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 it 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.