

ETERNUS DX80

ETERNUS DX60

Technical Slides

June, 2009

Fujitsu Limited



Business Value

Reliable Storage Solutions

- Quality and reliability
- Innovation and speed
- Simple installation and easy-to-manage
- Versatile usage scenarios
- Very affordable

ETERNUS DX60 and DX80 - Line-up



■ Optimized storage for Small & Medium Enterprises

Affordable entry in network storage



ETERNUS DX60

Max.24 drives



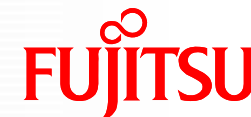
ETERNUS DX80

Max.120 drives
Supports FC 8Gbit/s

For higher performance and more expandability

| | DX60 | DX80 | Note |
|------------------|---------------|--------------------------|--|
| No. of drives | 24 | 120 | |
| Storage capacity | 10.8 TB | 54.0 TB | With 450GB SAS drives |
| | 24.0 TB | 120.0 TB | With 1TB Nearline SAS drives |
| Cache capacity | 2 GB | 4 GB | In configurations with two controllers |
| Host ports | 4x FC 4Gbit/s | 4x FC 4Gbit/s or 8Gbit/s | + SAS + iSCSI as of 09/2009 |

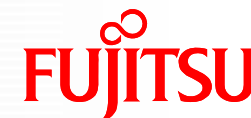
ETERNUS DX60 Specification Summary



| | | ETERNUS DX60 | ETERNUS2000 Model100 | FibreCAT SX60 |
|--|-------|--|---|-------------------------------|
| Number of Controllers | | 1 or 2 | 2 | 1 or 2 |
| Cache Capacity | | 1 or 2 GB | 2 GB | .5 or 1 GB |
| Cache Data backup / Cache Hold Time | | CacheProtector (write back to Flash powered by SCU), unlimited hold time | Memory Backed up by BBU, 48 or 96 hour hold time | FibreCAP, unlimited hold time |
| Host Interfaces | FC | 4 Gbit/s | 4 Gbit/s | 4 Gbit/s |
| | iSCSI | 1 Gbit/s* | 1 Gbit/s | - |
| | SAS | 3 Gbit/s* | 3 Gbit/s | - |
| Drive Types | | SAS / NL-SAS (3 Gbit/s) | SAS/SATA (3 Gbit/s) | SATA (3 Gbit/s) |
| RAID Levels | | 0,1,1+0,5,6,5+0 | 0,1,1+0,5,6 | 0,1,10,3,5,50,6 |
| Max. Number of HDD HDD Number/Enclosure | | 24 (12 in 2U) with 3.5" | 24 (12 in 2U) with 3.5" | 24 (12 in 2U) with 3.5" |
| | | 24* (24 in 2U) with 2.5" | - | - |
| Max.LUN Number | | 512 | 512 | 128 |
| Max.HBA Number | | 64 (32/port) | 64/(16/port) | 16 |
| Additional data protection features | | Data Block Guard, Redundant Copy, Global + Dedicated Hot Spares | Data Block Guard, Redundant Copy, Global Hot Spares | Global + Dedicated Hot Spares |
| RAID migration | | x | x | - |
| Copy Functions | | SnapOPC+, OPC, QuickOPC, EC | SnapOPC+, OPC, QuickOPC, EC | Snapshots |
| Encryption | | x | - | - |
| ECO mode | | x | x | - |
| Supported OS | | Windows, Linux, Unix, VMware | Windows, Linux, Unix, VMware | Windows, Linux, Vmware |

*2nd Release

ETERNUS DX80 Specification Summary



| | | ETERNUS DX80 | ETERNUS2000 Model200 | FibreCAT SX80/SX88 |
|--|-------|--|---|-------------------------------|
| Number of Controllers | | 1 or 2 | 2 | 1 or 2 |
| Cache Capacity | | 2 or 4 GB | 4 GB | 1 or 2 GB |
| Cache Data backup / Cache Hold Time | | CacheProtector (write back to Flash powered by SCU), unlimited hold time | Memory Backed up by BBU, 48 or 96 hour hold time | FibreCAP, unlimited hold time |
| Host Interfaces | FC | 4 or 8 Gbit/s | 4 Gbit/s | 4 Gbit/s |
| | iSCSI | 1 Gbit/s* | 1 Gbit/s | 1 Gbit/s |
| | SAS | 3 Gbit/s* | 3 Gbit/s | - |
| Drive Types | | SAS / NL-SAS (3 Gbit/s), SSD* | SAS/SATA (3 Gbit/s) | SAS/SATA (3 Gbit/s) |
| RAID Levels | | 0,1,1+0,5,6,5+0 | 0,1,1+0,5,6 | 0,1,10,3,5,50,6 |
| Max. Number of HDD HDD Number/Enclosure | | 120 (12 in 2U) with 3.5" | 120 (12 in 2U) with 3.5" | 56 (12 in 2U) with 3.5" |
| | | 120 * (24 in 2U) with 2.5" | - | - |
| Max.LUN Number | | 1024 | 1024 | 256 |
| Max.HBA Number | | 128(32/port) | 128/(32/port) | 32 |
| Additional data protection features | | Data Block Guard, Redundant Copy, Global + Dedicated Hot Spares | Data Block Guard, Redundant Copy, Global Hot Spares | Global + Dedicated Hot Spares |
| RAID migration | | x | x | - |
| Copy Functions | | SnapOPC+, OPC, QuickOPC, EC | SnapOPC+, OPC, QuickOPC, EC | Snapshots |
| Encryption | | x | - | - |
| ECO mode | | x | x | - |

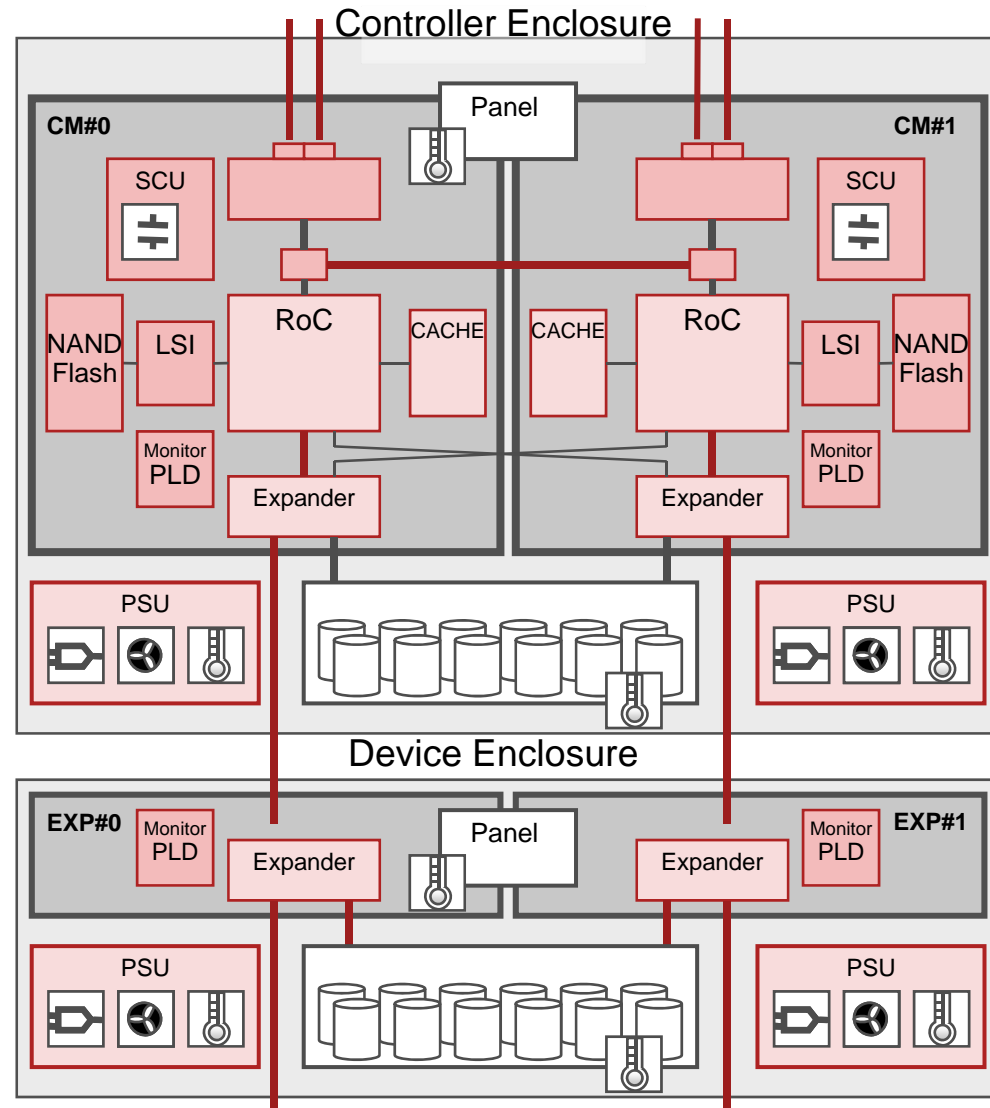
*2nd Release

Quality and Reliability

- Advanced data protection
- CacheProtector
- Redundant Copy
- Disk encryption
- RAID Migration

Redundant & hot-pluggable components

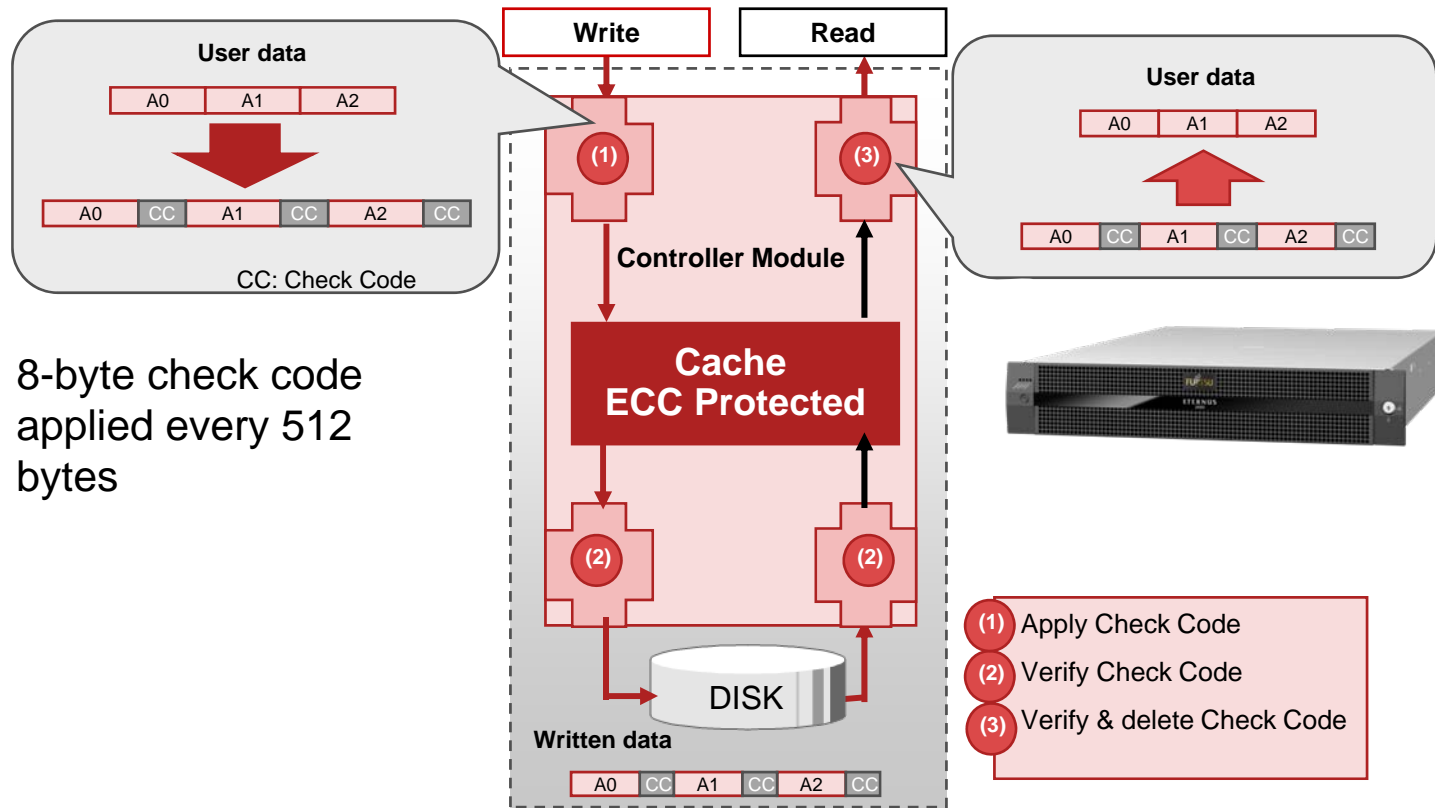
- Main components are redundant and hot-pluggable, such as controllers, power supply units, cooling fans and hard disk drives.
- Components are hot swappable without stopping system in case of failure.
- Hot expansion of disk drives
- Firmware can be upgraded without stopping operations.



CM: Controller Module, EXP: Expansion Module, PSU: Power Supply Unit, SCU: System Capacitor Unit, RoC: RAID-On-Chip

Data Block Guard

- saves additional 8-byte check code to every 512-byte data to ensure data integrity both on the disk and in the cache



- Improve data integrity beyond RAID



- When power fails, a capacitor maintains power until the cache content is saved to non-volatile memory (flash)
 - Cache data is safe for unlimited time, it does not depend on battery capacity

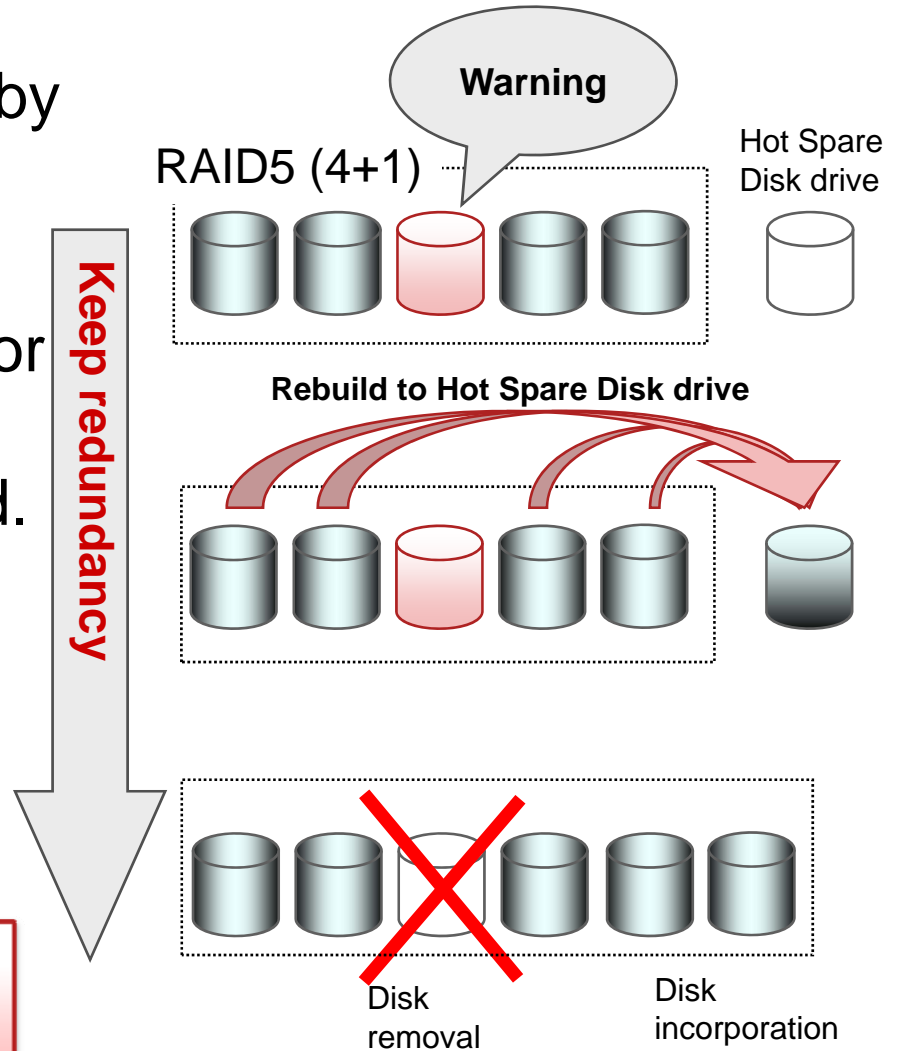
- The Capacitor recharges within 1 minute when power is restored
 - High performance (write cache) available much sooner than with battery backup solutions

- No periodic replacement
 - No maintenance necessary for Capacitor
 - Battery backup solutions must be monitored constantly and batteries need to be exchanged every 3 years

- No time limit to restore the data in case of power failure
- Fast restart after power failure
- No maintenance necessary for CompactFlash and Capacitor

Redundant Copy

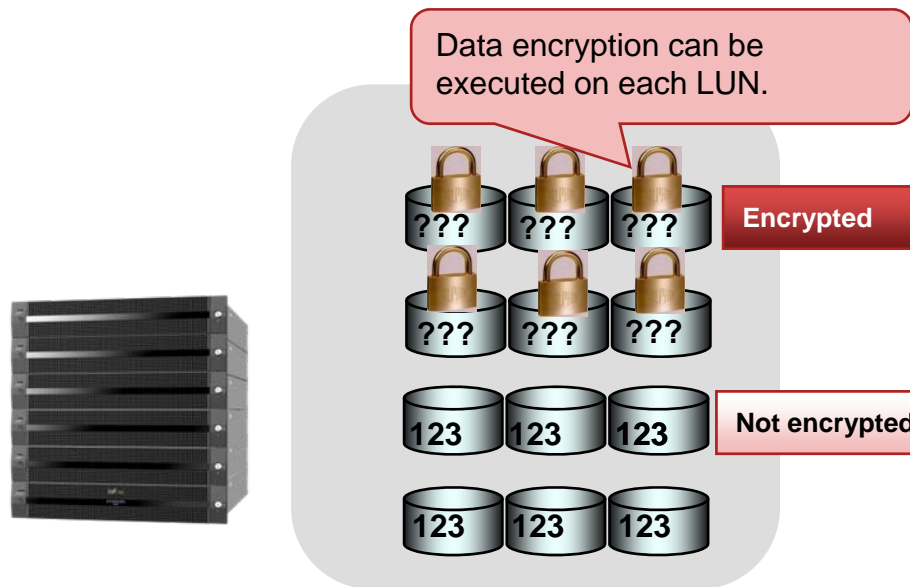
- All disk drives are monitored by system.
- Start rebuild automatically to Hot Spare if same type of error occurs repeatedly and exceeded a defined threshold.
- After rebuild is done, disable the disk.



• Replace failing disk to keep up redundancy

Disk Encryption

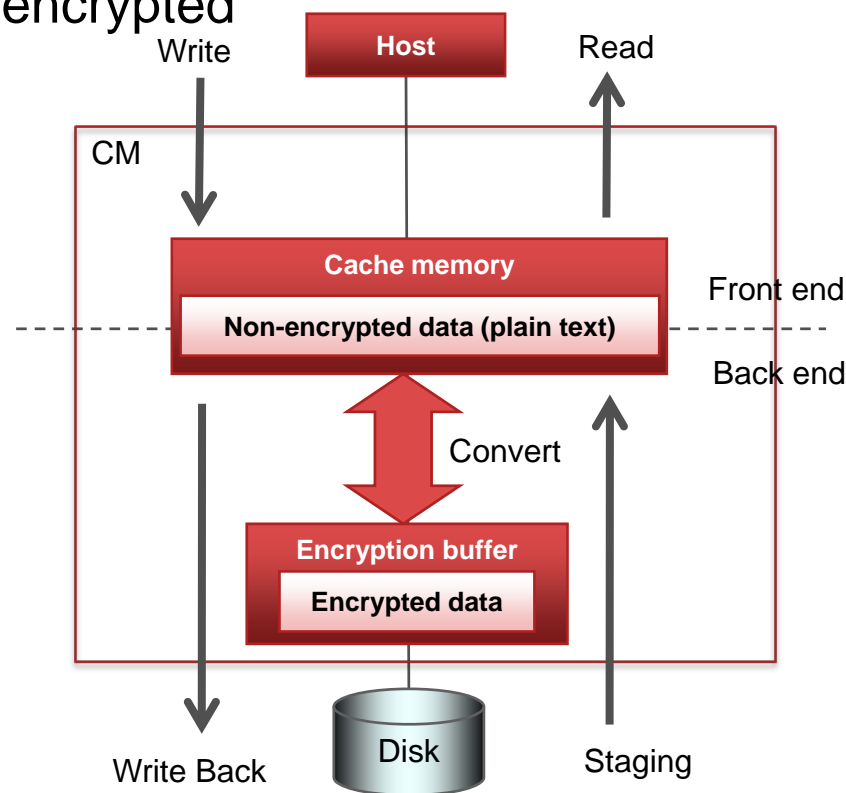
- Key is generated automatically by the system
- Encryption can be configured per volume



- Protects your data even on defective or decommissioned disk drives

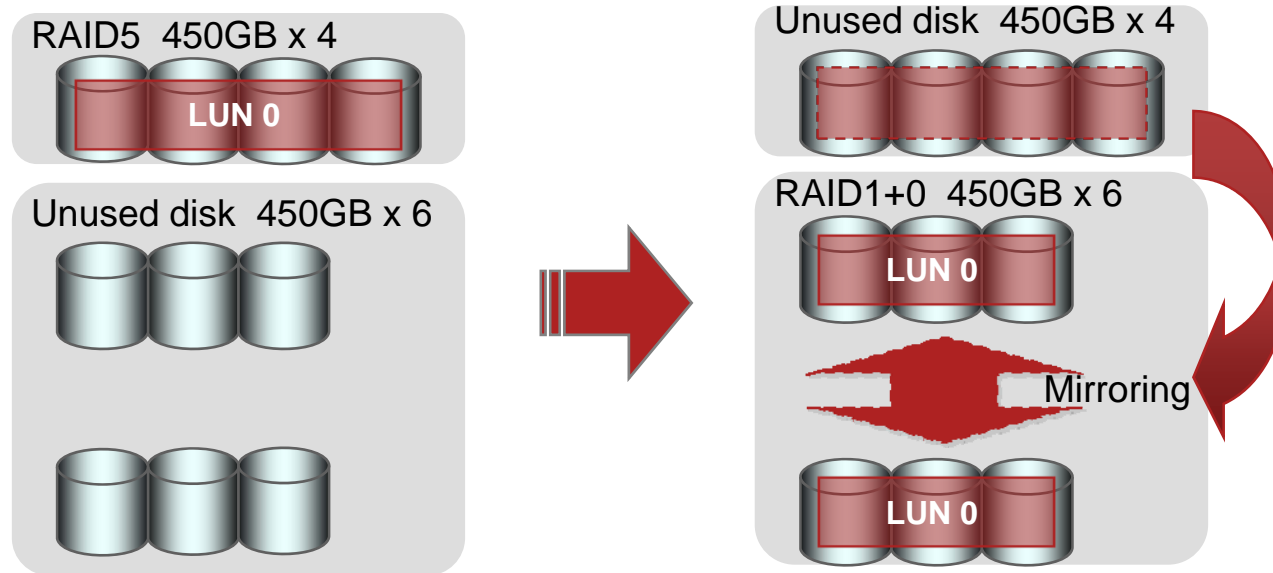
Working with Disk Encryption

- Encryption can be turned on per volume
 - At creation time
 - Or converted during operations
 - It can not be turned off later
 - Requires also encrypted copy destination volumes for snapshots or clones in case of source volumes are encrypted
- Encryption is done by the controller (CM)
 - Will have an impact on controller performance



RAID Migration

- LUNs can be migrated on the fly to other drives, different RAID groups, other drive types (e.g. SAS to NL SAS, SAS to SSD)



- Reduce hot spots
- Move LUNs to more suitable disk type or RAID type if requirements change

Innovation and Flexibility

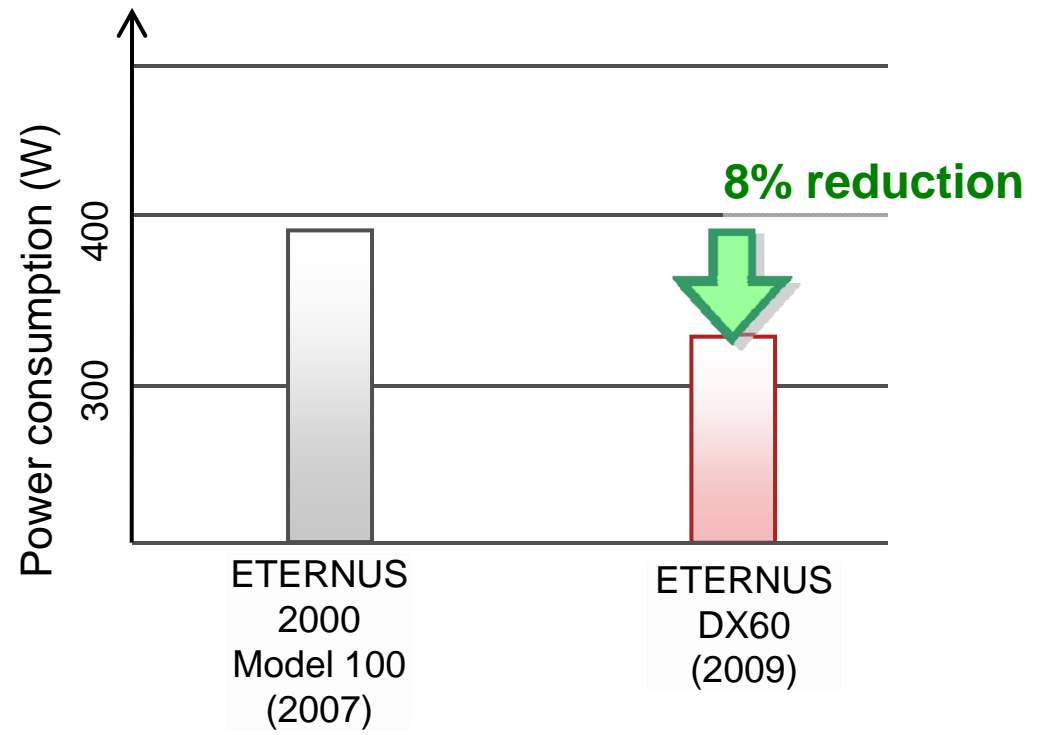
- High Power Efficiency
- ECO Mode
- Flexibility
- SSD Support



■ Max. 8% reduction in power consumption

- Improved enhancement of Power Supply Unit (PSU) efficiency for 10 %
- Improvement of FAN-spin-speed control equipment

■ ECO Mode can achieve additional power savings



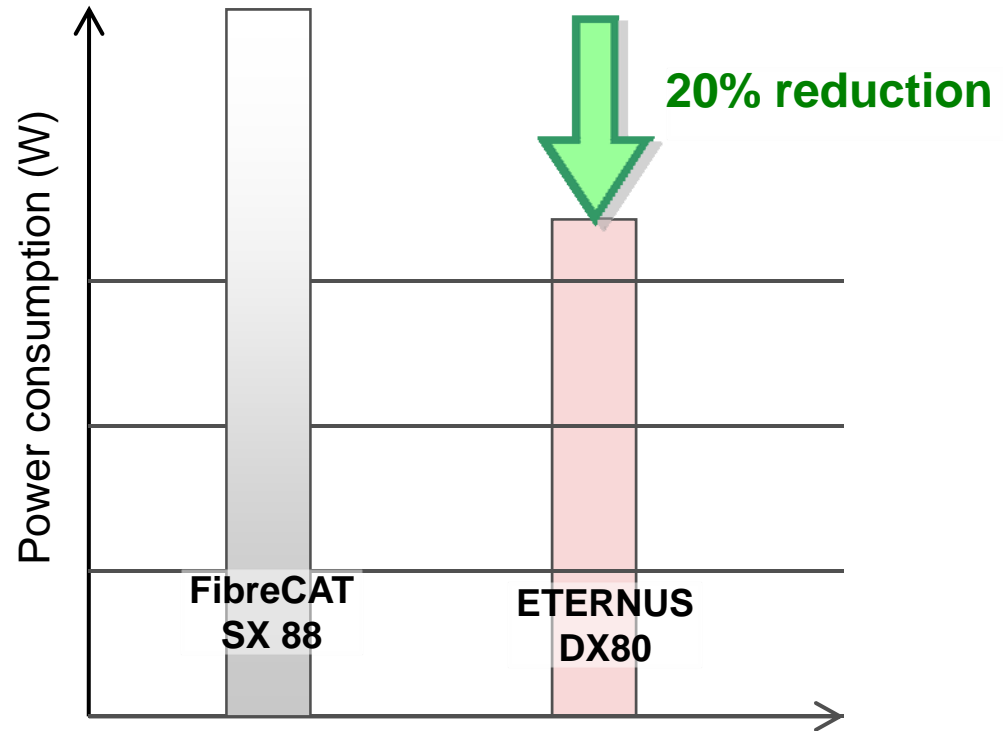
Test environment : 2 controllers and 12 HDDs at 25 deg C

High Power Efficiency (for EMEA)

- Max. 20% reduction in power consumption

- Improved enhancement of Power Supply Unit (PSU) efficiency for 10 %
- Improvement of FAN-spin-speed control equipment

- ECO Mode can achieve additional power savings

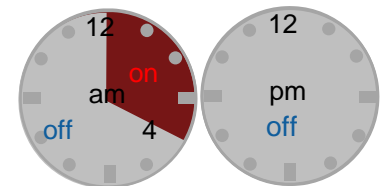
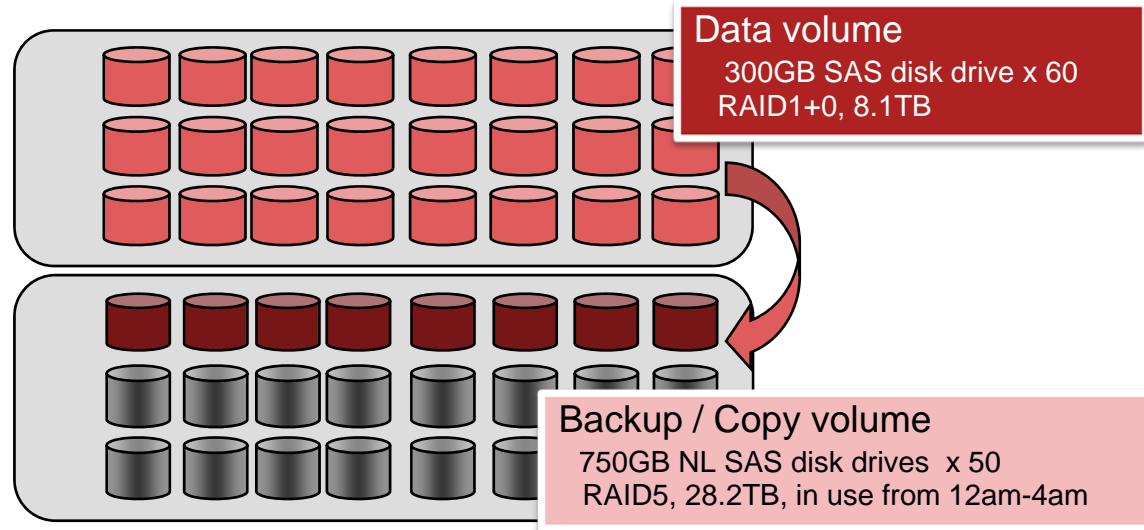


Test environment : 2 controllers and 12 HDDs at 25 deg C

ECO Mode

■ When disks (Raid groups) are used only a few hours per day (e.g. for backup), ECO mode provides a safe way of saving power

- Define schedules
- Drives are spun down if idle
- Drives are spun up automatically when accessed
- Can be managed with ETERNUS DX60/DX80 Web GUI or CLI



• Benefit: Save up to 10% energy by spinning down less frequently used drives

ECO Mode - Details

- Use ECO mode to save power for idling disks
- Disk drive motors will power off when
 - the RAID group is unused for a configurable time period (e.g. 30 minutes)
 - Or on scheduled times
- Powered on by Host I/O within the host time out value

Set ECO Mode Schedule
Present Set ECO Mode Schedule is displayed. Various setting change and details can be confirmed from the tree

ECO Mode Commonness Setting

ECO Mode Enable Disable

Host I/O Monitoring Time (min.) 30

Disk Motor Control Limit Count (Cycle/Day) 3

Set ECO Mode Schedule
Present Set ECO Mode Schedule is displayed. Various setting change and details can be confirmed from the tree at the left of the screen.

ECO Mode : Disable

RAID Groups

Schedule

New Schedule

Schedule

No. 0

Schedule Name Test (1 - 16 characters(alphanumeric character blanc sign))

Event List

| Event | From Time | To Time |
|-------|-----------|---------|
| | | |

Add Edit Delete Delete All

Set Event

Event Type Everyday Every week Specific days Specific week

From Time 20 : 00

To Time 07 : 00

Apply Cancel

Fibre Channel: when performance matters

- 4 or 8 Gbit/s connections for bandwidth-hungry applications (streaming, backup)
- Deterministic performance, best scalability
- The choice for datacenter, business-critical applications

iSCSI: easiest step towards networked storage

- 1 Gbit/s connections are OK for most applications
- Well-know IP infrastructure has lower training cost
- Dedicated network recommended for scalability

SAS: cheap and fast direct attachment, especially for small clusters

- SAS HBA is cheaper than FC HBA, and has excellent bandwidth
- Ideal for clusters: 2x HA direct attached, or 4x without failover

SAS, Nearline SAS, or Solid State Drives



3.5" SAS:
for mission critical data

- Enterprise performance and reliability
- 15k rpm, 300 GB, 450 GB

3.5" Nearline SAS: cost-efficient capacity for non-critical data

- Nearline SAS drives are SATA drives (high capacity, low cost) with a SAS interface (dual ported, SAS firmware)
- 7.2k rpm 750 GB, 1 TB

2.5" SAS drives: more spindles/IO per U, at less power

- 10k rpm, 300 GB, 24 drives in 2U enclosure
- Available as of September 2009

Enterprise SSDs provide best IO/\$

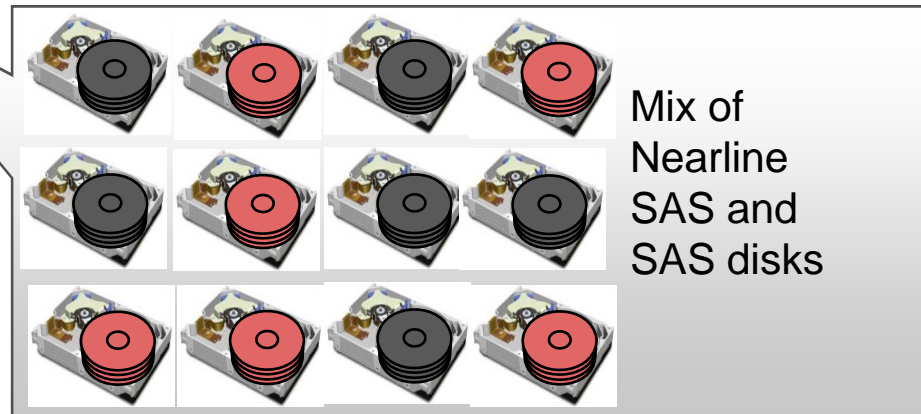
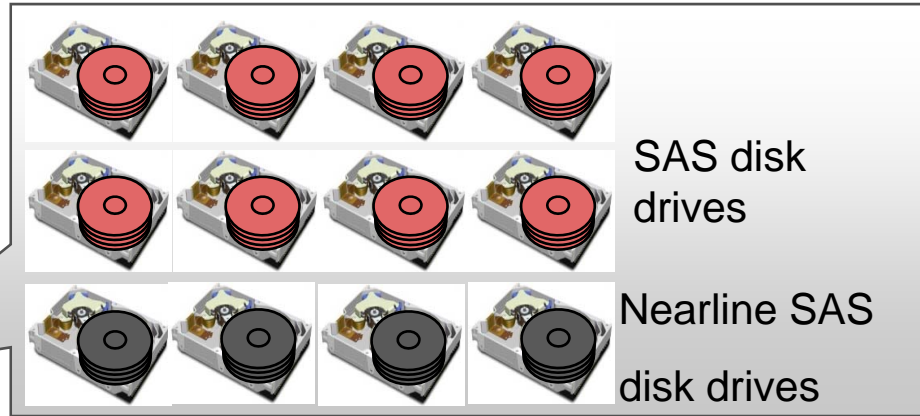
- Excellent random reads and writes, lowest latency
- Good for highest IOPS demands
- Available as of September 2009

3.5" SAS, Nearline SAS and 3.5" SSDs can be intermixed in the same enclosure

Disk Drive Intermix

- Able to mix different disk drives in the same DE (drive enclosure)

**ETERNUS
DX60 / DX80**



Simple installation and easy-to-manage

■ Embedded Web GUI and CLI

- No need to install software
- http or https for the GUI, telnet or ssh for the CLI
- Also used for initial setup

■ Integration

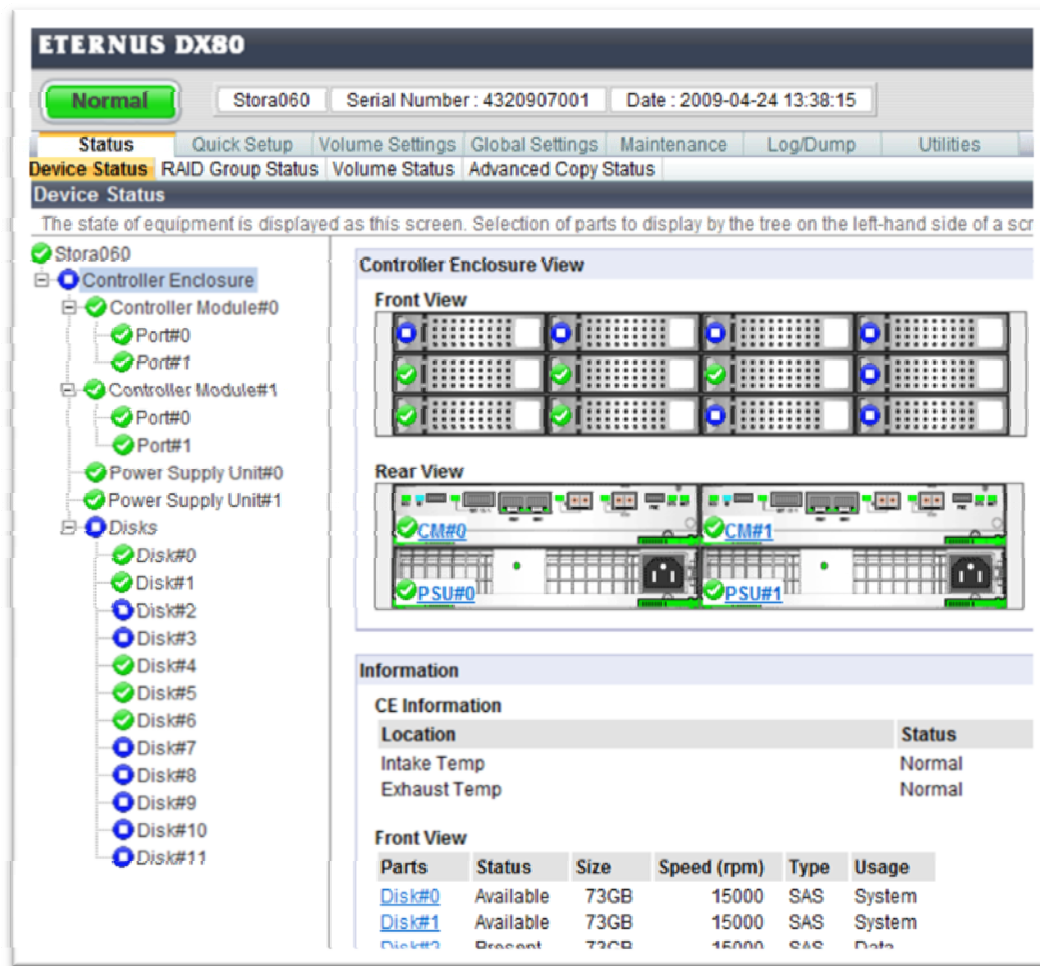
- SNMP: PRIMERGY ServerView 4.90 and others (MIB downloadable from Web GUI)
- SMI-S: PRIMERGY ServerView 4.91
- Microsoft Storage Manager for SANs (VDS)

■ ETERNUS SF

- Storage Cruiser: manage SAN with ETERNUS hardware
- AdvancedCopy manager: leverage all snapshot and clone features of ETERNUS

Web based management

- Initial setup wizard
- Manual operation or Wizard:
 - Create and manage RAID groups, LUNs
 - Manage LUN to host mapping
- Monitor system and component status
- Manage snapshots
- View events, collect diagnostic information
- Manage firmware



ETERNUS DX80

Normal | Stora060 | Serial Number : 4320907001 | Date : 2009-04-24 13:38:15

[Status](#) | [Quick Setup](#) | [Volume Settings](#) | [Global Settings](#) | [Maintenance](#) | [Log/Dump](#) | [Utilities](#)

[Device Status](#) | [RAID Group Status](#) | [Volume Status](#) | [Advanced Copy Status](#)

Device Status

The state of equipment is displayed as this screen. Selection of parts to display by the tree on the left-hand side of a scr

- Stora060
 - Controller Enclosure
 - Controller Module#0
 - Port#0
 - Port#1
 - Controller Module#1
 - Port#0
 - Port#1
 - Power Supply Unit#0
 - Power Supply Unit#1
 - Disks
 - Disk#0
 - Disk#1
 - Disk#2
 - Disk#3
 - Disk#4
 - Disk#5
 - Disk#6
 - Disk#7
 - Disk#8
 - Disk#9
 - Disk#10
 - Disk#11

Controller Enclosure View

Front View

Rear View

Information

CE Information

| Location | Status |
|--------------|--------|
| Intake Temp | Normal |
| Exhaust Temp | Normal |

Front View

| Parts | Status | Size | Speed (rpm) | Type | Usage |
|--------|-----------|------|-------------|------|--------|
| Disk#0 | Available | 73GB | 15000 | SAS | System |
| Disk#1 | Available | 73GB | 15000 | SAS | System |
| Disk#2 | Present | 73GB | 15000 | SAS | Data |

Easy to use Web GUI

■ Device Status overview

Intuitive device status display

Familiar Tree-structure display

The state of equipment is displayed as this screen. Selection of parts to display by the tree on the left-hand side of a screen displays the state of the part.

Controller Enclosure View

Front View

Rear View

Information

CE Information

| Location | Status | Error Code |
|--------------|--------|------------|
| Intake Temp | Normal | 0x0000 |
| Exhaust Temp | Normal | 0x0000 |

Front View

| Parts | Status | Size | Speed (rpm) | Type | Usage |
|---------|-----------|-------|-------------|------|--------|
| Disk#0 | Available | 73GB | 15000 | SAS | System |
| Disk#1 | Available | 73GB | 15000 | SAS | System |
| Disk#2 | Available | 73GB | 15000 | SAS | Data |
| Disk#3 | Available | 73GB | 15000 | SAS | Data |
| Disk#4 | Available | 146GB | 15000 | SAS | Data |
| Disk#5 | Available | 146GB | 15000 | SAS | Data |
| Disk#6 | Available | 146GB | 15000 | SAS | Data |
| Disk#7 | Available | 146GB | 15000 | SAS | Data |
| Disk#8 | Available | 146GB | 15000 | SAS | Data |
| Disk#9 | Available | 146GB | 15000 | SAS | Data |
| Disk#10 | Available | 146GB | 15000 | SAS | Data |
| Disk#11 | Available | 146GB | 15000 | SAS | Data |

Rear View

| Parts | Status | Expanded Information |
|-------|--------|----------------------|
| CM#0 | Normal | |
| CM#1 | Normal | |

Buttons: Activate DISK Port, Turn ON Location LED, Refresh

Initial Setup Wizard

ETERNUS DX80 User: juergeno Logoff FUJITSU

Normal Stora060 Serial Number: 4320907001 Date: 2009-05-08 16:04:55 Help

Status Easy Setup Volume Settings Global Settings Maintenance Log/Dump Utilities

Configuration Wizard Initial Setup

Initial Setup

Initialization of the storage system is performed in this wizard.

Start

- Set Date and Time
- Set Machine Name
- Change Password
- Set Network Environment
- Finish

Information

Initialization of the storage system is performed in this wizard. The contents set up here can be changed later.

Click Next to continue, or Cancel to exit Initial Setup.

< Back Next > Cancel

- Wizard starts automatically if not configured
- Setup Wizard reduces required trainings for deployment

■ Wizard guided configuration

Start Configuration Wizard

This wizard executes below:

- 1) Create RAID Group**
Creating new RAID Group/Select RAID Group.
- 2) Create Volume**
Create volume in Created/Selected RAID Group.
- 3) Set Host**
Setup for accessing from host.
- 4) Set Affinity Group**
Create or Set Affinity Group.
- 5) Assign LUN Mapping**
Set LUN to accessing from Hosts conneted by some ports.

Click "Start" to start Configuration Wizard.

Start

■ Step by step from RAID Group over LUN creation to Host visibility

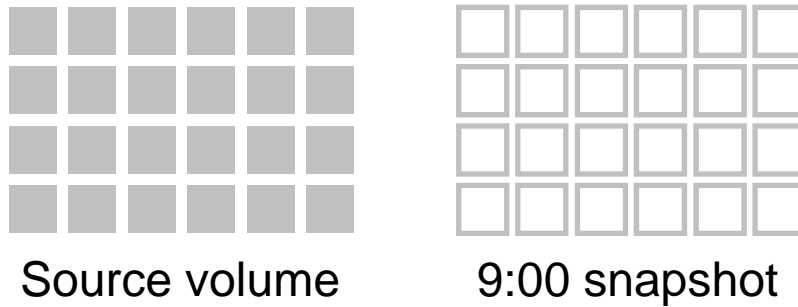
Snapshots and Clones



Snapshots and Clones

| | Snapshots | Clones |
|--|---|--|
| Description | Virtual copy | Real copy |
| Positioning | For space-efficient temporary copies such as a consistent source for backup to tape | For longer-term copies such as database clone, backup to and restore from disk |
| ETERNUS DX60/DX80 feature | SnapOPC+ | OPC QuickOPC EC |
| Space requirement | Only for changed data | Same space as source |
| Performance impact on source LUN during creation | None | OPC: after split, EC: before |
| Performance impact on source LUN after creation | if source changes or if many reads from snapshot | None |
| Resilient against failure of original LUN | - | ✓ |



How do Snapshots work

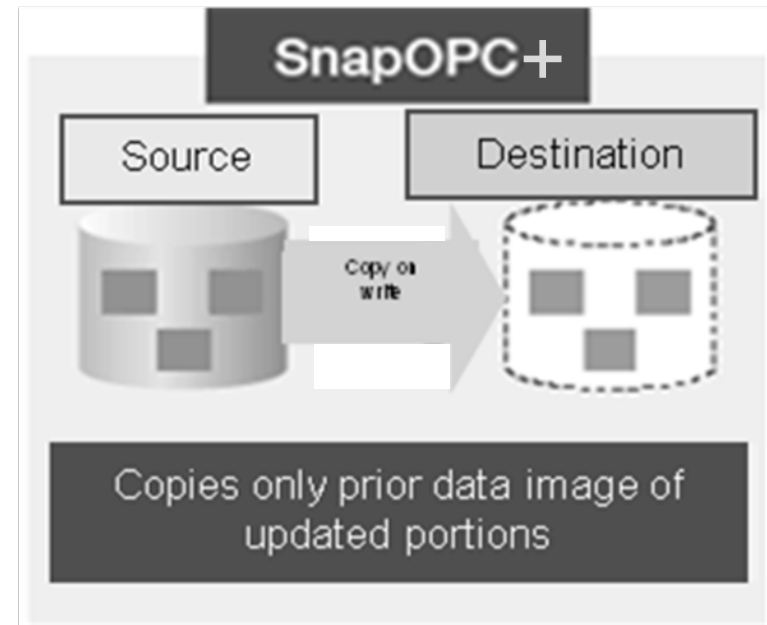


-  Blocks at 9:00
-  Blocks changed after 9:00

1. At 9:00, a snapshot is made
 - Happens very quickly because the data itself is not copied
2. After 9:00, the customer tries an upgrade and production data on source volume is changed
 - Causes “copy on write” (COW), also called “write-out”
 - Snapshot refers to source volume for unchanged blocks and snapshot volume for changed blocks

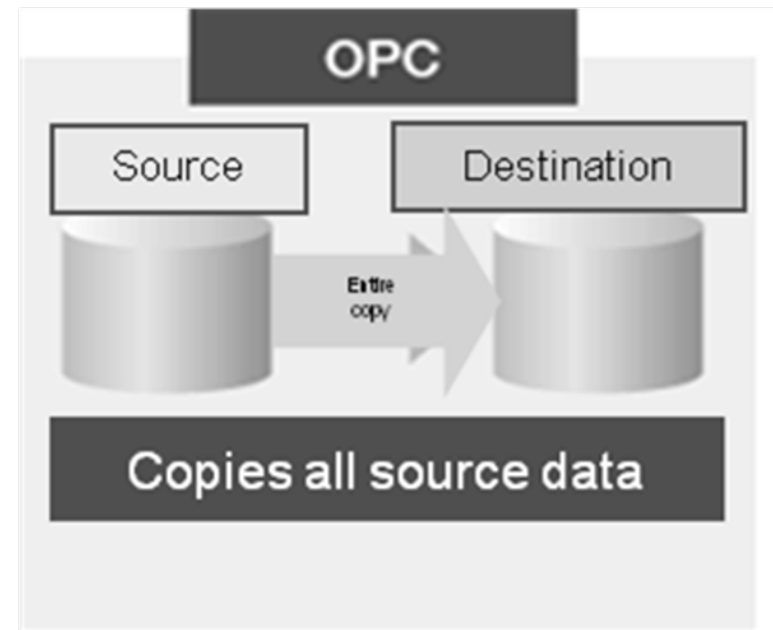
ETERNUS DX60/DX80 Snapshots

- Snapshots capture changes
 - ETERNUS DX60/DX80: SnapOPC+
 - Space requirement: only for changed data
 - Operational dependence
 - Zero Performance impact when the Snapshot is invoked
 - Latency for first writes to the source (copy-on-write)
 - Heavy reads from the snapshot impact the source LUN
 - Snapshots become invalid if source RAID group fails



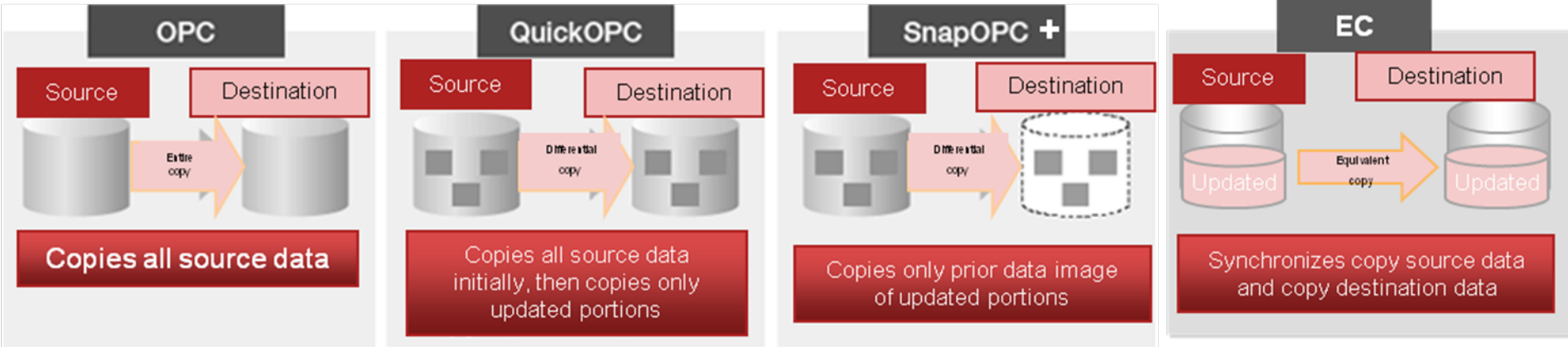
Recommendation: for space efficient temporary copies (e.g. a consistent source for backup to tape)

- Clones are full copies
 - ETERNUS DX60/DX80: OPC, QuickOPC, EC
 - Clones require as much space as the source LUN
 - Operational dependence:
 - Latency for read and write operations on the source during the copy process
 - Zero performance overhead when the copy process is complete
 - Destination is completely independent of source



Recommendation: for longer-term copies
(DB clone, restore from disk)

Snapshots and Clones on ETERNUS DX60/DX80



| | |
|-----------------|---|
| OPC | Copies entire source data. Suitable for backup operation with generational management. Provides full backup of multi-generation data. |
| QuickOPC | Copies only updated portions, after initial copy of entire source data. Suitable for database systems which need shorter backup times. |
| SnapOPC+ | Copies only data image prior to update. Enables size reduction of destination disk capacity, and provides multi-generation management. Suitable for backup of data stored on File Servers. |
| EC | Continually replicates (mirrors) entire source data to the copy destination. Replicated data can be accessed by suspending the EC session. The EC session can be resumed after being suspended. Only the data blocks that have changed data will be copied providing a fast resync of the mirror. |

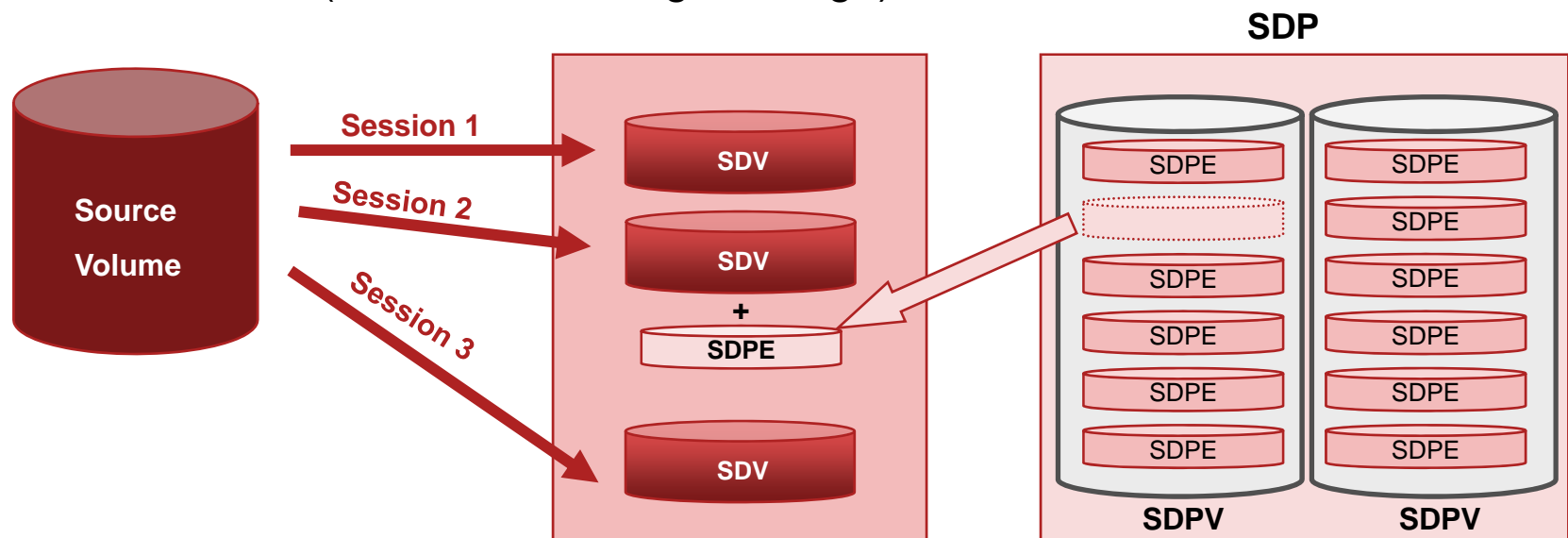
Snapshots & Clones - Licensing

- 8 Snapshots (or Clones) are available for free
 - Web GUI/CLI: SnapOPC+
 - ETERNUS VSS HW Provider: SnapOPC+ or QuickOPC
- ETERNUS DX60/DX80 Advanced Copy License
 - Allows up to 512/1024 Snapshots and Clones
 - ETERNUS SF ACM* required to manage OPC and EC

| HW License | Default | With Advanced Copy license | |
|-----------------|-----------------|--------------------------------|-----------------------------|
| | | Without ETERNUS SF ACM license | With ETERNUS SF ACM license |
| SW License | NA | Without ETERNUS SF ACM license | With ETERNUS SF ACM license |
| No. of sessions | 8 | 512 (DX60) or 1024 (DX80) | |
| Control by | Web GUI/CLI/VSS | Web GUI/CLI/VSS | ACM |
| SnapOPC+ | X | X | X |
| OPC | - | - | X |
| QuickOPC | X (via VSS) | X (via VSS) | X |
| EC | - | - | X |

SnapOPC+ Architecture

- **SDP: Snap Data Pool**
 - 1 Pool per ETERNUS DX60/DX80
 - Consists of SDP volumes (created like normal volumes)
- **SDV: Snapshot Data Volume**
 - 1 SDV must be defined per Session
 - SDVs are created like normal volumes, expect for space allocation:
 - from any RAID group at creation time (user must know max size of update)
 - or the SDP (SDP must be large enough)



■ Preparation

- Set up Advanced Copy table (cache tables, copy-on-write resolution depending on concurrent sessions and capacity snapped)
- Create Snapshot Pool (SDP) (1 per system)
- Create SDV devices for each snapshot destination (use own allocated space or from SDP)
- Verify snapshot policies

■ Create snapshot

- Via VSS HW provider (best consistency), CLI (scripting) or Web GUI

■ Map + Mount snapshot

- Use LUN mapping or affinity groups like with any other volume type
- Use operating system tools

■ Unmount+unmap snapshot

- Use operating system tool and unmap it

■ Restore from snapshot

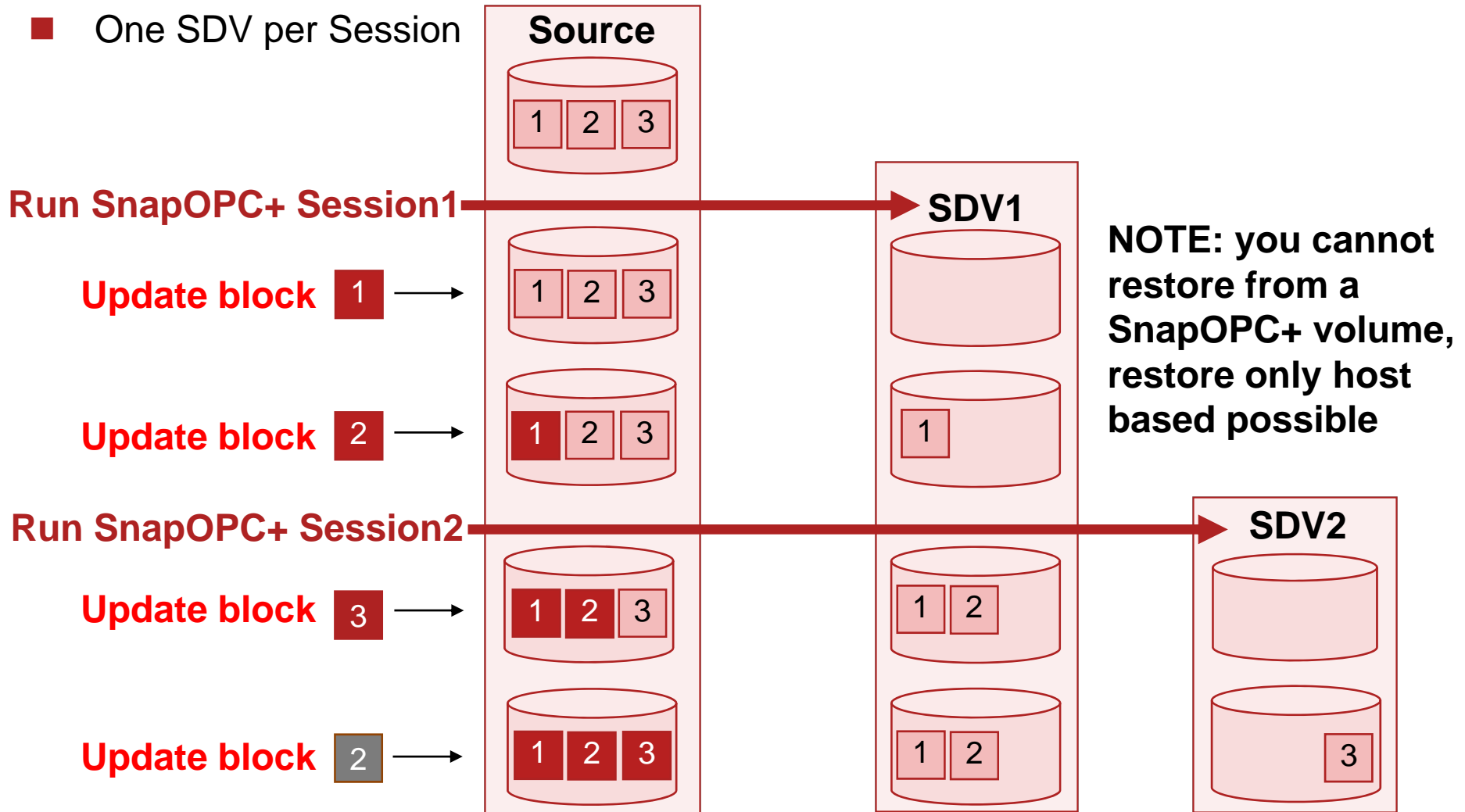
- Manually mount snapshot and retrieve the files required
- Full restore is not possible, only for clones

■ Delete snapshot

- Make sure to re-initialize the SDV

SnapOPC+ Multi Generation Operation

- As the copy source volume is updated, ETERNUS DX60/DX80 creates a physical copy of the old data (COW)
- One SDV per Session





Where to best trigger a Snapshot/Clone

- Snapshot or Clone operations are available
 - Snapshots (SnapOPC+) through the Web GUI
 - i.e. application has to be down for snapshot consistency
 - Snapshots (SnapOPC+) through the CLI
 - i.e. scripted interaction with application possible – make sure application is in backup mode or consistent otherwise
 - Snapshots (SnapOPC+) and Clones (QuickOPC) through a Microsoft VSS HW provider
 - i.e. VSS aware applications provide snapshot consistency automatically: Exchange, SQL, File service, Registry, ..
 - ETERNUS SF AdvancedCopy Manager can manage all Snapshots and Clones.*

Snapshot scenario: Symantec BackupExec

1. BackupExec initiates snapshot creation on production server
2. BackupExec mounts snapshot
3. BackupExec creates tape backup from snapshot
4. BackupExec dismounts snapshot
5. BackupExec initiates snapshot deletion

Production server with BackupExec Client +
ETERNUS VSS HW Provider



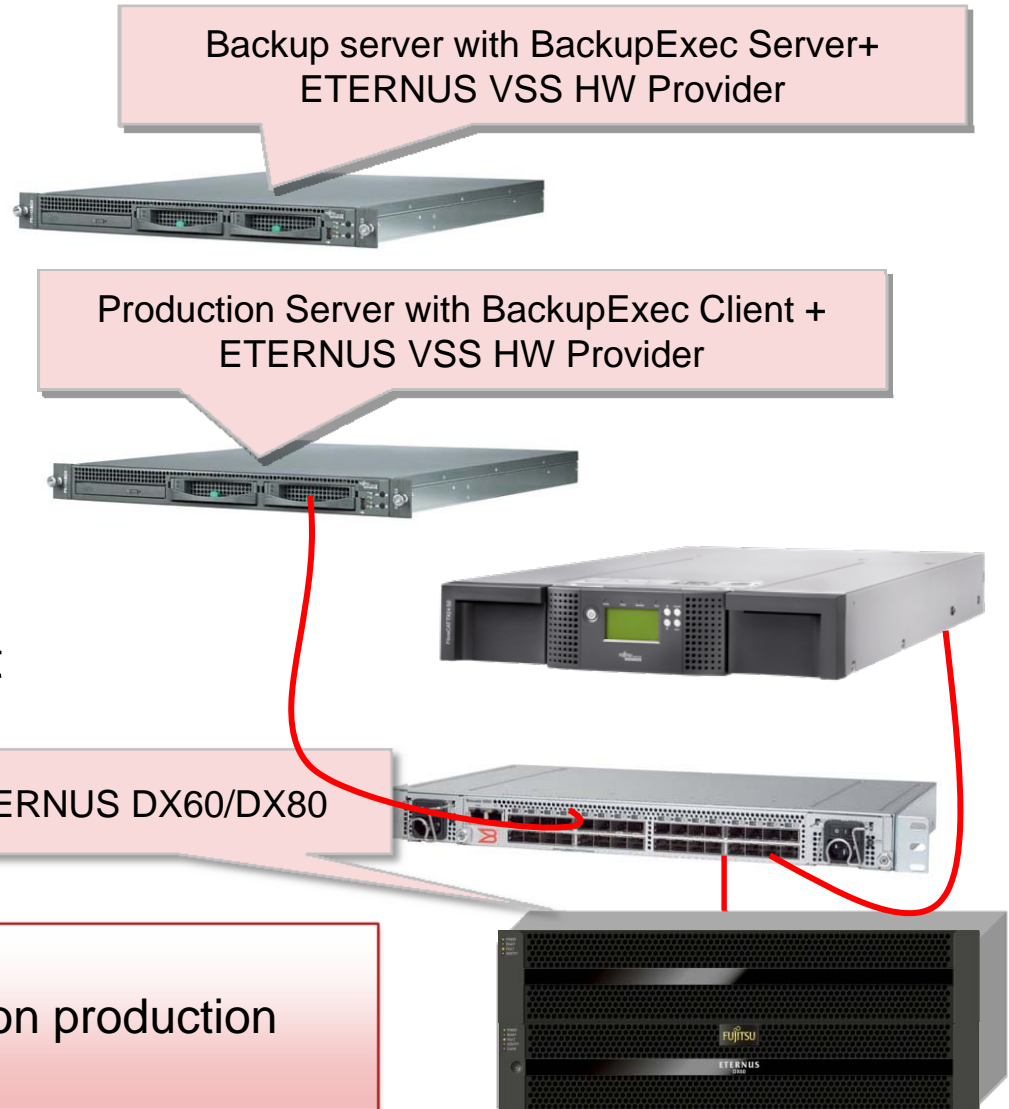
ETERNUS DX60/DX80



Benefit: Application consistent backup,
very short backup window

Snapshot scenario: Off-host backup

- BackupExec initiates snapshot creation on production server
 - BackupExec mounts snapshot on backup server
 - BackupExec creates tape backup from snapshot on backup server
1. BackupExec dismounts snapshot on backup server
 2. BackupExec initiates snapshot deletion



Benefit: Application consistent backup, very short backup window, low impact on production server during backup

Technology

- Hardware Architecture
- LUN Mapping
- System Disks

ETERNUS DX60/DX80 Terms

■ Controller Enclosure

- Controllers CM#0 and CM#1 (CM#1 optional)
- PSUs 0 and 1
- Disks 0 to 11

■ Drive Enclosure(s)

- 0-1 (ETERNUS DX60)
0-9 (ETERNUS DX80)
- Expanders Exp#0 and EXP#1 (EXP#1 optional)
- PSUs 0 and 1
- Note: Disk numbering starts at bottom left and goes to the right, then up

Controller Enclosure View

Front View



Rear View



Drive Enclosure View

Front View



Information

Front View

| Parts | Status | Capacity | Speed (rpm) | Type | Usage |
|------------------------|-----------|----------|-------------|------|--------|
| Disk#0 | Available | 1TB | 7200 | SAS | System |
| Disk#1 | Available | 1TB | 7200 | SAS | System |



- ETERNUS DX60/DX80 terms
 - LUN mapping = LUN map per ETERNUS DX60/DX80 port
 - Affinity Group = LUN map per host port identification (WWN)
- Steps for Affinity Groups
 1. Enable affinity groups per ETERNUS DX60/DX80 port
 2. Define host WWN (by discovery or manual entry)
 3. Create LUN map in affinity group and
 4. Assign affinity group to ETERNUS DX60/DX80 port and WWN
- Limitations
 - 64 (ETERNUS DX60) or 128 (ETERNUS DX80) concurrent connections (host ports) supported
 - LUN map: up to 256 LUNs (more for HP-UX)
 - Affinity group: Max. 32 different host WWNs per port

Lun Mapping – Details I

■ Port Settings + LUN map on port

Status Quick Setup **Volume Settings** Global Settings
 RAID Group Management Volume Management **Host I/F Management**
Set FC Port Parameters
 A setup of FC port is changed.

Port Settings

Port CM#0 Port#0
 Connection Fabric FC-AL
 Set Loop ID Manual Auto
 Loop ID Ascending
 Transfer Rate Auto Negotiation
 Frame Size 2048bytes
 Host Affinity Enable Disable
 Host Response 0:Default
 Reset Scope I_T_L T_L
 Reserve Cancel at Chip Reset Enable Disable

Volume Settings Global Settings Maintenance Log/Dump
 Volume Management **Host I/F Management** Advanced Copy Management
 View Logical Volumes and LUNs as seen from the host. It is possible to browse and set the configuration.

Port Setting

| | |
|------------------|-------------|
| Port | CM#0 Port#0 |
| Host Affinity | Disable |
| Number of LUN(s) | 4 |

Define LUN Mapping

| LUN | Volume No. | Volume Name | Status | Size (MB) |
|-----|------------|----------------|-----------|-----------|
| 0 | 2 | Thomas_R5_01_2 | Available | 2048 |
| 1 | 3 | Thomas_R5_01_3 | Available | 2048 |
| 2 | 7 | Thomas_R5_02_2 | Available | 3096 |
| 3 | 8 | Thomas_R5_02_3 | Available | 3096 |

Affinity Groups

[Status](#) | [Quick Setup](#) | **[Volume Settings](#)** | [Global Settings](#) | [Maintenance](#) | [Log/Dump](#)

[RAID Group Management](#) | [Volume Management](#) | **[Host I/F Management](#)** | [Advanced Copy Management](#)

Assign LUN Mapping

LUN Map defines mapping between Logical Volumes and LUNs as seen from the host. It is possible to browse and set the configuration :

LUN Mapping

- [-] Affinity Group
 - 0:Thomas_01
 - 1:jo1
 - 2:jo2
- [-] Ports
 - CM#0 Port#0
 - CM#0 Port#1
 - CM#1 Port#0
 - CM#1 Port#1

List of Affinity Group(s)

| No. | Name | Number of LUN(s) |
|-------------------|-----------|------------------|
| 0 | Thomas_01 | 4 |
| 1 | jo1 | 4 |
| 2 | jo2 | 4 |

LUN Mapping

- [-] Affinity Group
 - 0:jo_storb051
- [-] Ports
 - CM#0 Port#0
 - CM#0 Port#1
 - CM#1 Port#0
 - CM#1 Port#1

Port Setting

Port CM#0 Port#0
Host Affinity Enable
Number of Host(s) 4

Affinity Group Setting

| Host | Affinity Group | Number of LUN(s) |
|-----------------|-------------------------------|------------------|
| 0:storb051-17c6 | 0:jo_storb051 | 16 |
| 1:storb051-17ca | 0:jo_storb051 | 16 |
| 2:storb051-17c7 | 0:jo_storb051 | 16 |
| 3:storb05-17cb | 0:jo_storb051 | 16 |

Integration

- Event Notification
- ETERNUS SF Storage Cruiser
- Server List and Alarms

Event Notification

- ETERNUS DX60/DX80 support email alerts and SNMP traps
- SNMP traps are integrated with ServerView
- A MIB can be downloaded from the system

Summary

| | E-Mail | SNMP Trap | Host Sense |
|---------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| All Error Events | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| All Warning Events | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| All Informational Events | <input type="checkbox"/> | <input type="checkbox"/> | - |
| Individual Event Settings | No | Yes | No |

System Defaults REMCS Defaults

Add New Destination of SNMP Trap

IP Address

Community Name

Add New Destination

Download MIB File

Option The control code for ServerView is added to the comment line of the MIB definition file

Extended MIB Definition file

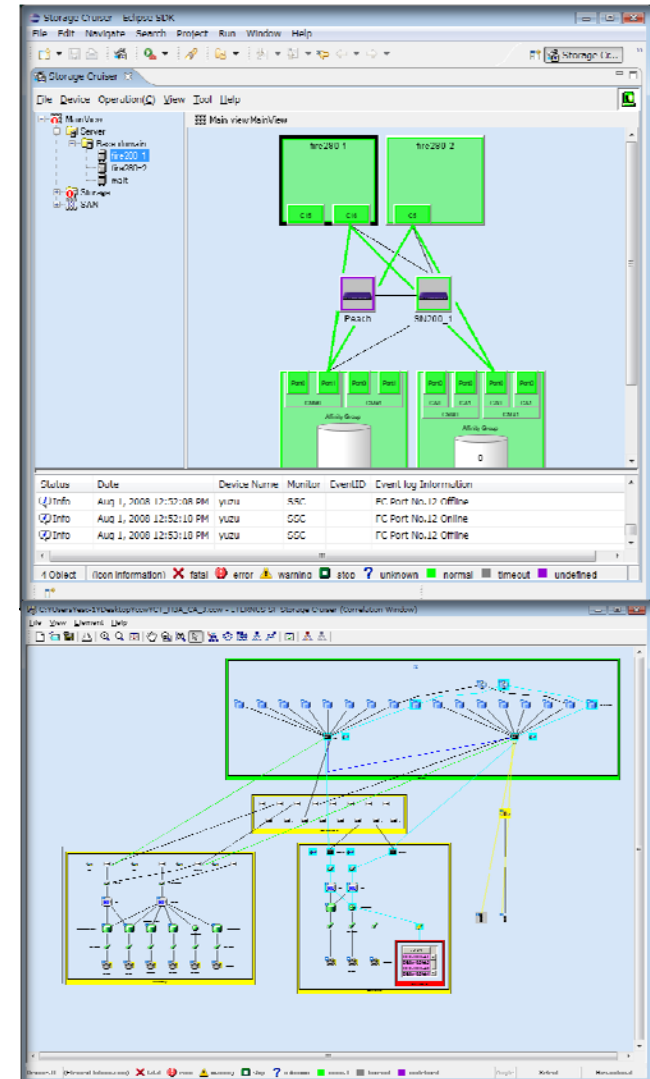
ETERNUS SF Storage Cruiser

■ ETERNUS and SAN infrastructure storage resource management

- Access path definition
- Consistency checks
- State monitoring and device display
- Power monitoring / ECO mode management
- Performance monitoring

■ Correlation Management

- Resource management of relations between storage systems and servers



Server List and Alarms

- ETERNUS DX60/DX80 are discovered via SNMP and SMI-S
- The overall status is displayed in the Server List
- Traps are displayed

The screenshot shows the ServerView web interface. At the top, there is a navigation bar with links for ADMINISTRATION, ASSET MANAGEMENT, EVENT MANAGEMENT, MONITORING, UPDATE MANAGEMENT, and HELP. Below this is a secondary navigation bar with links for ARCHIVE, IMPORT SERVER, and SETTINGS. The main content area is titled "ServerList" and displays a table of servers. The table has columns for Name, Network, Model, and System. A single server is listed: DX60@172.25.82.69, with a status icon of a green triangle and a blue circle. Below the table, there is an "Alarm Details" section with a tab for "Alarm Information". The alarm message reads: "Informational storage event # 233, type 28, description: Controller configuration parameters have been changed".


| Name | Network | Model | System |
|-------------------|--------------|----------------------|--------|
| DX60@172.25.82.69 | 172.25.82.69 | Fujitsu ETERNUS DX60 | |

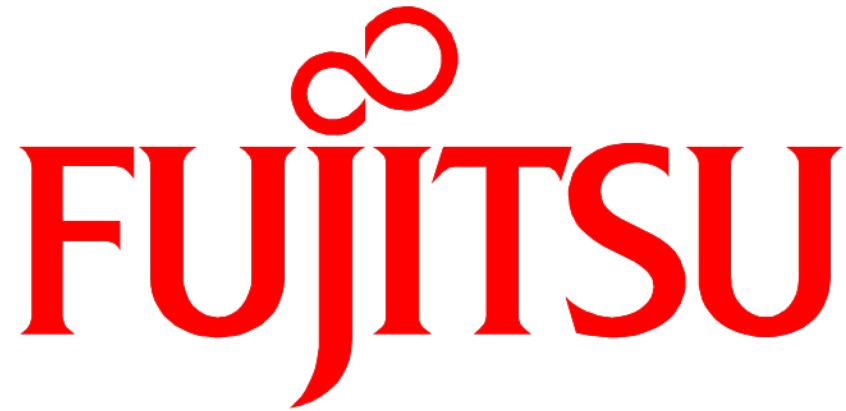
Alarm Details | Alarm Information

Informational storage event # 233, type 28, description: Controller configuration parameters have been changed

ETERNUS

<http://www.fujitsu.com/storage/>





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THE POSSIBILITIES ARE INFINITE