LDS Implementation Concerns & Challenges

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Implementation

- Support for 4KB block size at the interface will be expected for:
  - SATA
  - FC
  - SAS
    - U320 will be EOL by the time 4KB is fully deployed.
- One LDS transition only!
  - i.e from 512 byte sectors to 4KB blocks.
  - Do not introduce a 1KB transition.
- There must be an period of time (~3 years) where support for the legacy native 512 bytes/sector is required.
  - This is to allow for all parts of the upstream software stack to transition to 4KB asynchronously.

Implementation (continued)

- It is preferred that the HDD suppliers support 4KB at the interface before transitioning to a 4KB native at the media (concatenate 8 512 byte sectors):
  - Allows software stack to be in place
  - Facilitates testing and bring up
  - Avoid issues with:
    - Sector format alignment
    - Read Modify Writes
    - Error handling

Software Stack

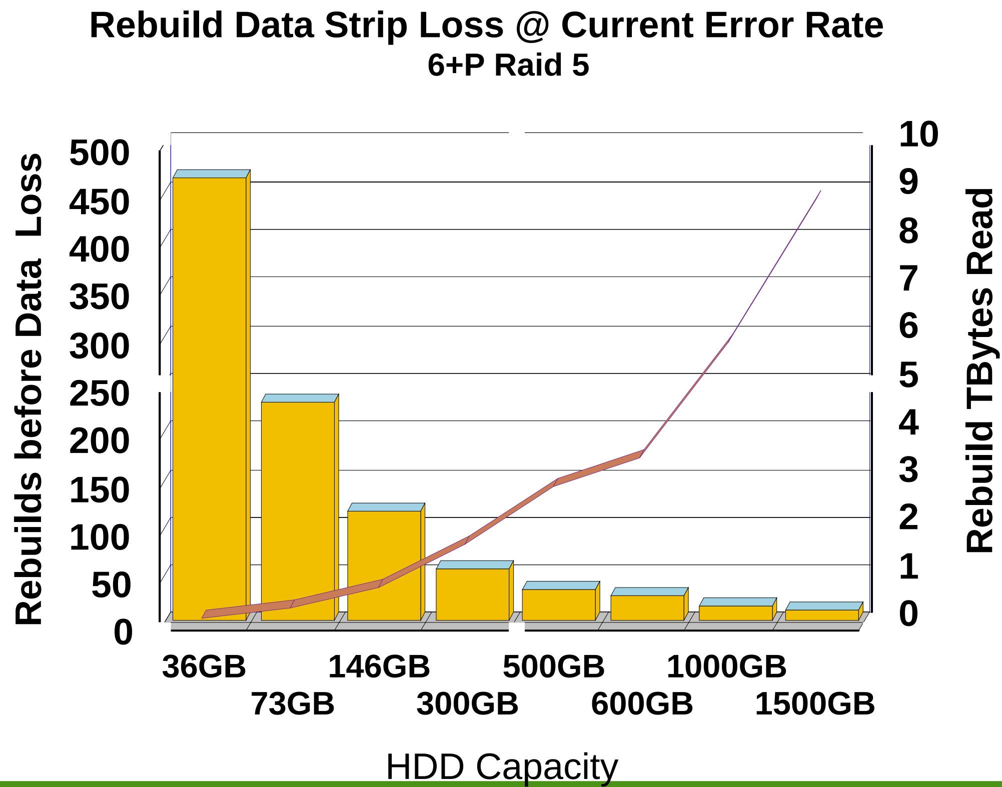
- Implementation must be across all levels of the upstream software stack such as:
  - BIOS
  - Device Drivers
  - RAID and Non Raid Controller firmware.
  - OS (Windows base, Linux, Netware, etc.)
    - File system support

Legacy concerns / Availability of legacy formatted drives

- 4KB native drives must include support for all the different legacy data sizes needed for end-to-end data protection schemes such as:
  - 8x (512) = 4096, or
  - 8x (512+16) sector or 4224 byte sectors.
  - 4096+26 = 4122 byte sector.
- A drive that supports 4KB native must also support 512 byte native format.
  - At least through the transition period.
- Need to understand the implication of performance loss, when using 512 byte at the interface to a 4KB native drive.
- Will a 4KB command execute in the same amount of time as 512 byte?
  - Will media access command time outs be the same?

Improved RHE rate will be necessary soon!

- Read Hard Error rate at 1 RHE in 10^15 bits read is inadequate for future very large capacity (VLC) drives in RAID systems
  - Exploit PMR for enhanced raw BER
  - Implement 4K Block and take advantage of 12 bit ECC
  - Have the higher ECC capability translate to larger media to head separation, wider tracks and track guard bands etc..



Summary

- One LDS transition
- Extended transition time to protect our customer base
- Smooth transition with upstream software stack
- Minimize Legacy impact
- Leverage higher ECC to improve RHE