

SAS 2.0 Requirements Status Review

Tuesday 9-12-06





Meeting Objectives

- Review of SAS 2.0 Market Requirements from January Meeting
 - Review and discussion on progress, issues, etc. of the goals as they were stated in Jan.
- Discussion on recently received requests and clarifications
- Discussion on branding of SAS 2.0 and feature set
- Feedback Integrated and “Finalized” by STA for Thursday



SAS 2.0 Marketing Requirements -

Status

- Preserve 3G installments/infrastructure (backward compatibility)
 - All components of the SAS 2.0 infrastructure must evolve independently of each other, (i.e. we can't impose architectural changes on installed components or cannot force components to migrate to the next generation in order to function properly). Required: interoperates with existing SAS components at 3 Gb
 - Desired: operates across existing passive infrastructure
 - Double transfer rate, while improving cost/performance
 - Reduce the number of host/external storage connections per Gb
 - Be compatible with 6Gb SATA within the constraints of the 6Gb SATA usage models (i.e. short backplanes, short cables, etc.)
 - Longer backplanes may require additional components (i.e. port selectors being used with X level transmissions)
- OK except for >6m SAS 2.0 cables-require disclaimer on long cables
 - OK
 - OK
 - OK –see requests



SAS 2.0 PHY Marketing Requirements - Status

- Leverage other PHY standards work (EQ, BER, etc) where applicable (For example: OIF CEI-6G, etc.), (eliminate unnecessary time and development risk)
 - Maintain 1.5Gb & 3Gb SATA/SAS Compatibility
 - Clarification: rolling two generation backward compatibility
 - Same usage models apply for 6Gb as they did for 3Gb
 - Objective is to maintain a unified electrical model for SAS 2.0 configurations (STA does not desire a short haul and long haul spec),
 - 6 Gb electrical spec must be the same for all components (including disk drives)
 - Required: same backplane and distance models as SAS 1.1 (.5 meter backplanes and 6 meter cables)
 - Desired; extend cabling distances to 10 meters.
 - Additional cost burden for rack-to-rack cabling solutions (10m) acceptable, but must not add cost to current usage models
 - Equalization schemes (if necessary) should not appreciably burden cost & power budget, especially for disk drives
- OK – leverage specification methods
 - OK -2 generations for links
 - OK –see requests
 - OK – between 3 and 5 taps likely-focus on cost and power



SAS 2.0 Marketing Requirements - Status

- Critical mass components ready for plug-fest testing in mid-2007
 - The plugfest committee will decide what meaningful subset is required for a meaningful plugfest
- Bandwidth Aggregation
 - Optional
 - Burden distributed between the expander and/or the host controller
 - Required: 6 Gb link must support two 3 Gb connections
 - Desired: 3 Gb link to support two 1.5 Gb connections
 - Clarification: 4-to-1 is a “non-goal”

Supporting more than two phy connections is acceptable as long as it doesn't burden the cost

- Now most likely late '07

- OK-Multiplexing – one generation back
- Given schedule change is it still needed?



SAS 2.0 Marketing Requirements - Status

- Required Bit Error Ratio (BER) of 10^{-12}
 - Desired Bit Error Ratio (BER) of 10^{-15}
 - Anticipating further EMI restrictions on servers STA feels it is prudent to investigate schemes such as Spread Spectrum Clocking SSC to mitigate emissions at higher data rates
 - T-10 efforts around zoning standards and improvements in SAS topology management are consistent with SAS 2.0 objectives
- OK – function of design margin within channel budget
 - OK –SSC should it be required for SAS 2.0/6Gb operation ?
 - OK



Long SAS 2.0 cables

- Due to the use of equalization at 6Gb/sec, longer cables are possible at 6Gb/sec than 3Gb/sec.
 - The 0.5m backplane is the gating item, if it works, then 10m cables should be possible
 - When a SAS 2.0 long cable is used in an older SAS 3Gb/sec system (or component) it may not work.
- Require a disclaimer/warning label on long cables that do not meet the 3Gb/sec channel compliance specification



Additional Requests

- SAS-2 HBA and expander phy support for SATA 3 Gbps "Gen2i" drives over SAS backplanes with no port selectors.
 - Not possible over 0.5m backplane – per Phy group feedback
 - Short backplane “bounded” solutions can be made to work
 - Will probably need port selectors for 6Gb/sec Sata
- Can the SAS backplane lengths be extended to 1 meter (like the OIF standards)
 - SAS standards are going to use similar methods of specifications that OIF uses, but reference receiver/transmitter characteristics will be different, length is not directly specified



Multiplexing – Still needed?

- Several inquiries as to the need of multiplexing given delay in 6 Gb deployment
 - Plugfest in late '07 → early '09 deployment
- Window of need is decreasing
 - Is it sufficient to justify the cost, complexity and risk added by multiplexing?
 - Interoperability (exp SSC & multiplexing)
 - Value proposition of possibly reusing existing infrastructure @6Gb rather than redesign
 - 6 Gb SAS and SATA drive timing is the gating item
- It is an optional feature – let the market decide?



SAS 2.0 Branding

- Current Thoughts – Keep it Simple
 - 6Gb/sec (w/SSC?)
 - Use of Mini-SAS connectors?
 - Support of SAS 2.0 required features (shalls)
 - Multiplexing (Optional) - need a name (TDM?)
- Don't include:
 - Full duplex or active/active requirements for disk drives
 - Difficult to specify and restricts optimization options
 - 3Gb/sec SSC
 - Detailed listing of SAS 2.0 enhancements
- There will be SAS and SAS 2 branding ONLY
 - Use of other designations is STRONGLY discouraged (e.g. SAS+, SAS 1.5, SAS Plus, etc.)