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Simulation Results for VBR+ABR Traffic

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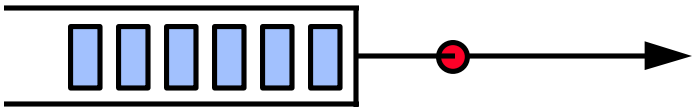
- Effect of VBR
- VBR Model
- ERICA
- Simulation Results

ERICA

- ERICA = Explicit Rate Indication for Congestion Avoidance
- ERICA is the switch algorithm part of EPRCA++ presented in the November'94 meeting.
- Fully compatible with source/switch/destination behaviors as agreed in the November'94, February'95, and April'95 meetings.
- Fully compatible with current RM Cell format. No new bits, no new fields

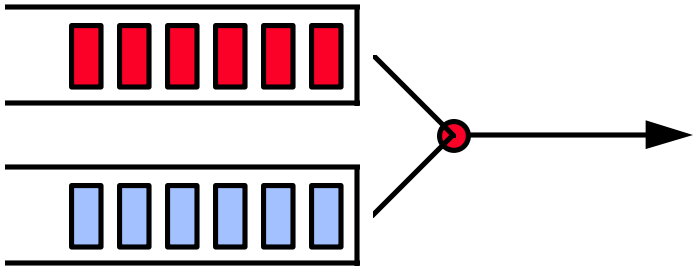
ABR-Only Systems

- Most simulations have assumed
  - Infinite sources
  - ABR only



- With ABR only:
  - Link capacity is known
  - Link capacity is fixed
  - Only traffic is random
  - Only traffic has to be measured, predicted, and allocated fairly

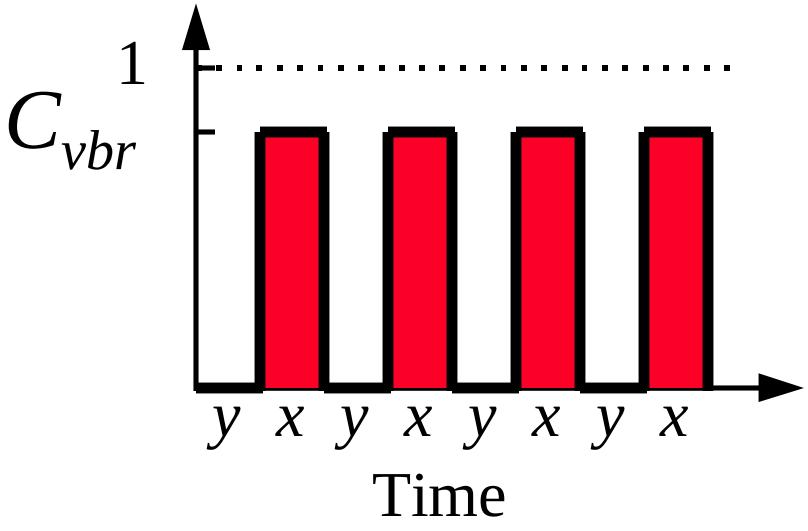
VBR+ABR Systems

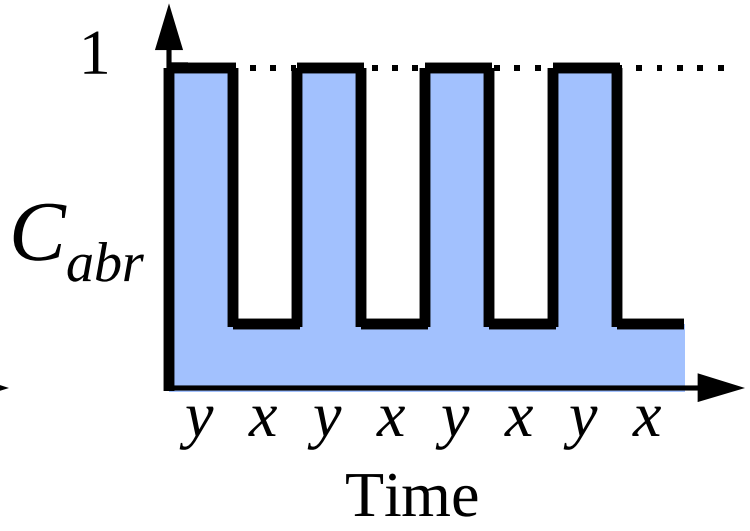


- VBR gets a preferential treatment
- ABR gets only left-overs
- ABR capacity is a random variable
  It has to be measured, forecasted, and allocated
- Sometimes, there may not be any left-overs
- Sometimes, even VBR may be overbooked

A Simple VBR Model

- On for x ms and off for y ms
- When on, VBR uses up C_{vbr} bandwidth
- In practice, x, y, C_{vbr} are random variables. We assumed constants.

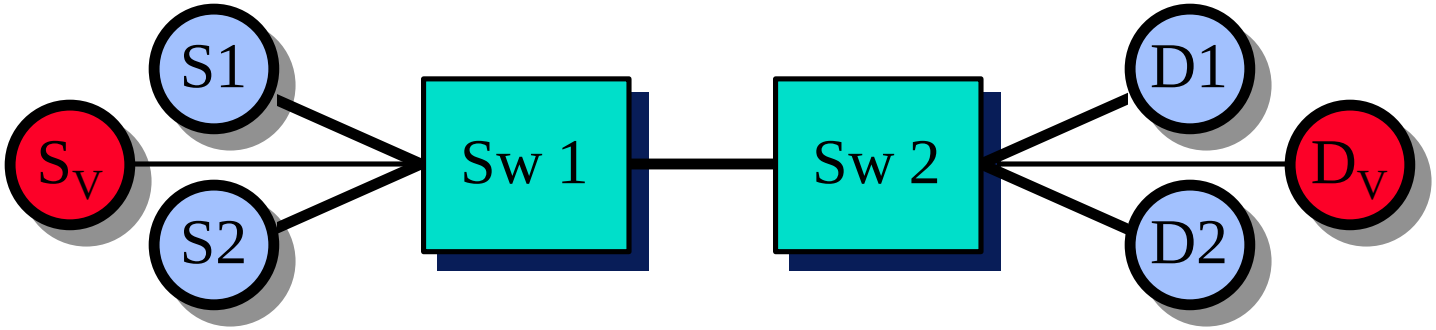




Simulation Parameters

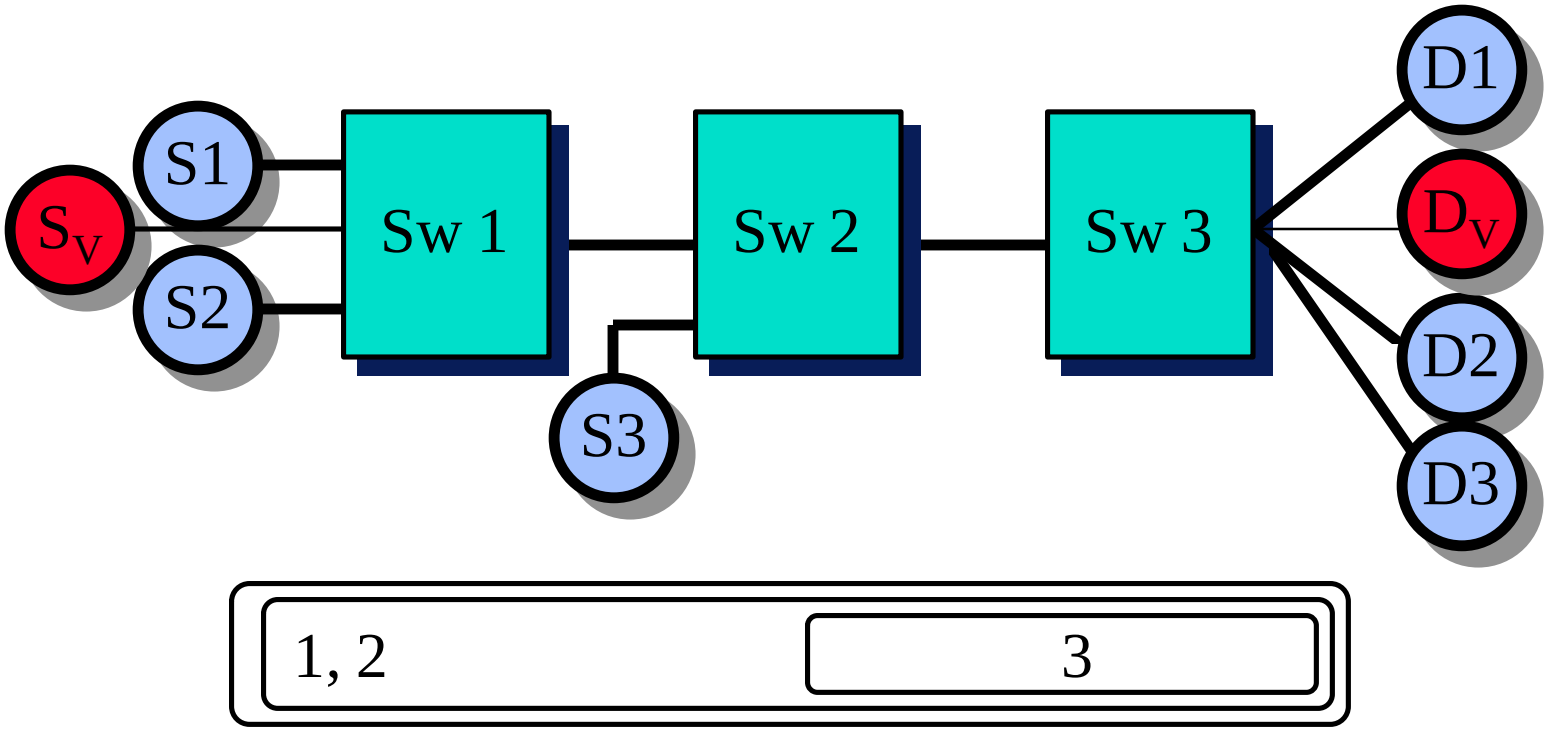
- Source:
  Nrm = 16
  ICR = PCR/20 or PCR
  AIR = PCR
  RDF= ∞
- Switch:
  Target Utilization = 90%
  Averaging interval = 30 cells
  Uses BECN option during first round-trip on WAN
- Traffic: C_{vbr} = 80%
  $x = y$ = 2 ms (LAN)
  $x = y$ = max round trip (WAN)

Two-Source Configuration



- All links 155 Mbps
- Goal: To check efficiency and fairness in the presence of VBR

Parking Lot Configuration

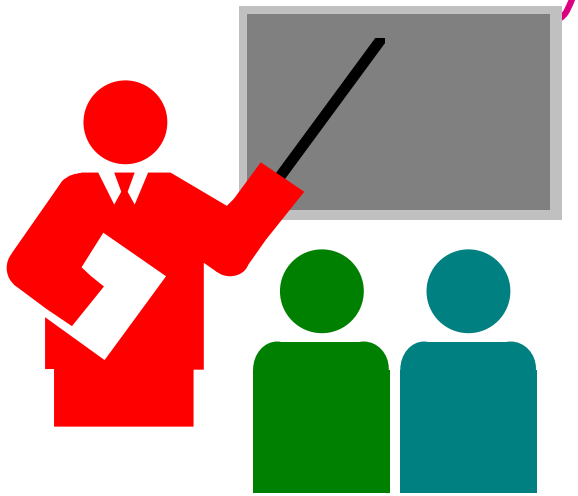


- All links 155.52 Mbps, 1 km (LAN) or 1000 km (WAN)
- Goal: Test fairness in the presence of VBR

Simulation Results

- ERICA converges fast
- ABR uses up all the left-over capacity
- ABR comes down fast during VBR-on periods
- ABR comes up fast during VBR-off periods
- Link is not underutilized
- Queues are small

Summary



- Switch schemes that work with ABR-only may or may not work with VBR+ABR
- With VBR+ABR:
- ERICA converges fast
- ABR comes down/up very fast filling up all left-over capacity
- Queues are small