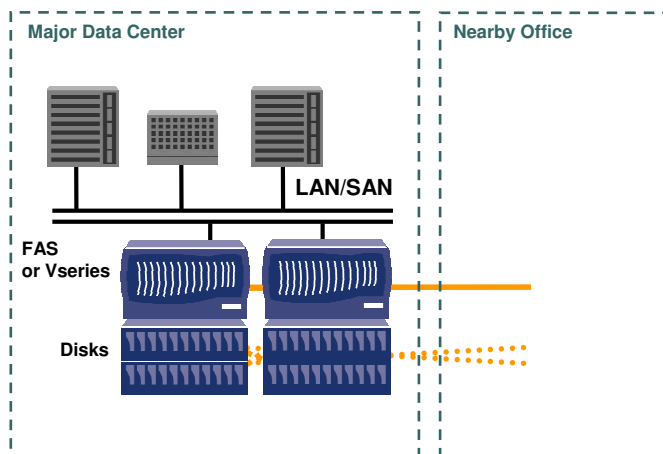


MetroCluster



MetroCluster

MetroCluster is a unique, cost-effective synchronous replication solution for combined HA and DR, protecting against site disasters within a campus or metro area



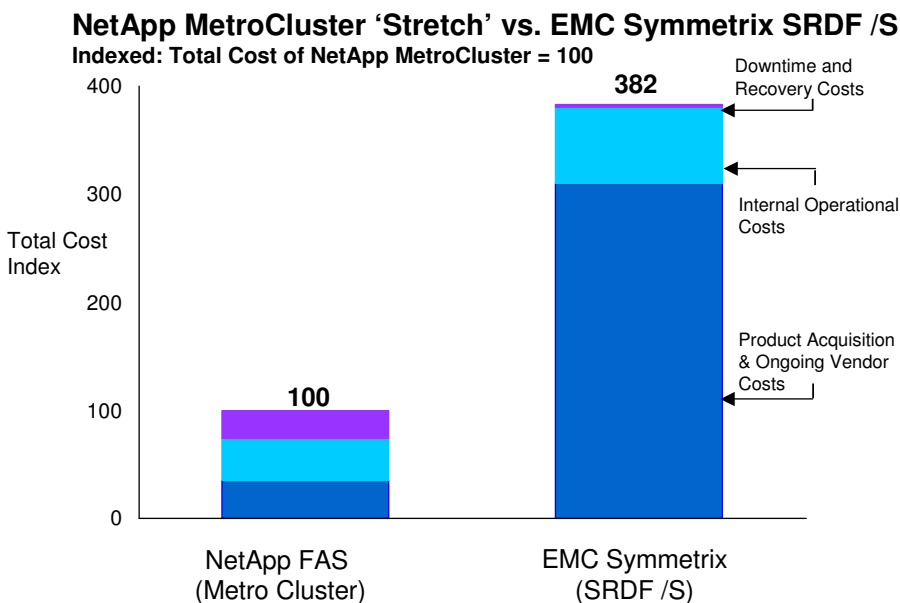
Configurations

- ▶ **Stretch MetroCluster provides Campus DR protection**
 - Can stretch up to 250 m
- ▶ **Fabric MetroCluster provides Metropolitan DR protection**
 - Can stretch up to 100 km with FC switches

- ▶ **Highest Level of Availability**
 - Provides superior availability to RAID 1 + 0
 - Protects against data center failures and site disasters for a negligible cost premium
- ▶ **Simple & Fast Recovery**
 - Automatic Recovery for any single component failure
 - One-button recovery even for major catastrophic site failures
- ▶ **Cost-effective**
 - Combines HA clustering with DR mirroring
- ▶ **Zero Data Loss**
 - Synchronous data replication
- ▶ **Enhanced Read Performance**
 - Up to 80% improved read performance for random reads, due to simultaneous read operations occurring on both plexes

Total Cost Assessment: Synchronous Replication Solutions

For a typical synchronous deployment for business applications, a NetApp MetroCluster 'Stretch' solution is 74% less expensive than an EMC Symmetrix SRDF /S solution.



Source: Mercer DR Total Cost Comparison Interviews, October 2006.

Key Drivers of NetApp Advantage

- ▶ **'Near-zero' Networking and Bandwidth costs**
- ▶ **1/3 SW license costs**
- ▶ **Lower installation and on-going vendor costs**
- ▶ **Lower management costs**
 - 2x fewer FTE hours required



High Availability Portfolio

Availability

“If you are buying a 2 node cluster, why not separate them into two buildings, to protect against site failures”

Highest

Higher

High

Corporate Data
• RAID-DP
• Clustered Failover

Mission Critical

- Previous Tier +
- Stretch MetroCluster

Additional protection
against primary Data
Center failure

Low

Medium

High

Note: MetroCluster solution includes CFO and SyncMirror Do Not Distribute

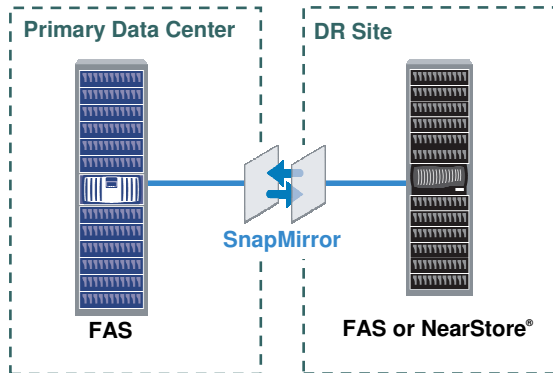
Investment

13



SnapMirror®

SnapMirror is a simple, flexible and cost-effective replication solution that enables you to protect more of your applications

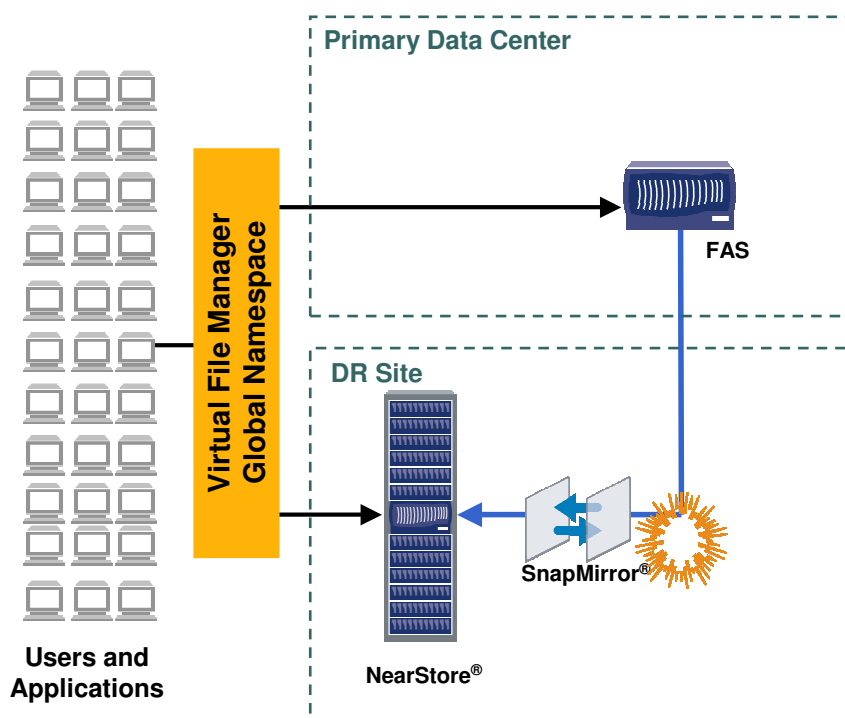


**Proven technology –
over 10K licenses installed**

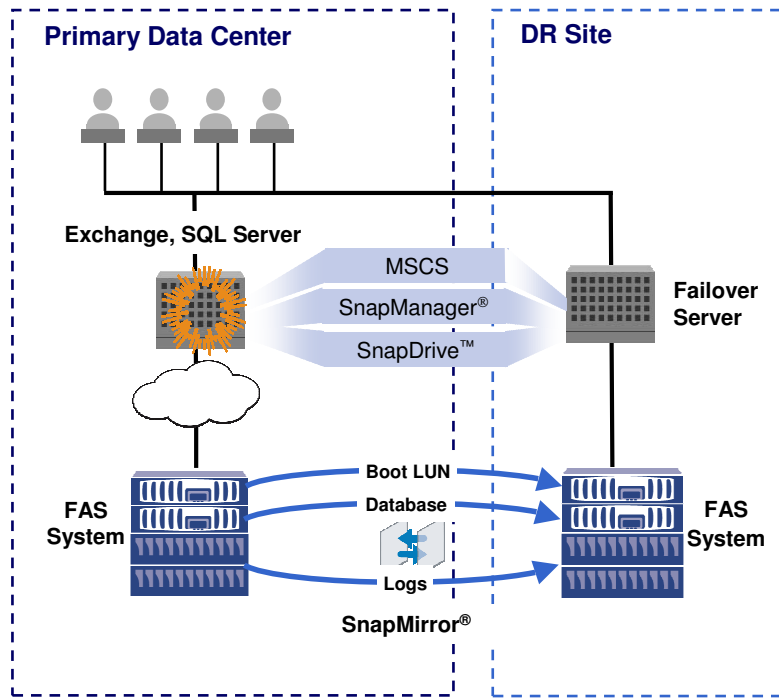
Benefits

- ▶ **Simplifies deployment and management**
 - Simple set up and recovery
 - Single product across all storage systems
 - Leverages SnapManager®, ensuring replication of application consistent snapshots
- ▶ **Cost-effective solution**
 - Mirror between FC and ATA systems
 - Leverages Snapshots – efficient storage and bandwidth utilization
- ▶ **Puts DR copy to active business use**
 - Remote read access for centralized backup, data distribution to remote sites
 - Remote clones for app testing, QA and production staging
 - Space efficient copies without impacting production system

Transparent Failover for Windows File Sharing



- ▶ **“Namespace” isolates users from hardware**
- ▶ **In the event of a disaster, VFM redirects users to the secondary storage**
- ▶ **Auto synchronization**
 - As qtrees and shares are added to primary, no additional steps required to keep the secondary synchronized



Application consistent Replication

- ▶ SnapManager coordinates application consistent snapshots
- ▶ SnapMirror replicates snapshot copies

Fast & Flexible

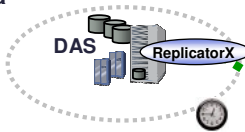
- ▶ Using with Microsoft Cluster Server ensures fast application recovery
- ▶ Enables mirroring of database and logs at different frequencies
 - Lowers network b/w utilization

PRODUCTION SITES

RECOVERY SITE

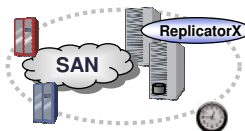
Any Block Data

- FC SAN
- IP SAN
- DAS
- Internal



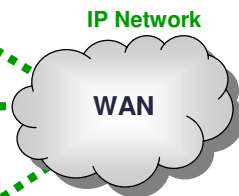
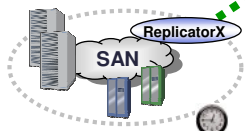
Any Storage

- NetApp
- EMC
- HDS
- HP
- Sun
- IBM
- Others



Any Platform

- Windows
- UNIX
- Linux
- VMware
- Cisco MDS



Recovery Servers



DAS

Tiered Storage

- **Non-Disruptive**
- **Enterprise-wide consistency**
- **Up to the second copy**
- **Recover in minutes**