

Project Proposal For A New INCITS Standard
Fibre Channel -
Single-Byte Command Code Sets-4 Mapping Protocol
(FC-SB-4)

Document: T11/08-272v1

1 Source of the Proposed Project

1.1 Title

Single-Byte Command Code Sets-4 Mapping Protocol (FC-SB-4).

1.2 Date

19 May, 2008.

1.3 Proposer(s)

INCITS TC T11, with a current membership of 45.

2 Process Description for 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 (Existing or New)

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)

April, 2009

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

This project proposal recommends the development of a FC-SB-4 standard that defines a new mode of operation that significantly improves the performance of certain types of data transfer operations compared to the existing FC-SB-3 protocol. The new mode of operation is referred to as transport mode and allows multiple device commands to be sent to a control unit in a single Information Unit (IU). Transport-mode operations utilize link-level protocols described by the FC-4 Fibre Channel Protocol (FCP) specification. The protocol and functions currently specified by FC-SB-3 and FC-SB-3-A1 will continue to be supported in FC-SB-4. It is intended that the FC-SB-4 Standard will be a complete replacement for FC-SB-3 and FC-SB-1-A1.

Transport mode operations make use of a new IU, the transport-command-IU, that is sent from a channel to a control unit using the FCP link-level protocol. The transport-command IU contains a list of device command words (DCW), each specifying a device command to be executed by the control unit. A single transport-response IU is returned to indicate completion or termination of the DCWs specified in the transport-command IU. Transport-data IUs are used to transport data for read and write operations as specified by FCP link-level protocols.

In transport mode, communication between the channel and control unit takes place using a single bidirectional exchange and utilizes fewer handshakes to close exchanges, to transmit device commands and to provide device status compared with the FC-SB-3 protocol. Performance improvement is most significant with I/O operations that are performing small block data transfers (e.g., multiple DCWs with data transfers of 25 kBytes or less) because of the reduction in overhead relative to transfer size. Certain types of complex I/O operations will still be required to use the existing FC-SB-3 protocol.

The goal of the FC-SB-4 standard is to:

- a) Define a new FC-SB-4 transport-mode protocol;
- b) Incorporate the FC-SB-3/AM1 amendment;
- c) Update all text references to current versions of existing standards; and
- d) Include changes required, technical or otherwise, for issues related to the current FC-SB-3 protocol as deemed necessary by the working group.

3.2 Existing Practice and the Need for a Standard

The existing FC-SB-3 protocol makes use of two unidirectional exchanges (an “exchange pair”) between the channel and control unit for each I/O operation. Device commands are provided in the form of a channel-command word (CCW) and multiple chained CCWs may be specified in a single I/O operation but each CCW is sent in a separate command IU or command-data IU to the control unit. Multiple device status IUs may be sent by the control unit during a CCW chain depending on IU pacing and synchronization requirements for the I/O operation.

The new FC-SB-4 protocols are needed to decrease protocol overhead and improve overall I/O performance.

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 and protects backward compatibility wherever possible. 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-SB-3 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

- [1] INCITS 424-2007, *Fibre Channel - Framing and Signaling - 2 (FC-FS-2)*
- [2] INCITS 374:2003 AM 1:2007, *Fibre Channel - Framing and Signaling - 2 / Amendment 1 (FC-FS-2-A1)*
- [3] INCITS 404-2005, *Fibre Channel - Physical Interface - 2 (FC-PI-2)*
- [4] ANSI X3.296-1997, *Single-Byte Command Code Sets Connection Architecture (SBCON)*
- [5] INCITS 374-2003, *Fibre Channel - Single-Byte Command Code Sets-3 Mapping Protocol (FC-SB-3)*
- [6] INCITS 374:2003 AM 1:2007, *Fibre Channel - Single-Byte Command Code Sets-3 Mapping Protocol / Amendment 1 (FC-SB-3-A1)*
- [7] INCITS 418 -2006, *Fibre Channel - Switch Fabric - 4 (FC-SW-4)*
- [8] INCITS 416-2006, *Fibre Channel - Protocol - 3 (FCP-3)*
- [9] INCITS 433-2006, *Fibre Channel - Link Services (FC-LS)*
- [10] INCITS 426-2007, *Fibre Channel - Security Protocols (FC-SP)*

4.2 Related Standards Activity

- [11] INCITS Project 1861-D, *Fibre Channel - Framing and Signaling - 3 (FC-FS-3)*
- [12] INCITS Project 1835-D, *Fibre Channel - Security Protocols - 2 (FC-SP-2)*
- [13] INCITS Project 1822-D, *Fibre Channel - Link Services - 2 (FC-LS-2)*
- [14] INCITS Project 1822-D, *Fibre Channel - Switch Fabric - 5 (FC-SW-5)*
- [15] INCITS Project 1828-D, *Fibre Channel - Protocol - 4 (FCP-4)*
- [16] INCITS Project 1871-D, *Fibre Channel - Backbone - 5 (FC-BB-5)*
- [17] INCITS Project 1647-D, *Fibre Channel - Physical Interface - 4 (FC-PI-4)*

4.3 Recommendations for Close Liaison

INCITS T11.

5 Units of Measurement used in the Standard

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

