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Packet Scheduling For Real-Time Video Transmission

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(Best-effort service)

(Guaranteed service)

가 . MPEG1, MPEG4, H.263

가

FIFO(First-in First-out)

CBQ(Class

Based Queuing), WFQ(Weighted Fair Queuing)

가

WFQ

(AWF2Q+)

FIFO, WFQ, AWF2Q+

(PSNR)

(PSNR)

1.

가

가

가

MPEG1

(PSNR)

가

. 2

가

. 3

FIFO, WFQ, AWFQ

FIFO

, 4

CBQ, WFQ[4], HPFQ[2]

AWFQ

(PSNR)

2.

FIFO

WFQ

FIFO

가

$$S_i(t) = \begin{cases} F_i & , \text{if } Q_i(a_i^k) > 0 \\ \max(F_i, V(a_i^k)) & , \text{if } Q_i(a_i^k) > 0 \end{cases}$$

$$F_i(t) = S_i \cdot \frac{L_i^k}{r_i}$$

$S_i(t), F_i(t)$

GPS

GPS(Generalized Packet Scheduling)[1],
WFQ(Weight Fair Queuing), HPFQ(Hierarchical Packet Fair
Queuing) 가

GPS 가

AWFQ

WFQ

가

가

가

(Virtual finish time) $F_i(t)$ 가

HOL(Head-Of-

Line)

AWFQ

WFQ

GPS

GPS

가 (Weight)

3.

WFQ, AWFQ

3.1

가

, Drop-Tail

MPEG1, MPEG4, H.263

가 I, P, B

가

B, I, B

(Protection)

가

I

가

가 I, P

B

WFQ

I

가 P, B

가

가 [3]

AWFQ

3.2

(AWFQ)

가 (Weight)

가.

AWFQ

가

가

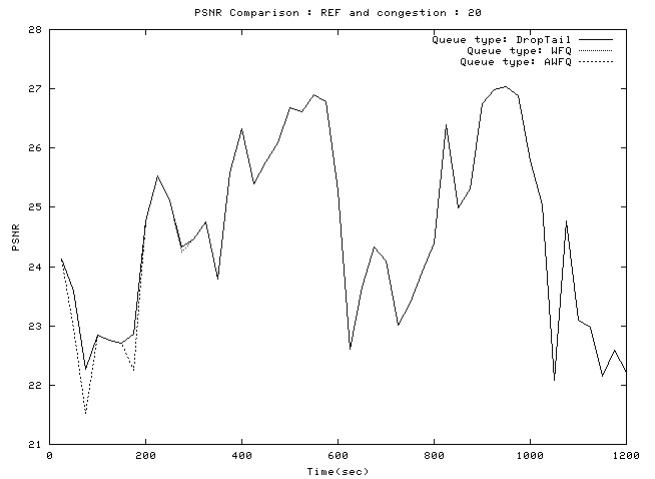
AWFQ

가

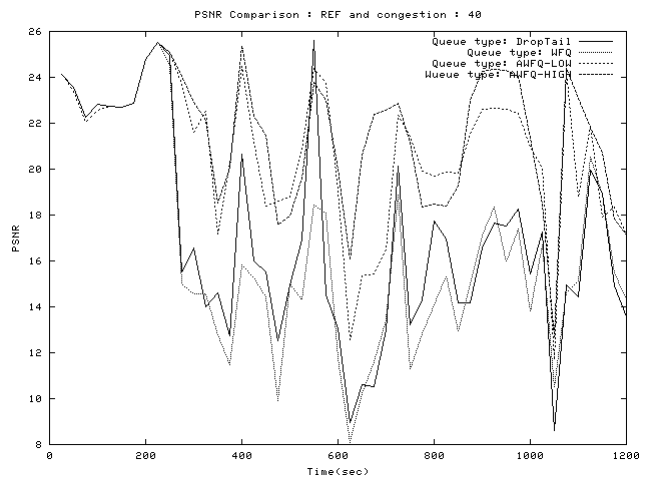
가
 ,
 가
 , I
 , P
 3 , B 1 가 5 가 3

4.

MPEG1 가 AWFQ ,
 (PSNR)
 FIFO, WFQ
 , NS-2
 < 1> (Congestion)
 . FIFO, WFQ, AWFQ
 가
 < 2> ,
 가 . AWFQ



< 1> 가



< 2> 가

가 , WFQ
 .
 가 . 가
 ,
 < 2> AWFQ ,
 가 ,

[1] A. K. Parekh and R. G. Gallager, "A Generalized Processor Sharing Approach to Flow control in integrated services networks: The single node case", IEEE/ACM Transactions on Networking, vol. 1, no 3, pp. 344-357, June 1993.
 [2] J.C.R. Bennett and H. Zhang, "Hierarchical Packet Fair Queuing Algorithms", IEEE/ACM Transactions on Networking, vol 5, no 5, pp. 675-689, Oct 1997.
 [3] Konstantinos Psounis, "Active Networks: Applications, Security, Safety, and Architectures", IEEE Communication Surveys, 1999
 [4] J.C.R. Bennett and H. Zhang, "WF2Q: Worst-case fair weighted fair queuing", In Proceedings of IEEE INFOCOM' 96, pages 120-128, San Francisco, CA, March 1996