

# **Project Proposal for a new INCITS Standard**

## **Fibre Channel - Switch Fabric - 6 (FC-SW-6)**

### **T11/10-220v1**

#### **1 Source of Proposed Project**

##### **1.1 Title**

Fibre Channel - Switch Fabric - 6.

##### **1.2 Date Submitted**

June 10, 2010.

##### **1.3 Proposer(s)**

INCITS Technical Committee T11.

#### **2 Process Description for the Proposed Project**

##### **2.1 Project Type (Development or Revision)**

Type D (Development done within INCITS TC T11).

##### **2.2 Type of Document**

Standard.

##### **2.3 Definition of Concepts and Special Terms**

None.

##### **2.4 Expected Relationship with Approved Reference Models, Frameworks, Architectures, etc.**

All Fibre Channel standards are intended for use in closed systems.

##### **2.5 Recommended INCITS Development Technical Committee**

It is recommended that this project be assigned to TC T11, in order that the project be coordinated with work on other Fibre Channel standards.

## **2.6 Anticipated Frequency and Duration of Meetings**

This project will make use of the regularly-scheduled bimonthly T11 plenary meetings. Informal Working Groups will be organized on an ad-hoc basis to discuss specific subjects where appropriate.

## **2.7 Target Date for Initial Public Review (Milestone 4)**

June 2012

## **2.8 Estimated Useful Life of Standard or Technical Report**

It is anticipated that this standard will have a useful life of over 10 years.

# **3 Business Case for Developing the Proposed Standard or Technical Report**

## **3.1 Description**

FC-SW-6 describes the requirements for an interconnecting Fabric consisting of multiple Fabric Switch elements to support the ANSI/INCITS Fibre Channel - Framing and Signaling (FC-FS-2) and ANSI/INCITS Fibre Channel - Physical Interface (FC-PI-4) standards.

## **3.2 Existing Practice and the Need for a Standard**

The FC-SW Standard addressed the basic functions necessary to interconnect Fibre Channel switches and distribute Domain IDs. These functions included the exchange of link parameters, exchange of fabric parameters, selection of a Principal Switch, and distribution of Domain IDs from the Principal Switch. This work was completed in 1998.

Development of the second generation Fibre Channel Switch Fabric standard began in 1997 and was completed in 2001. The FC-SW-2 project addressed path selection protocols, distributed services, and zoning. This included Fabric Shortest Path First (FSPF) path selection, Name Server distribution, Management server distribution, and zone exchange and merge protocols. This standard facilitated the wide distribution of heterogeneous fabrics that have common path selection protocols, and mechanism for distributed services. FC-SW-2 was a complete replacement for FC-SW.

Development of the third generation Fibre Channel Switch Standard began in 2001 and was completed in early 2004. The FC-SW-3 project addressed broadcast, enhanced zoning, link incident reporting, inter-switch communication for the Fabric Services, and provided additional details for the Port and Fabric initialization state machines and FSPF. FC-SW-3 is a complete replacement for FC-SW-2.

Development of the fourth generation Fibre Channel Switch Standard (FC-SW-4) began in 2004 and was completed 2006. The FC-SW-4 project addressed frame tagging (VSAN), the enhanced commit service, virtual channels, security, management enhancements and diagnostic tools. The FSPF-Backbone was removed in FC-SW-4. FC-SW-4 is a complete replacement for FC-SW-3.

Development of the fifth generation Fibre Channel Switch standard began in 2006 and was completed in 2009. The FC-SW-5 standard included class 2 support for Inter-Fabric Routing, updates to Zone and Name Server attributes, and refinements to the basic Switch Model and Virtual Port architecture. In addition, updates were made to the Fast Fabric Initialization protocol to support the Avionics Environment.

There are additional operational and management functions that need to be defined to allow more flexible and interoperable Fibre Channel Switch Fabric deployment. Examples of these functions may include:

- 1) FSPF extensions for distributed FCF topology (i.e., FC-BB-6);
- 2) FC Fabric and FCoE Fabric enhancements;
- 3) Fabric Name and Principal Switch\_Name disassociation;
- 4) Bandwidth and congestion management;
- 5) Definition of new SW\_ILS's;
- 6) Link Aggregation;
- 7) VC-RDY flow control enhancements.

An FC-SW-6 standard will allow for the adoption of these necessary functions.

### **3.3 Implementation Impacts of the Proposed Standard**

#### **3.3.1 Development Costs**

This standard will be developed through the voluntary and cooperative efforts of T11 Task Committee members. No significant development costs are anticipated.

#### **3.3.2 Impact on Existing or Potential Markets**

The proposed standard will provide an upward growth path that complements and enhances existing supplier products and support schemes. The proposed standard will result in expanded applications for existing and conceived products in both the channel and network markets. It is likely that isolated adverse effects would occur in any case through non-standard evolution or revolution.

#### **3.3.3 Costs and Methods for Conformity Assessment**

The committee will consider the results of testing provided to the committee through the voluntary efforts of the participants in T11. With this method all costs are borne by the organizations of the various participants and have for the most part been mainly an adjunct of their normal development costs.

#### **3.3.4 Return on Investment**

The return on investment for this development is expected to be high, due to the commonality of effort directed to a singular method of providing the services covered by the proposed standard. Additionally, the investment made in products developed under FC-SW-6 will be preserved by providing services within the existing infrastructure.

### **3.4 Legal Considerations**

#### **3.4.1 Patent Assertions**

Calls will be made to identify assertions of patent rights in accordance with the relevant INCITS, ANSI and ISO/IEC policies and procedures. T11 is aware of patent assertions that have been made and letters indicating compliance with INCITS policies have been received.

#### **3.4.2 Dissemination of the Standard or Technical Report**

Drafts of this document will be disseminated electronically. Dissemination of the final standard will be restricted as the document becomes the property of INCITS, ANSI, or ISO/IEC.

## 4 Related Standards Activities

### 4.1 Existing Standards

ID Number	Title
(1) INCITS 424-2007	Fibre Channel - Framing and Signaling - 2 (FC-FS-2)
(2) INCITS 332:1999,	Fibre Channel Arbitrated Loop (FC-AL-2)
(3) INCITS 416:2006,	Fibre Channel Protocol for SCSI - 3 (FCP-3)
(4) INCITS 427:2007,	Fibre Channel Generic Services - 5 (FC-GS-5)
(5) INCITS 418:2005,	Fibre Channel Switch Fabric - 4 (FC-SW-4)
(6) INCITS 374:2003,	Fibre Channel Single-Byte Command Sets Mapping Protocol - 3 (FC-SB-3)
(7) INCITS 419-2008,	Fibre Channel - Backbone (FC-BB-4)
(8) INCITS TR:36:2004,	Fibre Channel - Device Attach (FC-DA)
(9) INCITS TR:39:2005,	Fibre Channel Methodologies for Interconnects - 2 (FC-MI-2)
(10) INCITS 433-2006,	Fibre Channel Link Services (FC-LS)
(11) INCITS 426-2007,	Fibre Channel Security Protocols (FC-SP)
(12) INCITS 450-2009,	Fibre Channel Physical Interfaces - 4 (FC-PI-4)

### 4.2 Related Standards Activity

ID Number	Title
(1) Project 1833D	Fibre Channel - Generic Services-6 (FC-GS-6)
(2) Project 1822D,	Fibre Channel Switch Fabric - 5 (FC-SW-5)
(3) Project 1861D,	Fibre Channel Framing and Signaling - 3 (FC-FS-3)
(4) Project 2103D,	Fibre Channel Link Services - 2 (FC-LS-2)
(5) Project 1745D,	Fibre Channel - Inter-Fabric Routing (FC-IFR)
(6) Project 2206D,	Fibre Channel - Generic Services - 7 (FC-GS-7)
(7) Project 2217DT,	Fibre Channel - Methodologies for Interconnects - 3 (FC-MI-3)
(8) Project 1871D,	Fibre Channel - Backbone - 5 (FC-BB-5)
(9) Project 2159D,	Fibre Channel - Backbone - 6 (FC-BB-6)
(10) Project 2122D,	Fibre Channel Single-Byte Command Sets Mapping Protocol - 4 (FC-SB-4)

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#### **4.3 Recommendations for Close Liaison**

IETF - IP Storage Working Group

SNIA - Fibre Channel Technical Work Group

#### **5 Units of Measurement used in this Standard**

Système Internationale d'Unités (International System of Units).