How Much Power Do YOU Have?

Roger Hathorn – IBM
Lou Ricci – EMC

FC-LS-3
12/03/2012 (12-454v0)
01/05/2013 (13-030v0)

The “Problem”

- When link errors occur, it is difficult to find the failing component quickly
  - SFP on one end
  - Fiber in between
  - SFP on the other end
- It would be even better if there was a proactive way to see a link was degrading from a single place

RDP To The Rescue

- Proposal: New ELS, Report Diagnostic Parameters (RDP)
  - Returns diagnostic information from the port including
    - Transceiver Module temperature
    - Transceiver Input Bias Current and Voltage
    - Transceiver Transmit and receive power
    - Link Error Status (LESB)
    - Port Speed
  - Addressing rules exactly the same as RLS ELS
    - Can be addressed to the switch or another N_Port
  - Transceiver diags are those defined in SFF-8472 in the 2-wire address "A2" real time diagnostics and control registers bytes 96-105 that are read from the transceiver.
- A single entity could get a fabric wide view of all links (except ISLs)

RDP addressing

- A RDP can be addressed to:

  a) to any Domain Controller well known address (FFFCxxh);

  b) to the F_Port Controller Well-known address (FFFFEh); or

  c) to any Nx_Port logged in with the S_ID address.

RDP Request

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	RDP (XXh)	00	00	00
1	Reserved	N_Port_ID		

Target of the Request

a) If the D_ID is a Domain Controller well known address (FFFCxxh), the N_Port_ID field shall be set to an N_Port_ID within the associated domain. The OPB requested is for the F_Port that the N_Port_ID is logged in with;

b) if the D_ID is the F_Port Controller Well-known address (FFFFFEh), the N_Port_ID field is not meaningful and the OPB request is for the local Fx_Port that the S_ID is logged in with; or

c) for all other D_IDs, the N_Port_ID field is not meaningful and the OPB requested is for the Nx_Port assigned to the D_ID.

Reply Sequence

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	LS_ACC (02h)	00	00	00
2-n	Port Diagnostic Block			

RDP Data Returned - Structured

Port Diagnostic Block (PDB)

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0-3	SFP Diagnostics Descriptor (3 words)			
4	Port Speed Descriptor (1 word)			
5-10	LESB Descriptor (6 Words)			
11-14	Port Names Descriptor for Local Port (4 words)			
15-18	Port Names Descriptor for Attached Port (4 words)			

RDP Data Returned - TLV

Item	Size (bytes)
Descriptor List Length = n	4
SFP Diagnostics Descriptor Type (a)	4
SFP Diagnostics Descriptor Length (3 words)	4
SFP Diagnostics Descriptor	12
Port Speed Descriptor Type (b)	4
Port Speed Descriptor Length (1 word)	4
Port Speed Descriptor	4
LESB Descriptor Type (c)	4
LESB Length (6 words)	4
LESB Descriptor	24
Local Port Names Descriptor Type (d)	4
Port Names Descriptor Length (4 words)	4
Local Port Names	16
Attached Port Names Descriptor Type (d)	4
Port Names Descriptor Length (4 words)	4
Attached Port Names	16

SFP Diagnostics Descriptor

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	SFP Diagnostics Descriptor Type (a)			
1	SFP Diagnostics Descriptor Length (3 words)			
2	Temperature		Vcc	
3	Tx Bias		Tx Power	
4	Rx Power		Flags	

Diagnostics attributes are as specified in SFF-8472 – Diagnostic Monitoring Interface for Optical Transceivers

Temperature: Internally measured transceiver temperature in units of 1/256 C (Range -128C to + 128C)
Vcc: Internally measured supply voltage in units of 100uV (Range 0-6.55V)
Tx Bias: Measured transmitter laser bias current in units of 2 uA (Range 0 – 131mA)
Tx Power: Measured coupled TX output power in units of 0.1 uW (Range 0-6.5mW)
Rx Power: Measured received optical power in units of 0.1 uW (Range 0-6.5mW)

Flags:
Flags bit 0 = Port State; 0=Not Operational; 1=Operational
Flags bit 1-2 = Optics Type; 00b=Short wave; 01b=Long Wave Laser LC 1310nm; 10b=Long Wave Laser LL 1550nm, 11b-n/a
Flags bit 3 = Sync State; 0=No Rx Sync; 1=Rx Sync established
Flags bit 4 = Optical Port ; 0=Optical Port; 1=Not Optical
Flags bits 5-15 Reserved

Port Speed Descriptor

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	Port Speed Descriptor Type (b)			
1	Port Speed Descriptor Length (1 words)			
2	Port Speed Capabilities		Port Operating Speed	

- Port Speed Capabilities and Port Operating Speed are as defined for RPSC in FC-LS-3 4.2.36.4

a) **Port Speed Capabilities:**
Identifies the operating speed capabilities of the port
Bit 31 – 1 Gb capable,
Bit 30 – 2 Gb capable,
Bit 29 – 4 Gb capable,
Bit 28 – 10 Gb capable,
Bit 27 – 8 Gb capable,
Bit 26 – 16 Gb capable,
Bit 25 – 32 Gb capable
Bits 24 through 17 – reserved,
Bit 16 - Unknown; and

c) **Port Operating Speed:** Identifies the current operating speed if set.
Bit 15 – 1 Gb Operation,
Bit 14 – 2 Gb Operation,
Bit 13 – 4 Gb Operation,
Bit 12 – 10 Gb Operation,
Bit 11 – 8 Gb Operation,
Bit 10 – 16 Gb Operation,
Bit 9 - 32 Gb Operation
Bits 8 through 2 – reserved,
Bit 1 - Unknown,
Bit 0 – Speed not established.

Link Error Status Block (LESB) Descriptor

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	LESB Descriptor Type (c)			
1	LESB Descriptor Length (6 words)			
2-6	LESB (see FC-FS-3 or FC-BB-6)			
7	VN_Port Phy Type	Reserved		

VN_Port Phy Type:
Word 7 bits 31-30 identify the type of physical interface for the PN_Port or PF_Port through which the request was received.

Table xx

Encoded Value Word 7 bits 31-30	Description
00b	No Information about Phy Type Provided
01b	The sending VN_Port uses an FC-FS-3 PN_Port or PF_Port
10b	The sending VN_Port uses a lossless Ethernet MAC
11b	Reserved

Port Names Descriptor

Bits Word	31 … 24	23 … 16	15 … 8	7 … 0
0	Port Names Descriptor Type (d)			
1	Port Names Descriptor Length (4 words)			
2-3	WWNN			
4-5	WWPN			

Thank You Page

- Thank You!