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Please see the administrative notes on page iii

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Foreword

ISO (the International Organisation for Standardisation) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organisations, governmental and nongovernmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardisation.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

International Standard ISO/IEC 14165-331 was prepared by Joint Technical Committee ISO/IEC JTC 1, Subcommittee SC 25, Interconnection of information technology equipment.

Introduction

This standard defines an upper-layer protocol within the domain of Fibre Channel, that is designed to permit efficient peer-to-peer or client-server messaging between nodes, and to comply with the Virtual Interface (VI) Architecture. Vendors that wish to implement devices that connect to FC-VI may follow the requirements of this and other normatively referenced standards to manufacture an FC-VI compliant device.

1 Scope and purpose

This standard defines the Fibre Channel mapping protocol for the Virtual Interface (VI) Architecture (FC-VI). FC-VI defines the Fibre Channel Information Units in accordance with the VI Architecture model. FC-VI additionally defines how Fibre Channel services are used to perform the services required by the VI Architecture model of its network transport.

2 Normative references

2.1 Normative references overview

The following standards contain provisions that, through reference in the text, constitute provisions of this international standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this international standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

2.2 Approved references

The following approved international and regional standards (ISO, IEC, CEN/CENELEC and ITUT) may be obtained from the international and regional organizations that control them.

None.

2.3 References under development

At the time of publication, the following referenced standards were still under development.

ISO/IEC 14165-251, *Fibre Channel - Framing and Signaling Interface (FC-FS)*

ISO/IEC 14165-413, *Fibre Channel - Generic Services-3 (FC-GS-3)*

ISO/IEC 14165-122, *Fibre Channel - Arbitrated Loop-2 (FC-AL-2)*

2.4 Other references

2.4.1 VI Architecture 1.0 reference specifications

The following references for VI Architecture are the product of Intel, Microsoft, and Compaq. The VI Architecture 1.0 specification is completely defined in these three documents. For information on the current status and availability of the document, contact the VI Developer Forum (VIDF) web site at www.vidf.org.

Virtual Interface Architecture Specification, V1.0 (VI-ARCH)

Virtual Interface (VI) Architecture Developer's Guide, V1.0 (VI-DG)

Virtual Interface (VI) Architecture Developer's Guide Error Table Supplement, V1.0 (VI-ERRTAB)

2.4.2 Miscellaneous

IP Version 6 Addressing Architecture, RFC 2373, July 1998 (RFC2373)

3 Definitions and abbreviations

3.1 FC-VI definitions

3.1.1 completing a descriptor: a VI Provider completes a Descriptor by updating the status field and setting the Done bit.

3.1.2 FC-VI connection: a VI Connection that is established and maintained between two FC-VI Ports.

3.1.3 FC-VI connectionpoint: the context used to listen for FC-VI Connection requests and responses within an FC-VI Port. It is bound to an IP address and a Discriminator.

3.1.4 FC-VI connection setup: an FC-VI operation that consists of a Sequence of FC-VI Connection IUs that establish an FC-VI Connection.

3.1.5 FC-VI disconnect: an FC-VI operation that consists of a Sequence of FC-VI Connection IUs that removes an FC-VI Connection or aborts a FC-VI Connection Setup.

3.1.6 FC-VI endpoint: the context for a VI within an FC-VI Port. Each end of an FC-VI Connection is an FC-VI Endpoint.

3.1.7 FC-VI message transfer: an FC-VI operation that consists of one or more FC-VI Message IUs to transfer a VI Message between FC-VI Ports.

3.1.8 FC-VI port: a Fibre Channel Port that is capable of FC-VI operation and complies with this specification.

3.1.9 FC-VI provider: the hardware and software services that implement the transport dependent functions of a VI Provider over a Fibre Channel transport conforming to this specification.

3.1.10 fully qualified message ID (FQMID): the tuple of {FCVI_HANDLE, FCVI_MSG_ID, Exchange Context (F_CTL:23)} that uniquely identifies and routes each received FC-VI IU to the correct FC-VI Endpoint context within a FC-VI Port.

3.1.11 host name: a symbolic name associated with a VI capable Node. The Host Name is represented as an ASCII character string to the VI Application.

3.1.12 in-order fabric: a Fibre Channel configuration where the order of frame arrival at a receiving Port is identical to the transmission order at the originating Port. An Arbitrated Loop is one example of an In-Order Fabric.

3.1.13 local: the entity (Endpoint, Connectionpoint, Provider, etc.) at this end of a FC-VI Connection.

3.1.14 out-of-order fabric: a Fibre Channel configuration where the order of frame arrival at a receiving Port may be different than the transmission order at the originating Port.

3.1.15 remote: the entity (Endpoint, Connectionpoint, Provider, etc.) at the other end of a FC-VI Connection.

3.1.16 VI connection: a connection between two VI Endpoints.

3.1.17 VI endpoint: a pair of work queues and associated context visible to a VI Application. Also known as a VI.

3.1.18 VI message: VI Application data that is transferred between FC-VI Ports over a previously established FC-VI Connection.

3.2 VI Definitions

The following VI Terms used in this specification are defined in the VI Architecture Specification and the VI Architecture Developer's Guide. The user of this document is expected to be familiar with these terms.

Client-Server

Control Segment

Descriptor

Discriminator

Peer

Peer-to-Peer

RDMA

RDMA Read

RDMA Write

Reliability Level

Reliable Delivery

Reliable Reception

Send

Unreliable Delivery

VI

VI Address

VI Application

VI Handle

VI NIC

VI Provider

3.3 Abbreviations

D_ID	Destination_Identifier [ISO/IEC 14165-251]
ELS	Extended Link Service [ISO/IEC 14165-251]
FC	Fibre Channel [ISO/IEC 14165-251]
FC-FS	The architecture specified by the Fibre Channel standard [ISO/IEC 14165-251]
FC-PH	The architecture specified by the Fibre Channel standard [ISO/IEC 14165-251]
FCP	Fibre Channel Protocol for SCSI [ISO/IEC 14776-222]
FC-4	Fibre Channel Layer 4 mapping layer [ISO/IEC 14165-251]
IU	Information Unit [ISO/IEC 14165-251]
S_ID	Source_Identifier [ISO/IEC 14165-251]
ULP	Upper Layer Protocol [ISO/IEC 14165-251]

3.4 Editorial conventions

Definitions, conventions, abbreviations, acronyms and symbols applicable to this standard are provided, unless they are identical to that described in any referenced standard, in which case they are included by reference. Some definitions from the glossary or body of other standards are included here for easy reference.

In this Standard, a number of conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the following conventions:

– the first letter of each word in uppercase and the rest lowercase (e.g., Exchange, Class, etc.).

Such terms and words have special meaning and are defined in other standards. All terms and words not conforming to the convention noted above have the normal technical English meanings.

Numbered items in this Standard do not represent any priority. Any priority is explicitly indicated.

In case of any conflict between text, figure, table and state diagram, the state diagram, then table, then figure, and finally, text takes precedence. Exceptions to this convention are indicated in the appropriate subclauses.

The term “shall” is used to indicate a mandatory rule. If such a rule is not followed, the results are unpredictable unless indicated otherwise.

The fields or control bits which are not applicable shall be set to zero.

If a field or a control bit in a frame is specified as not meaningful, the entity which receives the frame shall not check that field or control bit.

Hexadecimal notation

Hexadecimal notation is used to represent fields. For example, a four-byte FCVI_HANDLE field containing a binary value of 00000000 11111111 10011000 11111010 is shown in hexadecimal format as ‘00FF98FAh’.