Framework of Priority Promotion Scheme (PPS) draft-morita-tsvwg-pps-00

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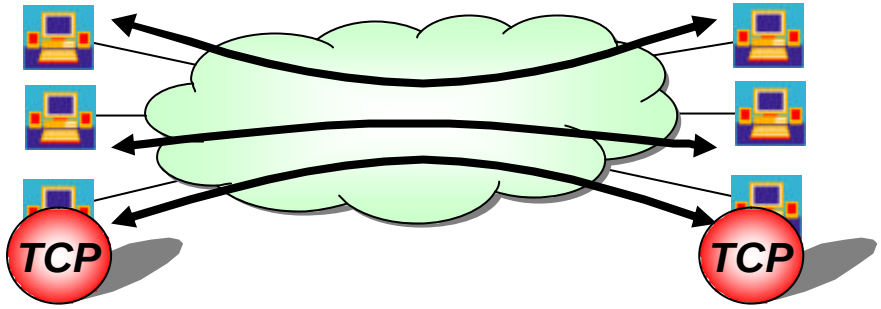
1. Introduction

- A framework of a new scheme for traffic control to achieve **end-to-end QoS** for interactive multimedia services.
  - The first target services are VoIP, video chat and video conferencing.
  - Scheme for QoS, more specifically a kind of admission control.
- The scheme is based on **end-to-end measurement** of network resources by end systems (e.g., PCs).
- The network is assumed to fully support the **priority control scheme** specified in the Diffserv architecture for QoS, and SIP [1] for session control.
- Since the scheme relies on the behavior of the end systems, this document also touches on mechanisms for **monitoring end-system behavior.**

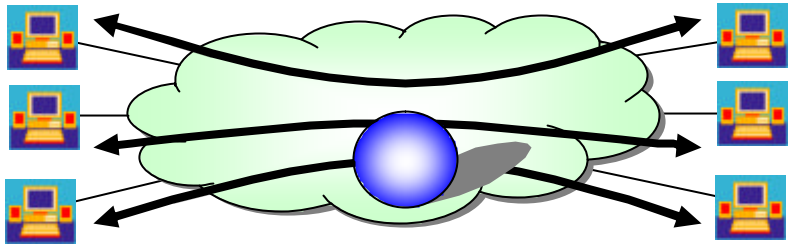
2. Comparison of two approaches

Data communication



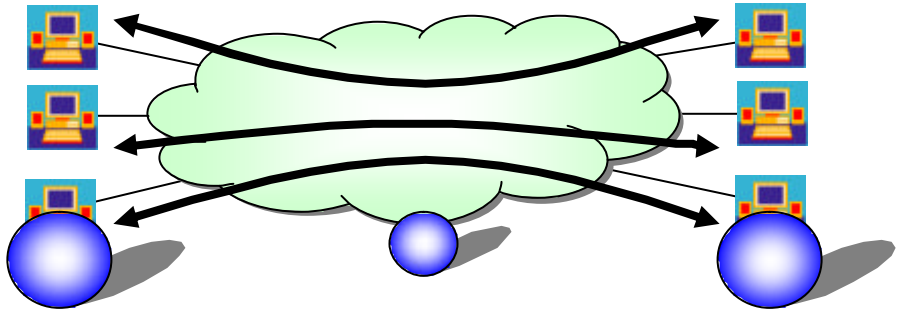
Target: **Fair share** of network resources
How: Autonomous flow control (TCP) **by the terminal**

Real-time communication



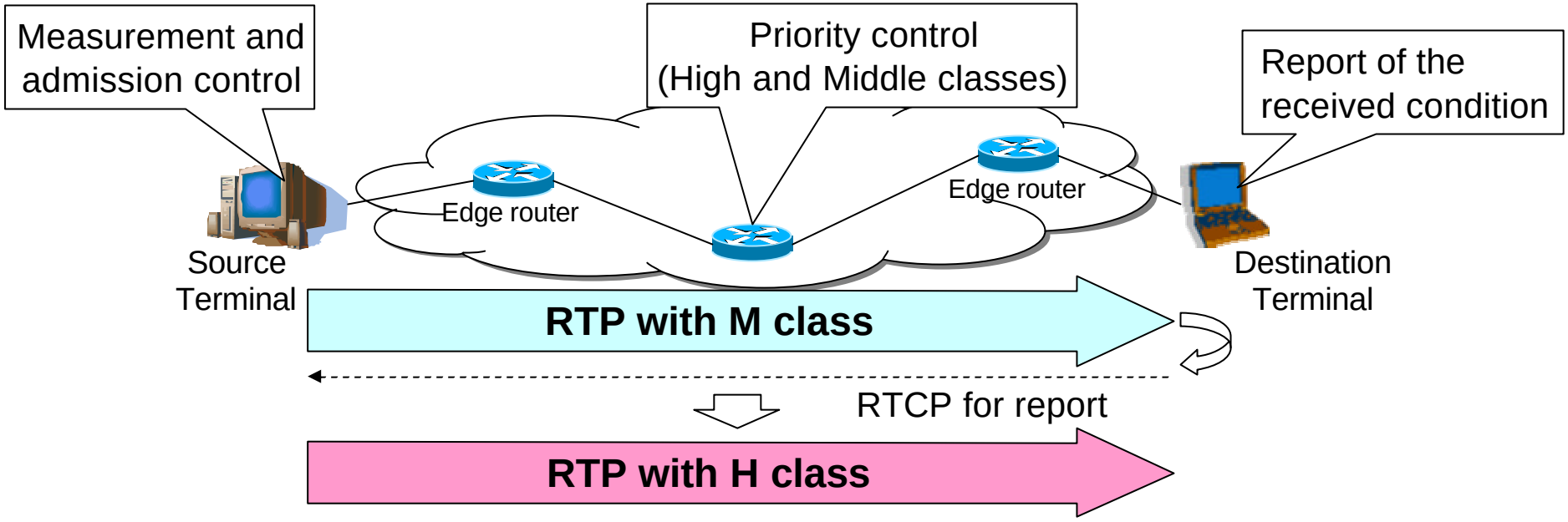
Target: **Maximize premium connections**
How: Resource management **at the network side**

Real-time communication
(Proposed approach)

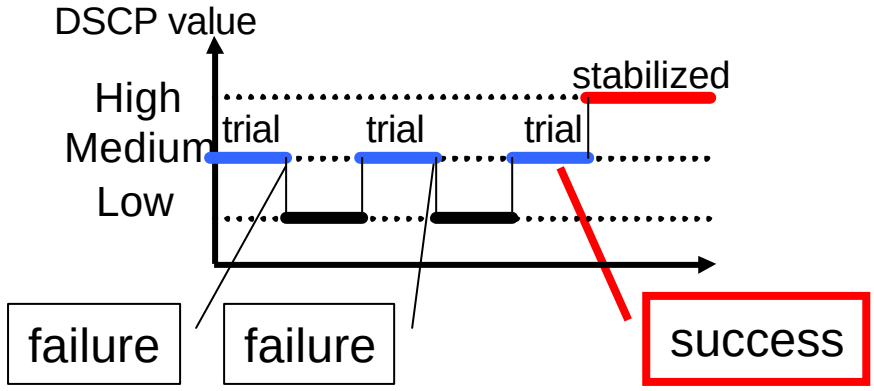


How: Autonomous session control by the terminal, with some assistance from the network

3. Overview of Priority Promotion Scheme (PPS)



Promotion/demotion of DSCP values



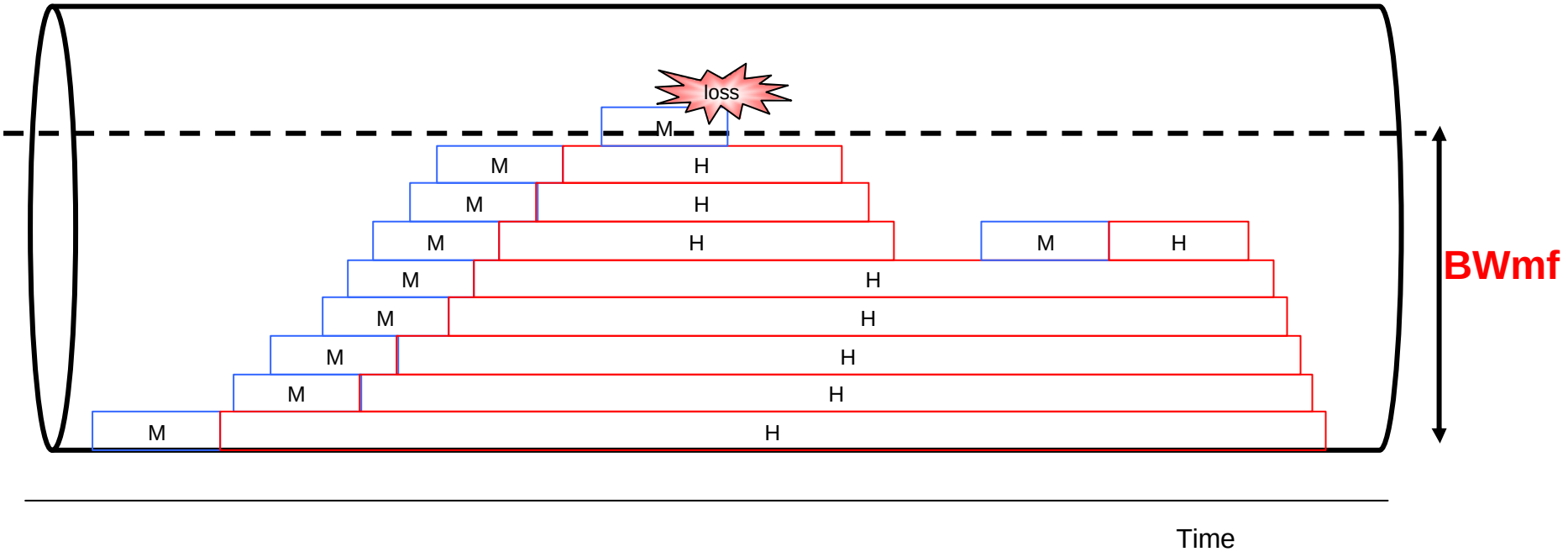
- Terminal monitors network performance by probing with Priority=Medium and RTCP.

=> No impact on other existing High sessions.

- If probe succeeds, change Priority to H.
- If it fails, change Priority to L or give up.

4. Dynamics of the PPS

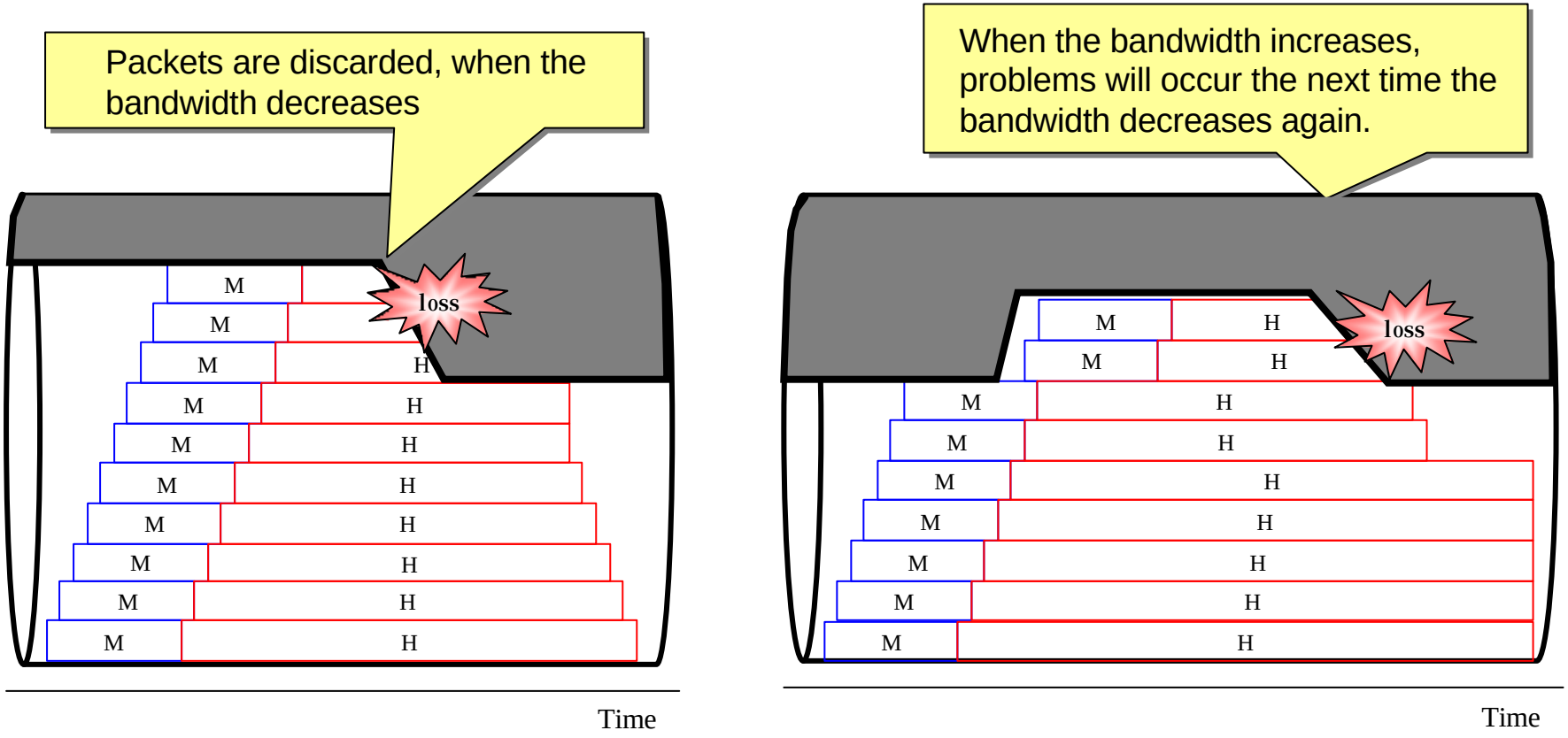
- For the router,
  if the offered traffic, equal to the sum of H and M classes, is less than the upper limit, i.e., BWmf, then all traffic should pass through.
  if the offered traffic of the sum is more than BWmf, the M class packets should be dropped rather than H class packets.



For the sake of simplicity, Constant Bit Rate source is assumed.

5. Notes for the bandwidth limitation

Note that if there is any change in the total bandwidth available on a link, there will be packet loss and interruption of service.



If there is any unused bandwidth, lower priority classes can take advantage of it.

6. New PHB; Measurable Forwarding PHB

Implementing PPS appears to be feasible using the existing Diffserv PHB. However, **to clearly explain** the scheme's requirements, we have to define a new PHB. We refer to this as measurable forwarding (MF).

1) MF has two sub classes, MF-High and MF-Middle
2) MF-H and MF-M share the same capacity
3) MF-H takes priority over MF-M

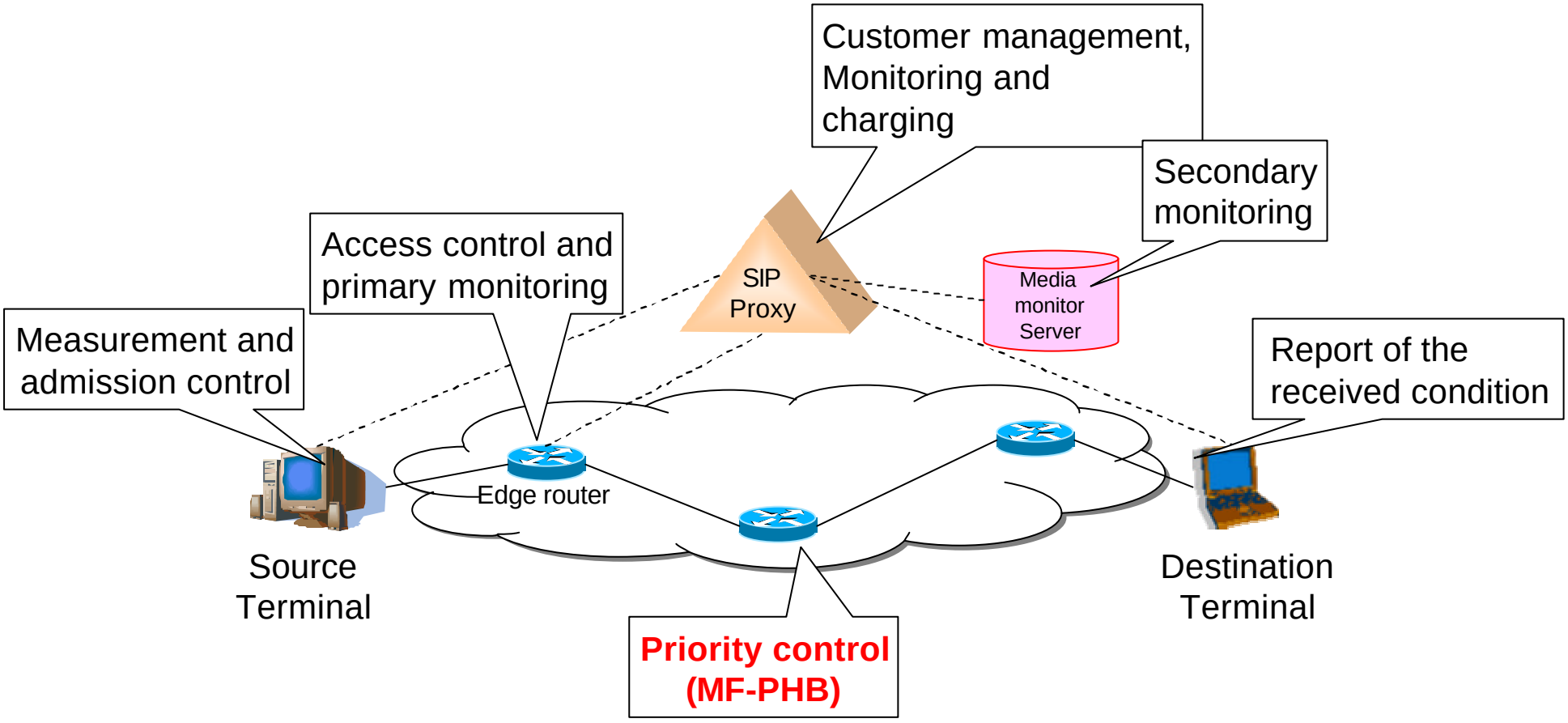
If a given amount of MF-M traffic for a particular stream passes through a router, the same amount of MF-H traffic for that stream must also be able to pass through.

The total amount of MF-H and MF-M traffic is set as a limit, rather than having separate limits for MF-H and MF-M traffic. However, since MF-M traffic will always defer to MF-H traffic, MF-M traffic may experience markedly higher jitter and loss than MF-H; in fact, one would expect MF-H traffic to experience very nominal jitter or loss.

7. Additional requirements of MF-PHB

- 1) The MF must **co-exist with other PHBs**, such as the EF, AF, and BE. Existing implementations may not be capable of satisfying this extended requirement.
- 2) MF should **take priority over AF and BE**. This is because the target services are IMM services, where real-time variations in traffic characteristics are crucially important.

8. Functional architecture of PPS



9. Conclusion

With the architecture described above, the next step will be a detailed specification of each relevant functional entity's actions.
Candidates to be specified include;

1. **MF-PHB including DSCP assignment (1st step);**
2. A SIP signaling extension for the Priority Promotion Scheme (2nd step);
3. The interface between an SIP proxy and edge router (2nd step);

Although the existing Diffserv architecture may already meet the requirements of a MF class, there is an urgent need to verify this. This is because, although new requirements may not seem like much, **the MF PHB is essential to the realization of the Priority Promotion Scheme.**

Other items may be left to each implementation.