SAS Small Form Factor Drive (2.5″)

Customer Value Proposition

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SAS SFF (2.5”) Value Proposition

Better Performance & Reliability

- TPC-H Benchmarks prove a performance advantage for SFF Drives
  - #1 position in the 300gb non-clustered spot
  - Lowest Dollar $ per GB than our competitors in the TPC-H benchmark test
- More spindles per platform
- 15% better MTBF than U320 parallel SCSI
  - Tighter packaging, smaller parts, improved vibration attenuation, & improved disk drive reliability
- SFF enables RAID 5 to be deployed on 1U servers
  - Smaller Drives allow more drives in a single server to fill out a RAID 5 set

Flexible configurations

- 50% to 100% more SSF SAS Drive Bays than U320 SCSI or large 3.5” SAS drives
- SAS and SATA drives can be mixed/matched in the same back plane
- Universal Drive Carrier
- SFF Drives Leveraged across all HP Server solutions (BCS & ISS)

IT Environment

- Half the power consumption of 3.5” drives
  - Lower heat loads
- Smaller form factor enables better airflow
  - More efficient cooling
- Better Acoustics than large drives
  - Small Form Factor Drives are Quieter

Density

- SFF Drives Ideal for space constrained environments
- Data Center Consolidation supported by SFF smaller drives
- Potential Real Estate Savings with smaller drives

Smooth Transition

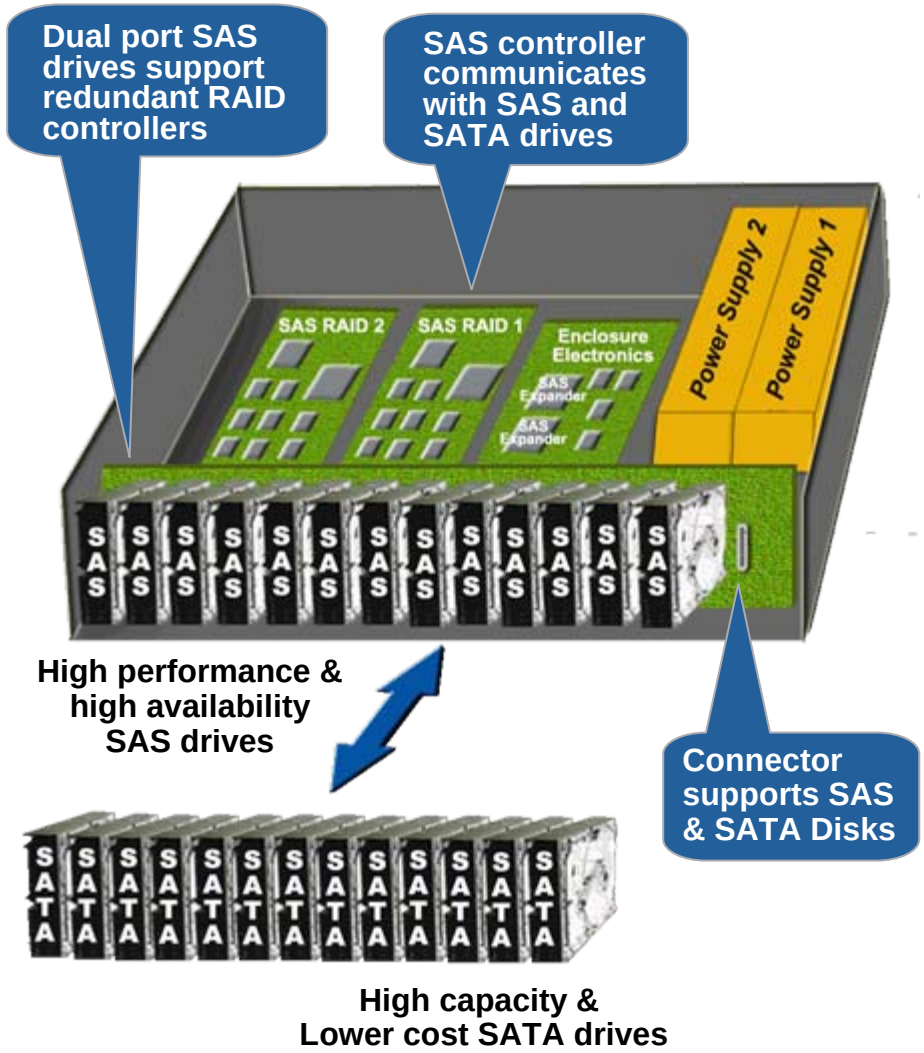
- By the end of 2007, most IT Server providers will have SFF drives in their servers
  - HP Gets Customers Transitioned to SFF Drives First
- HP offers 1 Transition to SFF drives, Competitors make customers transition twice
- With 1 transition, HP minimizes the cost of transitioning to small form factor

Performance & Reliability

- TPC-H Benchmarks with SFF Drives
  - #1 position in the 300gb non-clustered spot
  - TPC ranked the HP ProLiant DL585 server as the top performer, processing 2,000 more queries per hour (QphH) at a cost of $8.70 less per QphH than the next closest competitor. This single-system result also beat several recent dual-system clustered solutions. Of equal significance, HP further demonstrated its leadership in Serial Attached SCSI (SAS) as this was the first benchmark result allowing vendors to outfit their systems with higher performing Small Form-Factor (2.5") SAS drives.
    - 11,915 QphH @ 300GB
    - $24.24 QphH @ 300GB
  - http://www.tpc.org/tpch/results/tpch_perf_results.asp?resulttype=noncluster
  - More spindles per platform
  - Allow Raid 5 deployment on 1U servers
    - Boosting data protection and system reliability
  - Provides faster rebuild times for individual drives
    - Avoids losing data during lengthy re-build times
  - Provides the same capacity by doubling the number of drives
    - On the DL360g4p and the DL380g5
  - 15% better MTBF than U320 parallel SCSI Drives
    - At a 100% duty cycle – increasing reliability
    - Reliability driven by tighter packaging, smaller parts, improved vibration attenuation, & improved disk drive reliability

Flexibility

- SAS & SATA drives mixed/matched in the same back plane
- Universal Carrier
  - Hot Plug Drives
- Leveraged across all HP Server solutions
  - ISS Servers Now
  - BCS in 2006



IT Environment

- Power & Cooling - major concern for today's IT customers
  - Often customers cannot get enough power to data centers
  - Customers cannot always fill racks due to power consumption
  - Server Rack heat loads are driving up data center air-conditioning
- SFF Drives consume Half the power of 3.5" drives
  - SFF drives consume 8 watts vs 16 watts for a 3.5" drive
  - Lower power consumption correlates with lower heat produced
  - Customers save on power consumption & cooling requirements
- Smaller form factor enables better airflow
  - In addition to putting out less heat, drives have better airflow
    - Smaller drives allow more airflow through the server
  - Better airflow dissipates heat more quickly
- Better Acoustics than large drives
  - Small Form Factor Drives are Quieter
  - Data centers are loud—HP does our part to reduce the noise

Density

- SFF Drives 70% Smaller than 3.5" U320
- Ideal for space constrained environments
  - Up to 66% less rack space needed
- Data Center Consolidation supported by SFF smaller drives
  - Lowers Total Cost of Ownership
- Cost Savings with smaller drives
  - Reduced Data Center Space Requirements
  - Less ancillary infrastructure
    - Routers, Switches, & Cabling

Smooth Transition

- Most IT Servers will use SFF drives in 2007
  - HP transitions customers 1 time to SFF SAS drives
  - Competitors transition to 3.5" SAS in 2006
    - Then to SFF (2.5") SAS drives in 2007 – 2 transitions
    - Increases customers' qualification cost
    - The end objective is getting to SFF drives
      - HP gets customers there sooner and with 1 transition
- Larger Capacity SFF Drives coming soon
  - HP 146 GB SFF 10k SAS drives
    - available in ~2H'06*
  - HP 73 GB SFF 15k SAS drives
    - available in ~1H'07*

**dates and timelines are subject to change*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Customer Value Summary

Feature	HP Provides	Customer Benefit
Higher MTBF	SFF provides 15% higher MTBF than U320	Higher drive reliability and greater data protection. Lower cost of ownership for customers from replacing fewer drives
More spindles with SFF Drives	HP doubles the number of drives in servers like the DL360g4p and the DL580 &DL585	Customers can deploy Raid 5 on 1U servers providing greater data protection. Customers get faster drive re-build times, minimizing exposure from losing data during re-builds.
High Performance	HP SFF Drives provide higher performance in dense storage applications	Customers get faster processing for data intensive applications. The independent TPC-H benchmarking test proves SFF drives out perform larger parallel SCSI drives in 300gb non-clustered arena.
Data Center Environment	HP SFF drives require half the power of large pSCSI drives	Customers are able to reduce the power requirements driving their data centers. Additionally, customers lower cost for both power and air-conditioning, since the SFF drives are also cooler