

SNIA Solid State Storage Initiative

January 23, 2012

SSSI F2F Agenda

10:00AM	Greetings, Introductions	
10:05AM	SSSI Overview	Paul Wassenberg, SSSI
10:10AM	SSS Technical Work Group Overview	Arnold Jones, SNIA
10:15AM	PCIe Roundtable	Eden Kim, SSSI (moderator)
12:00 PM	Lunch	Courtesy of SNIA
1:00PM	Promotional Activities	Marty Foltyn, SSSI
1:30PM	Understanding SSD Performance	Eden Kim, Easen Ho, Calypso
2:30PM	SSD Security	Tom Coughlin Michael Willett, Samsung
3:30PM	Caching with Flash	Mike James, SanDisk
4:00PM	Adjourn	

Solid State Storage Initiative

➤ Mission

- ◆ Foster the Growth and Success of **Solid State Storage**
- ◆ Promote Enterprise and Client Markets

➤ Goals

- ◆ Provide **Authoritative Information** on solid state storage
- ◆ **Educate** the Supplier and User Communities about solid state storage
- ◆ Guide and Pursue **Standards** for solid state storage
- ◆ **Market Outreach** that accurately highlights the advantages of solid state storage
- ◆ **Collaborate** with other industry associations for success of solid state storage
- ◆ Enable **Worldwide Adoption** of solid state storage

➤ SSS TWG develops SNIA Architecture & SSS Standards

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Texas Memory Systems, Inc.



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Defining SSD Performance

- SSD Performance is the Main Focus of SSSI & SSS TWG
- Establishes a standard for measuring the performance of SSDs
 - ◆ Current manufacturer specs are based on different assumptions and cannot be fairly compared
- Enterprise v1.0 and Client v1.0 specifications released
 - ◆ Both documents may be downloaded at www.snia.org/pts

SNIA Solid State Storage Performance Test Specification (PTS)			
PTS-E	PTS Enterprise ver 1.0	PTS-C	PTS Client ver 1.0
 <p>Advancing storage & information technology</p> <p>Solid State Storage (SSS) Performance Test Specification (PTS) Enterprise</p> <p>Version 1.0</p> <p><small>This document has been released and approved by the SNIA. The SNIA believes that the ideas, methodologies and technologies described in this document accurately represent the SNIA goals and are appropriate for widespread distribution. Suggestion for revision should be directed to http://www.snia.org/feedback.</small></p> <p>SNIA Technical Position April 26, 2011</p>		 <p>Advancing storage & information technology</p> <p>Solid State Storage (SSS) Performance Test Specification (PTS) Client</p> <p>Version 1.0</p> <p><small>This document has been released and approved by the SNIA. The SNIA believes that the ideas, methodologies and technologies described in this document accurately represent the SNIA goals and are appropriate for widespread distribution. Suggestion for revision should be directed to http://www.snia.org/feedback.</small></p> <p>SNIA Technical Position August 6, 2011</p>	

- Version 1.1 of both specifications will be available in 2012

Understanding SSD Performance

- Initiative to educate users on how to interpret PTS results and to provide a venue for users to compare actual test results
 - ◆ Webpage, white paper, presentation material, webcast

SNIA PTS SSD Performance Test Comparison					
Products Tested		MLC-A 256 GB	MLC-B 160 GB	SLC-A 100 GB	SLC-B 100 GB
Test Platform Hardware / Software		Calypso RTP 2.0 Intel 5520HC, Intel Xeon 5580 12GB ECC DDR3 RAM, LSI 6GB/s HBA		Calypso CTS 6.5 Cent OS 5.6	
Tests Run		WSAT (FOB)	IOPS (Steady State)	TP (Steady State)	LAT (Steady State)

Summary Performance - Selected					
Test	Workload	MLC-A 256 GB	MLC-B 160 GB	SLC-A 100 GB	SLC-B 100 GB
WSAT	FOB RND 4KIB W	56,896	20,364	39,092	55,677
	Steady State RND 4KIB W	2,714	658	16,305	19,415
IOPS	RND 4KIB R	29,876	38,087	93,707	46,365
	RND 4KIB W	3,147	152	16,563	19,561
Throughput MB/s	1024KIB R	417	264	514	437
	1024KIB W	267	99	157	205
Latency mSec <small>(smaller value is better)</small>	RND 4KIB R Ave	0.20	0.19	0.16	0.18
	RND 4KIB W Ave	0.35	1.00	0.09	0.08
	RND 4KIB R Max	1.60	1.43	6.26	0.39
	RND 4KIB W Max	51.00	288.29	32.63	443.94
LINKS		MLC-A	MLC-B	SLC-A	SLC-B

Links to definitions



Links to data summaries



Actual performance data

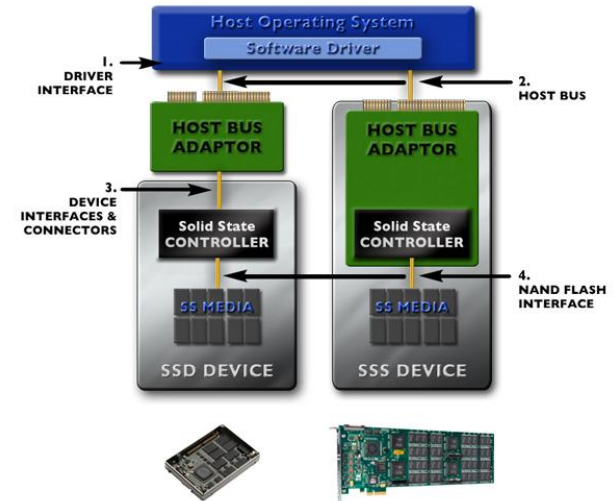


Links to full reports



➤ SSD Standards Explained page

- ◆ Overview of standards that must be considered when designing or evaluating an SSD



➤ SSD Form Factors page

- ◆ Describes the wide range of SSD physical formats on the market today



- ▶ SSSI is always looking for help on:
 - ◆ White papers
 - ◆ Articles
 - ◆ Presentations
 - ◆ Webcasts

- ▶ Increased visibility for SSSI members
 - ◆ Author name, bio, company can appear on materials
 - ◆ Posted to SSSI site

- ▶ Check out the SSSI education page
 - ◆ www.snia.org/forums/sssi/knowledge/education

- SSSI public home page: <http://www.snia.org/forums/sssi>
- SSSI blog: <http://sniasssiblog.org>
- SSSI on Twitter: twitter.com/SNIASolidState

- As PCIe SSD form factors, interfaces, and drivers become standardized, it has become clear that SSSI must specifically address this I/O technology
- The PCIe Roundtable kicks off a new project within SSSI covering PCIe SSDs
- Outcomes of the PCIe SSD Project will include:
 - ◆ PCIe Reference Test Platform for PTS testing
 - ◆ White papers, webpage, tutorials, webcasts
- SSSI will be working out the details of this new project and is seeking inputs from all interested parties