

Improving RFC5865 Core Network Scheduling with a Burst Limiting Shaper

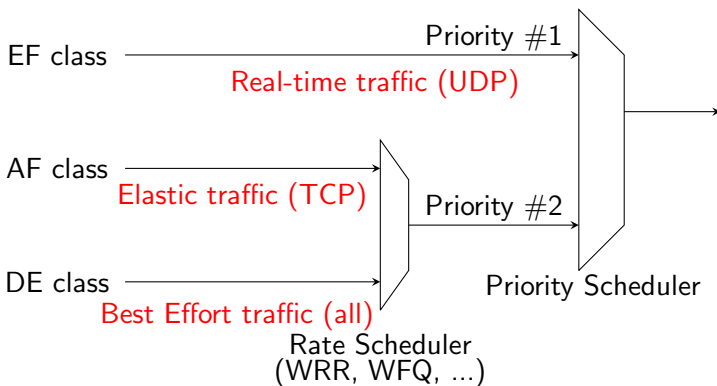
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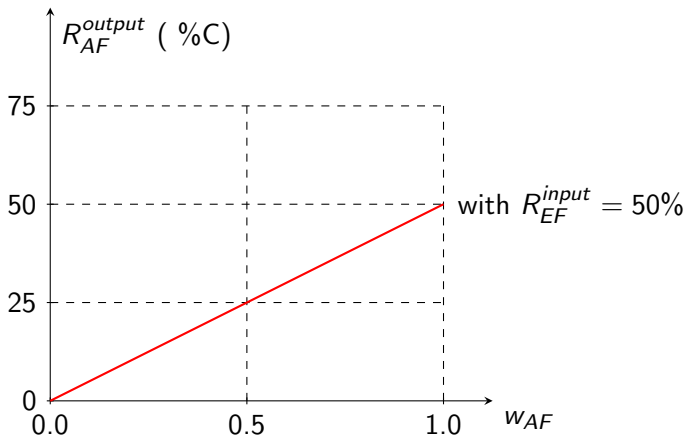
99th IETF meeting, Prague, 07-2017

Current core router architecture in RFC5865

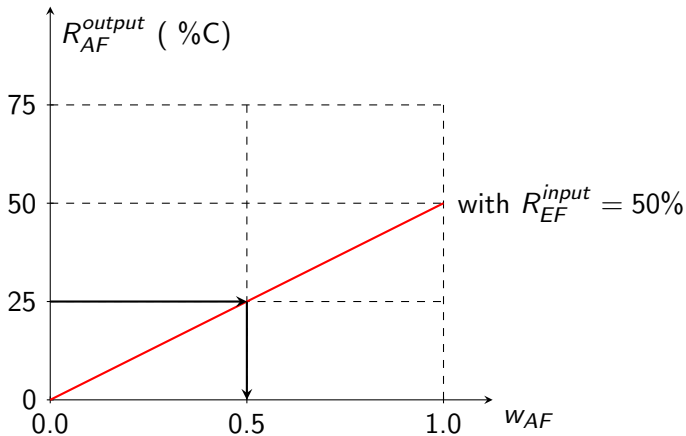
A Differentiated Services Code Point (DSCP) for Capacity-Admitted Traffic



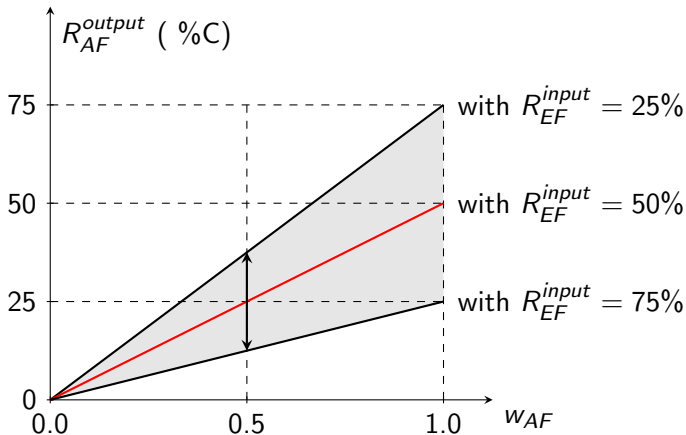
Rate Scheduler key feature: limits the capacity available to AF to prevent BE starvation

AF output rate R_{AF}^{output} with rate scheduler

AF output rate with rate scheduler

AF output rate R_{AF}^{output} with rate scheduler

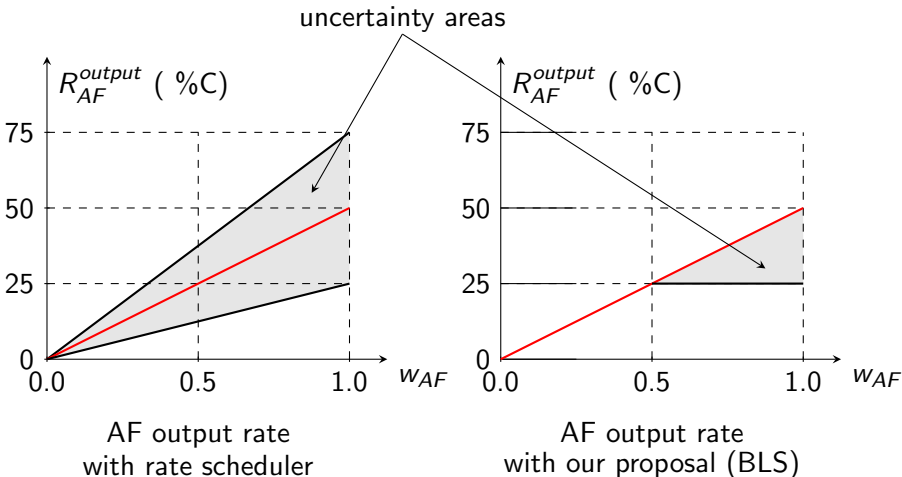
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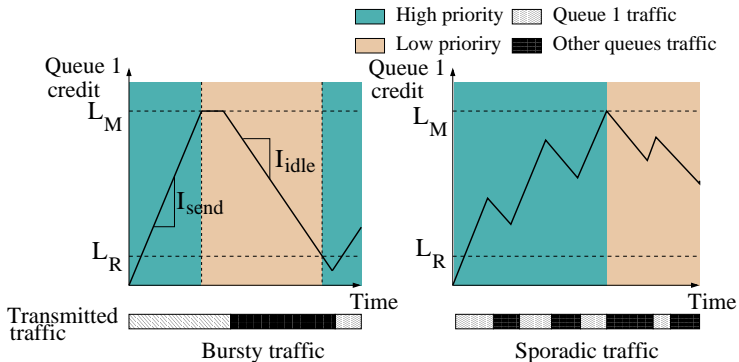
R_{AF}^{output} uncertain when R_{EF}^{input} is unknown
⇒ our aim: make R_{AF}^{output} more predictable

How to better quantify AF output rate R_{AF}^{output} ?

BLS in a nutshell

The BLS is a credit-based shaper proposed by the Time Sensitive Networking (TSN) task group.

Its **key idea**: a **credit-depending priority change**



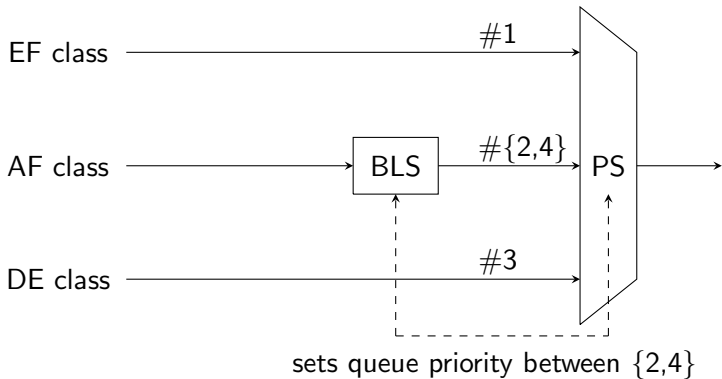
Our work on the Burst Limiting Shaper (BLS)

- Formal analysis of the BLS with Network Calculus done with Ahlem Mifdaoui and Fabrice Frances (ISAE-SUPAERO)
- Complexity analysis
- NS2 Prototype
- Multiple simulations (Results under submission)

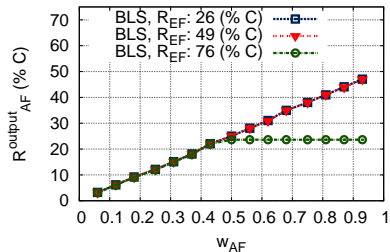
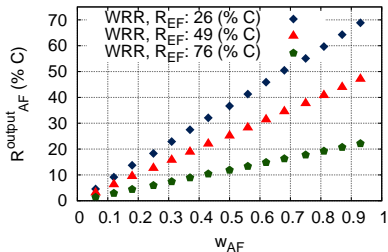
⇒ **Low complexity, hardware implementable**

⇒ **BLS limits the capacity available to shaped queue:
coupled with PS, it behaves much like a rate scheduler**

Proposed core router architecture



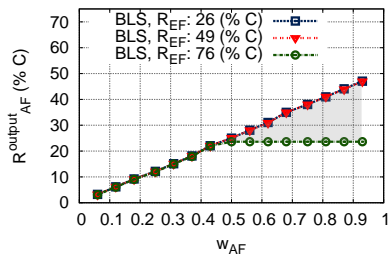
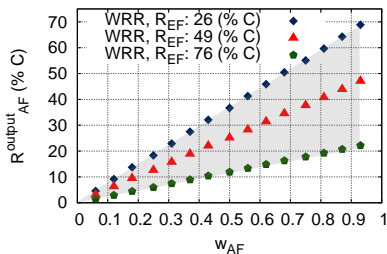
Improvement of AF output rate quantification



Simulations with parameters set with expected EF input rate,

$$R_{EF}^{exp} = 49\%$$

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Conclusion

- EF class not impacted by the proposed change
- BLS parameters easily calculated from a current WRR configuration with an expected EF input rate
- When **EF input rate is known**: BLS and WRR have **same AF output rate**
- When **EF input rate varies**: the **range** of possible **AF output rates** is much **narrower with BLS than with WRR**

Perspective: propose a draft in [aqm] WG