Enabling T3P to Execute over FRED

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Background:

- Several proposals have been made for the basis of a protocol to configure .bg and .bh components
- Trivial TLV Transport Protocol (T3P) is one that has gained a certain amount of support
  - Transfers generic TLVs
  - Provides a basic flow control mechanism using ACKs
    - Start with 1 credit
    - Send a frame
    - ACK replenishes the credit
  - Timer based retransmit in case frame or ack is lost
- LLDP+ is another protocol that has gained some support
  - Designed to leverage existing implementations of LLDP
  - Modified to support a flow control scheme similar to T3P
  - Additional state machines layered on top of the LLDP MIBs
    - Allows partial database transmission within the LLDP PDU

Observations

- The most compelling feature of LLDP+ is that is allows the reuse of existing LLDP implementation

    Both LLDP+ and T3P are ultimately both simple protocols that transfer generic TLVs

- Both LLDP+ and T3P require functions that provide FRame Encode / Decode (FRED)

    LLDP implementations provide the FRED function

    This is the primary function LLDP+ brings to the table

- Given that T3P requires this function, why not use the LLDP FRED?

    Enables re-use of existing LLDP implementations for those who are interested

    Does not materially affect the operation of T3P

A Proposal

- Define FRED to be a minimally modified version of LLDP

- Define the T3P PDUs to be a minimally modified version of those produced / consumed by LLDP

- Thus, operation of T3P over FRED is enabled

- However:

    There is no need to specify FRED in the standard

    T3P over FRED becomes one way to implement the protocol

    We don't specify implementations, but we can write the specification to simplify a particular implementation

    Implementers that do not see value in reuse of their LLDP code are under no obligation to do so.

Introducing FRED

- FRED is a slightly modified and specific configuration of LLDP:

    It emits a new Ethertype

    It has infinite credit (a slight modification of the LLDP Transmit State Machine to remove the txCredit >0 term from the transition from TX_IDLE to TX_INFO_FRAME)

    Its retransmit and fast retransmit timers are set to infinite (the standard allows each of these to be set to 3600 seconds, which is a close enough approximation of infinite)

    Set the time to live value to infinite (setting the msgTxHold value to 18 results in a time to live of 64,800 seconds; again a close enough approximation of infinite)

    Create FRED MIBs (vendor-specific) that correspond to the T3P TLVs

Modifications to T3P

- Ensure that the on-the-wire format looks like an LLDP PDU except:

  Different Ethertype

  Probably different required TLVs

- Utilize the LLDP TLV validation rules

- No changes required to the T3P state machines

  A FRED application would simply interface the T3P state machines to the wire via FRED's MIBs.