Summary of Modifications

Instructions for the Editor

1. Clause 4.2.4.1
    - Table 6
        i. Add the following descriptors:
            1. 0001 000Fh Congestion Detection Capability descriptor
            2. 0002 0001h Link Integrity Notification descriptor
            3. 0002 0002h Delivery Notification descriptor
            4. 0002 0003h Peer Congestion Notification descriptor
            5. 0002 0004h Congestion Notification descriptor
            6. 0003 0001h FPIN Registration descriptor
2. Clause 4.3.1
    - Table 9
        i. Add the following ELS codes
            1. 16h Fabric Performance Impact Notification (FPIN)
            2. 19h Register Diagnostic Functions (RDF)
3. Clause 4.3.52.3
    - Remove requirement for Link Fault descriptor under table 180
4. Clause 4.3.52.4
    - Remove requirement for Link Fault descriptor under table 181
5. Clause 4.3.52.5.3
    - Add new clause describing the Congestion Detection Capability descriptor
6. Clause 4.3.53
    - Add new clause describing Register Diagnostic Functions (RDF)
7. Clause 4.3.54
    - Add new clause describing Fabric Performance Impact Notification (FPIN)

*Changes are shown highlighted in yellow.

4.2.4 Link Service TLV descriptors

4.2.4.1 Overview

Link Service TLV descriptors are specified in table 6.

Table 6 – Link Service TLV descriptors

Tag value	Descriptor	Reference
0000 0000h	Reserved	
0000 0001h	Link Service Request Information	4.2.4.2
0000 0002h	Reserved	
0000 0003h	N_Port_ID descriptor	4.2.4.3
0001 0000h	SFP Diagnostics descriptor	4.3.49.5.4
0001 0001h	Port Speed descriptor	4.3.49.5.1
0001 0002h	Link Error Status Block descriptor	4.3.49.5.2
0001 0003h	Port Names descriptor	4.3.49.5.3
0001 0004h	QSFP Diagnostics descriptor	4.3.49.5.5
0001 0005h	FEC Status descriptor	4.3.49.5.6
0001 0006h	Buffer Credit descriptor	4.3.49.5.7
0001 0007h	Optical Element Data descriptor	4.3.49.5.8
0001 0008h	Optical Product Data descriptor	4.3.49.5.9
0001 0009h	Priority Range descriptor	4.3.50.4
0001 000Ah	VEM ID descriptor	4.3.51.3
0001 000Bh	Instantiated VE Mapping descriptor	4.3.51.3
0001 000Ch	Deinstantiated VE Mapping descriptor	4.3.51.3
0001 000Dh	Link Fault Capability descriptor	4.3.52.5.2
0001 000Eh	Reserved	
0001 000Fh	Congestion Signaling Capability descriptor	4.3.52.5.3
0002 0000h	Reserved	
0002 0001h	Link Integrity Notification descriptor	4.3.54.7.2
0002 0002h	Delivery Notification descriptor	4.3.54.7.3
0002 0003h	Peer Congestion Notification descriptor	4.3.54.7.4
0002 0004h	Congestion Notification descriptor	4.3.54.7.5
0003 0000h	Reserved	

0003 0001h	FPIN Registration descriptor	4.3.53.5.2
All other values	Reserved	

4.3 Extended Link Service requests

4.3.1 Introduction

A Sequence Initiator shall transmit an ELS Sequence in order to solicit the destination Nx_Port to perform a link-level function or service. Unless otherwise noted, Extended Link Service requests shall not be issued prior to completion of N_Port Login. Table 9 applies to ELSs sent to or received by all valid addresses, including well known addresses. FLOGI is required before any other ELS if a Fabric is present.

The LFA is used as the destination ID (D_ID) in the LINIT and LSTS ELS Request Sequences, and is used as the source ID (S_ID) in the Reply Sequences. No other Sequences shall be directed to a LFA.

Table 9 – ELS_Command codes

Value (Bits 31-24)	Description	Abbr.	Reference	N_Port Login Required	TLV Format
01h	Link Service Reject	LS_RJT	4.4.4	N/A	No
02h	Link Service Accept	LS_ACC	4.4.2	N/A	No
03h	N_Port Login	PLOGI	4.3.7	No	No
04h	F_Port Login	FLOGI	4.3.7	No	No
05h	Logout	LOGO	4.3.8	No	No
06h	Abort Exchange – obsolete	ABTX	N/A	N/A	No
07h	Read Connection Status – obsolete	RCS	N/A	N/A	No
08h	Read Exchange Status Block – obsolete	RES	N/A	N/A	No
09h	Read Sequence Status Block – obsolete	RSS	N/A	N/A	No
0Ah	Request Sequence Initiative	RSI	4.3.12	Yes	No
0Bh	Establish Streaming	ESTS	4.3.6	Yes	No
0Ch	Estimate Credit	ESTC	4.3.5	Yes	No
0Dh	Advise Credit	ADVC	4.3.3	Yes	No
0Eh	Read Timeout Value	RTV	4.3.10	Yes	No
0Fh	Read Link Error Status Block	RLS	4.3.9	Yes	No
10h	Echo	ECHO	4.3.4	No	No
11h	Test	TEST	4.3.13	Yes	No
12h	Reinstate Recovery Qualifier	RRQ	4.3.11	Yes	No
13h	Read Exchange Concise	REC	4.3.36	Yes	No
14h	Reserved for legacy implementations[a]				
16h	Fabric Performance Impact Notification	FPIN	4.3.54	No	Yes
17h	Exchange Diagnostic Capabilities[b]	EDC	4.3.51	No	Yes
18h	Read Diagnostic Parameters	RDP	4.3.48	Yes	Yes
19h	Register Diagnostic Functions	RDF	4.3.53	No	Yes
20h	Process Login	PRLI	4.3.19	Yes	No
21h	Process Logout	PRLO	4.3.20	Yes	No
23h	Test Process Login	TPLS	4.3.21	Yes	No

[a] Some early implementations of FCP-2 may have used the value 14h for SRR (Sequence Retransmission Request). This code is permanently reserved in this standard to avoid conflicts with such implementations. See FCP-3 for the standard implementation of SRR as an FC-4 Link Service.

[b] N_Port Login required if the D_ID is the N_Port_ID of an N_Port. N_Port Login not required if the D_ID is the F_Port Controller.

4.3.52 Exchange Diagnostic Capabilities (EDC)

4.3.52.1 Description

The EDC ELS is used to exchange diagnostic capabilities parameters between requesting and responding FC_ports.

4.3.52.2 Protocol

a) Exchange Diagnostic Capabilities Request Sequence; and
b) LS_ACC or LS_RJT Reply Sequence

4.3.52.3 Request Sequence

Addressing: The S_ID field designates the source Nx_Port requesting the diagnostic parameters. The D_ID field shall be set as follows:

a) to the F_Port Controller (FFFFEh); or
b) to any Nx_Port N_Port_ID

Payload: The format of the EDC Request Payload is shown in table 180.

Table 180 – EDC Payload

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	EDC (17h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2 - n	Diagnostic capability descriptors			

~~The diagnostic capability descriptors (see 4.3.52.5) in an EDC request shall include the Link Fault Capability descriptor.~~

An EDC request shall include zero or more Diagnostic Capability descriptors (see 4.3.52.5).

4.3.52.4 Reply Sequence

LS_RJT: LS_RJT signifies rejection of the EDC command.

LS_ACC: LS_ACC signifies acceptance of the request and provides the requested data. The format of the LS_ACC Payload is shown in Table 181.

Table 181 – EDC LS_ACC Payload

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	LS_ACC (02h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2	MSB	Link Service Request Information descriptor (see 4.2.4.2)		
3				
4				LSB
5 - n	Diagnostic capability descriptors			

~~The diagnostic capability descriptors (see 4.3.52.5) in an EDC LS_ACC shall include the Link Fault Capability descriptor.~~

The diagnostic capability descriptors in an EDC LS_ACC shall include zero or more Diagnostic Capability descriptors (see 4.3.52.5).

4.3.52.5 Diagnostic capability descriptors

4.3.52.5.1 Overview

The diagnostic capability descriptors included in an EDC request correspond to functions supported by the requesting FC_Port.

The diagnostic capability descriptors included in an EDC response correspond to functions supported by the responding FC_Port.

4.3.52.5.2 Link Fault Capability descriptor

Link Degrade Signaling is supported by monitoring errors in the 64GFC Reed-Solomon FEC logic (see FC-FS-5). The Link Fault Capability descriptor provides a mechanism to exchange the Link Degrade Signaling function parameters between two ports. This allows each port to determine the error rate associated with the Link Degrade Signal when it is received.

The Link Fault Capability descriptor is shown in table 182.

Table 182 – Link Fault Capability descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Link Fault Capability descriptor tag = 0001 000Dh			
1	Descriptor Length (12 bytes)			
2	Degrade Activate Threshold			
3	Degrade Deactivate Threshold			
4	FEC Degrade Interval			

Degrade Activate Threshold: The value of the Degrade_Activate_Threshold register (see FC-FS-5).

Degrade Deactivate Threshold: The value of the Degrade_Deactivate_Threshold register (see FC-FS-5).

FEC Degrade Interval: The value of the FEC_Degrade_interval register (see FC-FS-5).

4.3.52.5.3 Congestion Signaling Capability descriptor

Congestion Signaling is supported by sending and/or receiving the Warning Congestion Signal and Alarm Congestion Signal (see FC-FS-6). The Congestion Signaling Capability descriptor provides a mechanism to exchange the Congestion Signaling function parameters between two ports. The format of the Congestion Signaling Capability descriptor is shown in Table 183.

Table 183 - Congestion Signaling Capability descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Congestion Signaling Capability Descriptor tag = 0001 000Fh			
1	Descriptor Length (16 bytes)			
2	Transmit Signal Capability			
3	Transmit Signal Frequency			
4	Receive Signal Capability			
5	Receive Signal Frequency			

Transmit Signal Capability: Defines the ability of the FC_Port to transmit the primitives used for Congestion Signals (see FC-FS-6). An FC_Port that is capable of transmitting only one signal value shall indicate support of the Warning Congestion Signal. The definition of the Transmit Signal Capability methods is listed in Table 184.

Table 184 – Signal Capability description

Bit	Description
31 – 4	Reserved
3 – 0	**Signal Capability values**: 0 = The Warning Congestion Signal and the Alarm Congestion Signal are not supported 1 = The Warning Congestion Signal is supported 2 = The Warning Congestion Signal and the Alarm Congestion Signal are supported All other values are reserved

Transmit Signal Frequency: The Transmit Signal Frequency describes the time between transmissions of Congestion Signals. The Transmit Signal Frequency fields are defined in Table 185.

Table 185 – Signal Frequency description

Bit	Description
31 – 26	Reserved
25 – 16	**Signal Frequency Count**: 0 = Reserved 1 to 999 = The time between signals in the units indicated in the Signal Frequency Units field. All other values are reserved
15 - 4	Reserved
3 - 0	**Signal Frequency Units**: 0 = Reserved 1 = Seconds 2 = Milliseconds All other values are reserved

Receive Signal Capability: Defines the ability of the FC_Port to receive the primitives used for Congestion Signals (see FC-FS-6). An FC_Port that is capable of receiving only one signal value shall indicate support of the Warning Congestion Signal. The definition of the Receive Signal Capability methods is listed in Table 184.

Receive Signal Frequency: The Receive Signal Frequency describes the time between the processing of received Congestion Signals. A sender of Congestion Signals should not transmit signals more frequently than the Receive Signal Frequency. The Receive Signal Frequency fields are defined in Table 185.

At the completion of the EDC ELS exchange, each end-point of the link adopts the least capable settings for Signal Capability and Signal Frequency of the two end-points. If a port indicates it is not able to receive a signal then the connected port shall not transmit that signal. A port's frequency of transmission is the larger of that port's transmit value and the connected port's receive value.

Example #1, the EDC sender is capable of transmitting and receiving the Warning Congestion Signal and the Alarm Congestion Signal at a rate of 10 milliseconds. The EDC responder is capable of transmitting and receiving only the Warning Congestion Signal at a rate of 100 milliseconds. At the conclusion of the EDC exchange, both end-points adopt transmission and reception of the Warning Congestion Signal at a rate of 100 milliseconds and no Alarm Congestion Signal is sent.

Example #2, the EDC sender is capable of transmitting and receiving the Warning Congestion Signal and the Alarm Congestion Signal at a rate of 10 milliseconds. The EDC responder is capable of transmitting the Warning Congestion Signal at a rate of 100 milliseconds and is capable of receiving the Warning Congestion Signal and the Alarm Congestion Signal at a rate of 10 milliseconds. At the conclusion of the EDC exchange, the EDC sender adopts transmitting the Warning Congestion Signal and the Alarm Congestion Signal at a rate of 10 milliseconds and adopts receiving the Warning Congestion Signal at a rate of 100 milliseconds. The EDC responder adopts receiving the Warning Congestion Signal and the Alarm Congestion Signal at a rate of 10 milliseconds and adopts transmitting the Warning Congestion Signal at a rate of 100 milliseconds.

4.3.53 Register Diagnostic Functions (RDF)

4.3.53.1 Description

The RDF ELS requests the Fabric Controller to add the Nx_Port that is sending the RDF ELS to the list of Nx_Ports registered to receive the ELSs specified by the registered diagnostic function descriptors (see 4.3.53.5).

4.3.53.2 Protocol

a) Register Diagnostic Functions Request Sequence; and
b) LS_ACC or LS_RJT Reply Sequence

4.3.53.3 Request Sequence

Addressing: The S_ID field designates the source Nx_Port requesting registration of the diagnostic functions. The D_ID designates the Fabric Controller, FFFFFDh.

Payload: The format of the RDF Request Payload is shown in table 186.

Table 186 – RDF ELS Request format

Bits / Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	RDF (19h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2 - n	Descriptor list			

Descriptor list: The list of registered diagnostic function descriptors (see 4.3.53.5) identifying the registered diagnostic functions supported by requesting Nx_Port.

4.3.53.4 Reply Sequence

LS_RJT: LS_RJT signifies rejection of the RDF command.

LS_ACC: LS_ACC signifies acceptance of the RDF request and registration of the Nx_Port to receive the specified registration descriptors. The format of the LS_ACC Payload is shown in Table 187.

Table 187 – RDF ELS Reply format

Bits / Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	LS_ACC (02h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2	MSB	Link Service Request Information descriptor (see 4.2.4.2)		
3				
4				LSB
5 - n	Descriptor list			

Descriptor list: The list of diagnostic function registration descriptors (see 4.3.53.5) describing the subset of diagnostic functions supported and successfully registered by the Fabric Controller.

The RDF command provides a method for Nx_Ports to indicate to the Fabric Controller the specific diagnostic functions supported by the Nx_Port and the range of diagnostic capabilities associated with each of the supported functions.

If a registered diagnostic function (see Table 188) is not registered by an Nx_Port then the Fabric Controller shall not transmit the associated ELS to that Nx_Port. A registered diagnostic function ELS transmitted to the Nx_Port shall contain only the descriptors successfully registered in the RDF ELS exchange.

4.3.53.5 Registered Diagnostic function descriptors

4.3.53.5.1 Overview

The registered diagnostic function descriptors included in an RDF Request correspond to functions supported by the requesting Nx_Port and to be registered with the Fabric Controller. The list of registered diagnostic functions is shown in Table 188.

Table 188 – RDF diagnostic functions

ELS	Reference	Registration Descriptor	Reference
FPIN	4.3.54	FPIN Registration descriptor	4.3.53.5.2

The registered diagnostic function descriptors included in an RDF LS_ACC correspond to functions supported by the Fabric Controller and the requesting Nx_Port. The RDF LS_ACC from the Fabric Controller indicates the Nx_Port is registered to receive the FPIN ELS.

4.3.53.5.2 FPIN Registration descriptor

The FPIN Registration descriptor registers an Nx_Port with the Fabric Controller to receive FPIN ELS. The format of the FPIN Registration descriptor is shown in Table 189.

Table 189 – FPIN Registration descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	FPIN Registration descriptor tag = 0003 0001h			
1	FPIN Registration descriptor length ((n-1)*4) bytes)			
2	Count			
3-n	Descriptor Tag list			

Count: Number of descriptor tags indicating the FPIN functions supported.

Descriptor Tag list: List of FPIN descriptor tags supported. The Descriptor Tag list in the RDF Request indicates the functions supported by the Nx_Port. The Descriptor Tag list in the RDF LS_ACC indicates the functions supported by the Nx_Port and the Fabric Controller, which may be a subset of the functions listed in the RDF Request.

4.3.54 Fabric Performance Impact Notifications (FPIN)

4.3.52.1 Description

The FPIN ELS is used to notify registered Nx_Ports of Fabric events or behaviors in the Fabric. The FPIN ELS contains a list of notification descriptors for each detected event. Simultaneously detected events may be coalesced into a single FPIN ELS. Each descriptor contains a description of the Fabric event.

4.3.54.2 FPIN events sent by the Fabric Controller

The Fabric Controller may issue an FPIN ELS to registered Nx_Ports when the Fabric detects an event. The distribution scope of FPIN ELS is defined by the Fabric notification descriptor (see 4.3.54.7) and is limited to the Nx_Ports in the zone membership list of the Nx_Port associated with the event. An event may include any of the following:

a) Link Integrity event;
b) Delivery event;
c) Peer Congestion event; or
d) Congestion event.

4.3.54.3 FPIN events sent by the Nx_Port

An Nx_Port may issue an FPIN ELS to the Fabric Controller when an event is detected by an Nx_Port. Fabric Controllers are implicitly registered to receive FPINs after a successful implicit or explicit FLOGI. FPIN ELS received by the Fabric Controller from an Nx_Port are forwarded by the Fabric Controller. The forwarding scope of the FPIN ELS is defined by the Fabric notification descriptor (see 4.3.54.7) and is limited to the Nx_Ports in the zone membership list of the requesting Nx_Port. An event may include any of the following:

a) Link Integrity event; or
b) Congestion event.

4.3.54.4 Protocol

a) Fabric Performance Impact Notification Request Sequence
b) None or LS_RJT Reply Sequence

4.3.54.5 Request Sequence

Addressing: If the Fabric is using FPIN to notify a registered Nx_Port of a Fabric event (see 4.3.54.2), the S_ID is the Fabric Controller (FFFFFDh) and the D_ID is the address of the registered Nx_Port destination. If an Nx_Port is using FPIN to notify the Fabric of a Fabric event (see 4.3.54.3), the S_ID designates the Nx_Port indicating a Fabric event and the D_ID is the Fabric Controller (FFFFFDh).

Payload: The format of the FPIN Request Payload is shown in table 190.

Table 190 – FPIN ELS format

Bits / Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	FPIN (16h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2 - n	Descriptor list			

Descriptor list: The list of notification descriptors identifying the event detected by the Fabric Controller or an Nx_Port (see 4.3.54.7).

4.3.54.6 Reply Sequence

None.

4.3.54.7 Fabric notification descriptors

4.3.54.7.1 Overview

The Fabric notification descriptors included in an FPIN request from the Fabric Controller correspond to events detected by the Fabric (see 4.3.54.2).

The Fabric notification descriptors included in an FPIN request from an Nx_Port correspond to events detected by the Nx_Port (see 4.3.54.3).

4.3.54.7.3 Link Integrity notification descriptor

The Link Integrity notification descriptor indicates an error threshold has been exceeded. The format of the Link Integrity notification descriptor is shown in Table 191.

Table 191 – Link Integrity notification descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Link Integrity notification descriptor tag = 0002 0001h			
1	Descriptor length ((n-1)*4) bytes)			
2	MSB — Detecting Port Name —			
3				LSB
4	MSB — Attached Port Name —			
5				LSB
6	Event Type		Event Modifier	
7	Event Threshold			
8	Event Count			
9	Port Name Count			
10 - n	Port Name List			

Detecting Port Name: The Name_Identifier of the FC_Port detecting the notification event.

Attached Port Name: The Name_Identifier of the FC_Port connected to the FC_Port detecting the notification event.

Event Type: The type of event reported in the Link Integrity notification descriptor. The Event Type values are show in Table 192.

Table 192 – Link Integrity notification Event Type values

Value (hex)	Description
00h	Unknown
01h	Link Failure
02h	Loss-of-Synchronization
03h	Loss-of-Signal
04h	Primitive Sequence Protocol Error
05h	Invalid Transmission Word
06h	Invalid CRC
0Fh	Device Specific
All other values are reserved	

Event Modifier: An implementation specific value describing the Event Type (I.e., information describing the Device Specific Event Type).

Event Threshold: The duration in milliseconds of the Link Integrity detection cycle.

Event Count: The minimum number of event occurrences during the Event Threshold to cause generation of a Link Integrity event.

Port Name Count: Number of Port Names in the Port Name List. If the attached FC_Port is the only accessible port then the Count is set to zero and the Port Name List is empty.

Port Name List: The list of N_Port_Names accessible through the attached ported. An N_Port_Name is the Name_Identifier associated with the port (see FC-FS-6).

Link Integrity events detected by an F_Port are distributed by the Fabric Controller to all the Nx_Ports in the zone membership list(s) associated with the PN_Port attached to the detecting F_Port.

Link Integrity events detected by an Nx_Port are sent to the Fabric Controller and distributed by the Fabric Controller to all the Nx_Ports in the zone membership list(s) associated with the PN_Port of the detecting Nx_Port.

Link Integrity events detected by an E_Port are distributed by the Fabric Controller to all the Nx_Ports affected by the event.

4.3.54.7.4 Delivery notification descriptor

The Delivery notification descriptor indicates a frame has been discarded by the Fabric. The format of the Delivery notification descriptor is shown in Table 193.

Table 193 – Delivery notification descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Delivery notification descriptor tag = 0002 0002h			
1	Descriptor length (44 bytes)			
2	MSB — Detecting Port Name			
3				LSB
4	MSB — Attached Port Name			
5				LSB
6	Delivery Reason Code			
7 – 12	Delivery Event Data (discarded frame header)			

Detecting Port Name: The Name_Identifier of the FC_Port detecting the notification event.

Attached Port Name: The Name_Identifier of the FC_Port connected to the detecting FC_Port.

Delivery Reason Code: The reason for the delivery failure. The Reason Code values are show in Table 194:

Table 194 – Delivery Reason Code values

Value (hex)	Description
00h	Unknown
01h	Timeout
02h	Unable to route
0Fh	Device Specific
All other values are reserved	

Delivery Event Data: The event data for a Delivery notification event is the 24-byte frame header of the discarded frame (see FC-FS-6).

Delivery notification events are sent by the Fabric Controller to the FC_Port identified in the S_ID of the discarded frame header.

Delivery notification events are sent by the Fabric Controller on a best effort basis and only for command, response, status, or last frame in sequence frames.

4.3.54.7.5 Peer Congestion notification descriptor

The Peer Congestion notification descriptor indicates a congestion condition has been detected in the Fabric. The format of the Peer Congestion notification descriptor is shown in Table 195.

Table 195 – Peer Congestion notification descriptor

Bits / Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Peer Congestion notification descriptor tag = 0002 0003h			
1	Descriptor length ((n-1)*4) bytes)			
2	MSB — Detecting Port Name —			
3				LSB
4	MSB — Attached Port Name —			
5				LSB
6	Event Type		Event Modifier	
7	Event Period			
8	Port Name Count			
9 - n	Port Name List			

Detecting Port Name: The Name_Identifier of the FC_Port detecting the notification event.

Attached Port Name: The Name_Identifier of the FC_Port connected to the detecting FC_Port.

Event Type: The type of congestion event detected. The Congestion Event Type values are show in Table 196:

Table 196 – Congestion Event Type values

Value (hex)	Description
00h	Clear/None
01h	Lost Credit
02h	Credit Stall
03h	Oversubscription
0Fh	Device Specific
All other values are reserved	

Event Modifier: An implementation specific value describing the Event Type (I.e., information describing the Device Specific Event Type).

Event Period: The duration in milliseconds of the detected congestion event.

Port Name Count: Number of Port Names in the Port Name List. If the attached FC_Port is the only accessible FC_Port then the Count is set to zero and the Port Name List is empty.

Port Name List: The list of N_Port_Names accessible through the attached FC_Ported. An N_Port_Name is the Name_Identifier associated with the FC_Port (see FC-FS-6).

Peer Congestion events detected by an F_Port are distributed by the Fabric Controller to the attached FC_Port and to the Nx_Ports in the zone membership list(s) associated with the PN_Port attached to the detecting F_Port.

Peer Congestion events are sent while the congestion condition persists at the interval indicated by the Event Period.

The status of the Peer Congestion event is cleared when:

a) Peer Congestion events cease for a period of two-times the Event Period,
b) a Peer Congestion event with a Congestion Event Type value of “Clear/None” is received, or
c) the Attached Port Name is no longer in the Fabric (I.e., an RSCN is received indicating the Nx_Port with the Attached Port Name is no longer reachable).

4.3.54.7.6 Congestion notification descriptor

The Congestion notification descriptor indicates a congestion condition has been detected at the FC_Port. The format of the Congestion notification descriptor is show in Table 197.

Table 197 – Congestion notification descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Congestion notification descriptor tag = 0002 0004h			
1	Descriptor length (12 bytes)			
2	Event Type		Event Modifier	
3	Event Period			
4	Severity	Reserved		

Event Type: The type of the detected congestion event (see Table 195).

Event Modifier: An implementation specific value describing the Event Type (I.e., information describing the Device Specific Event Type).

Event Period: The duration in milliseconds of the detected congestion event.

Severity: The Status contains a value indicating the distress level of the detected congestion event. The Severity values are show in Table 198:

Table 198 – Congestion notification Severity values

Value (hex)	Description
F1h	Warning
F7h	Alarm
All other values are reserved	

Congestion events detected by an F_Port are distributed by the Fabric Controller to the attached FC_Port and the Congestion notification descriptor is the only descriptor included in the FPIN ELS payload.

Congestion events are sent to the attached FC_Port while the congestion condition persists at the interval indicated by the Event Period.

The status of the Congestion event is cleared when:

a) Congestion events cease for a period of two-times the Event Period,
b) a Congestion event with a Congestion Event Type value of “Clear/None” is received, or
c) the attached FC_Port is no longer in the Fabric.