Smart Array Competitive Analysis

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ISS Server Storage

Part 3 of 3

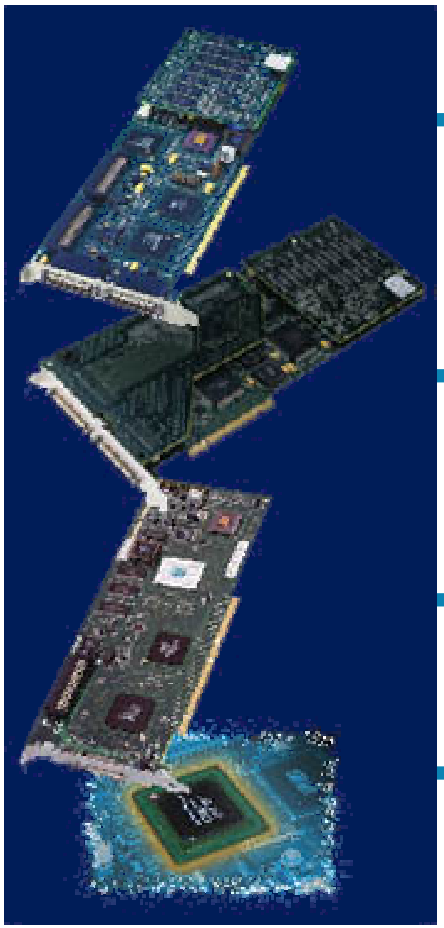
HP WORLD 2003
Solutions and Technology Conference & Expo

Firmware distinctions and storage software

Upgrade to a newer controller

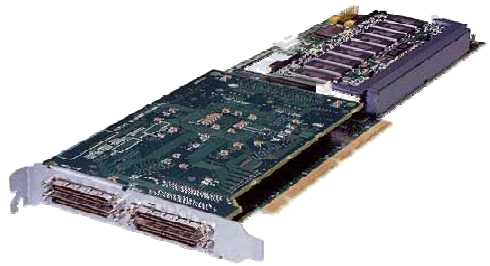
- Upgrade to a Newer Controller
  - Smart Array configuration information and data is migrated seamlessly.
  - Difficult and confusing upgrade from 3D/i to PERC3/QC or PERC3/DC. Very treacherous from PERC2 (ultra2) to PERC3 U160)

Upgrading your Smart Array



instant upgrade:

1. Power down the server.
2. Replace the old controller and cables with the new controller and cables.
3. Re-power up the server.
2. Ensure that you are running the latest device driver and Smart Array firmware. Can obtain both from the SmartStart CD.
4. Data will be seamlessly recognized.



Smart Array 53xx

- faster performance
- greater capacity
- higher availability

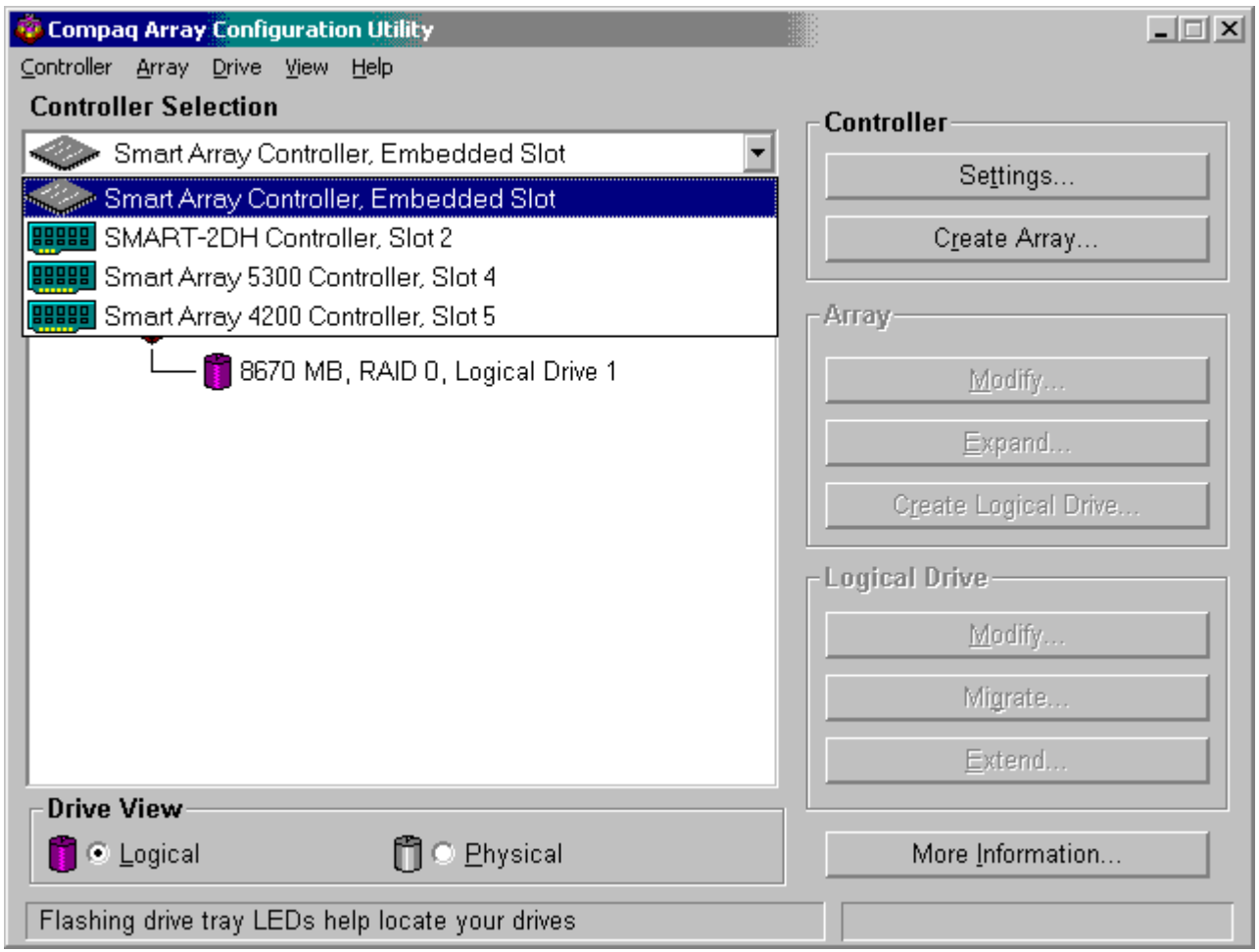
RAID configuration utilities

HP – two methods:

1. ACU/XE – started with SmartStart 6.0
   - Browser based
2. ORCA – Option ROM Configuration for Arrays
   - ROM based
   - Available at POST
   - Same user interface for all HP RAID controllers
   - Begun with SA-5300 and all SA RAID controllers subsequent
   - Easy way to configure drives before entering O/S

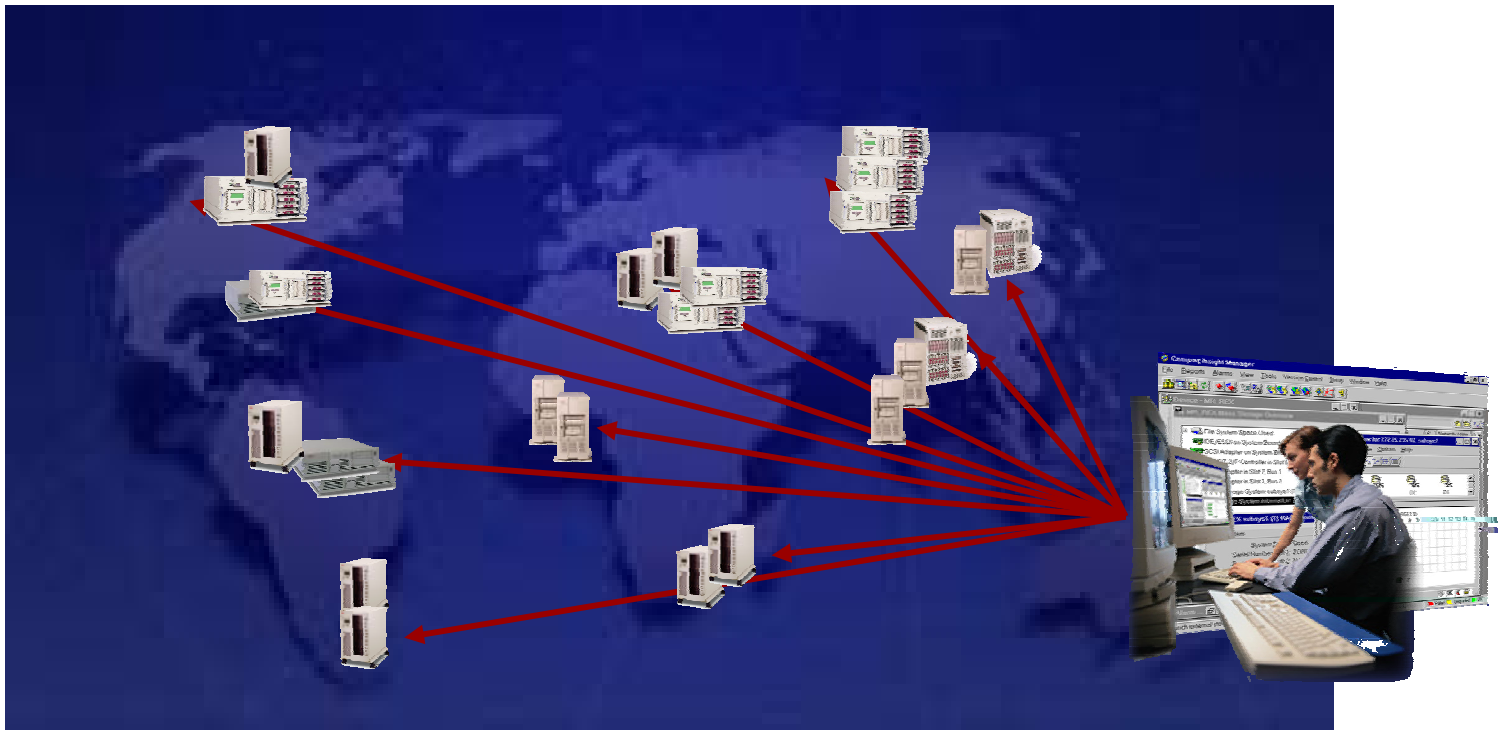
Array Configuration Utility (ACU)

Say goodbye to an old friend…

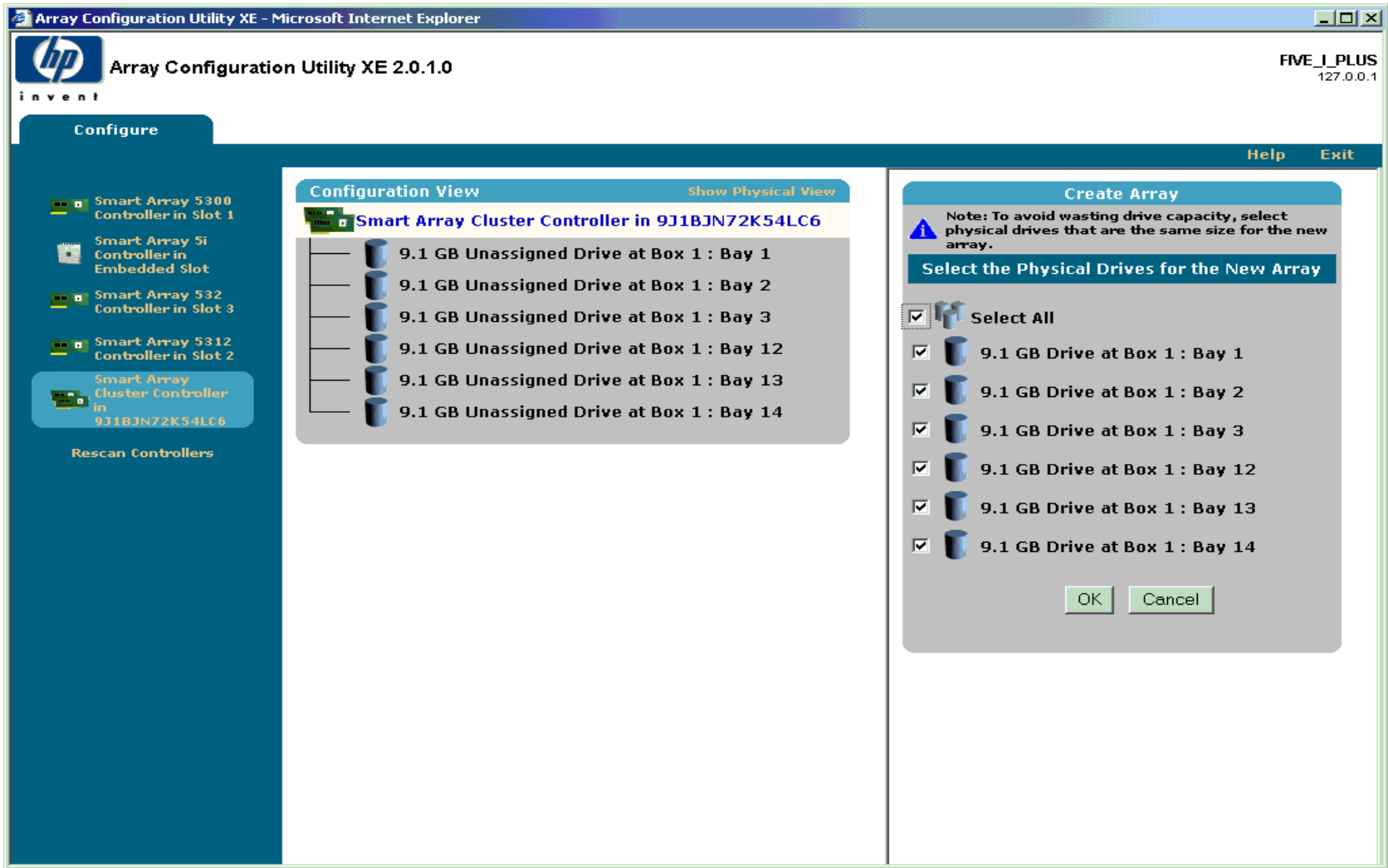


Next generation software

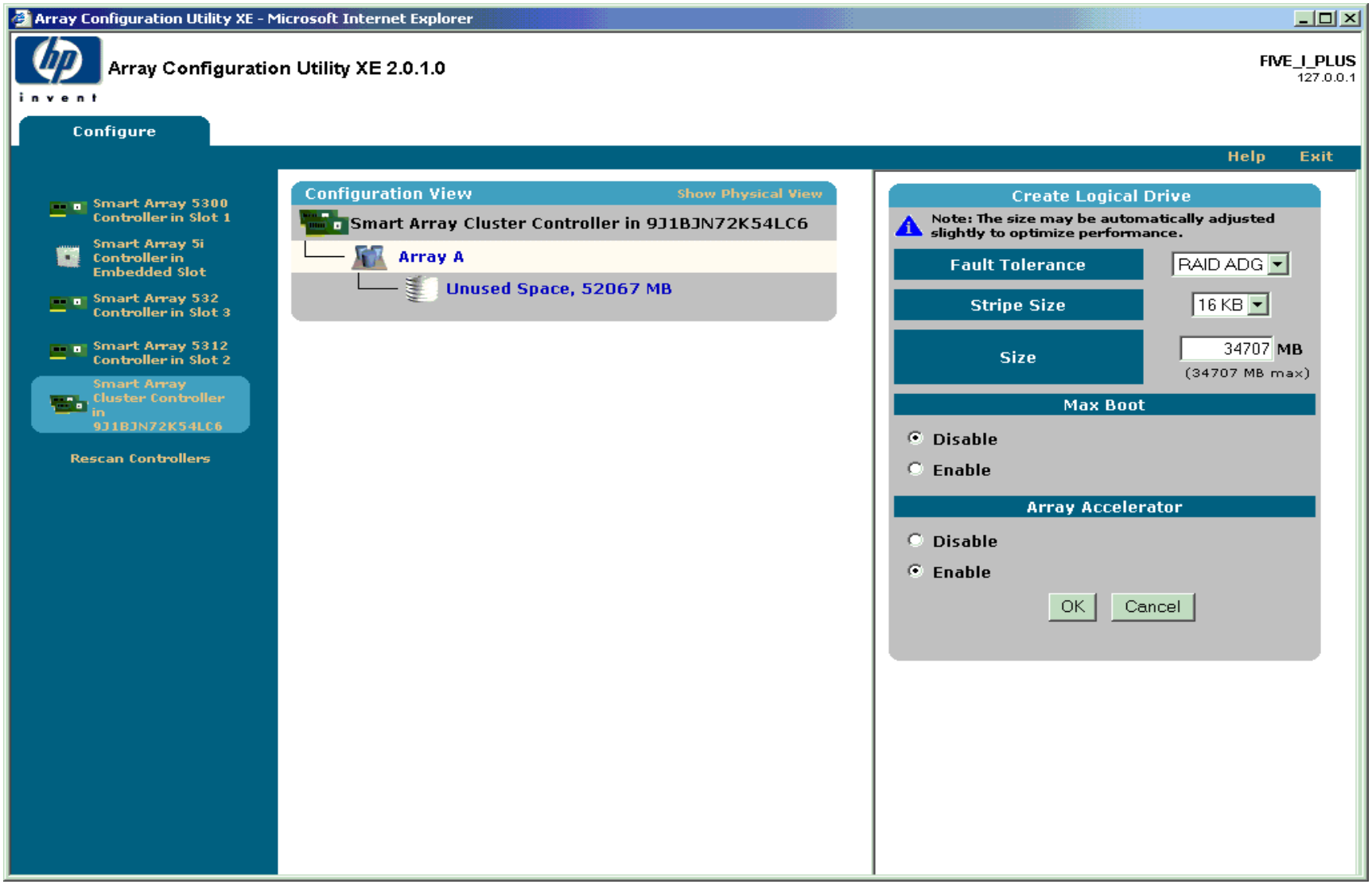
- Web based Array Configuration Utility (ACU-XE)
  - Browser based interface
  - Manage all Smart Arrays from one central location.



ACU/XE


Array Configuration Utility XE - Microsoft Internet Explorer
Array Configuration Utility XE 2.0.1.0
invent
FIVE_I_PLUS
127.0.0.1
Configure
Help
Exit
Smart Array 5300 Controller in Slot 1
Smart Array 5i Controller in Embedded Slot
Smart Array 532 Controller in Slot 3
Smart Array 5312 Controller in Slot 2
Smart Array Cluster Controller in 9J1BJN72K54LC6
Rescan Controllers
Configuration View
Show Physical View
Smart Array Cluster Controller in 9J1BJN72K54LC6
9.1 GB Unassigned Drive at Box 1 : Bay 1
9.1 GB Unassigned Drive at Box 1 : Bay 2
9.1 GB Unassigned Drive at Box 1 : Bay 3
9.1 GB Unassigned Drive at Box 1 : Bay 12
9.1 GB Unassigned Drive at Box 1 : Bay 13
9.1 GB Unassigned Drive at Box 1 : Bay 14
Create Array
Note: To avoid wasting drive capacity, select physical drives that are the same size for the new array.
Select the Physical Drives for the New Array
Select All
9.1 GB Drive at Box 1 : Bay 1
9.1 GB Drive at Box 1 : Bay 2
9.1 GB Drive at Box 1 : Bay 3
9.1 GB Drive at Box 1 : Bay 12
9.1 GB Drive at Box 1 : Bay 13
9.1 GB Drive at Box 1 : Bay 14
OK
Cancel

ACU/XE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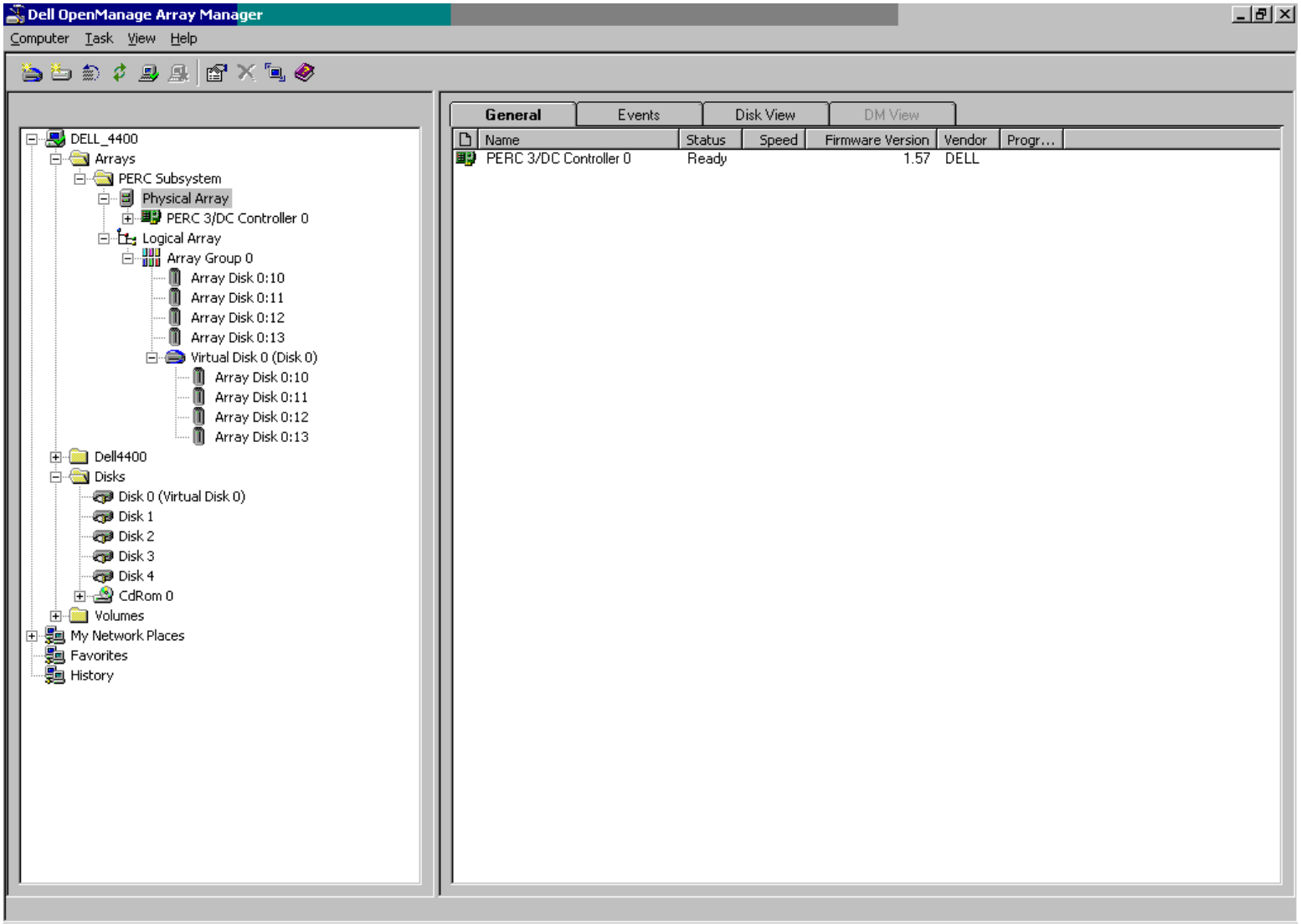
Rescan Controllers
Configuration View
Show Physical View
Smart Array Cluster Controller in 9J1BJN72K54LC6
Array A
Unused Space, 52067 MB
Create Logical Drive
Note: The size may be automatically adjusted slightly to optimize performance.
Fault Tolerance
RAID ADG
Stripe Size
16 KB
Size
34707 MB
(34707 MB max)
Max Boot
Disable
Enable
Array Accelerator
Disable
Enable
OK
Cancel

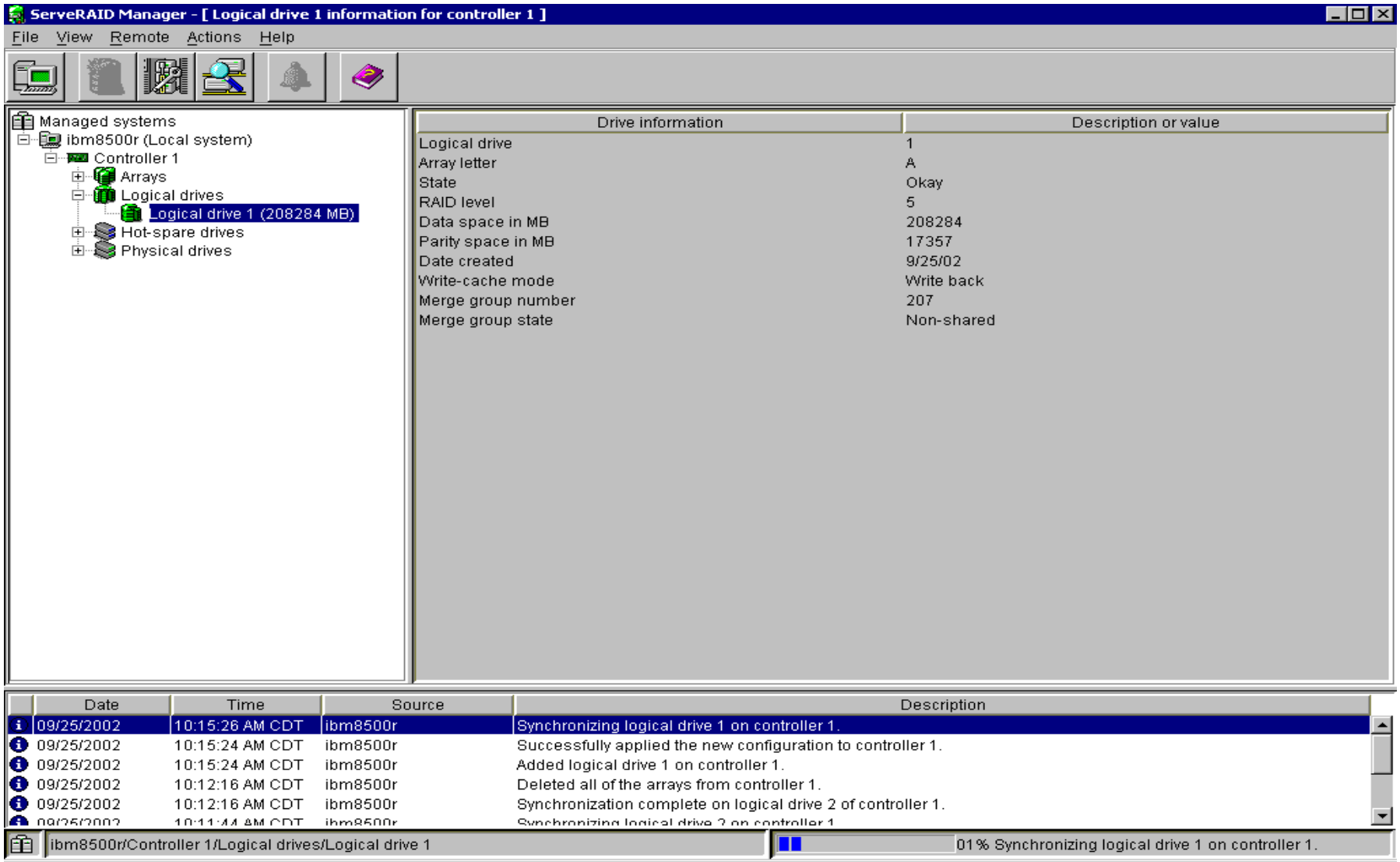
Dell's RAID configuration utilities:

- PERC BIOS
  - Accessed by <Ctrl> <M> key sequence at POST
  - Comparable to HP's ORCA – text based
  - Now has same utility look across 3 different OEM RAID offerings –
  - Adaptec, AMI and LSI
- PERC WebBIOS
  - Graphical HTML-BIOS based utility originally from AMI
  - Versatile – can access and configure multiple Dell RAID controllers
- Open Manage Array Manager
  - Veritas version of Windows Disk Manager
  - Comprehensive – all controllers accessed here
  - Takes awhile to get used to as some options not intuitive

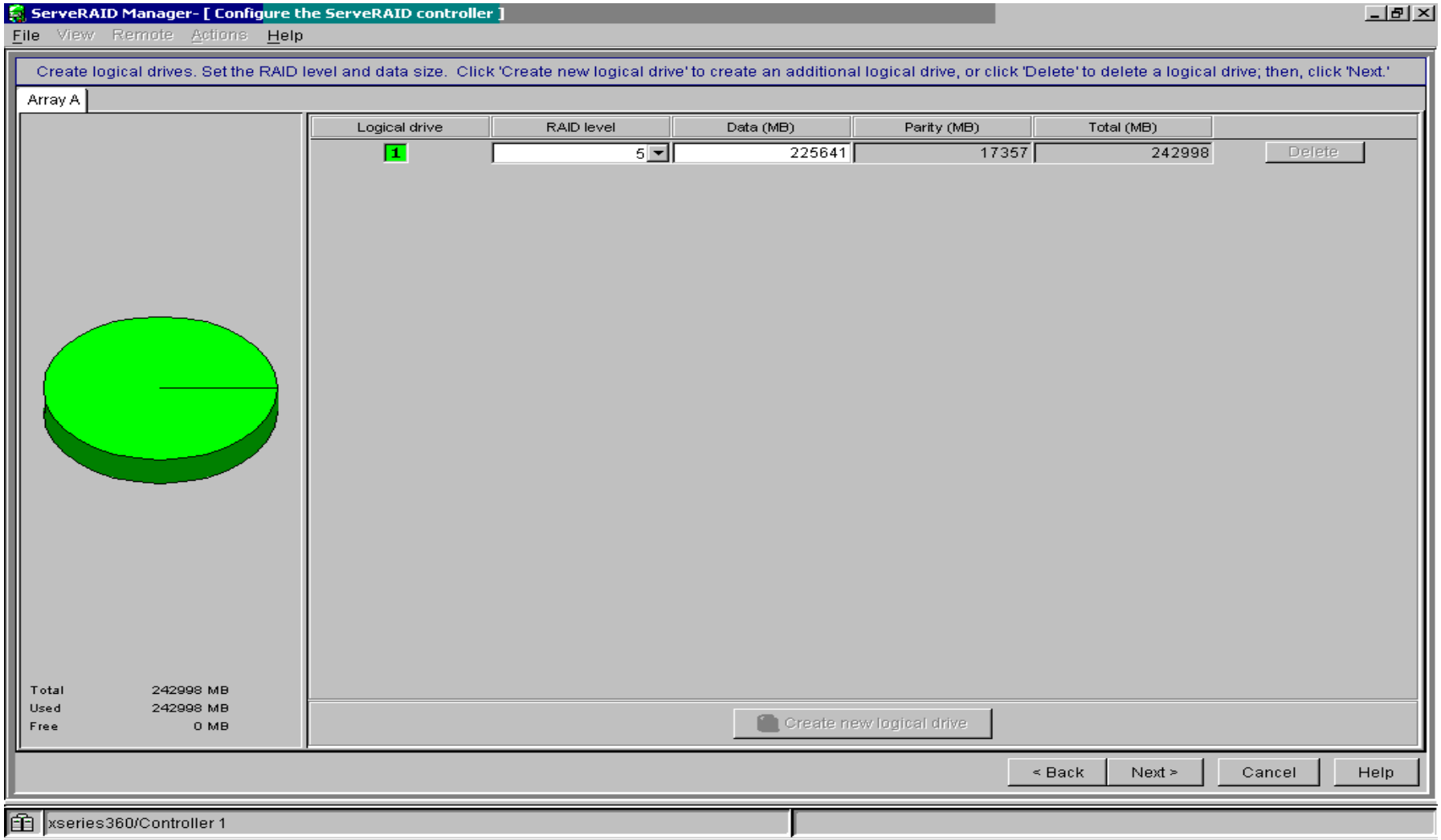
Dell OpenManage Array Manager



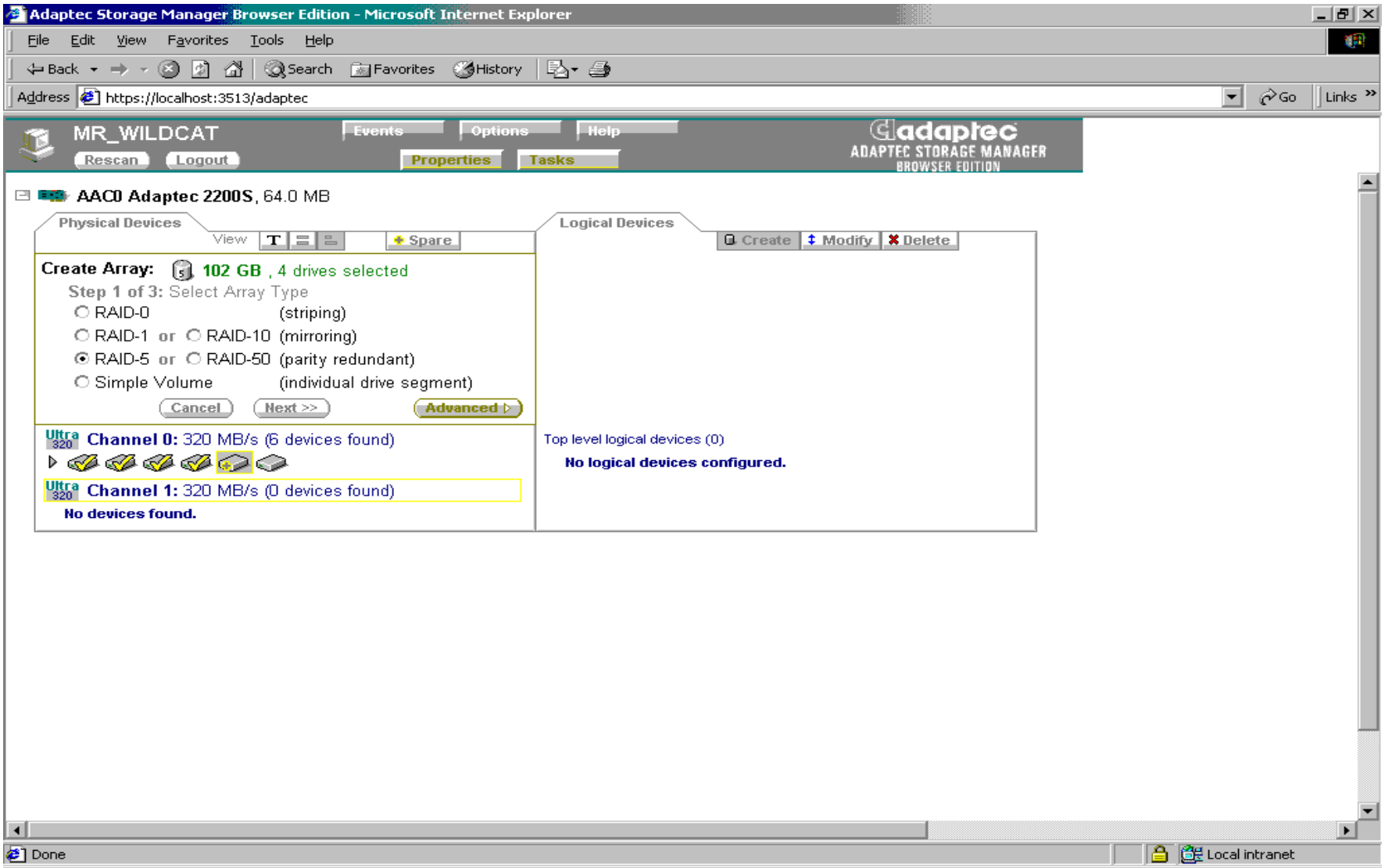
IBM configuration- ServeRAID Manager



IBM's ServeRAID Manager

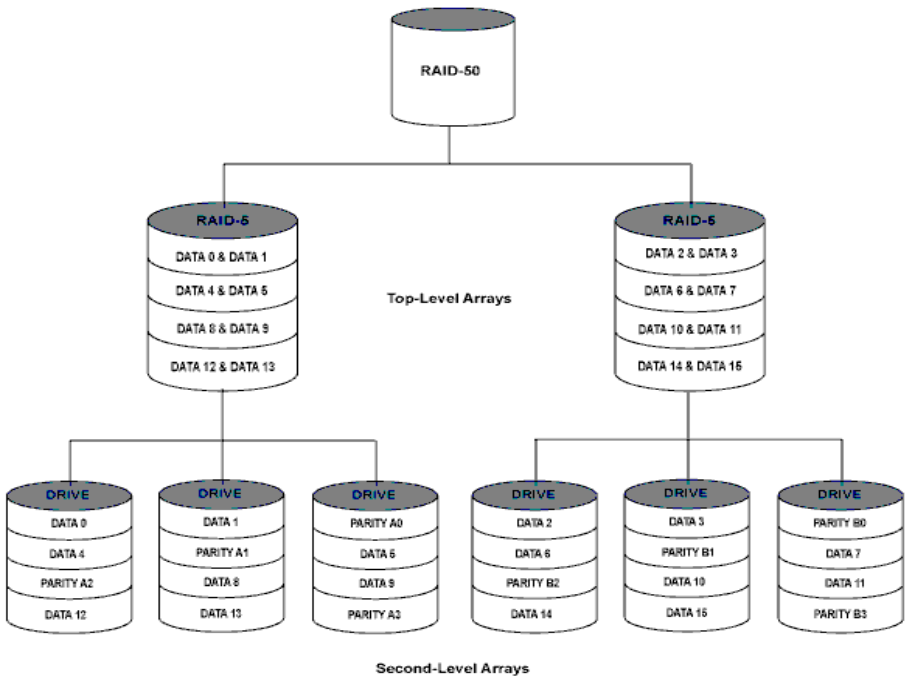


Adaptec's storage manager



Adaptec's RAID level 50

A RAID-50 is a dual-level array created by using two or more equal-sized RAID-5s to create a RAID-0.



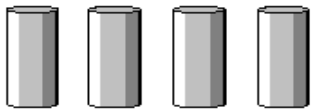
The top-level RAID-0 shares the load among the second-level RAID-5s, improving both read and write performance. The second-level RAID-5s use of parity provides efficient redundancy.

IBM's RAID-5E

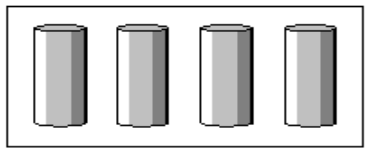
The following illustration is an example of a RAID level-5E logical drive.

RAID level-5 Enhanced example

Start with four physical drives.

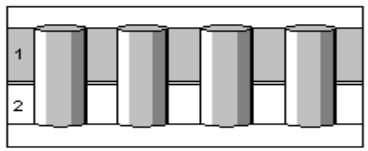


Create an array using all four physical drives.



Then create a logical drive (labeled as 1) within the array.

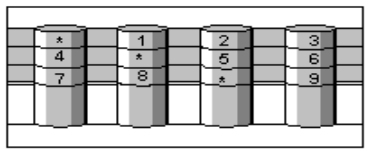
Notice that the distributed spare drive is the free space (labeled as 2) shown below the logical drive.



The data is striped across the drives, creating blocks in the logical drive.

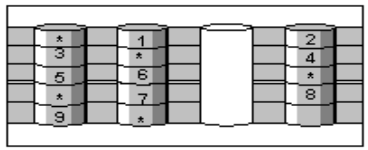
The storage of the data parity (denoted by ✱) is striped,

and it shifts from drive to drive as it does in RAID level-5.



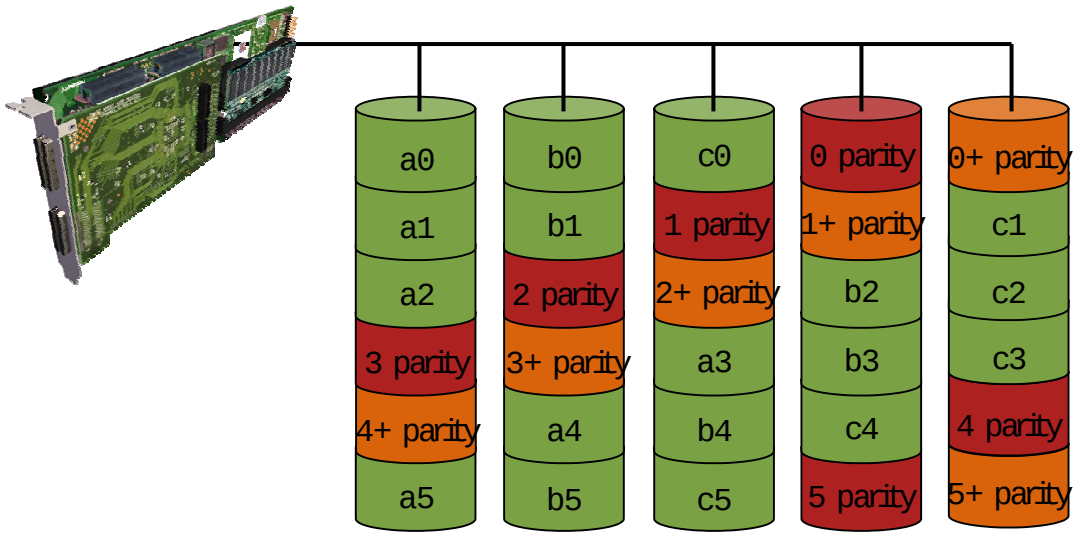
Notice that the spare drive is **not** striped.

If a physical drive fails in the array, the data from the failed drive is reconstructed. The array undergoes compression, and the distributed spare drive becomes part of the array. The logical drive remains RAID level-5E.



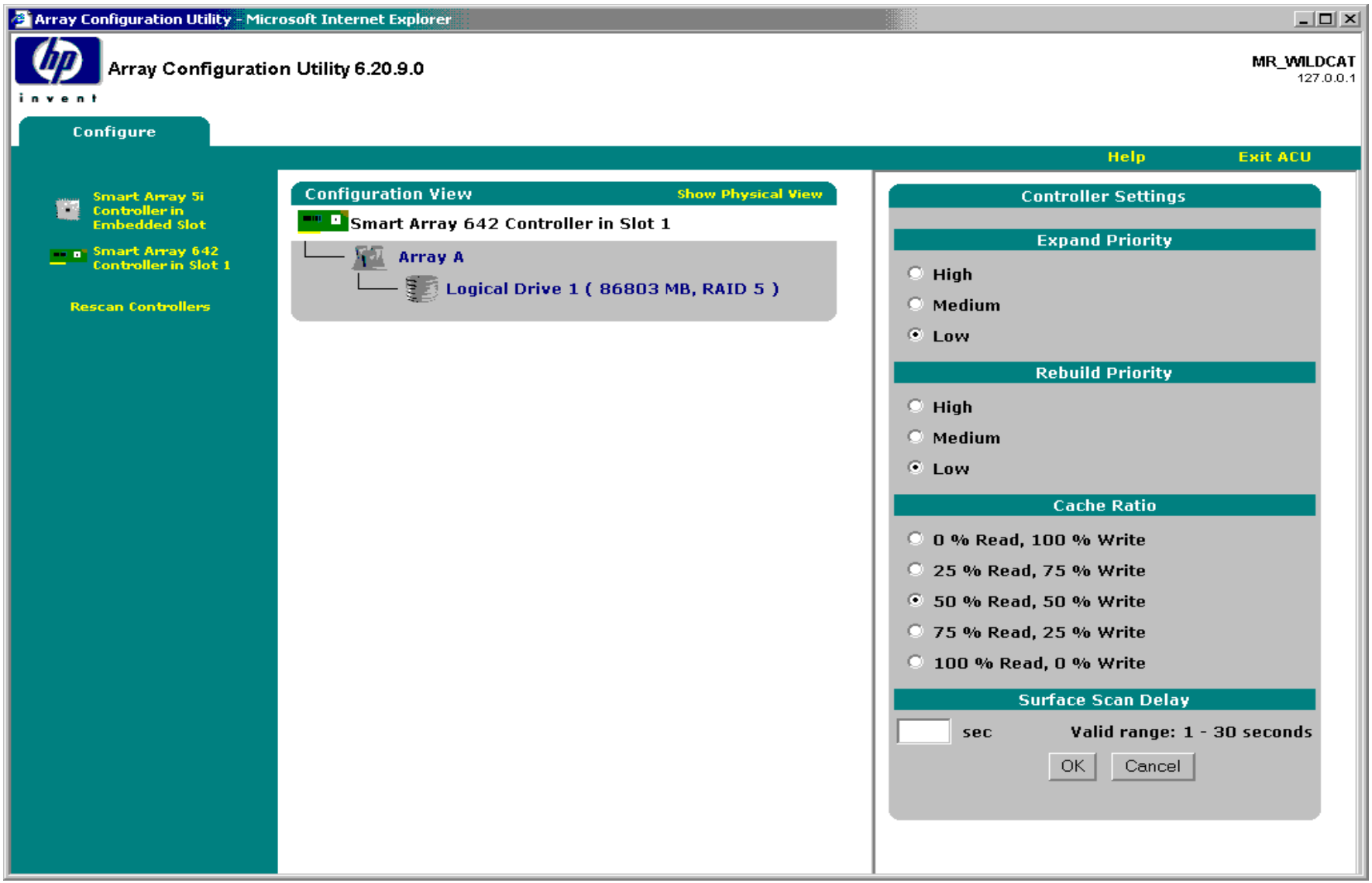
When you replace the failed drive, the data for the logical drive decompresses and returns to the original striping scheme.

RAID ADG



- similar to RAID 5, data and parity is distributed across all drives
- the capacity equal to two drives is reserved for parity data
- RAID ADG can withstand two simultaneous drive failures with out downtime or data loss
- supports online RAID level migration from RAID 1 or RAID 5
- supports online spares

Smart Array can change cache ratios

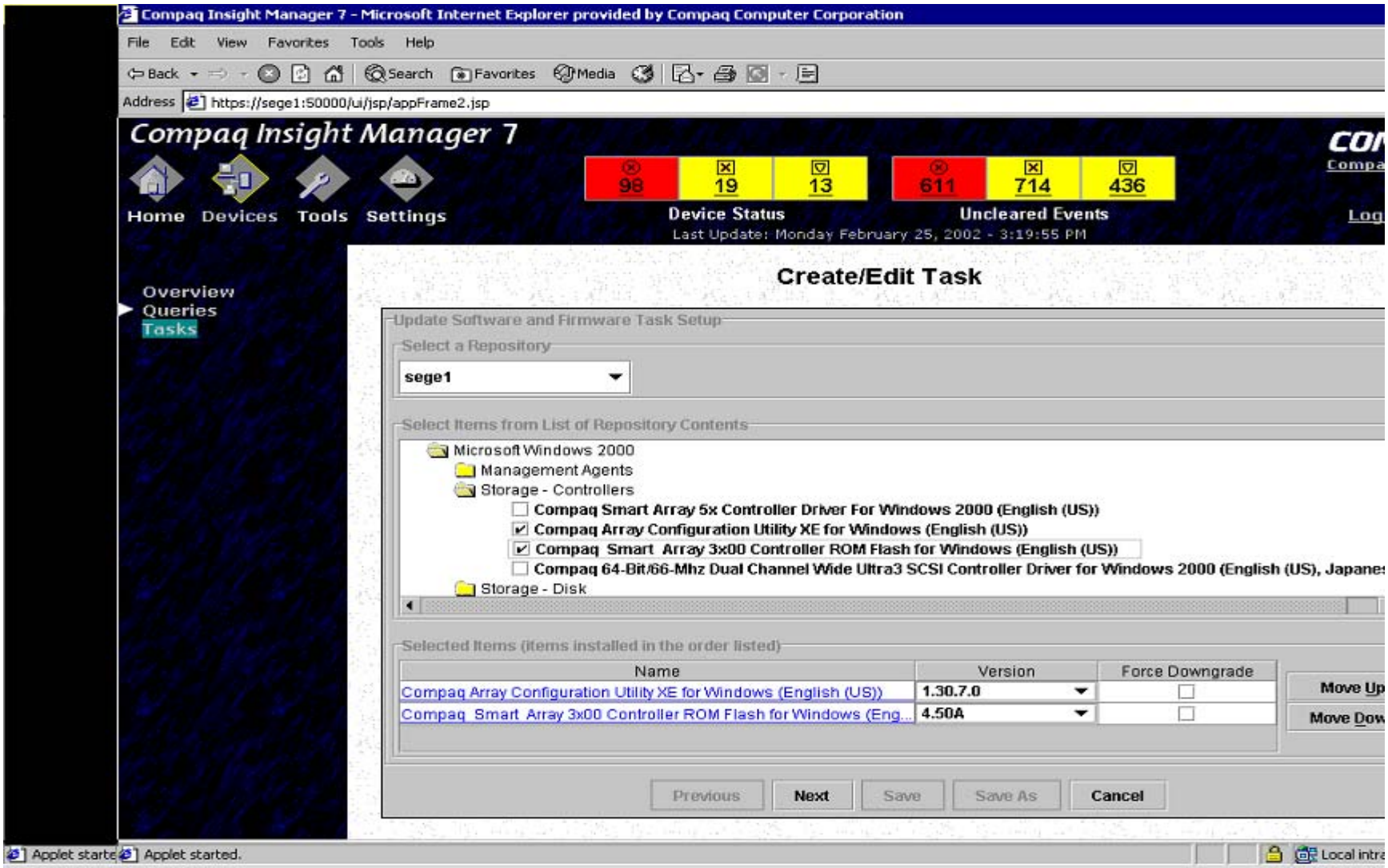


Drive Roaming

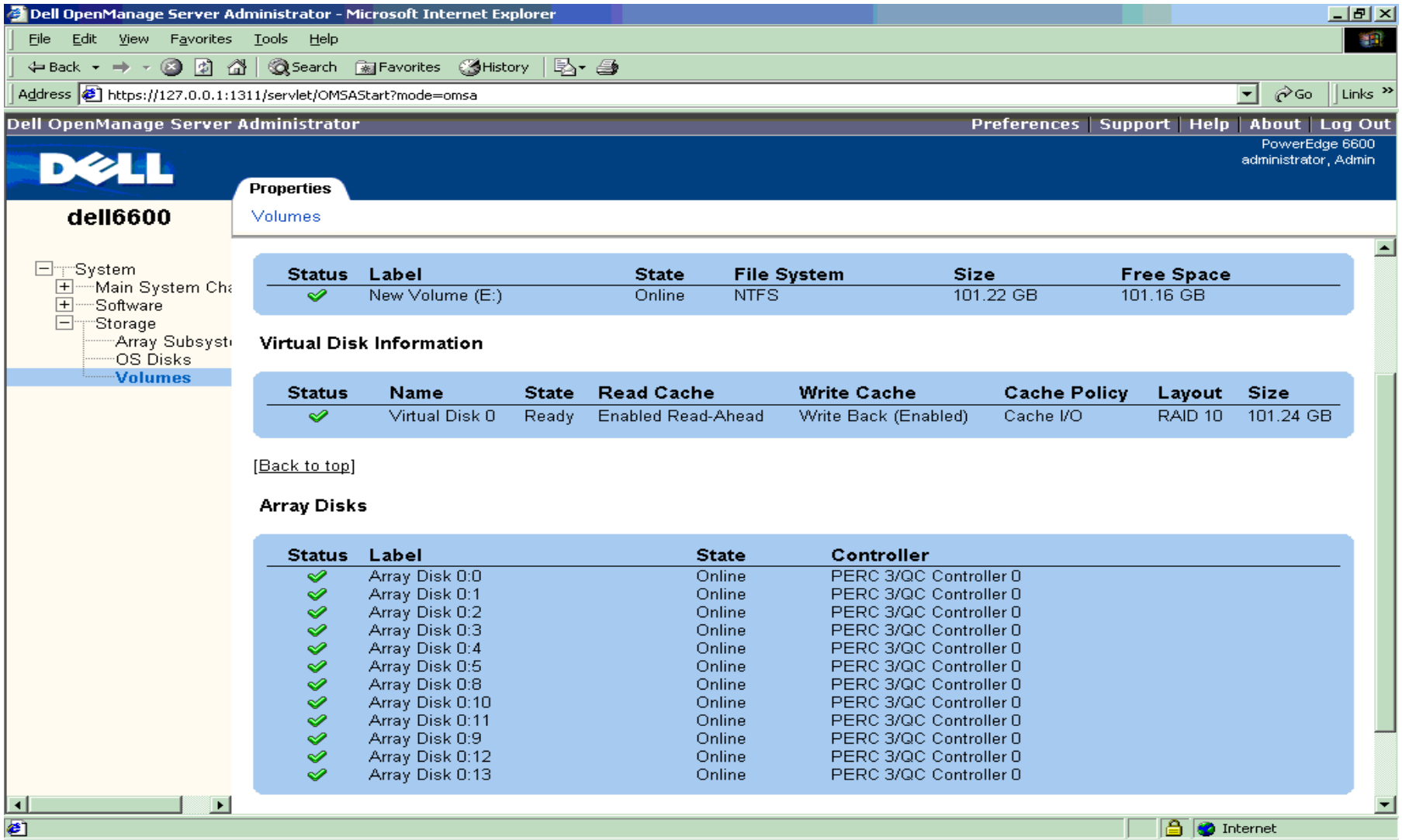
- If drives inadvertently get mixed up (even across different channels), during a move for example, controller performs a self discovery during POST and re-maps the drives in the correct order.

- How is it done? RIS (Redundant Information Sectors) on each drive in the array that keeps track of the array it belongs to and it's parameters.

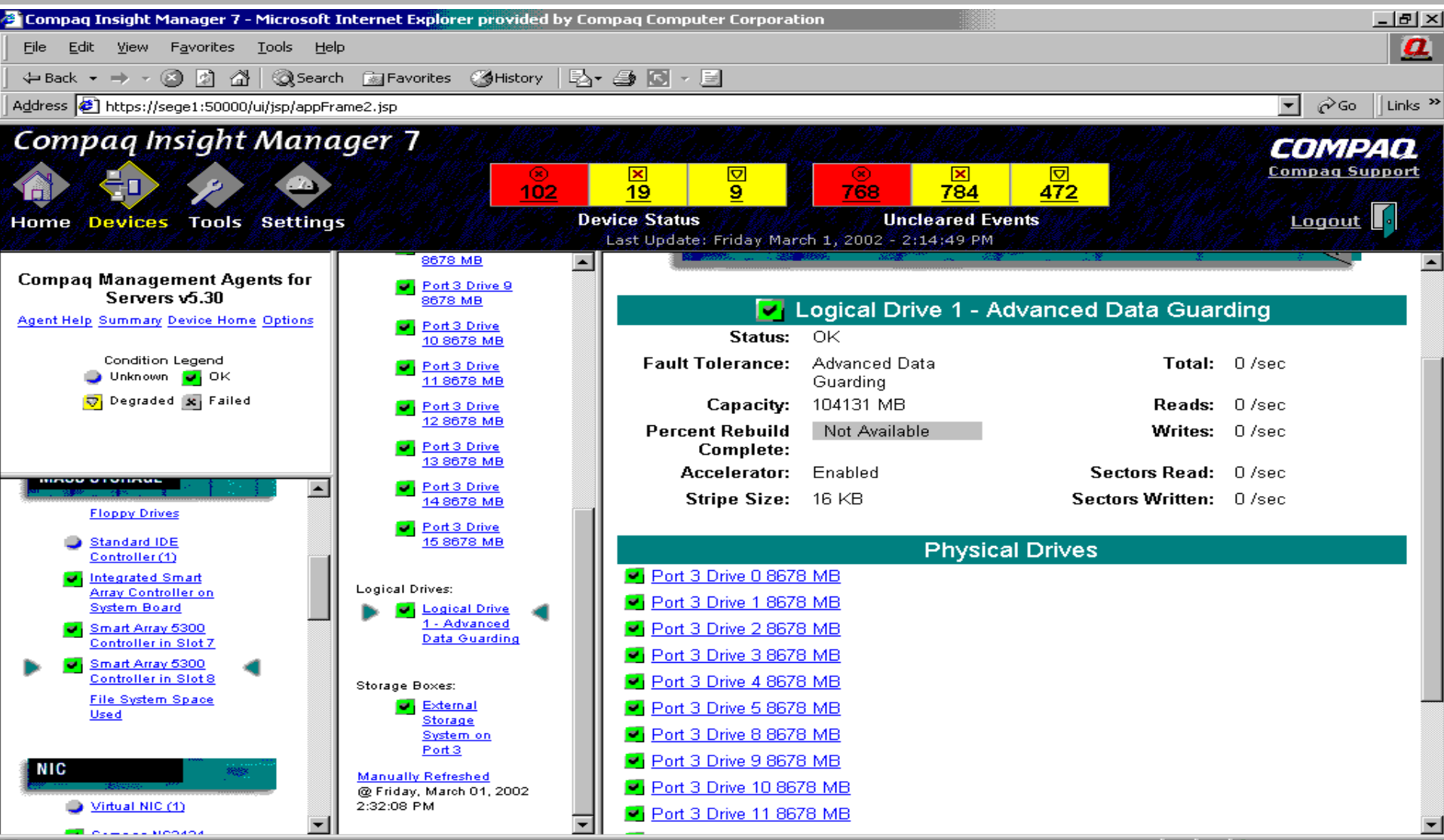
Remote SA controller firmware flash



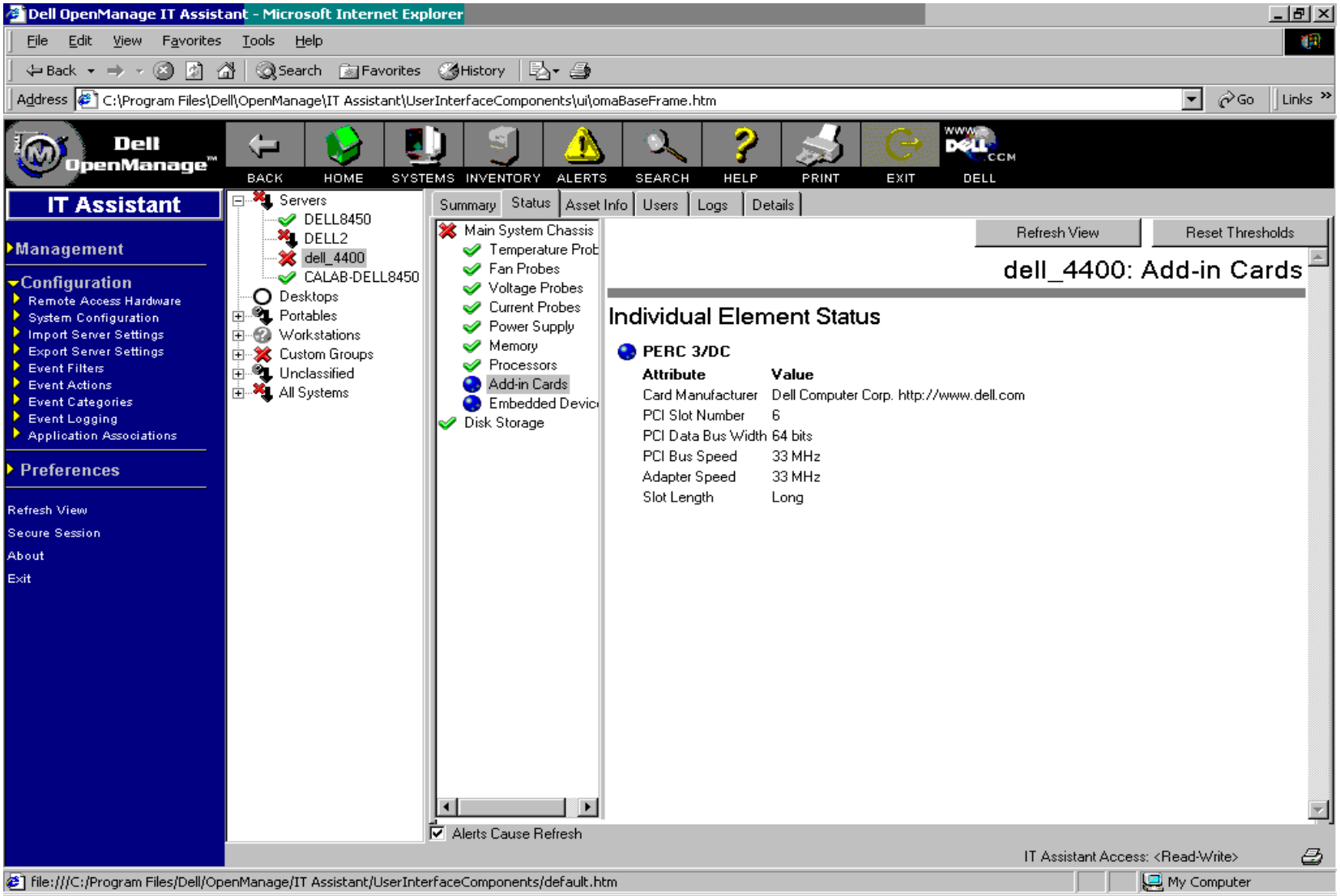
Can update controllers, one server at a time



good detail - remotely



Dell IT Assistant – sparse controller detail



ProLiant Universal HDD Features

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Available height converter easily snaps onto the top of 1" high drives, providing disk compatibility for legacy systems requiring 1.6" high LVD drives

Capacity & RPM to suit you

Universal drive designed for use across all Compaq enterprise class systems … ProLiant, Alpha, StorageWorks … DAS, NAS, & SAN ready … you decide

Ergonomically designed ejector button and handle allow for single handed removal and carrying

Rock solid spares strategy

'99 INDUSTRIAL DESIGN EXCELLENCE AWARDS
IDSA
GOLD

Award winning design

Fiber optic lights for easy visibility of drive status

Easily recognizable tray label clearly shows capacity points, RPM level, and interface level

Ribbed design for increased cooling capacity allows customers to easily upgrade to new, hotter hard drives

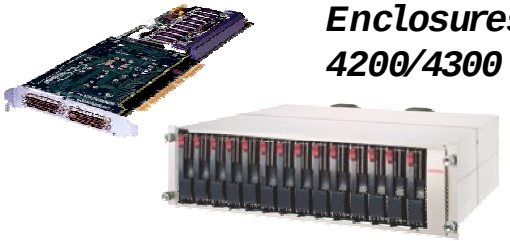
DtS seamless data migration

investment protection for ProLiant customers

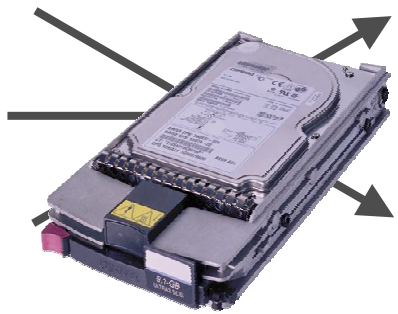
Smart Array Cluster Storage
Remote & Distributed Environments

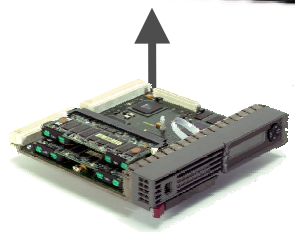
Smart Array plus

Enclosures 4200/4300



seamless data/drive migration





Conversion to the SAN

Smart Array plus internal drives

RA 4100

Modular SAN Array 1000
Departmental/Data Center

Hp disk drive features

- Ability to flash disk drive firmware
- SmartStart 6.3 allows controller and disk drive firmware upgrades
  - No more 15 minutes to make RomPaq's 11 floppy disk set
- "Smart Components" available at www.hp.com
- At POST, controllers detect if attached drives need to be upgraded

Summary: ideas, dedication and action

Summary of HP Key Storage Benefits

- ✓ Performance Engineered by dedicated Smart Array Engineering team.
- ✓ Easiest one utility to configure all controllers
- ✓ Storage Software – Versatile web enabled agents ie. firmware group updates tied to version management
- ✓ Upgrade seamlessly to newer controllers
- ✓ Unique firmware enhancements – ie. ADG, cache ratios, drive roaming.


hp
invent