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Upgrading Smart Array Controllers, Configuring Logical Drives using the ACU and Exploring RAID Controller Performance Parameters

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ISS Server Storage

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Today's Lab

Equipment:

- Proliant DL380 Server running Windows 2000 from an Integrated Smart Array 5i Plus in a two drive mirroring (RAID 1+0) configuration.
- StorageWorks 4314R Disk Enclosure (with 6 Ultra-3 drives)
- Smart Array 4200 controller (four channel Ultra-2, 64MB cache)
- Smart Array 5300 controller (2/4 channel Ultra-3, 128MB cache, ADG enabled)
- Smart Array 6400 controller (2/4 channel Ultra-320, 256MB cache)
- Smart Start 6.30 CD

Today's Lab

Goals:

- Install SA-4200 and configure the 6 Drives in the 4314R with ACU to a RAID 0 Volume.
- Migrate drives from SA-4200 to SA-5304.
- Explore the ORCA utility for the SA-5304.
- Migrate drives from SA-5304 to SA-6400.
- Re-configure the RAID 0 volume to a RAID 5 volume using ACU
- 5 RAID performance experiments using Iometer test tool.

Smart Array Data Migration Matrix

To: / From:	SMART-1 (Smart Array)	SMART-2/E	SMART-2/P, 2DH	SMART-2SL	Smart Array 221	Smart Array 3100ES, 3200	Integrated Smart Array	Smart Array 4200, 4250ES	Smart Array 431, 5i, 532, 5312	Smart Array 5300	RA 4000, 4100	MSA1000, SA-C5000	RA 6000, 8000
SMART-1 (Smart Array)	YES	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	NO	YES Note 4,6	NO
SMART-2/E	NO Note 5	YES Note 1	YES Note 1	YES Note 1,4	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	LIMITED Note 7,9	YES Note 4,6	NO
SMART-2/P, 2DH	NO Note 5	YES Note 1	YES Note 1	YES Note 1,4	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	LIMITED Note 7,9	YES Note 4,6	NO
SMART-2SL	NO Note 5	YES Note 1	YES Note 1	YES Note 1	YES Note 4	YES Note 4	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	LIMITED Note 7,9	YES Note 4,6	NO
Smart Array 221	NO Note 5	YES Note 1	YES Note 1	YES Note 1	YES	YES Note 4	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	LIMITED Note 7,9	YES Note 4,6	NO
Smart Array 3100ES, 3200	NO Note 5	YES Note 1,4	YES Note 1,4	YES Note 1,4	YES Note 1,4	YES	YES Note 4	YES Note 4	YES Note 4,6	YES Note 4,6	LIMITED Note 7,9	YES Note 4,6	NO
Integrated Smart Array	NO Note 5	YES Note 3,4	YES Note 3,4	YES Note 3,4	YES Note 3,4	YES Note 4	YES	YES Note 4	YES Note 4,6	YES Note 4,6	NO	YES Note 4,6	NO
Smart Array 4200, 4250ES	NO Note 5	YES Note 3,4	YES Note 3,4	YES Note 3,4	YES Note 1,4	YES Note 4	YES	YES	YES Note 4,6	YES Note 4,6	LIMITED Note 7,8,9	YES Note 4,6	NO
Smart Array 431	NO Note 5	YES Note 3,4	YES Note 3,4	YES Note 3,4	YES Note 1,4	YES Note 4	YES	YES	YES Note 4	YES Note 4	LIMITED Note 7,8,9	YES Note 4	NO
Smart Array 5i, 532, 5312	NO Note 5	YES Note 3,4	YES Note 3,4	YES Note 3,4	YES Note 1,4	YES Note 4	YES	YES	YES Note 4	YES Note 4	NO	YES Note 4	NO
Smart Array 5300	NO Note 5	YES Note 2,3,4	YES Note 2,3,4	YES Note 2,3,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 10	LIMITED Note 2,7,9	YES	NO
RA4000, 4100	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES Note 9	YES	NO
MSA1000, SA-C5000	NO Note 5	YES Note 2,3,4	YES Note 2,3,4	YES Note 2,3,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 2,4	YES Note 10	LIMITED Note 2,7,9	YES	NO
RA 6000, 8000	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

Key to Data Migration Matrix "Notes"

- NOTE 1: A firmware upgrade to v3.00 or higher is required on the destination controller if drive(s) will be installed at positions above ID 7.
- NOTE 2: Fault tolerance modes RAID 0, 1, 1+0, 4, 5 only (no ADG); logical drives must be <2TB. RAID ADG volumes cannot be migrated to earlier controllers (migrate to different RAID level first).
- NOTE 3: A firmware upgrade to v3.00 or higher is required on the destination controller.
- NOTE 4: Update or install appropriate OS driver for new controller (before replacing controller). If a different driver file is required (see OS driver matrix) the new driver must be manually added (new driver won't be installed automatically by installation utility if new card isn't installed yet), and the driver for the original controller may be removed afterwards.
- NOTE 5: "No" implies that a backup & restore is required to perform this controller downgrade.
- NOTE 6: SA 431, 5300, 5i, 532, 5312, C5000 and MSA1000 controllers are not exhaustively qualified with single-ended SCSI drive models; Ultra-2 or Ultra-3 drives are recommended. Use of non-ultra enclosures require SA 431 f/w upgrade to v1.06+.
- NOTE 7: Data migration will only work in this scenario if RA firmware is 2.00 or higher and SCSI bus and ID of each and every drive is preserved when moving to RA controller, all drives are moved, and no drives are in RA enclosure already.
- NOTE 8: Source controller's firmware must be updated to v1.06+ if SA431 or v1.30+ if SA42xx, followed by any write operation to save configuration data in new format, before moving drives to RA controller.
- NOTE 9: Check drive carrier style; RA4100 and MSA1000 uses new universal drive carriers, but RA4000 uses older drive carriers.
- NOTE 10: Firmware on destination SA 5300 must be 1.62 or higher if RAID ADG volumes are configured.

General Notes on Data Migration

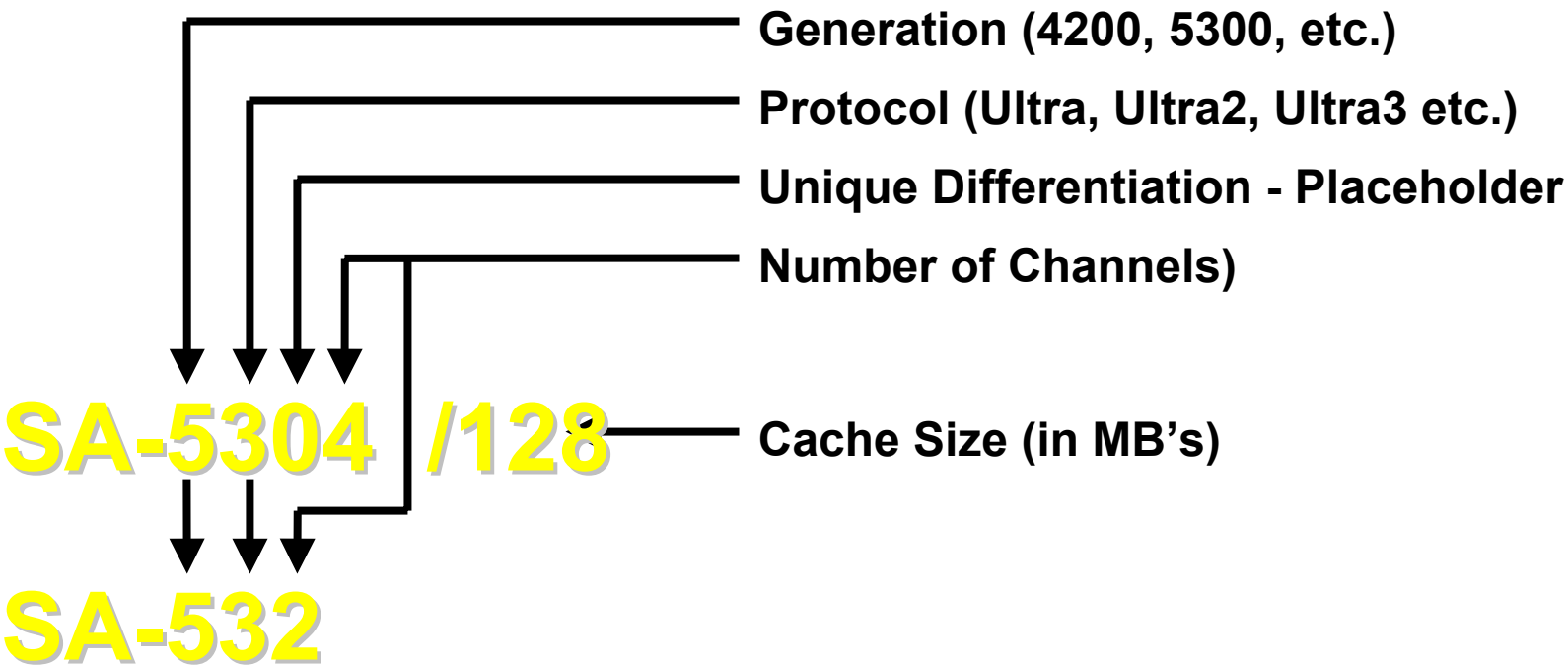
- **Whenever upgrading a controller or moving drives, a backup should be performed first. We will not be doing this for today's lab.**
- If all drives are not online, the SCSI ports & IDs should not be changed (drive movement restriction).
- Controller must be compatible with server, for example SA4XX controllers do not work in older servers with PCI slots that do not supply 3.3V; 3100ES and 4250ES models require extended PCI slot.
- New SCSI cables or an adapter is required in many cases due to SCSI connector changes between models (50-pin narrow SCSI, 68-pin wide SCSI, or 68-pin external VHDCI).
- System ROM update is recommended before replacing controller.
- After replacing controller, configuring controller order by running the System Configuration utility from the SmartStart CD is required in most cases (especially if new controller is installed in a different slot).
- RA (external) controllers are not bootable.
- Data migration between intelligent and non-intelligent (non-array) controllers is not supported (data will be lost).

Array Controller/OS Device Driver Matrix

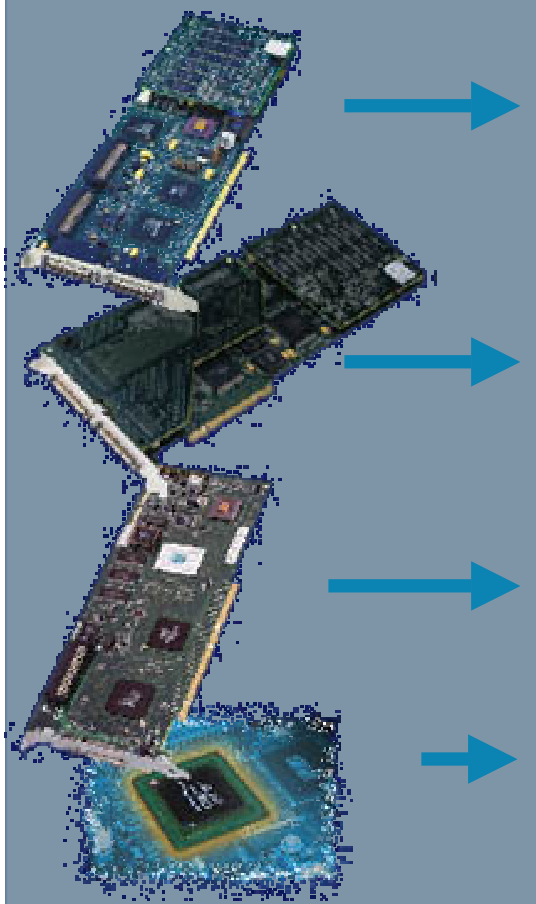
Ctlr: / OS:	SMART-1 (Smart Array)	SMART-2/E	SMART-2/P, 2DH	SMART-2SL	Smart Array 221	Smart Array 3100ES, 3200	Integrated Smart Array	Smart Array 4200, 4250ES	Smart Array 431	Smart Array 5300	RA 4000/4100 (FC Adapter)
Banyan Vines											
IBM OS/2		cpqarray.add (all)	cpqarray.add (all)	cpqarray.add v?.??	cpqarray.add v?.??						
Linux	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.2	cpqarray v1.0.5	cciss (all)	
Microsoft Windows 3.1/95											
Microsoft Windows NT 3.51		cpqarray.sys (all)	cpqarray.sys (all)	cpqarray.sys v?.??	cpqarray.sys v?.??	cpqarray.sys v?.??	cpqarry2.sys v1.00 from NT SSD 1.39a (SS 4.80)	cpqarry2.sys v1.00 from NT SSD 1.39a (SS 4.80)	cpqarry2.sys v1.00 from NT SSD 1.39a (SS 4.80)	Cpqcissm.sys v4.18.x.x	
Microsoft Windows NT 4.0	cpqarray.sys v4.00	cpqarray.sys v4.00	cpqarray.sys v4.00	cpqarray.sys v4.00	cpqarray.sys v4.00	cpqarray.sys v4.00	cpqarry2.sys v4.01.20.01	cpqarry2.sys v4.01.20.01	cpqarry2.sys v4.01.20.01	cpqcissm.sys	
Microsoft Windows 2000	cpqarray.sys v5.00.2173.1	cpqarray.sys v5.00.2173.1	cpqarray.sys v5.00.2173.1	cpqarray.sys v5.00.2173.1	cpqarray.sys v5.00.2173.1	cpqarray.sys v5.00.2173.1	cpqarry2.sys v5.00.2139.1	cpqarry2.sys v5.00.2139.1	cpqarry2.sys v5.00.2139.1	Cpqcissm.sys v5.3.x.x.	
Novell NetWare	Cpqarray.ham (all)	Cpqarray.ham (all)	Cpqarray.ham (all, 1.20 put in 2DH strings)	Cpqarray.ham (all)	Cpqarray.ham v1.23	Cpqarray.ham v1.20, v1.22	Cpqarray.ham v2.01 (cpqshd.cdm 1.25+ for all 2.x drivers)	Cpqarray.ham v2.01, v.202	Cpqarray.ham v2.03	Cpqraid.ham (all) Cpqshd.cdm v1.34	Cpqfc.ham (all)
SCO Openserver 5 Unix											
SCO Unixware											

Smart Array Product Numbering

- Entry-level arrays have 3 digits (SA-532)
- Higher-end arrays have 4 digits (SA-5300)

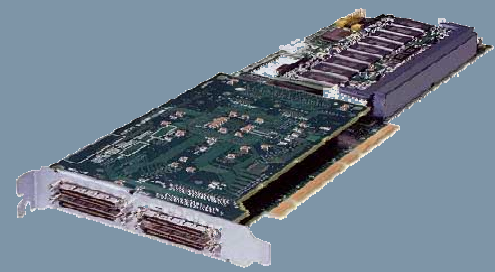


upgrading your Smart Array



instant upgrade:

1. Power down the server
2. Replace the old controller and cables with the new controller and cables.
3. Reboot the server.
4. Ensure that you are running the latest device driver and Smart Array firmware. This can be found on the SmartStart CD.
5. Configuration and data will be migrated seamlessly.



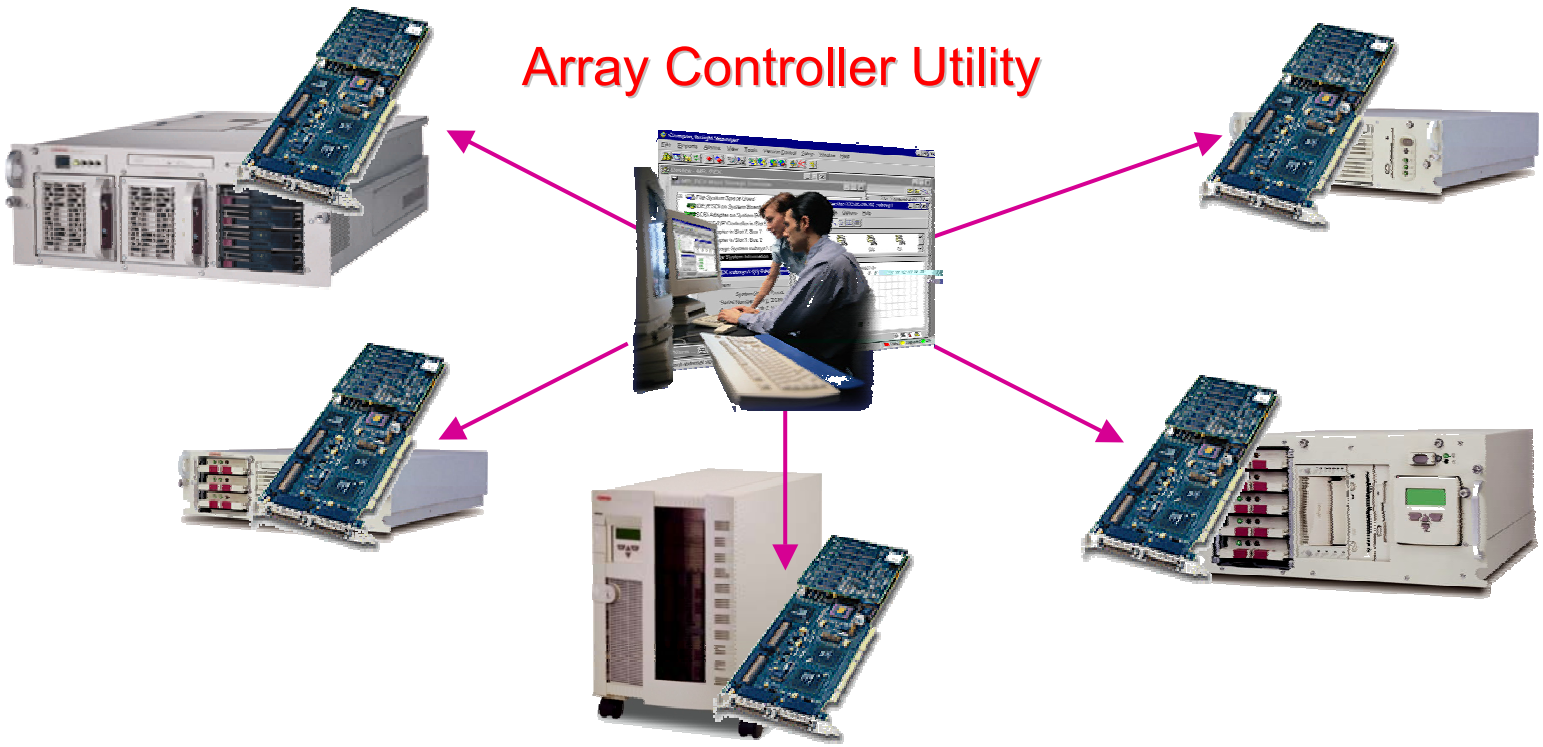
Smart Array 64xx

- faster performance
- greater capacity
- higher availability

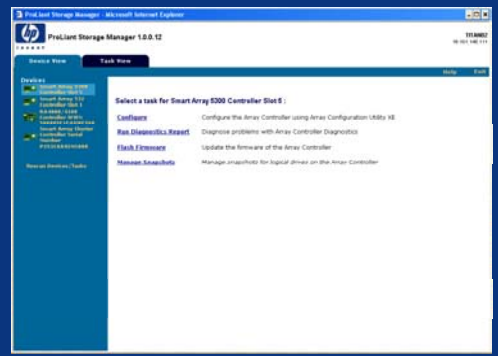
Consistent Configuration Utility

Array Configuration Utility

- Consistent
- Ease to use GUI & Wizards
- Robust features



Simple interface to manage your Smart Array – ProLiant Storage Console



Array Configuration Utility (ACU)

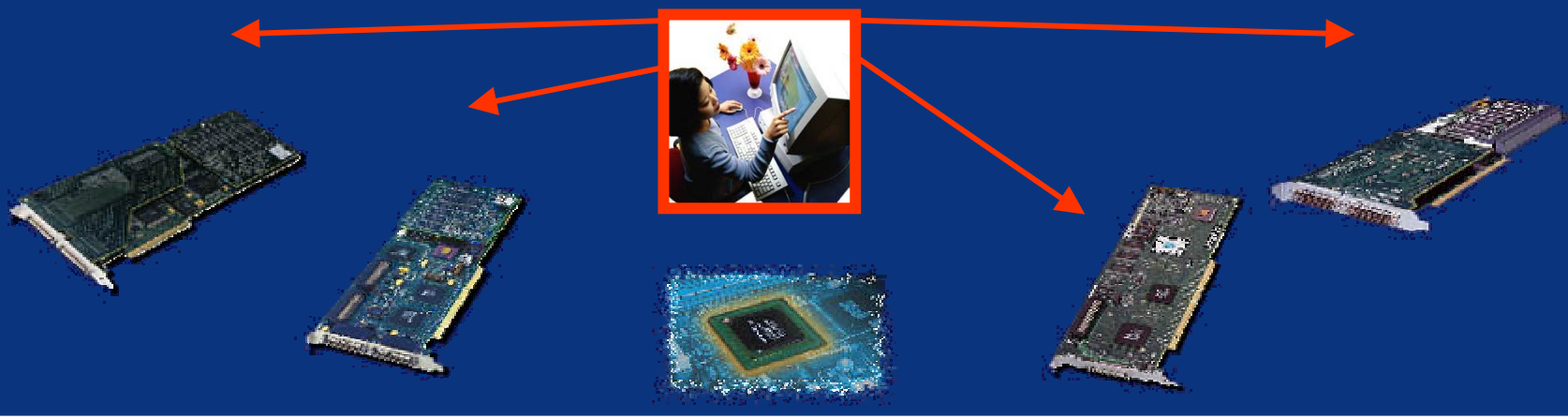
- simple to use configuration wizard
- robust configuration and on-line management options

Options ROM Configuration for Arrays

- simple Option ROM based configuration alternative

Insight Manager

- over 1200 subsystem conditions monitored
- monitors server and all related server components
- access from standard web browser anytime...anywhere!



Start the Self Paced Lab

- Follow the Instructions
- We will be available to answer questions and help if you have any problems
- ***At the end of the workshop please take time to follow the last section in the lab guide "End of Lab"to place the servers back to the original state.***
- Good Luck.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