

Storage for Server Blade Architectures

Server Blade Summit

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Slide 1

MDu1

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Blade Server HDD Characteristics

High Density Blades

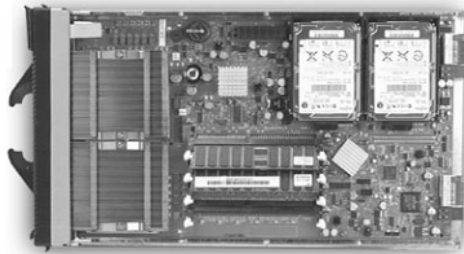


Photo courtesy of HP

- 1-2 2.5" SFF drives per blade (Mobile or 10K)
- Benefits
 - Low power
 - Enables highest density
 - Mobile HDD's are less susceptible to non-op shock failures
- Drawbacks
 - Low I/O performance
 - Lower HDD MTBF in high I/O applications (mobile drives)
 - Higher \$/MB

High Performance Blades

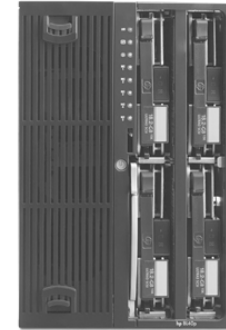


Photo courtesy of HP

- 2-4 3.5" 10K RPM or 15 RPM SCSI or SAS/SATA drives per blade
- Benefits
 - High I/O performance
 - Higher capacity
 - Higher HDD MTBF in high I/O application
 - Lower \$/MB
- Drawbacks
 - Higher power
 - Lower density

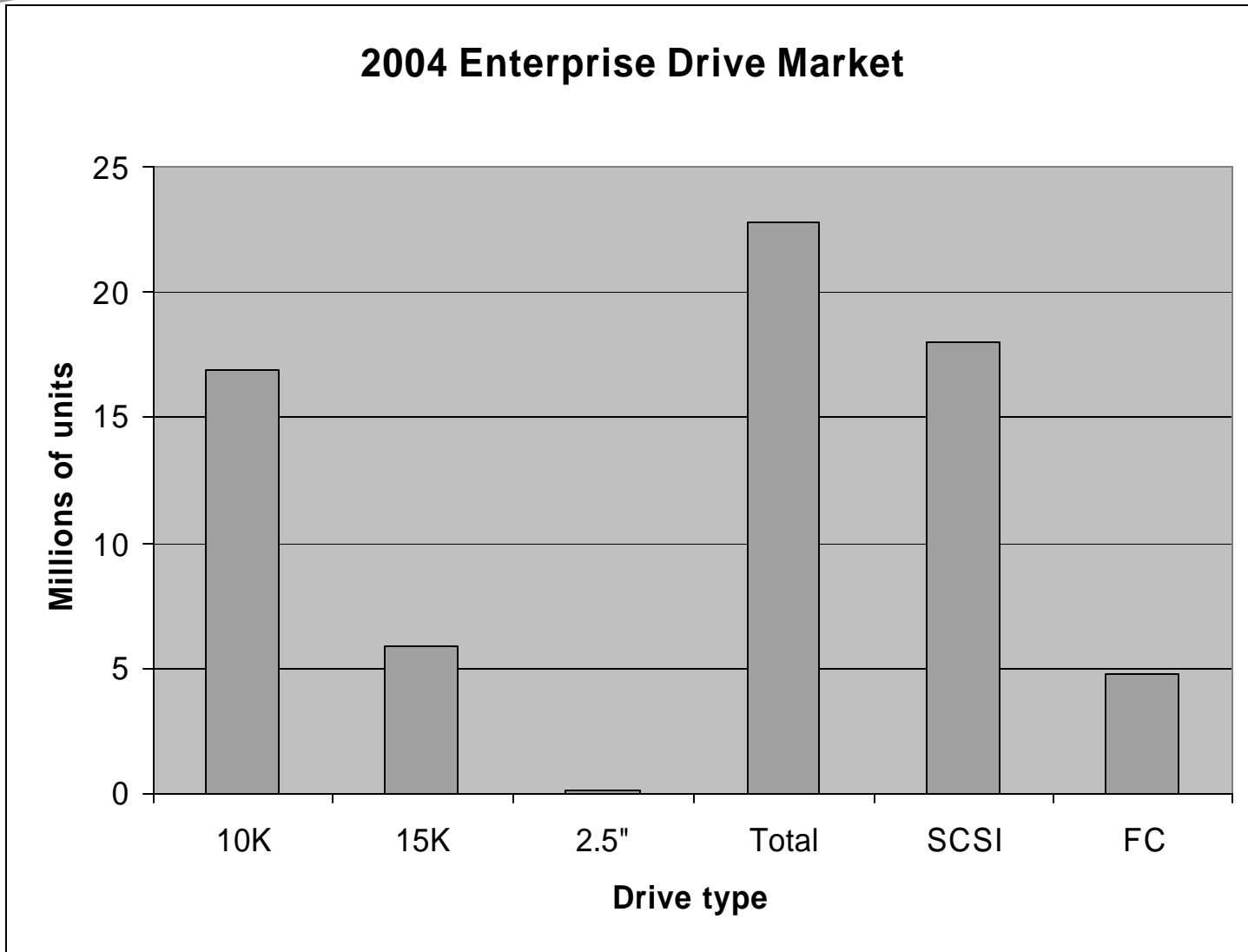
Slide 2

MDu2

Do we have authority to include the images? What are the sources?

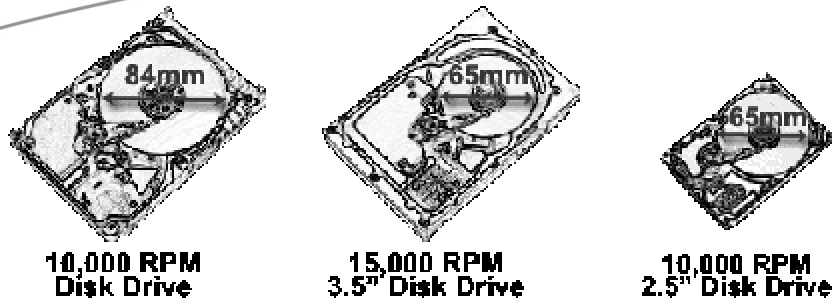
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2004 Enterprise drive Market

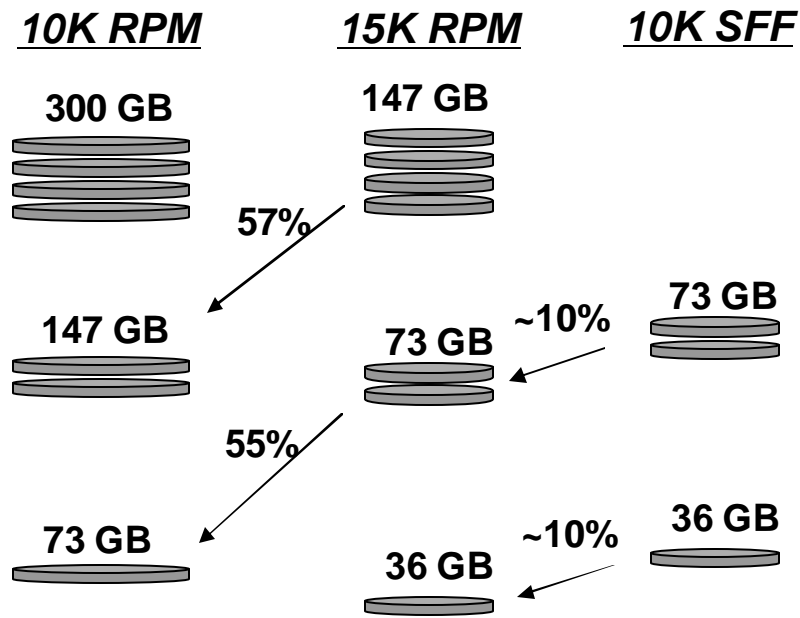


Source : Infotrend

10K SAS : Value and Capacity

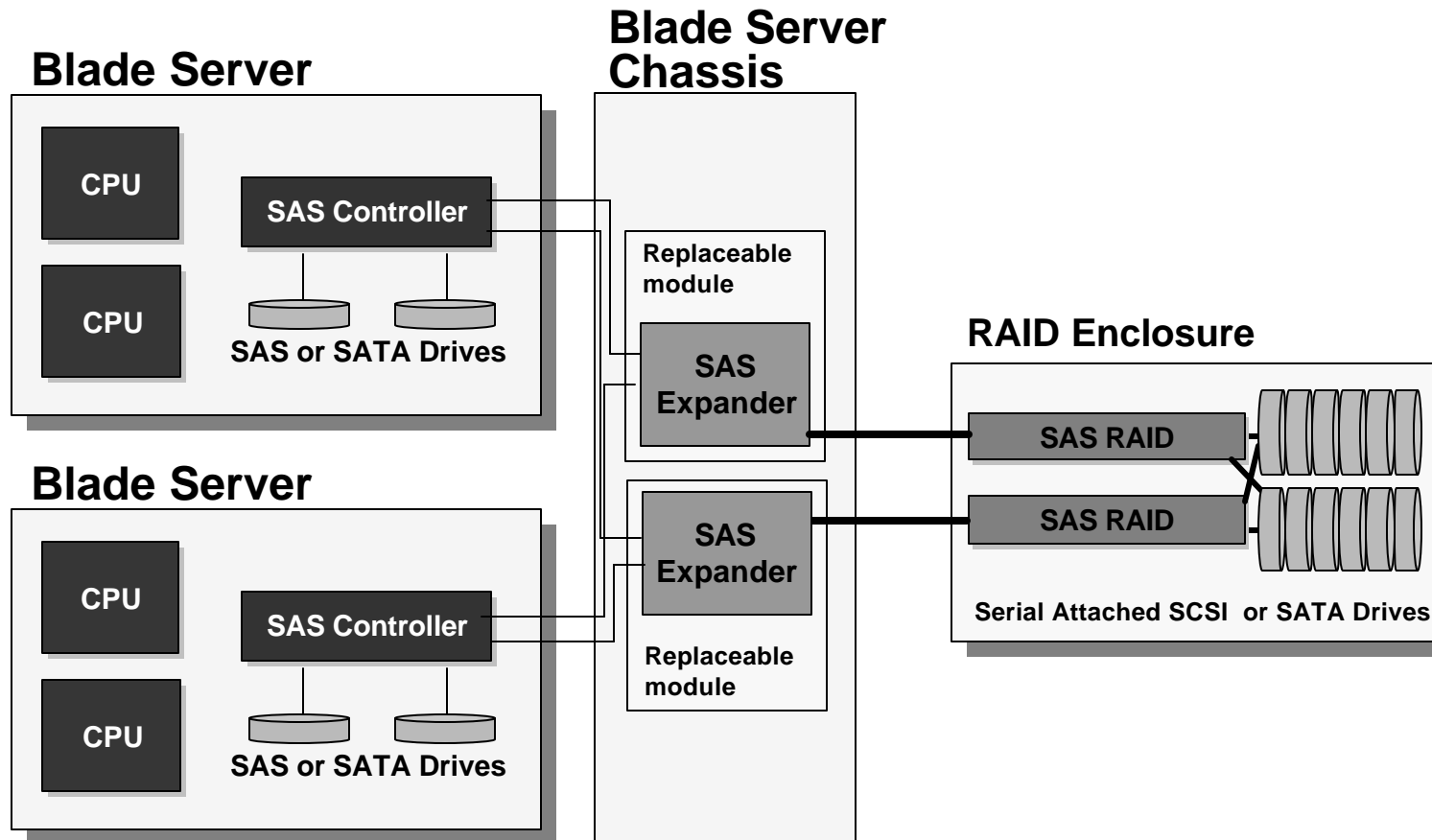


Maxtor Estimated SCSI Street Prices



- 3.5" 15K drives require smaller platters to moderate power consumption and maintain rotational stability.
- 3.5" 10K drives deliver twice the capacity per platter of a 15K drive.
- Less heads and media per capacity point means 10K SAS drives offer a substantial \$/GB advantage over 15K.
- 3.5" 10K drives provide the highest SAS capacity point, 300GB.
- Offering both 10K and 15K SAS HDDs broadens customer choice.
- 10K SFF drives are expected to cost slightly more than 15K 3.5" drives.
 - ✍ 2.5" 10K HDDs use the same size media & number of heads as 15K 3.5"
 - ✍ Expect adoption to follow traditional industry "s" curve

Low-Cost DAS RAID Connections



Serial Attached SCSI Expanders enable low-cost connections to low-cost DAS enclosures

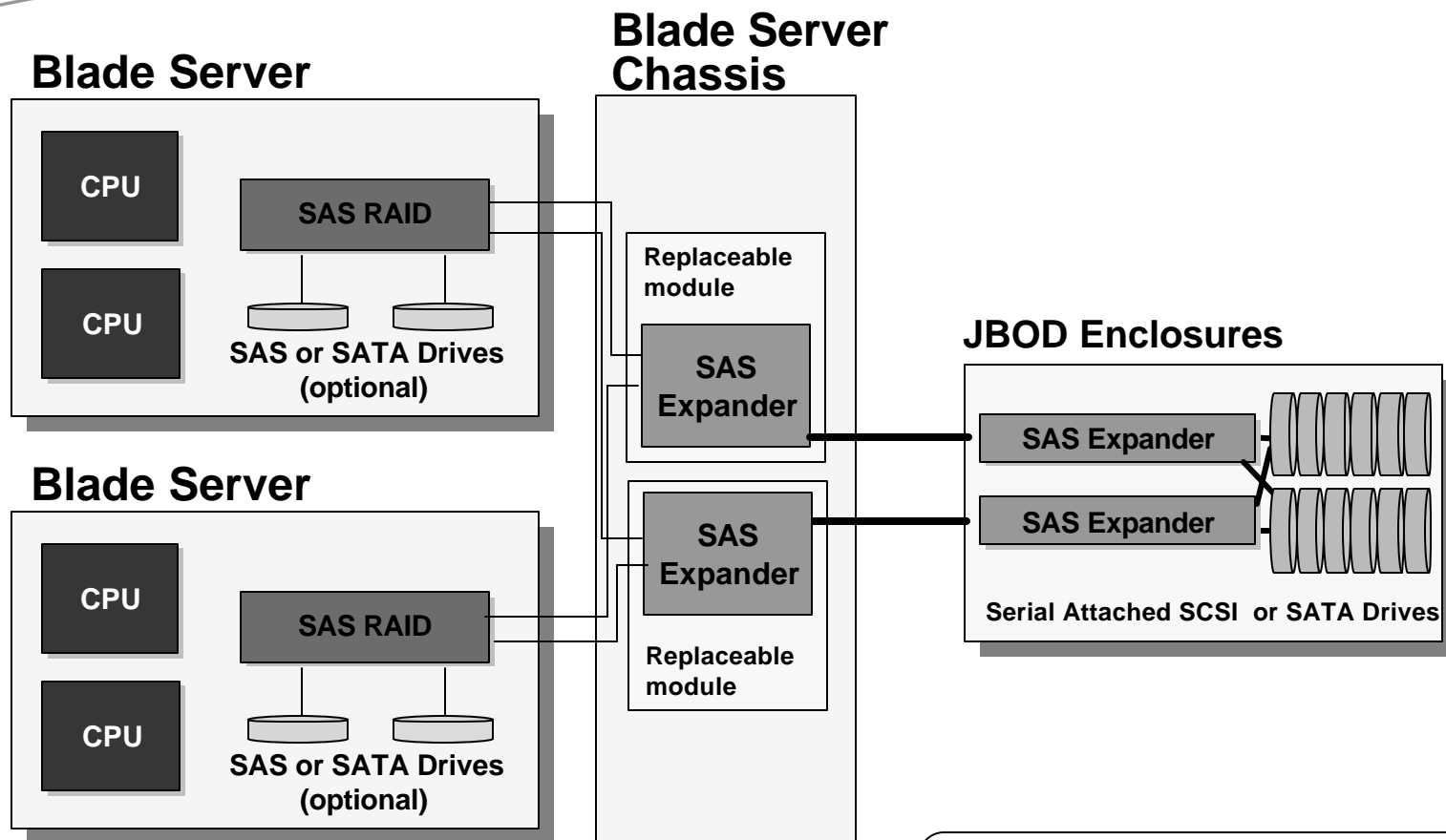
Slide 5

MDu5

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Low-Cost DAS Utility Model Connections



Serial Attached SCSI ROMB and Expanders enable pay-as-you-grow low cost solutions

To learn more, see Maxtor's series of white papers on Serial Attached SCSI at:
<http://www.maxtor.com/sas>

Slide 6

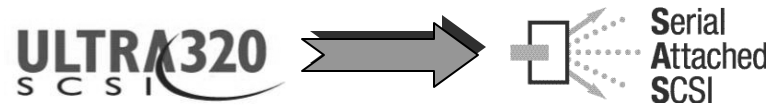
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Upcoming Technology Transition

2005

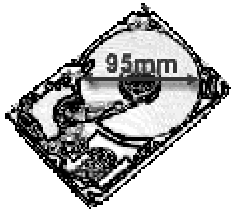


<ul style="list-style-type: none">• 320MB/sec shared bus	<ul style="list-style-type: none">• 3Gb/sec P-T-P, full duplex with dual ports
<ul style="list-style-type: none">• Up to 15 devices per bus	<ul style="list-style-type: none">• Up to 16K devices per domain
<ul style="list-style-type: none">• 80-pin, hot-plug connector	<ul style="list-style-type: none">• 29 pin, slim-line, hot-plug connector
<ul style="list-style-type: none">• Backward compatible with parallel SCSI	<ul style="list-style-type: none">• Compatible with Serial ATA

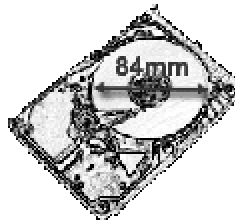
*Preserves investment in
SCSI command set*



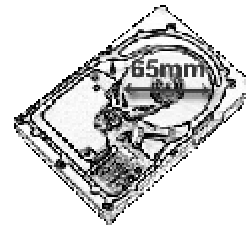
SAS/SATA Drive Technology Choices



7200 RPM SATA
3.5" Disk Drive



10,000 RPM
3.5" Disk Drive



15,000 RPM
3.5" Disk Drive



7200 RPM SATA
2.5" Disk Drive



10,000 RPM
2.5" Disk Drive

<ul style="list-style-type: none"> • Dimensions: 142 x 102 x 25 mm 	<ul style="list-style-type: none"> • Dimensions: 142 x 102 x 25 mm 	<ul style="list-style-type: none"> • Dimensions: 142 x 102 x 25 mm 	<ul style="list-style-type: none"> • Dimensions: 102 x 70 x 15 mm 	<ul style="list-style-type: none"> • Dimensions: 102 x 70 x 15 mm
<ul style="list-style-type: none"> • < 9 ms seek time 	<ul style="list-style-type: none"> • < 4.2 ms seek time 	<ul style="list-style-type: none"> • < 3.2 ms seek time 	<ul style="list-style-type: none"> • < 10 ms seek time 	<ul style="list-style-type: none"> • < 4.2 ms seek time
<ul style="list-style-type: none"> • Max Data Rate: ~65 MB/sec 	<ul style="list-style-type: none"> • Max Data Rate: ~89 MB/sec 	<ul style="list-style-type: none"> • Max Data Rate: ~98 MB/sec 	<ul style="list-style-type: none"> • Max Data Rate: ~ 45MB/sec 	<ul style="list-style-type: none"> • Max Data Rate: ~ 63MB/sec
<ul style="list-style-type: none"> • ~14W Max Power 	<ul style="list-style-type: none"> • 18W Max Power 	<ul style="list-style-type: none"> • 18W Max Power 	<ul style="list-style-type: none"> • 3W Max Power 	<ul style="list-style-type: none"> • 9W Max Power
<ul style="list-style-type: none"> • Max Capacity: 500GB 	<ul style="list-style-type: none"> • Max Capacity: 300GB 	<ul style="list-style-type: none"> • Max Capacity: 147GB 	<ul style="list-style-type: none"> • Max Capacity: 60GB 	<ul style="list-style-type: none"> • Max Capacity: 73GB
<ul style="list-style-type: none"> • Max non-op shock: 225 G's 	<ul style="list-style-type: none"> • Max non-op shock: 250 G's 	<ul style="list-style-type: none"> • Max non-op shock: 250 G's 	<ul style="list-style-type: none"> • Max non-op shock: 1000 G's 	<ul style="list-style-type: none"> • Max non-op shock: 275 G's

Enterprise reliability, scalability & availability

Martin Czekalski**Maxtor Corporation**

Marty Czekalski brings over twenty years of senior engineering management experience in advanced architecture development for ASICs, memory, and IO subsystem design.

He currently serves as Interface Architecture Initiatives Manager within Maxtor's Technical and Strategic Marketing Group. Mr. Czekalski has participate in many interface standards committees and industry storage groups. He currently serves as Vice President and member of the Board of Directors of the SCSI Trade Association. Mr. Czekalski is also active with the T10 committee.