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A Fast and Robust Scheme for Measuring Internet Bottleneck Bandwidth

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Scheme[1]

Yoo Han-seung Fast Convergence
Fast Convergence Scheme

1. (available bandwidth) 가 가 가 Fast Convergence Scheme [1] 가, Fast Convergence Scheme

2. Fast Convergence Scheme Bandwidth Filter[2][5] 가, 3 4 5

가

2.

2.1 Potential Bandwidth Filter(PBF)

Fast Convergence Scheme

Potential Bandwidth Filter
가

[3] Potential Bandwidth Measured Bandwidth
가 .

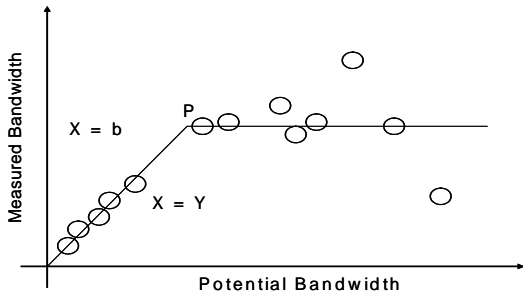


그림 1 Potential Bandwidth Filter 방식

1

[2]

MB = P	Actual Bandwidth
MB > P	Time Compression
MB < P	Time Extension

표 1 PBF |서 패킷을 필터링 하는 조건

Time Compression

Time Extension

[5]

2.2 Fast Convergence Scheme(FCS)

1 가
가
FCS
가

3. ()

가

가

가

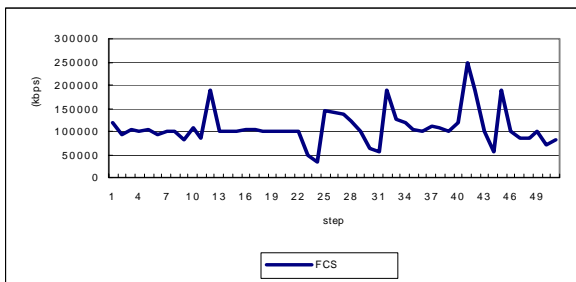


그림 2 FCS | 안정화된 대역폭 측정 결과

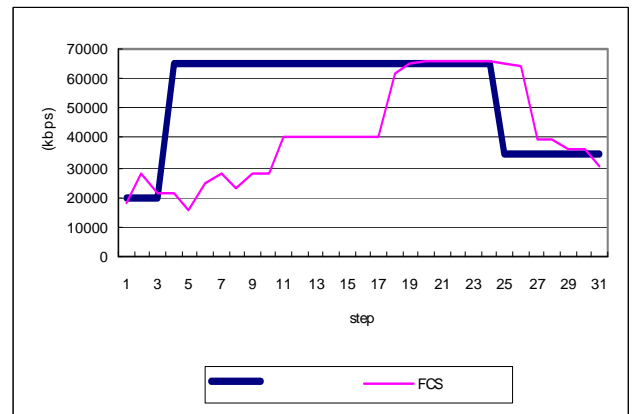


그림 3 FCS | 변화하는 대역폭 측정

3

가

가

3.1

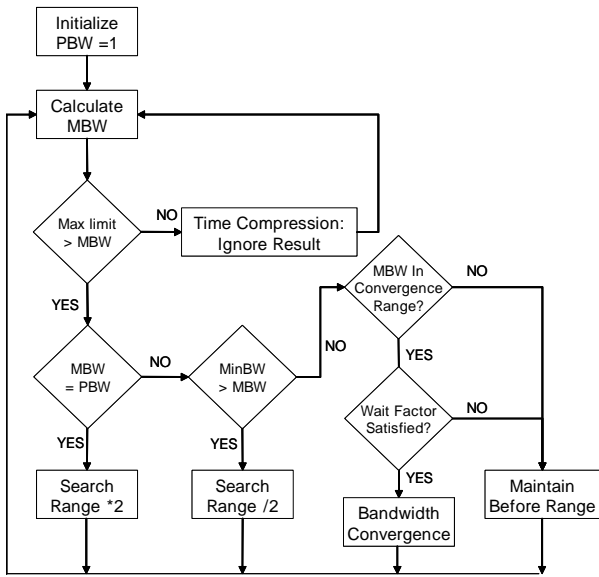
4

가

가

가

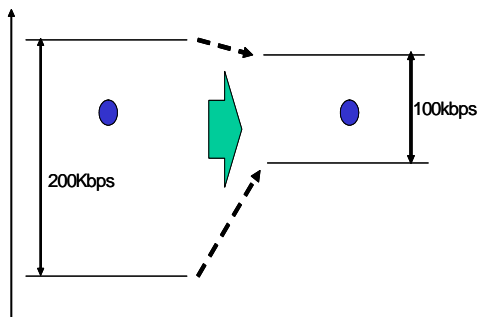
가



4 Bandwidth Search Procedure

5

1/2



5

3.2

4.

4.1

-600MHz

UDP
Packet Pair

FCS PDF

4.2

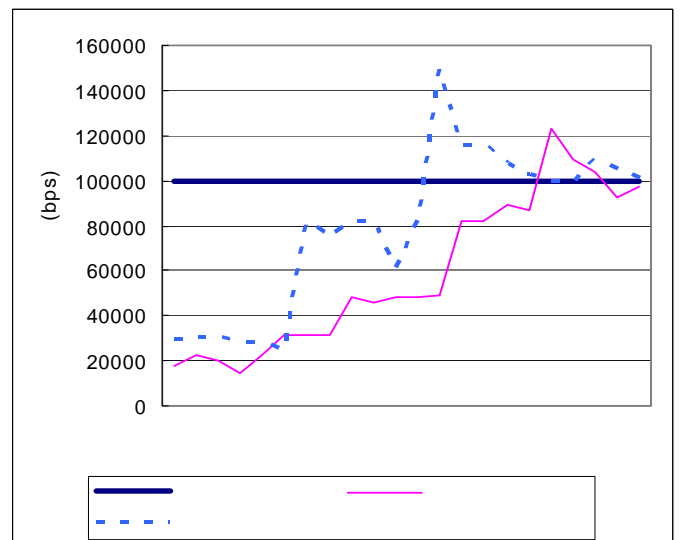


그림 6 대역폭 측정 시간의 비교

6

가 가

100kbps

500

가
가 가

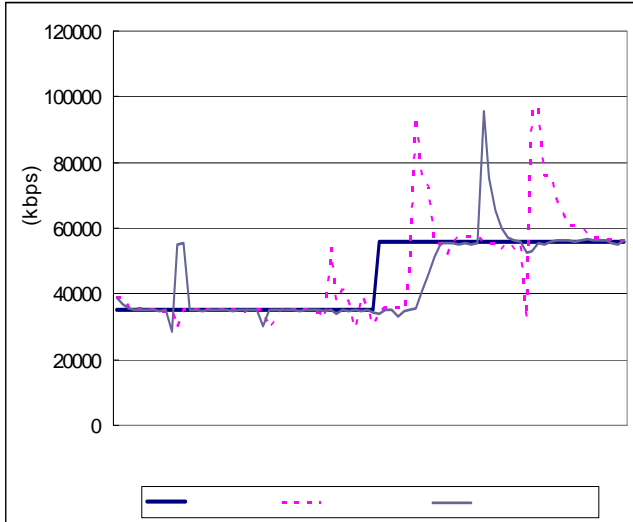


그림 7 변화하는 대역폭에서의 성능 비교

7

가

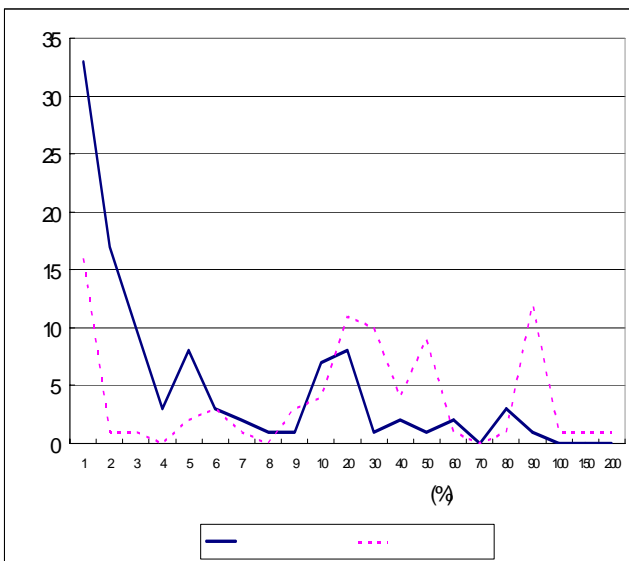


그림 8 알고리즘의 추정오류에 의한 영향 비교

8

가

5.

가

Fast Convergence Scheme

Fast Convergence

Scheme

23~31%

가

가

[1] Han-Seung Yoo, Ju-Wook Jang, An improved packet pair method for filtering estimation noise and fast convergence in measuring bottleneck bandwidth, Parallel and Distributed Systems, 2001. ICPADS 2001

[2] Kevin Lai, Mary Baker, Measuring Bandwidth, In proceeding of the IEEE INFOCOMM99, 1999

[3] Robert L.Carter, Mark E. Crovella, Measuring Bottleneck link speed in Packet Switched Network, Technical Report BU-CS-96-007, Boston University, 1996

[4] Vern Paxson, End to End Internet Packet Dynamics, In Proceeding of SIGCOMM97, 1997

[5] Kevin Lai, Mary Baker, Measuring Link Bandwidths Using Deterministic Model of Packet Delay, In Proceeding of SIFGCOMM00,

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