Draft Meeting Minutes
Prepared 25 February 1998
Joint Technical and Marketing Task
T11 Fibre Channel Standards Community
Fibre Channel Association (FCA)
Fibre Channel Loop Community (FCLC)

Meetings Held During The T11 Plenary Week
11 - 12 February 1998; Hyatt Islandia, San Diego, CA.

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Electronic Document Availability:

Draft documents, proposals, and presentations for the Joint Technical and Marketing Task may be obtained at the following ftp site:

ftp.dpt.com/t11/admin/fca_fclc/

Additionally, these same files may be obtained at the URL: http://www.fibrechannel.com

Joint Technical and Marketing Task; 11-12 February 1998:
T11, Fibre Channel Association (FCA), Fibre Channel Loop Community (FCLC)
Hyatt Islandia, San Diego, CA.

Meeting Summary:

Two Joint Technical and Marketing Task meetings were held during the T11 Plenary week, at the Hyatt Islandia, San Diego, CA., 11 - 12 February 1998. The Joint Technical and Marketing Task represents a coordinated, or joint, activity between the T11 Fibre Channel Standards Community, Fibre Channel Association (FCA), and Fibre Channel Loop Community (FCLC). The relevant sessions during the T11 Plenary week were the following: a) during the FCA Marketing Meeting on Wednesday 11 February 1998 (please note FCA Marketing Meetings have now been scheduled to be coincident with the T11 Plenary week), and b) immediately following the T11 Plenary on Thursday 12 February 1998.

Please note, T11 is an official standards development committee under the National Committee for Information Technology Standardization (NCITS) and American National Standards Institute (ANSI) organizations. Please also note, the FCA and FCLC are non-profit, technology marketing and public relations based trade associations established by member companies to expedite Fibre Channel deployment into a broad class of industry applications.

Topics covered in the 11 - 12 February, Joint Technical and Marketing Task meeting included...

- Fibre Channel Technical and Marketing Survey	Michael Hoard	Boeing Defense & Space
- Migrating to 2 Gbit/s Fibre Channel	Fred Weniger	Vitesse
- Fibre Channel, State of the Art, and What is Needed	Dave Anderson	Seagate
- Next Generation Networking Technology	Carla Kennedy	Ancor
- Fibre Channel Clustering, the Next Generation	Jay Kramer	Unisys

Meeting Details:

- Fibre Channel Technical and Marketing Survey	Michael Hoard	Boeing Defense & Space

Michael Hoard, Boeing Defense and Space, presented an overview of the Fibre Channel industry survey, and described the progress to date. Michael's presentation is available at ftp.dpt.com/t11/admin/fca_fclc/9802jt01.pdf. Please see the PFD file for points covered during the formal presentation. Major topics covered were the initial objective and content of the survey. After the presentation, Michael Hoard moderated a group discussion to gather input and suggestions leading to the release of the industry survey. The minutes from the group discussion are covered below...

A comment was made that the survey process should be more dynamic, and focus on more iterations over time. Recommendations were made to format the survey in a very informal manner, and focus on more of a top level (40 Thousand Foot View). The group discussed who is the intended customer of the survey. Some contributors stated they would prefer only Fibre Channel contributing members, others stated that end customers are really the ones who should have a voice, and others stated the survey should go to all Fortune 500 companies. After some discussion it was decided that more than one type of survey was needed, one for Fibre Channel members, and another for those outside the development circle.

Dave Deming, Solution Technology, volunteered to provide a brief description of the survey he is currently conducting for the FCLC. He stated that he is creating a capabilities matrix, and will focus on very specific interoperability issues (what works with what). After discussion, the group decided that this level of detail would not be desired in the Top Level Survey, which should focus on much broader market areas and product categories. The group also decided to avoid any claim of interoperability by people who respond to the survey. Recommendations were made to place all of the data from the survey on the FCA web site.

Discussion explored the need to develop compliance test suites, and address market areas not currently covered by the standard, such as Hubs. The group decided that anything placed on the web should have appropriate disclaimer language, regarding legal claims and the level of accuracy of information provided by vendor companies. The group discussed issues regarding the effort one year ago to write a conformance test suite. This effort was lead by Xyratex. Comments were made by Xyratex representatives that any future activity should include a large number of companies, and not just consist of a few companies.

Further comments were made to format the survey in a very simple manner. Discussion explored how to get over the "why should I bother with responding to this survey" issue. Suggestions were made to offer a reward to people who respond by a stated deadline. (Separately, a suggestion was made after the meeting that a good "responder prize" would be to offer 10 Free Hard Drives to 10 of the responders; these prizes could be donated by one of the member companies) Other suggestions were made that the survey could be sent out to end customers, via shipping the survey with end user product. The group reiterated the importance of keeping the survey very simple and get the dialog going immediately.

Another suggestion was made to hire a firm to conduct the survey, such as Computer Intelligence. Comments were made that this may represent a $25K fee. Suggestions were made to include this fee in the FCA / FCLC membership fee at the beginning of the year. The group discussed the difficulty in talking with end users. Suggestions were made to rely upon the vendors to act as filters to determine what the end user needs are. Norm Harris, Adaptec, recommended that there are two groups of people to collect information: end users with their needs, and Fibre Channel vendors with their product features and standards issues. Norm stated that the questions will be different between the two groups.

Some of the questions to be asked included: a) how do end users want to use Fibre Channel, b) how can Fibre Channel solve their problems using Fibre Channel, c) they already have something which meets some level of need now, where do they need to go and where are the critical gains that need to be provided. Comments were made that the survey results should not be kept private, and that results should be widely distributed.

This concluded the Wednesday afternoon session.

On Thursday evening after the T11 Plenary, the Joint FCA / FCLC meeting was held for two hours. Michael Hoard, Boeing Defense and Space, moderated the session. The evening meeting consisted of four Key Note speakers. Please refer to their PDF files for details regarding their formal presentations. The following minutes capture the group dialog during the presentations.

 - Migrating to 2 Gbit/s Fibre   Fred Weniger   Vitesse
 Channel

Fred Weniger, Vitesse, presented his market view in the migration from 1 Gbit/s to 2 Gbit/s. Fred's presentation is available at ftp.dpt.com/t11/admin/fca_fclc/9802jt03.pdf.

A question was asked, "why are we attempting to deliver 2X now when 1X is not there yet?" Fred responded that customers are already asking for 2X to meet some of their needs, and Vitesse is responding to their requests. Discussion in the group explored what is the cost model for speed increases. Comments were made that in Gigabit Ethernet the cost target is 10X performance / speed increase for 2X the cost. Comments were made that the goal for Fibre Channel should be to drive the cost of 1X down to "cheap as dirt" levels, while increasing reliability and other criteria. Comments were made that we should not keep the cost of the transceiver constant and simply raise the speed, we should attempt to significantly lower the price. A question was asked, "isn't the path to integrate the SerDes into the protocol ASIC, and try to provide mix speed?" Fred responded no, that there are good reasons to have separate SerDes components. Discussion in the group explored the technical features of the Vitesse 2X product and the capability to offer mixed speed.

 - Fibre Channel, State of the Art,   Dave Anderson   Seagate
 and What is Needed

Dave Anderson, Seagate, presented his market view of the storage market and how cluster computing applications will impact the data center. Dave's presentation is available at ftp.dpt.com/t11/admin/fca_fclc/9802jt04.pdf.

Dave stated that the chief competitors to Fibre Channel in the cluster computing area are proprietary solutions which use Fibre Channel based components yet avoid the use of buffers (which cause latency). The leading proprietary contenders are Servernet and Myrinet. Dave stated that in order for Fibre Channel to truly provide "what the customer needs," new

capabilities are required to attain low latency and high utilization / efficiency. At this time, Dave stated that these capabilities are latent just below the Fibre Channel surface, yet we as a community are not using these capabilities and thus retain a slower interface which may not effectively compete with the proprietary solutions. Dave stated that T11 and the marketing organizations are now positioned to correct this issue, to fully address "what the customer needs" in cluster computing applications. However, Dave warned that we (as standards and marketing organizations) need to act rapidly and not delay.

Dave stated the need for two independent interfaces on one device, which would operate in two modes: AL mode and enhanced mode. Dave stated the two independent interfaces would provide non-associated loop behavior, and deliver 200 Mbytes (100 Mbytes in and 100 Mbytes out) concurrently on both interfaces for a total of 400 Mbytes aggregate for the single chip device.

Dave, stated that the other network alternatives are claiming that they can provide low latency now, and they believe attachment to storage is not a large problem. Discussion in the group explored how Fibre Channel already has storage attachment, and that Fibre Channel already has all of the potential technology components (second generation devices in development) to attain low latency. Comments were made that the only remaining item required is rapid consensus among Fibre Channel developers on how to take advantage of second generation device development that retains the existing storage position, yet provides low latency / high efficiency for data center "cluster" applications.

Discussion in the group explored what is a rough target to shoot for in terms of latency. Comments were made that approximately 10 microseconds for a 64 byte memory to memory transfer would be very attractive. Comments were made that years ago Digital Equipment had developed Memory Channel, which provided 100 nanoseconds capability. Discussion in the group explored the use of Fibre Channel in storage applications, where a 10Km Fibre Channel link is being used to remote a dynamic (in real time) mirror copy of a RAID controller cache. Discussion explored the attributes in maintaining coherence between the distributed systems.

  - Next Generation Networking   Carla Kennedy   Ancor
  Technology

Carla Kennedy, Ancor, presented her market view in addressing the needs in networking. Carla's presentation is available at ftp.dpt.com/t11/admin/fca_fclc/9802jt05.pdf.

Carla stated that Fibre Channel is positioned very well in a large number of target vertical markets. She provided an overview of several market areas: medical, military, movie & broadcast, oil & gas, and automotive. Carla stated that ATM is relatively difficult to use, and Gigabit Ethernet is relatively late to market; however, she stated that these alternatives have very large amounts of money backing (promoting) the technology. Therefore, she stated that Fibre Channel must maintain and expand on the success in the storage market. Carla stated that a key requirement going forward is interoperability.

  <u>- Fibre Channel Clustering, the</u>   Jay Kramer   Unisys

  <u>Next Generation</u>

Jay Kramer, Unisys, presented his market view in the newly emerging Cluster Computing application area. Jay's presentation is available at ftp.dpt.com/t11/admin/fca_fclc/9802jt06.pdf.

Jay asked the group a question, "how many people in the room come from server companies?" Eight people raised their hand. Jay then asked, "how many of those are on the server side of their company?" Two people raised their hand. Jay stated that the majority of people in Fibre Channel represent storage, and that a critical need is to attract new people into the Fibre Channel community.

Jay described the emergence of a new market, which is developing mission critical applications using "open systems" networking and computing, operating with NT and UNIX. This new market is significantly different from the predominant VAX clusters, which have been in operation for many years. The new market is being driven by software companies, and OS vendors, not the traditional hardware vendors. This shift represents a significant change in the types of vendors involved, as well as the relative speed in being able to deploy whole new classes of applications. This is due to the fact that there is such a large array of very capable software development companies all focused on deploying high availability, mission critical applications operating on commodity, inexpensive, "open systems" hardware. Jay stated that Fibre Channel has a very rich opportunity to expand on its success in storage.

Discussion in the group explored requirements to implement cache transfers, as well as heart-beat. Comments were made that a present vulnerability in NT is the reliability of the cache, and much work is required to expand NT beyond the current 4 to 8 way capability. Discussion in the group explored the dynamics of latency. Examples were given on the latency inherent within TCP/IP, and how processor cycles are taken away from applications to manage TCP/IP. As new methods are developed to reduce network overhead (even in reducing intermediate copies in TCP/IP), then processor cycles are freed up to do more application (real) work. However, with more application work being done, more I/O is created which just stacks up outbound and inbound queues (again). Comments were made that the more work you do, the less time you have to manage the additional I/O, and the lower the overhead must be to actually take advantage of available processor cycles. Comments were made that without adequate "system level" design provisions, average I/O can indeed be improved; however, average latency may remain the same or even grow worse (across the distributed system, not just the single board computer). Therefore, comments were made that to effectively improve both metrics and thus gain net "system level" scaleability improvements, a far more efficient method to regulate I/O is required.

Comments were made that Servernet offers very attractive performance relative to a single port Fibre Channel device; however, when comparing a dual port Fibre Channel device to Servernet the opposite conclusion can be drawn. Comments were made that the real question is data delivery to the processor, to maintain very high application (real) work, and Fibre Channel coupled with Virtual Interface Architecture (VIA) will pose a very significant challenge to

Servernet. Discussion in the group explored the need for deterministic behavior. Comments were made that deterministic and "real time" does not mean "real fast" or low latency. Comments were made that different applications require different behavior.

Comments in the group stated that Fibre Channel is not taking advantage of the multi-protocol capability inherent since the beginning. Many people commented that this is a very significant point that needs to be raised in the community. Other comments were made that this needs to be done very carefully, because some users become scared when they hear SCSI may be inter-mixed with IP traffic. Comments were made that much education is needed to raise the awareness of what can be done with a unified, multi-protocol interface.

Discussion in the group explored possible methods to reduce latency in Fibre Channel. Comments were made that currently we require 6 words between frames. This was done years ago when people projected the largest possible network size achievable using multi-hop, cascaded fabrics. However, comments were made that this could effectively be reduced for a "lean and mean" data center application, which would have a much reduced maximum size (number of possible elasticity buffers which eat / create inter-frame transmission words).

Comments were made asking the Fibre Channel community, "will we do what it takes to meet the customer need for very low latency and performance scaleability in the data center?" Additional comments were made that if we take on this challenge, then we need "go all the way" to take out latency wherever we find it (nothing sacred). Further additional comments were made that this work should be done as a profile, and attempt to fine tune the Fibre Channel protocol down to nanosecond levels (not be satisfied with microsecond tuning). Jay Kramer concluded that in order to make a significant impact, Fibre Channel must be fully aware of what the competitive alternatives provide, and rapidly respond to market needs (measured in very low latency and high efficiency).

This concluded the meetings.

1998 Joint FCA / FCLC Meetings:

The Joint FCA / FCLC Meetings are scheduled immediately following the T11 plenary, from 6:00 - 8:00 PM, on the following dates...

23 April 1998	Palm Springs, CA. (T11 Plenary Week)
11 June 1998	St Petersberg Beach, FL. (T11 Plenary Week)
13 August 1998	Portsmouth, UK. (T11 Plenary Week)
8 October 1998	Ft. Lauderdale, FL. (T11 Plenary Week)
17 December 1998	Tucson, AZ. (T11 Plenary Week)

Attendance:

At the FCA Marketing Meeting:

Linda Hardman	McData	Gloria Possert	Xyratex
Mary Miller	Ancor	Richio Aikawa	Emulex
Chris Lyon	Vixel	Mike Kane	Emulex
K. Srivastava	Digital	Linda Reed	McData
B. Jalali	NCR	Madeline Schnapp	Infortrend
Jeff Lawrence	Systran	Samir Desai	Qlogic
Linda Self	Litton	Mimi Howard	Storage Concepts
Herb Silverman	Xyratex	Peter Dougherty	McData
Marc Staimer	Polaris	Nancy Kuehn	Seagate
Ron Rossie	Planning	Kirk Dillon	Meltek
Stetan Koller	Meltek Group	Fred Gribi	Meltek
Marty Francis	Symbios	Dave Deming	Solution Tech
Steve Paulhus	NSTOR	Bob Kembel	Connectivity Solutions
Gerry Hohenstein	NSTOR	Croky Bau	JMR
Heather O'Hara	TFG	Barry Reinhold	U of N H
Anne Ferris	TFG	Dave Ford	Orca Systems
P.J. Stegen	TFG	Scott Carlson	Amdahl
M.K. Jibbe	Symbios	Steve Wilson	Amdahl
Steve Garceau	Micronet	Jeff Stai	Brocade
Harry Aire	Aire & Assoc	Rich Taborek	G2 Networks
John Ives	Serano Systems	Marc Friedmann	Prisa
Tom Harrington	LSI	Norm Harris	Adaptec
Marc Farley	Crossroads	Ken Fredericks	McData
Jay Kramer	Unisys	Michael Hoard	Boeing
Barbara Bardach	Crossroads	Mike Fitzpatrick	Fujitsu
Kim Albert	Crossroads	Carl Zeitler	Compaq
Lisa Richard	Brocade	Ed Frymoyer	EMF Assoc
Sari Gallagher	Brocade	Jan Dadek	Ancot
		Lisa Huff	Berg

At the Joint Meeting after the T11 Plenary:

Dave Deming	Solution Technology	Gary Warden	SRB Consulting
Arlan Stone	Unisys	Dave Hepner	TRW SIG
Bill Ham	Digital	Charles Brill	AMP
Bill Martin	Gadzoox	Stan Moist	AMP
Carl Zeitler	Compaq	Elizabeth Moore	AMP
K. Srivastava	Digital	Jim McGrath	Quantum
Mike Kane	Emulex	David Peterson	STK Networks
Richio Aikawa	Emulex	Michael Morandi	CNT
Curtis Ridoewan	LSI	Gene Milligan	Seagate
Jaime Calle	NCR	Steven Wilson	Amdahl
Dave Janesh	TASC (JASA)	Bent Stoevhase	Serial Comm
Bob Snively	Sun Microsystems	M.K. Jibbe	Symbios
Ron Bossard	3M	Herb Silverman	Xyratex
Jim Nelson	Northrop	Don Spolar	ILC DDC
Jeff Stai	Brocade	Horst Truestedt	ENDL
Rich Taborek	G2 Networks	Paul Levin	Xyratex
Kumar Malavalli	Brocade	Norm Harris	Adaptec
Dan Allan	ENDL	Charles Binford	Symbios
Mike Fitzpatrick	Fujitsu	Colin Schaffer	Mylex
Tom Harrington	LSI	Jim Jones	Exabyte
Courtland Bau	JMR	Jim Coomes	Seagate
Earl Rydell	Rockwell-Collins	Jay Neer	Molex
Robert Pedersen	General Dynamics	Harry Aire	Aire & Assoc
Linda Reed	McData	Scott Darnell	Raytheon
		Michael Hoard	Boeing