GFPT and PW require 8B/10B

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1 Overview

This presentation proposes changes to the specifications for FC-BB_GFPT and FC-BB_PW to advise that these specifications do not support 16GFC.

2 Issue

During an effort to understand the impact of certain recent changes in the IETF draft "Encapsulation Methods for Transport of Fibre Channel frames Over MPLS Networks" (draft-ietf-pwe3-fc-encap), author David Black determined an interesting and previously unreported restriction on the FC-BB_GFPT and FC-BB_PW specifications: they presume a Fibre Channel link uses 8B/10B encoding. This means that Fibre Channel links relying on FC-BB_GFPT or FC-BB_PW are unable to support 16GFC and higher Fibre Channel speeds.

Adding an explicit advisory to these specifications seems to be the minimum responsible resolution, and that is what is proposed here.

3 Instructions to editor

3.1 Conventions

This proposal references FC-BB-6 revision 1.01 for numbers of clauses, subclauses, tables, figures, etc. Deletions are indicated by ~~red strikeout text~~. Additions are indicated by blue text.

3.1.13 FC-BB_GFPT: Equipment model defining gateway functionality for the interconnection of two non-Arbitrated Loop FC physical ports using 8B/10B encoding across a GFPT_WAN infrastructure (e.g., SONET, SDH, OTN, PDH). ~~Supports both arbitrary-rate WAN transport and distance extension of buffer-to-buffer flow control.~~

3.1.14 FC-BB_IP: A model defining equipment that interfaces with a Fibre Channel switched network on one side and an IP network on the other side.

3.1.15 FC-BB_PW: Equipment model defining gateway functionality for the interconnection of two non-Arbitrated Loop FC physical ports using 8B/10B encoding across a PSN (see 3.4.5). ~~Supports both arbitrary-rate WAN transport and distance extension of buffer-to-buffer flow control.~~

4.3.2 FC-BB_GFPT

The FC-BB_GFPT model defines the means by which FC physical links that carry 8B/10B encoded information may be extended over any WAN transport infrastructure for which GFP mapping is defined. The FC-BB_GFPT model is not applicable to FC physical links that use other encodings (e.g., 16GFC physical variants use 64B/66B encoding, and are not supported). With that restriction, FC-BB_GFPT supports the interconnection of arbitrary, legal, non-Arbitrated Loop FC_Port combinations, imposing no requirements, and making no suppositions regarding the topology, or even the presence of an FC Fabric. FC-BB_GFPT supports efficient transport of FC data over transport facilities of arbitrary bandwidths and potentially large distances. FC-BB_GFPT supports Class 2, 3, and F traffic.

FC-BB_GFPT devices do not generate FC frames and do not directly participate in port initialization or other Exchanges. FC-BB_GFPT devices are exempt from any requirements regarding FC_Port authentication (see FC-SP), and they do not impede or interfere with any such processes that may occur between the attached and interconnected FC_Ports. FC-BB_GFPT devices have no FC identity or visibility, and administratively they may be kept separate and distinct from FC Fabrics and ports.

FC_Ports are interconnected pair-wise over SONET/SDH/OTN/PDH networks, via FC-BB_GFPT devices, in a point-to-point fashion. Although multiple FC_Ports may interface with a single FC-BB_GFPT device, each opposing FC_Port pair is connected via a dedicated Transport Trail (e.g., a contiguously or virtually-concatenated group). Since trail and access section configurations may differ, FC-BB_GFPT devices have both physical interfaces to the transport network, and individual FC-BB_GFPT devices may have more than one such physical interface, as well as logical interfaces associated with individual circuits. Logical interfaces are referred to as GFPT_WAN interfaces. A GFPT_WAN interface corresponds to a specific Transport Trail, and always to a single attached FC_Port pair. Governance of the relationship of GFPT_WAN interfaces to physical SONET/SDH/OTN/PDH interfaces, and of any changes of such relationships (e.g., as may occur during network protection events), is specified in the appropriate ITU-T and ANSI-T1 standards (see clause 2), and is therefore outside the scope of this standard. Multiple GFPT_WAN links originating on one FC-BB_GFPT device may be terminated on different, and geographically disparate, FC-BB_GFPT devices. The routing and provisioning of network facilities underlying GFPT_WAN links is outside the scope of this standard.

The FC-BB_GFPT device interfaces to attached FC_Ports are FC physical interfaces operating at standard rates. The FC physical interfaces on FC-BB_GFPT devices may support link speed negotiation with the attached FC_Ports.

4.3.3 FC-BB_PW

The FC-BB_PW model defines the means by which FC physical links that carry 8B/10B encoded information may be extended over a wide area MPLS network. The FC-BB_PW model is not applicable to FC physical links that use other encodings (e.g., 16GFC physical variants use 64B/66B encoding, and are not supported). FC-BB_PW is specified in conjunction with draft-ietf-pwe3-fc-encap-09 to define the mapping and control required by the MPLS/PW protocol. According to this model the FC-BB_PW device serves as a PE network element in the PW architecture. FC-BB_PW is independant of the physical-level and link-level technologies that exist beneath the MPLS layer.

FC-BB_PW supports the interconnection of FC_Ports transporting Class 2, 3, and F traffic. FC-BB_PW encapsulates 8B/10B~~byte~~-encoded FC frames and a selected set of Primitive Signals and Primitive Sequences into PW PDUs for transport over the MPLS network. FC-BB_PW utilizes reliable transport of FC traffic over the MPLS network provided by the PW termination layer as specified in draft-ietf-pwe3-fc-encap-09.

The FC-BB_PW entity does not generate FC frames and does not directly participate in port initialization or other Exchanges. The FC-BB_PW entity is exempt from any requirement regarding FC_Port authentication (see

FC-SP), and it does not impede or interfere with any such processes that may occur between the attached and interconnected FC_Ports. The FC-BB_PW entity has no FC identity or visibility, and administratively it may be kept separate and distinct from FC Fabrics and ports.

6.4.1 Transparent FC-BB initialization

The FC physical interfaces on Transparent FC-BB devices may support link speed negotiation (see FC-FS-3) with the attached FC_Ports (e.g., to prevent use of physical variants that require 64B/66B encoded information).

Other than link speed negotiation, Transparent FC-BB devices do not directly participate in FC link initialization or FC_Port initialization. The remainder of FC link initialization and FC_Port initialization occurs between the attached FC_Port and the remote FC_Port. This is a key distinction between the Transparent FC-BB device model and other FC-BB-5 models.