Text Contribution to P802.1Qdq

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Abstract

- We are considering the case that an application developer requests to assure bounded latency including the last bit of the last frame of Blockdata.
- This idea covers the case that the last frame of Blockdata is preempted by another frame.
- We are adding the explanation about this topic, while there is no change to the way to calculate parameters.

Problem statement and solution

Problem

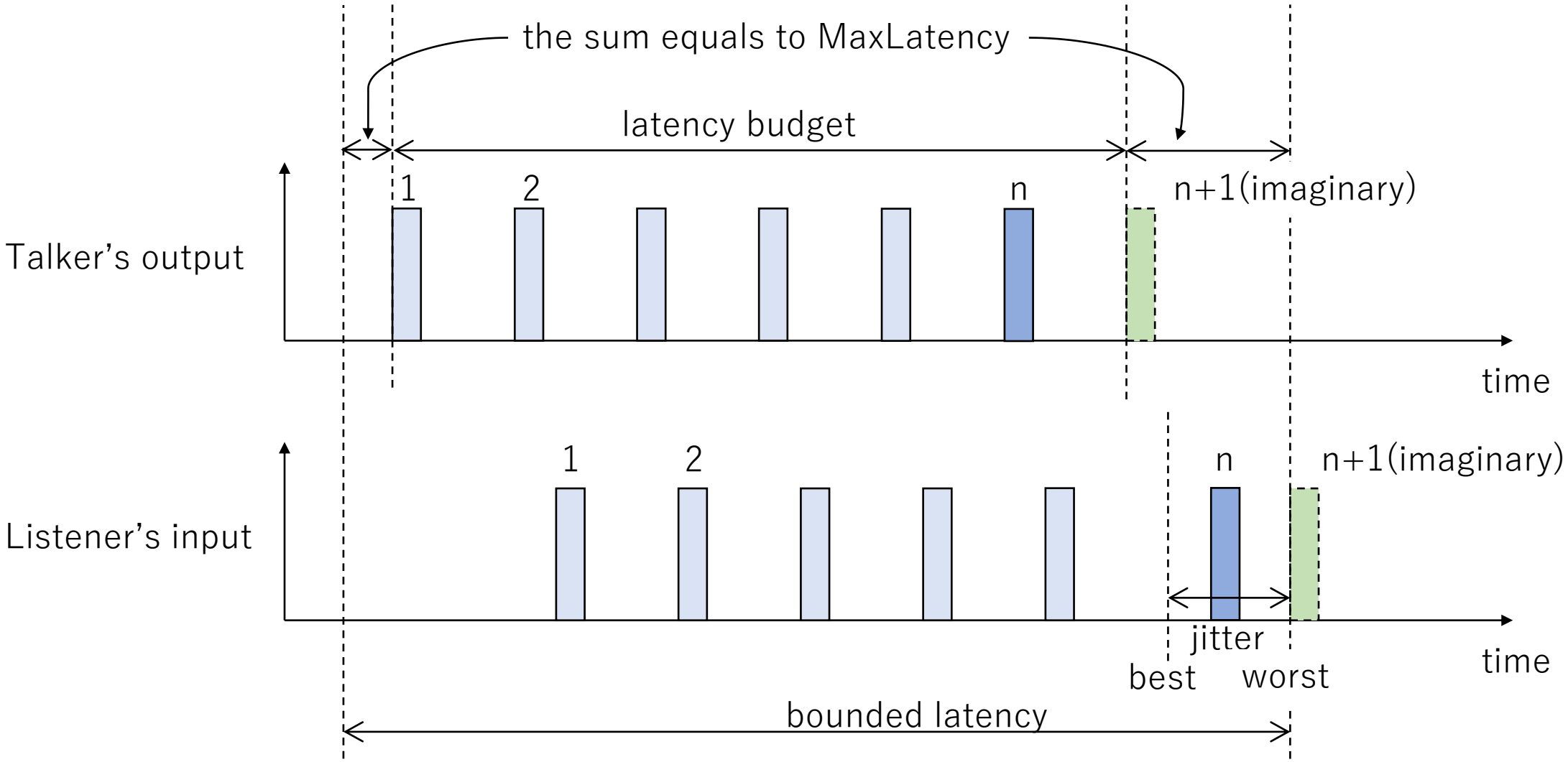
- An application developer may request to assure bounded latency including the last bit of the last frame of Blockdata. However, the current draft does not consider the remaining data after reference point of the last frame.

Solution

- Assuming that there is an (n+1)th frame and calculating shaping rate with reference point of the (n+1)th frame, the arrival of the first bit of the first frame through the last bit of nth frame is guaranteed within bounded latency.

  * (n+1)th frame = next frame of the last frame

Utilize (n+1)th frame for jittery frame



Changes to P802.1Qdq/D0.1

- Propose to change clause X4.1 of P802.1Qdq/D0.1 as the following slides:

X.4.1 General Discussion of Shaping Rate

This standard defines several types of shapers. Any of those shapers makes intervals between frames, however its parameters vary according to the type of the shaper. Each shaper is discussed in the following subclauses.

In order to minimize over-provisioning of bandwidth reservation while ensuring the specified bouded latency, the bursty traffic should be shaped with the minimum shaping rate (*RequiredMinimumShapingRate*). Figure X-5 illustrates worst-case propagation of the last frame of a cluster comprising *n* frames within the given bounded latency while minimizing over-provision of bandwidth reservation. accumulatedLatency is given by the network. latencyBudget is the maximum duration while Talker emits (n-1) frames. Figure X-6 shows latencyBudget can be derived from bounded latency and *MaxLatency*. The minimum shaping rate for traffic shaping is equal to:

$$\text{RequiredMinimumShapingRate} = \frac{\int_{k=1}^{n_{i_{worst}}-1} \text{FrameLentgh}, i_{worst}1k.}{\text{BoundedLatency} - \text{MaxLatency}} \quad \text{(X-3)}$$

$$= \frac{\text{DataSize}(i_{worst}) - \text{FrameLentgh}, i_{worst}1n_{i_{worst}}.}{\text{BoundedLatency} - \text{MaxLatency}}$$

In practice, the required minimum shaping rate can be approximated to (DataSize(i_{worst})/*BoundedLatency*), which is slightly larger than the exact value if the frame length is smaller than data size. Actually, regardless small or large value of n-th frame length compared with data size, it gives an additional delivery time margin to the bounded latency.

P802.1Qdq/D0.1 clause X.4.1 (cont.)

Blue: add
~~Red~~: remove

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DataSize is much larger than the length of the last frame (i.e. FrameLength(i_{worst},n_{iworst})) , therefore RequiredMinimumShapingRage can be simplified by introducing a small positive value ε as follows;

$$\text{RequiredMinimumShapingRate} = \frac{\text{DataSize}(i_{worst})}{\text{BoundedLatency} - \text{MaxLatency}} - \varepsilon \qquad \text{(X-4)}$$

ε can be zero in actual implementations.

P802.1Qdq/D0.1 clause X.4.1 (cont.)

Blue: add
~~Red~~: remove

In case that an application developer requests to assure bounded latency until the last bit of BlockData delivers, consider the (n+1)th frame and its reference point that are imaginary. RequiredMinimumShapingRate is given to make the time between reference points of the first frame and this imaginary frame ensure the bounded latency. Therefore, replacement n_{iWORST} with $(n_{i_{WORST}} + 1)$ in (X-3) results in (X-5).

$$\text{RequiredMinimumShapingRate} = \frac{\sum_{k=1}^{(n_{iWORST}+1)-1 \;\sout{n_{i_{worst}} - 1}} \text{FrameLentgh}(i_{worst}, k)}{\text{BoundedLatency} - \text{MaxLatency}}$$

$$= \frac{\text{DataSize}(i_{worst}) \;\sout{\text{FrameLentgh}(i_{worst}, n_{i_{worst}})}}{\text{BoundedLatency} - \text{MaxLatency}} \qquad \text{(X-5)}$$

Thank you