Mapping Types of Service to RPR Priorities

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Goals

- Facilitate rapid convergence of the 802.17 standard
  - Limit the scope of the standard to the minimum necessary
  - Focus on bandwidth management protocol definition
  - Leave transit path design to implementation
  - Allow co-existence on the same ring between multiple transit path designs
  - Provide minimum rules for transit processing necessary to guarantee QoS
  - Define required response to bandwidth management protocol messages to guarantee weighted fair sharing of bandwidth

Proposal

- RPR header shall include 3 bits to indicate user priority
- Not all implementations use all 8 combinations for their locally terminated traffic
- Proposed approaches to 802.17 have any number of transit buffers between 1 to 8
- Follow the spirit of 802.1D in this regard
- Informative recommendations:
  - Mapping of traffic types to user priorities (802.1D, Table H-15)
  - Mapping of user priorities to transit buffers (802.1D, Table 7-2)
- This supports all known proposals to 802.17
- Leave transit path design to implementation

Requirements

- Minimum requirements to guarantee multiple implementations co-existence over the same ring:
  - Ingress traffic can't be inserted in front of packets in transit with higher user priority
    - Priority order: 7,6,5,4,3,0,2,1 – to be consistent with 802.1D
  - Stations should response to bandwidth management protocol messages by throttling their ingress bandwidth
    - Define bandwidth management protocol
      - Message format, fields content, transmission frequency
    - Define required actions due to reception of bandwidth management protocol messages
      - Minimum performance requirements in terms of response time, ingress bandwidth accuracy, etc.
  - User priority 7,6 have static bandwidth allocation and should not be infected by the bandwidth management protocol
    - The remaining bandwidth should be dynamically shared between other user priorities

Informative Recommendation

From 802.1D, Table H-15

Table H-15—Traffic type acronyms

user_priority	Acronym	Traffic type
1	BK	Background
2	—	Spare
0 (Default)	BE	Best Effort
3	EE	Excellent Effort
4	CL	Controlled Load
5	VI	"Video," < 100 ms latency and jitter
6	VO	"Voice," < 10 ms latency and jitter
7	NC	Network Control

Informative Recommendation

From 802.1D, Table7-2

Table 7-2—Recommended user priority to traffic class mappings

		Number of Available Traffic Classes							
		1	2	3	4	5	6	7	8
User Priority	0 (Default)	0	0	0	1	1	1	1	2
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	1
	3	0	0	0	1	1	2	2	3
	4	0	1	1	2	2	3	3	4
	5	0	1	1	2	3	4	4	5
	6	0	1	2	3	4	5	5	6
	7	0	1	2	3	4	5	6	7

NOTE—The rationale behind the choice of values shown in this table is discussed in H.2. A consequence of the mapping shown is that frames carrying the default user priority are given preferential treatment relative to user priority 1 and 2 in Bridges that implement four or more Traffic Classes.

Informative Recommendation

From 802.1D, Section H.2.2

The following list of traffic types, each of which can benefit from simple segregation from the others, seems to command widespread support:

a) Network Control—characterized by a "must get there" requirement to maintain and support the network infrastructure.

b) "Voice"—characterized by less than 10 ms delay, and hence maximum jitter (one way transmission through the LAN infrastructure of a single campus).

c) "Video"—characterized by less than 100 ms delay.

d) Controlled Load—important business applications subject to some form of "admission control," be that pre-planning of the network requirement at one extreme to bandwidth reservation per flow at the time the flow is started at the other.

e) Excellent Effort—or "CEO's best effort," the best-effort type services that an information services organization would deliver to its most important customers.

f) Best Effort—LAN traffic as we know it today.

g) Background—bulk transfers and other activities that are permitted on the network but that should not impact the use of the network by other users and applications.

Conclusions

- Queuing and buffering schemes are usually implementation issues
- Minimizing the scope and allowing co-existence of existing implementations can speed-up 802.17 convergence
- Leave transit path design to implementation, specify only a minimum requirement for transit path behavior
- Focus group effort on bandwidth management protocol