IEEE 1914 NGFI

IEEE 1914.3 RoE – Parameter for Prioritization

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The Task and Some Related Questions

- Define a RoE parameter that sets the priority level of a RoE flow
  1. What do we call this RoE parameter?
  2. How many levels of priority can be defined by this parameter?
  3. A parameter configures priority for each unique flowID, but what about the RoE control messages that use the common flowID = 0xFFFF?
     - Slow C&M messages
       - latency requirement is not known
     - Timing Control messages
       - same latency requirements as data messages and thus need same priority
     - OAM TLV messages
       - do they all have same priority? Loopback response messages might need higher priority to allow higher measurement rate
  4. What transport layer mechanisms correspond to this new RoE parameter?
  5. How do we map the transport layer mechanisms to this new RoE parameter

Background Info (1)

- P1914.1
  - Clause 8.2 lists 6 levels of priority, 0 to 6
  - "Priority level 0 means the highest priority"
  - "Priority levels shall have equivalent switched network QoS priority classes"

Table 2—NGFI transport classes of service

Class	Subclass	Max one-way latency	Priority Level
Synchronization	Synchronization	N/A	0
RAN Control & Management	Real-time RAN control	τ_2	3
	Near-real-time RAN Control	τ_4	5
	Non-real-time control/management	τ_5	6
	Data-plane control	Data-plane latency dependent	Data-plane priority dependent
Data Plane	Subclass 0	τ_0	1
	Subclass 1	τ_1	2
	Subclass 2	τ_2	3
	Subclass 3	τ_3	4
	Subclass 4	τ_4	5
Transport Network Control & Management	Transport NW Control	τ_2	3
Reserved			

NOTE 1—Latency requirement is not directly linked to the priority levels. For data plane messages, lower latency data traffic is assigned to higher priority level.

Background Info (2)

- xRAN
  - "Priority marking per packet is needed in each protocol layer. For operation at Layer 2, prioritization is performed by specifying a configurable value for the Priority Code Point in the IEEE 802.1q VLAN header on the outgoing traffic"
  - As per IEEE 802.1Q, PCP = 7 is the highest priority and PCP = 0 is the lowest priority
  - As per IETF RFC 2474, DSCP = 111000 is the highest priority and DSCP = 000000 has the lowest priority

Table 3-5 : Quality of service classes

Plane	L2 CoS Priority (range 0-7)	L3 DSCP Code	Preemption(2)
S-Plane	Default: 7 (1)	Not applicable	non-preemptable
U-Plane	Default: 7	EF (Expedited Forwarding)	non-preemptable
C-Plane	Default: 7	EF (Expedited Forwarding)	non-preemptable
M-Plane	Default: 2	AF2x (Assured Forwarding)	preemptable
Other traffic	Default: 1	BE (Best Effort)	preemptable

(1) Applicable if vLAN is applied which will be possible in the future.
(2) Not all networks will support preemption so this only applies to networks supporting preemption

Background Info (3)

- eCPRI
  - "The Class of Service (CoS) Identifier for Data Service Frames is an EVC per UNI Service Attribute that is of special interest for this document. The following Class of Service identification methods are of interest among the ones described in 10.2.1 of [2]:"
    - "Class of Service Identifier based on the EVC (see section 10.2.1.1 of [2])."
    - "Class of Service Identifier based on the Priority Code Point Field (see section 10.2.1.2 of [2])."
    - "Class of Service Identifier based on Internet Protocol (see section 10.2.1.3 of [2])."

  Where [2] is "Technical Specification MEF 10.3 Ethernet Services Attributes Phase 3 October 2013"

  - From the above, we can see that EVC address (or other unique field of the EVC), VLAN PCP, and IP DSCP are used

Proposed Answers

1. What do we call this RoE parameter?
   - See answer to item 5
2. How many levels of priority can be defined by this parameter?
   - See answer to item 5
3. A parameter is used for each unique FlowID, but what about for RoE control messages that use the common FlowID = 0xFFFF?
   - Add new parameter to each control message type that uses flowID = 0xFFFF to allow it to be defined as high, medium, or low priority
   - Allow configurable transport priority levels for each of these high, medium, and low priority control messages
   - See answer to item 5
4. What transport layer mechanisms correspond to this new RoE parameter?
   - IEEE 802.1Q VLAN for Ethernet
   - IETF RFC 2474 DSCP for IPv4 and IPv6

Proposed Answers

5. How do we map the transport layer mechanisms to this new RoE parameter
   - Add the following parameter to each control message that uses flowID = 0xFFFF
     - CTRL_FLOW_PRI[1:0]: 11 = reserved, 10 = high, 01 = med, 00 = low
     - Default value is low priority
   - Add the following parameters to service the flowIDs and the high/medium/low priority control messages (with flowID = 0xFFFF)
     - L2_FLOW_PRI[3:0] → maps to PCP[2:0] & DEI, DEI should be set to 0
     - L3_FLOW_PRI[5:0] → maps to DSCP[0:5], L3_FLOW_PRI[2:0] must be set to 000
     - L2_CTRL_HI_PRI[3:0]
     - L3_CTRL_HI_PRI[5:0]
     - L2_CTRL_MED_PRI[3:0]
     - L3_CTRL_MED_PRI[5:0]
     - L2_CTRL_LO_PRI[3:0]
     - L3_CTRL_LOW_PRI[5:0]
   - These parameters do not have default values. They must be configured.
   - These prioritization values must be set so their preemption characteristics correspond to that of the network