Identifying VN_Port Phy Types

Follow-on to 10-432v0, 12-384v0

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12-384v1

12/03/2012

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Problem Statement

- There is no method available for remote SAN elements to tell which physical port type (FC or CEE) on which a VN_Port is running.
- This is necessary for certain management functions and other applications.
- Examples are RLS and RLIR Extended Link services that present different data for VN_Ports running FCoE vs. VN_Ports running Fibre Channel.
- See T11/10-253v0 for a related proposal (EMC)
- See T11/10-432v0 and T11/12-384v0 for prior versions of THIS proposal.

Change to FC-SB-5 Node Descriptor

- **Since the original proposal in 10-432v0, FC-SB-5 has been modified to include phy type identification in the FC-SB Type Node Descriptor**
- ***FC-SB-5 Modified the FC-SB-5 node descriptor Node Parameters Byte 1, bit 5 to indicate:***
  - **When the bit is one, the physical interface is Fibre Channel over Ethernet (FCoE).**
  - **When the bit is zero, the physical interface is the Fibre Channel native interface.**
- **Since there were no known SB-5 implementations over FCoE at the time, a single reserved bit was used for future implementations to indicate a FCoE Phy Type when set to one. The value zero indicates Fibre Channel, or not specified (reserved).**

VN_Port PhyType

- A proposed 2 bit VN_Port PhyType attribute is defined as follows:
  - 00 = Not Defined
  - 01 = The sending N_Port/ F_Port uses an FC-FS-3 PN_Port/ PF_Port
  - 10 – The sending N_Port/ F_Port uses a lossless Ethernet MAC
  - 11 = Reserved
- This VN_Port PhyType attribute will be returned in an RNID ELS response.
- Two bits are necessary for compatibility with existing implementations (there may be existing implementations supporting RNID today on both FCoE and Fibre Channel)

Proposal

- **Define the VN_Port PhyType identifier in the Node Descriptor obtained by the RNID ELS (See FC-LS-3 reference attached in backups)**
  - **Place the identifier in the Reserved field of the RNID Accept Payload (Word 1, bits 15-14) as shown in the following text markup of the RNID section of FC-LS-3 Rev 3 (12-102v0)**

sponse code values are shown in table 53; and

Table 53 – TPLS accept response code

Encoded Value Word 0, Bits 11-8	Description
0000b	Reserved
0001b	Request executed
0010b - 0110b	Reserved
0111b	Obsolete
1000b - 1111b	Reserved

b) **Image pair state:**

1 = image pair established,
0 = image pair not established.

4.2.22 Request Node Identification Data (RNID)

4.2.22.1 Introduction

The RNID ELS is an ELS for acquiring Node Identification Data. The normal response shall be an Accept (i.e., LS_ACC) ELS Sequence with Node Identification Data in its payload. If the recipient Nx_Port or Fx_Port does not support the RNID ELS, it shall reply with an LS_RJT ELS Sequence with a reason code of “Command not supported”. If the recipient Nx_Port or Fx_Port does not support the requested Node Identification Data format, it shall either reply with an LS_RJT ELS Sequence with a reason code of “Unable to perform command request” and reason code explanation of “Unable to supply requested data” or reply with an LS_ACC ELS Payload containing only the Common Identification Data.

If an Nx_Port sends an RNID ELS and receives an LS_RJT Sequence with a reason code of “Unable to perform command request” and reason code explanation of “Unable to supply requested data”, the ULP may cause the Nx_Port to retry the RNID ELS with a different Node Identification Data Format request if an Nx_Port sends an RNID ELS and receives a reply with an LS_ACC ELS containing only Common Identification Data (see Table 58) in its payload, the ULP usage of the Common Identification Data and any further discovery processing is beyond the scope of this standard.

The RNID ELS may be sent to any Nx_Port. If the RNID ELS is sent to the Fabric Controller (i.e., FFFFFDh), then the reply shall represent the Switch that contains the Fx_Port to which the requesting FC_Port is attached.

4.2.22.2 Protocol

a) Request Node-Identification (RNID) request Sequence

b) LS_ACC or LS_RJT Reply Sequence

4.2.22.3 Request Sequence

Addressing: The S_ID field designates the requesting source port or the Fabric Controller (FFFFFDh). The D_ID field designates the Nx_Port or F_Port Controller receiving the RNID request or the Fabric Controller (FFFFFDh).

Payload: The format of the RNID Payload is shown in table 54.

Table 54 – RNID Payload

Bits Word	31 ... 24 Byte 0	23 ... 16 Byte 1	15 ... 08 Byte 2	07 ... 00 Byte 3
0	RNID (78h)	00h	00h	00h
1	Node Identification Data Format	Reserved		

Node Identification Data Format: The format of the Node Identification Data field is shown in table 55.

Table 55 – Node Identification Data Format

Value	Description
00h	Shall be set when the requesting Nx_Port is requesting Common Identification Data only (see table 58).
01h – DEh	For Specific Identification Data corresponding to a specific ULP (e.g., FC-SB-4), shall be set to the FC-4 TYPE (see FC-FS-3) of that ULP.
DFh	Shall be used if the General Topology Discovery format (see 4.2.22.5) is to be returned in the RNID Accept Payload.
E0h – FFh	Shall be used to indicate that Specific Node Identification Data in a vendor specific format is to be returned.

4.2.22.4 Reply Sequence

LS_RJT: Signifies the rejection of the RNID request

LS_ACC: Signifies acceptance of the RNID request and returns Node Identification Data. The format of the Accept Payload is shown in table 56.

Table 56 – RNID Accept Payload

Bits Word	31 ... 24 Byte 0	23 ... 16 Byte 1	15 ... 08 Byte 2	07 ... 00 Byte 3
0	02h	00h	00h	00h
1	Node Identification Data Format	Common Identification Data Length (0 or 16)	Reserved	Specific Identification Data Length
2		Common Identification Data (0 bytes or 16 bytes)		
...				
5				
6		Specific Identification Data (m) (0 - max bytes)		
...				
m				

a) **Node Identification Data Format:** The value of the Node Identification Data Format field is shown in table 57;

Table 57 – Node Identification Data Format

Value	Description
00h	The RNID Accept Payload only contains the Common Identification Data (see Table 58).
01h – DEh	The RNID Accept Payload may contain the Common Identification Data and shall contain the Specific Identification Data for the ULP that is assigned an FC-4 frame type (see FC-FS-3) equal to the value of the Node Identification Data Format from the RNID Payload (see Table 55).
DFh	The RNID Accept Payload shall contain the Common Identification Data and General Topology Discovery format Specific Identification Data.
E0h – FFh	The RNID Accept Payload may contain the Common Identification Data and shall contain vendor specific Specific Identification Data.

b) **Common Identification Data Length:** When Common Node Identification Data is included in the RNID Accept payload, the Common Identification Data length shall specify 16 bytes as the size of the Common Identification Data field. When the ULP indicates in the Node Identification Data Format that no (see table 57) Common Node Identification Data is to be included in the RNID Accept payload, the Common Identification Data length shall be set to zero;

c) **Specific Identification Data Length:** The Specific Identification Data Length field indicates the number of bytes in the Specific Identification Data field. The length is determined by the Node Identification Data Format requested for the respective ULP. This value shall be a multiple of 4. The minimum value of this field is zero bytes. The maximum value of this field is 252 bytes;

d) **Common Identification-Data:** The format of the Common Identification Data field is shown in table 58; and

Table 58 – Common Identification Data

Bits Word	31 ... 24 Byte 0	23 ... 16 Byte 1	15 ... 08 Byte 2	07 ... 00 Byte 3
0	MSB	N_Port_Name (8 bytes)		
1				LSB
2	MSB	Node_Name (8 bytes)		
3				LSB

A) **N_Port_Name:** The N_Port_Name field provides the Name_Identifier (see FC-FS-3) of the Nx_Port or Fx_Port to which the RNID ELS was directed; and

B) **Node_Name:** The Node_Name field provides the Name_Identifier (see FC-FS-3) of the node associated with the Nx_Port or Fx_Port indicated in the N_Port_Name field.

e) **Specific Identification Data:** The format of the Specific Identification Data field shall be dependent on the Node Identification Data Format field (see Table 55). If the value of the Node Identification Data Format field is set to DFh, the format is General Topology Discovery (see 4.2.22.5). For all other values of the Node Identification Data Format field the standard for the related ULP defines the format, fields used, and size of the parameters.

NOTE 4 – The information in the Specific Identification Data should only be used to determine the product identity of a node. The information in the Specific Identification Data should not be used to determine the functional characteristics or the service capabilities of a node.

4.2.22.5 General Topology Discovery format:

When the Node Identification Data Format field in the RNID LS_ACC Payload (see table 57) indicates the General Topology Discovery format (DFh) the RNID LS_ACC payload shall contain the following:

a) Node Identification Data Format field set to DFh;

b) Common Identification-Data length set to 16;

c) Specific Identification-Data length set to 52;

d) Common Node Identification Data (see table 58); and

e) Specific Identification Data (see table 59).

Table 59 – General Topology Specific Identification Data

Bits Word	31 ... 24 Byte 0	23 ... 16 Byte 1	15 ... 08 Byte 2	07 ... 00 Byte 3
0	MSB	Vendor Unique (16 bytes)		
...				
3				LSB
4	Associated Type			
5	Physical Port Number			
6	Number of Attached Devices			
7	Node Management	IP Version	UDP/TCP Port Number	
8	MSB	IP Address (16 bytes)		
...				
11				LSB
12	Reserved		Vendor Specific	

a) **Associated Type:** The Associated Type (see table 60) is the type of Fibre Channel functionality associated with the node of the Nx_Port or Fx_Port receiving the RNID request (e.g., switch, hub, storage device);

b) **Physical Port Number:** A vendor unique value that identifies the physical port that has a Fibre Channel link attached;

c) **Number of Attached Devices:** The number of LCFs attached to the LCF of the Nx_Port or Fx_Port receiving the RNID request. The minimum value is one. The maximum value is 126. For any Nx_Port receiving the RNID, the Number of Attached Devices shall be set to one. For any FL_Port receiving the RNID, the Number of Attached Devices shall be set to the number of nonzero ALPAs known to that FL_Port (i.e., the number of loop devices other than the FL_Port);

d) **Node Management:** The Node Management field contains the protocol by which a Node Management Entity for the responding node may be accessed (see table 62);

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Table 60 – Associated Type

Value (hex)	Type
00 00 00 00	Reserved
00 00 00 01	Unknown
00 00 00 02	Other (none of the following)
00 00 00 03	Hub
00 00 00 04	Switch
00 00 00 05	Gateway
00 00 00 06	obsolete
00 00 00 07	obsolete
00 00 00 09	Storage device (i.e., disk drive, CD-ROM drive, tape drive).
00 00 00 0A	Host
00 00 00 0B	Storage subsystem (e.g., raid, library)
00 00 00 0E	Storage Access Device (e.g., Media changer)
00 00 00 11	NAS server
00 00 00 12	Bridge
00 00 00 13	Virtualization device
xx xx xx FF	Multi-function device (see Table 61 for values to fill in for xx xx xx)
All Others	Reserved

Table 61 – Multi-function device bit definitions

Bit position	Function
31	Hub
30	Switch
29	Gateway
28	Storage device
27	Host
26	Storage subsystem
25	Storage access device
24	Wavelength division multiplexer
23	NAS server
22	Bridge
21	Virtualization device
20-8	Reserved

Table 62 – Node Management

Value	Protocol	Reference
00h	IP/UDP/SNMP	See RFC 791, RFC 2460, RFC 768, RFC 1157, and RFC 1901
01h	IP/TCP/Telnet	See RFC 791, RFC 2460, RFC 793 and RFC 854
02h	IP/TCP/HTTP	See RFC 791, RFC 2460, RFC 793, and RFC 2616
03h	IP/TCP/HTTPS	See RFC 791, RFC 2460, RFC 793, and RFC 2818
04h	IP/TCP/HTTP/XML	See RFC 791, RFC 2460, RFC 793, RFC 2616, CIM[a], XML[b], CIM-XML[c], and CIM-HTTP[d]
05h - FFh	Reserved	

[a] Distributed Management Task Force, *Common Information Model (CIM) in XML*, Version 2.2, June 14, 1999

[b] World Wide Web consortium, *Extensible Markup Language (XML) 1.0*, Second Edition, October, 6, 2000

[c] Distributed Management Task Force, *Specification for the Representation of CIM in XML (CIM-XML),* Version 2.0, July 20, 1999

[d] Distributed Management Task Force, *Specification for CIM Operations over HTTP (CIM-HTTP),* Version 1.0, August 11, 1999

e) **IP Version:** The IP versions are shown in table 63;

Table 63 – IP Version

Value	Version	Description
00h	None	Indicates that this port is not providing IP support, and the Node Management, UDP Port, and IP Address fields shall be ignored.
01h	IPv4 (IP version 4)	See RFC 791
02h	IPv6 (IP version 6)	See RFC 2460
03h - FFh	Reserved	

f) **UDP/TCP Port Number:** The numerical value used in UDP (see RFC 768) or TCP (see RFC 793) to distinguish among multiple destinations at the same IP address; and

g) **IP Address:** The IP address by which a Node Management Entity for the responding node may be reached. If the IP version field is set to one, the IPv4 address shall be stored in the least significant word of the IP field and the remainder shall be set to zero.