Summary of T10 Activities to ISO/IEC SC 25 / WG 4

John Lohmeyer, Chair T10 Technical Committee
July 17, 2007

T10's principal physical interface work is the Serial Attached SCSI (SAS). The SAS architecture leverages Serial ATA (SATA). SAS uses a drive connector that is compatible with the SATA drive connector. Subsystem vendors can develop products that use either kind of disk drive: SATA for cost-sensitive applications and SAS for enterprise-class applications that need the highest reliability and highest performance storage devices available.

The SAS architecture uses serial point-to-point links with circuit switches (called expanders) to provide fan-out to a large number of storage devices. The SAS expanders are relatively inexpensive because they do not attempt to store and forward packets. Instead, a full-duplex connection is established between the source device and destination device; then packets are routed through the connection with minimal FIFO buffering. SAS expanders can also be used with SATA drives to greatly increase the number of SATA drives accessible on a computer system.

While SAS can support thousands of devices, it is intended for applications that require at most 10s of meters of distance, typically called "attached storage".

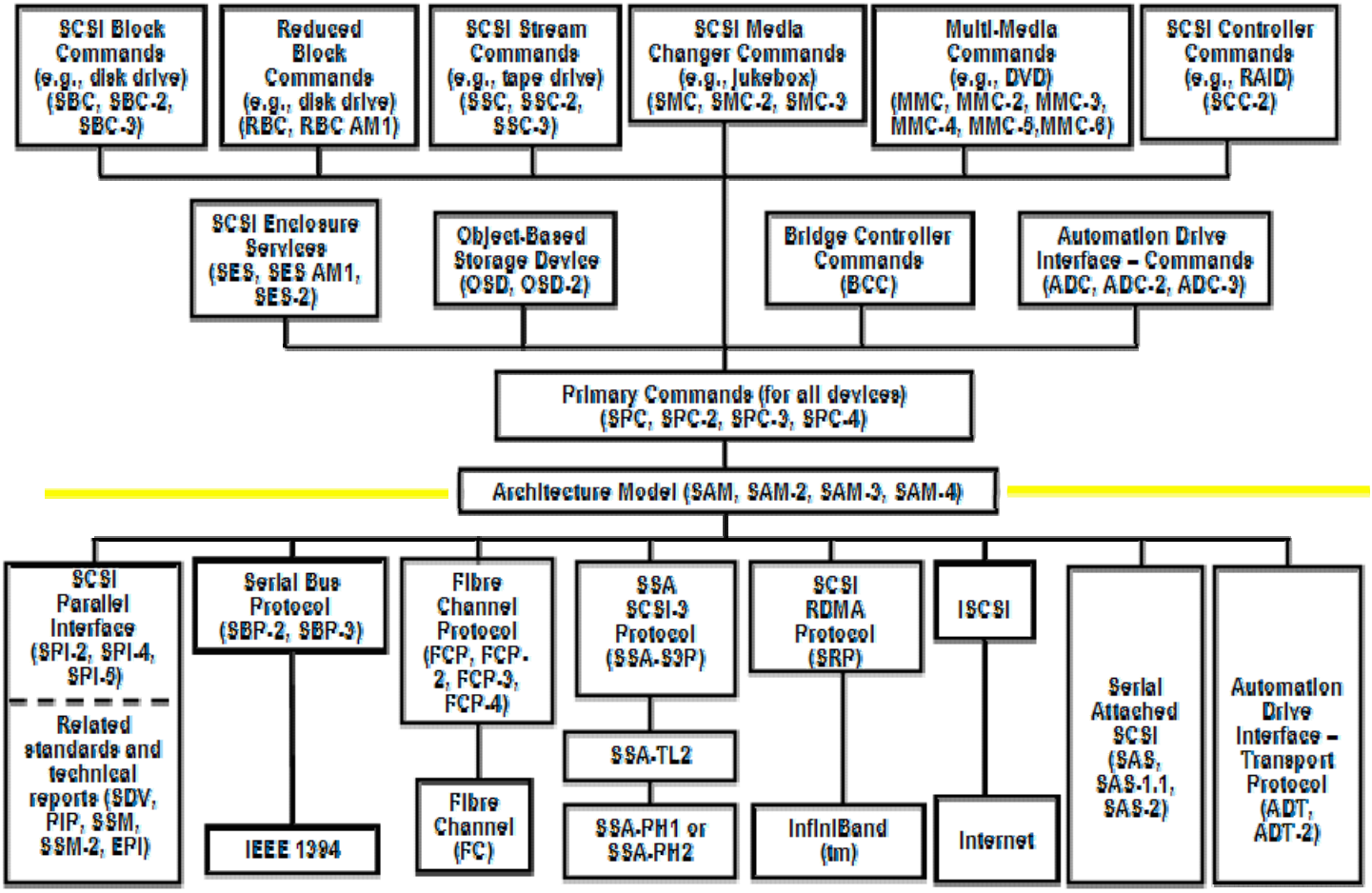
The first ANSI SAS standard was published in 2003 (ANSI INCITS.376-2003) and SAS-1.1 (ANSI INCITS.417-2006) was published in June 2006. Both of these standards support 1.5 Gbit/sec and 3.0 Gbit/sec signaling rates. Multiple connections between two devices may be simultaneously used to increase throughput. These are called wide links. The main enhancements in SAS-1.1 were transport-layer retries to better support tape devices and a new compact connector option.

Over the last two years, T10 has been actively defining SAS-2, which defines a 6 Gbit/sec signaling rate, while continuing to support the lower signaling rates. SAS-2 also defines a zoning mechanism and a bandwidth aggregation mechanism. SAS-2 is nearing completion and should go to T10 letter ballot late this year.

Another significant T10 activity related to SAS is a project to map SCSI commands to ATA commands, called SCSI / ATA Translation (SAT). This is a software layer standard that will enable operating systems to use their SCSI protocol stack with SATA disks in a standard way. SAT has been approved by INCITS and should be published by ANSI soon. T10 has begun work on a SAT-2 project.

T10 also spends significant effort on the SCSI architecture, protocols, and command sets. Almost all modern I/O interfaces, including SCSI, SAS, Fibre Channel, SSA, IEEE 1394, USB, iSCSI, and ATAPI (ATA) use these standards.

The Figure below shows the relationship of these standards. With the exception of IEEE 1394, Fibre Channel, InfiniBand (tm), iSCSI, and the Internet, all of the standards shown are assigned to T10. A detailed status summary is included, below.



SCSI Standards Architecture

(See http:www.t10.org for the latest SCSI Standards Architecture diagram and the latest project status summary.)

T10 Technical Committee Project Status Summary (July 17, 2007)
(See the abbreviation key at the end)

Proj Name	BSR Number	Proj Number	Status	Next Action	Target Date	Dist. in Mailing	Rev.	PL/Editor
			P R O J E C T P R O P O S A L S					
ADC-3		____-D	At INCITS	aprv Proj	Aug 07		__	Suhler / open
			D E V E L O P M E N T					
ADT-2		1742-D	in development	to INCITS	Nov 07	2007_2	04a	Suhler / Entzel
BCC		1528-D	in development	to INCITS	Jul 08	2004_5	00	Rob Elliott
FCP-4		1828-D	in development	to INCITS	Sep 07	2006_6	00a	Dave Peterson
MMC-6		1836-D	in development	to INCITS	Sep 07	2006_6	00	Bill McFerrin
OSD-2		1729-D	in development	to INCITS	Nov 06	2007_1	01	Ralph Weber
SAT-2		1826-D	in development	to INCITS	Jun 08	2007_4	01a	Mark Overby
SAM-4		1683-D	in development	to INCITS	Nov 06	2007_3	11	George Penokie
SBC-3		1799-D	in development	to INCITS	Nov 08	2007_3	10	George Penokie
SES-2		1559-D	in development	to INCITS	Jul 08	2007_3	17	Rob Elliott
SMC-3		1730-D	in development	to INCITS	Nov 07	2007_4	08	Banther / Snelder
SPC-4		1731-D	in development	to INCITS	Nov 09	2007_3	11	Ralph Weber
SSC-3		1611-D	in development	to INCITS	Nov 07	2007_4	03d	Dave Peterson
SAS-2		1760-D	in development	to INCITS	Jul 07	2007_3	10	Rob Elliott
SDI		1740-D	in development	to INCITS	Nov 07	2005_2	00	Rob Elliott
			T 1 0 A P P R O V A L					
			I N C I T S A P P R O V A L					
ADC-2		1741-D	At INCITS for 1PR	Start 1PR	Aug 07	2007_4	08	Suhler / Entzel
MMC-5	INCITS 430	1675-D	INCITS Aprvd	to ANSI BSR	Jul 07	2006_6	04	Bill McFerrin
SAT	INCITS 431	1711-D	INCITS Aprvd	to ANSI BSR	Jul 07	2006_5	09	Johnson / Sheffield
			P U B L I C A T I O N					
			P U B L I S H E D					
ADC	INCITS 403	1558-D	INCITS 403-2005	5 yr review	2010	2004_6	07	Suhler / Wideman
ADT	INCITS 406	1557-D	INCITS 406-2005	5 yr review	2010	2004_6	14	Suhler / Entzel
SCSI3 FCP	INCITS 269	0993-M	INCITS 269-1996 [R2006]	5 yr review	2011	1995_3	12	Bob Snively
FCP-3	INCITS 416	1560-D	INCITS 416-2006	5 yr review	2010	2005_5	04	David Peterson
MMC-2	INCITS 333	1228-M	INCITS 333-2000 [R2005]	5 yr review	2010	1999_4	11a	McFerrin / Roberts
MMC-3	INCITS 360	1363-D	INCITS 360-2002 [R2007]	5 yr review	2012	2001_6	10g	Bill McFerrin
MMC-4	INCITS 401	1545-D	INCITS 401-2005	5 yr review	2010	2005_3	05a	Bill McFerrin
OSD	INCITS 400	1355-D	INCITS 400-2004	5 yr review	2009	2004_5	10	Ralph Weber
RBC	INCITS 330	1240-M	INCITS 330-2000 [R2006]	5 yr review	2011	1999_4	10a	McLean / Roberts
RBC AM1	INCITS 330/AM1	1240-M	INCITS 330-2000/ AM1-2003	5 yr review	2008	2003_3	01	Ron Roberts
SAM-2	INCITS 366	1157-D	INCITS 366-2003	5 yr review	2008	2002_5	24	Ralph Weber
SAM-3	INCITS 402	1561-D	INCITS 402-2005	5 yr review	2010	2004_5	14	Ralph Weber
SBC-2	INCITS 405	1417-D	INCITS 405-2005	5 yr review	2010	2004_6	16	Rob Elliott
SCC-2	INCITS 318	1225-M	INCITS 318-1998 [R2003]	5 yr review	2008	1997_5	04	George Penokie
SDV	INCITS TR-28	1378-DT	INCITS TR-28-2002	5 yr review	2007	2001_6	08b	Lohmeyer / Gibbons
SES	INCITS 305	1212-M	INCITS 305-1998 [R2003]	5 yr review	2008	1998_1	08b	Bob Snively
SES AM1	INCITS 305/AM1	1212-M	INCITS 305-1998/ AM1-2000 [R2003]	5 yr review	2005	2000_4	01	Rob Elliott
EPI	INCITS TR-23	1143-TR	INCITS TR-23-1998			1998_4	16	Bill Ham
FCP-2	INCITS 350	1144-D	INCITS 350-2003	5 yr review	2008	2002_6	08	Dave Peterson
SMC-2	INCITS 382	1383-D	INCITS 382-2004	5 yr review	2009	2004_1	07	Erich Oetting
SPI-2	INCITS 302	1142-M	INCITS 302-1998	5 yr review	2008	1998_3	20b	Ham/Penokie

			[R2003]					
SPI-5	INCITS 367	1525-D	INCITS 367-2003	5 yr review	2008	2003_1	06	George Penokie
PIP	INCITS 368	1439-D	INCITS 368-2003	5 yr review	2008	2003_1	04	Zane Daggett / Bill Ham
SPC-3	INCITS 408	1416-D	INCITS 408-2005	5 yr review	2010	2005_3	23	Ralph Weber
SRP	INCITS 365	1415-D	INCITS 365-2002 [R2007]	5 yr review	2012	2002_4	16a	Cris Simpson
SSM-2	INCITS 369	1514-D	INCITS 369-2003	5 yr review	2008	2003_1	05a	Aloisi / Manildi
SSC-2	INCITS 380	1434-D	INCITS 380-2003	5yr review	2008	2003_4	09	Dave Peterson
S2TIB1		0375-T	Pub by Global	(none)		1995_1	E	George Penokie
S2TIB2		0375-T	Pub by Global	(none)		1995_1	E	
SCSI CAM	INCITS 232	0792-M	INCITS 232-1996 [R2006]	5 yr review	2011	1995_3	12b	Bill Dallas
SCSI3 SBC	INCITS 306	0996-M	INCITS 306-1998 [R2003]	5 yr review	2008	1997_6	08c	open
SCSI3 GPP	INCITS TR-16	0991-TR	T10 rec to w/draw	to INCITS	14 May 07	1995_2	09	Gary Stephens
SCSI3 SMC	INCITS 314	0999-M	INCITS 314-1998 [R2003]	5 yr review	2008	1998_1	10a	Erich Oetting
SCSI3 SSC	INCITS 335	0997-M	INCITS 335-2000 [R2006]	5 yr review	2011	2000_1	22	Dave Peterson
SAS	INCITS 376	1562-D	INCITS 376-2003	5 yr review	2008	2003_4	05	Rob Elliott
SAS-1.1	INCITS 417	1601-D	INCITS 417-2006	5 yr review	2010	2005_5	10	Rob Elliott
SBP-2	INCITS 325	1155-M	INCITS 325-1998 [R2003]	5 yr review	2008	1998_2	04	McLean/Johansson
SBP-3	INCITS 375	1467-D	INCITS 375-2004	5 yr review	2009	2003_5	05	Peter Johansson
SCSI-2	INCITS 131	0375-M	INCITS 131-1994 [R2004]	5 yr review	2009		10L	Larry Lamers
SSA-PH1	INCITS 293	1145-M	INCITS 293-1996 [R2006]	5 yr review	2011	1996_4	09c	Ham/Scheible
SSA-PH2	INCITS 307	1146-M	INCITS 307-1997 [R2007]	5 yr review	2012	1997_2	05b	Ham/Scheible
SSA-S2P	INCITS 294	1121-M	INCITS 294-1996 [R2006]	5 yr review	2011	1996_4	07b	John Scheible
SSA-S3P	INCITS 309	1051-M	INCITS 309-1997 [R2007]	5 yr review	2012	1997_2	05b	John Scheible
SSA-TL1	INCITS 295	0989-M	INCITS 295-1996 [R2006]	5 yr review	2011	1996_4	10b	John Scheible
SSA-TL2	INCITS 308	1147-M	INCITS 308-1997 [R2007]	5 yr review	2012	1997_2	05b	John Scheible

T10 Technical Committee Project Status Summary Abbreviation Key:

X3	= Obsolete name for INCITS	comp	= completion	cur	= current
NCITS	= Obsolete name for INCITS	res	= resolve/resolving	rev	= revision
INCITS	= InterNational Committee for Information Technology Standards	LB	= Letter Ballot	#	= number
		pub	= published	ng	= negative
OMC	= Operational Management Committee	aprvl	= approval	prep	= preparation
BSR	= Board of Standards Review (of ANSI)	aprv	= approve	cmnts	= comments
WG4	= Working Group 4 of ISO/IEC JTC 1/SC 25	dev	= development	prj	= project
ISO	= International Standards Organization	SD3	= Project Proposal	fwd	= forward
MgtRev	= INCITS management review	T10	= T10 Technical Committee	doc	= document
1PR	= 1st Public Review	.1	= T10.1 Task Group (obsolete)	TG	= Task Group
2PR	= 2nd Public Review	CD	= Committee Draft (ISO)	rec	= recommend
TBD	= To Be Determined	DIS	= Draft International Stnd	reaf	= reaffirm
		NP	= New Project	w/dw	= withdraw
		IS	= International Standard	rvis	= revise
		A/I	= ANSI/ISO/IEC (joint standard)		