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Bursty ABR Sources

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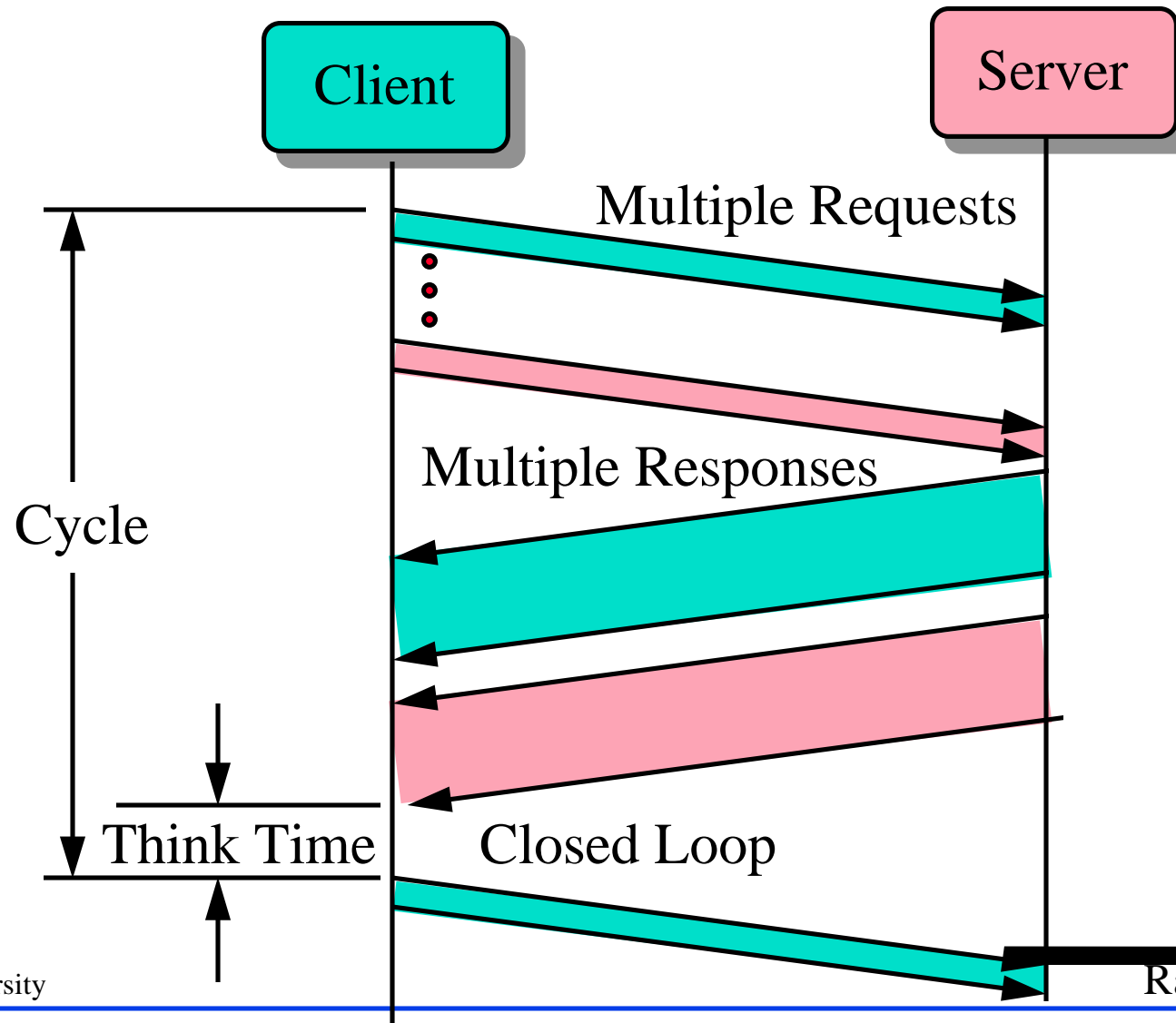
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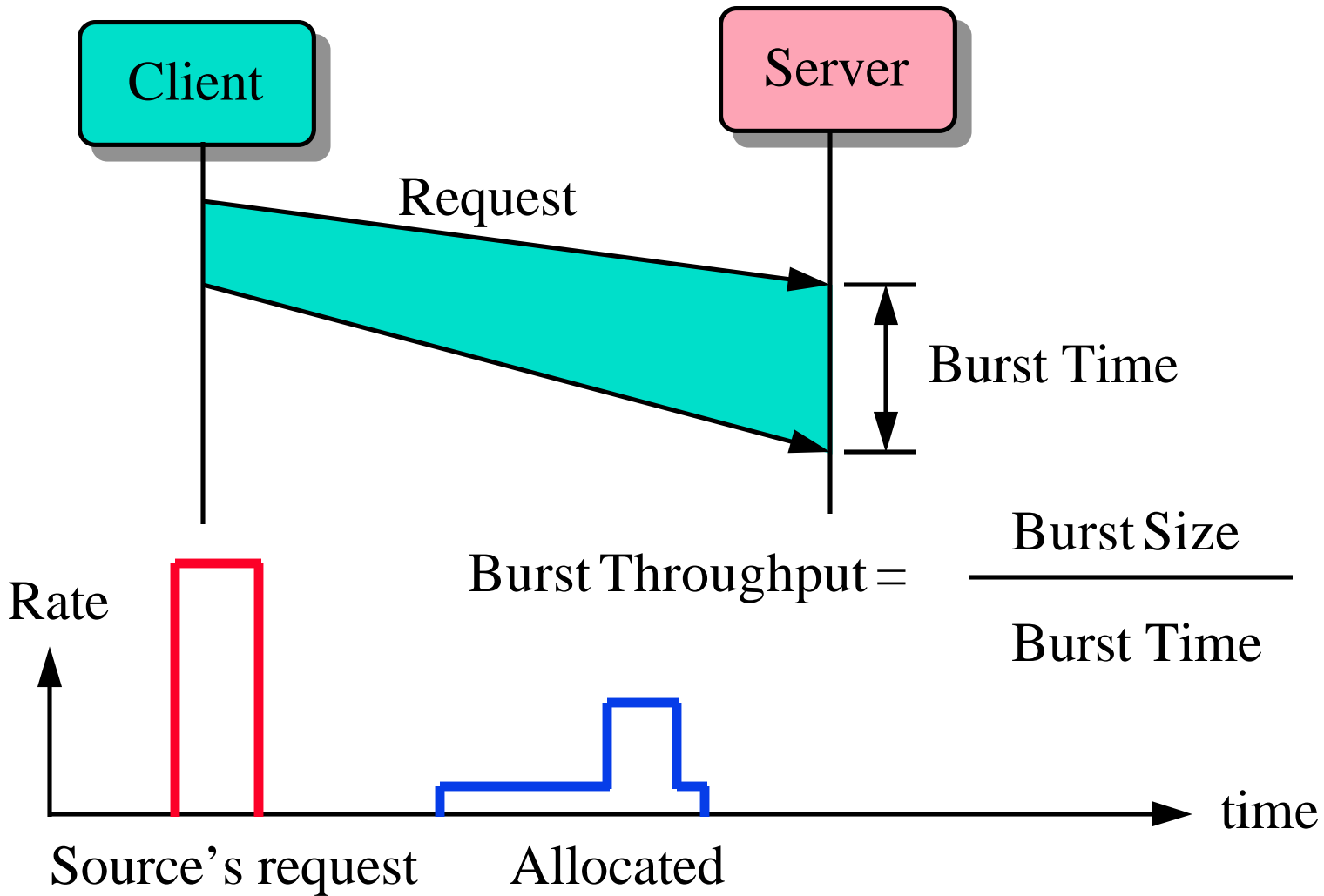


- ❑ Bursty traffic model
- ❑ Bursty traffic performance metrics
- ❑ Bursty traffic performance with ABR

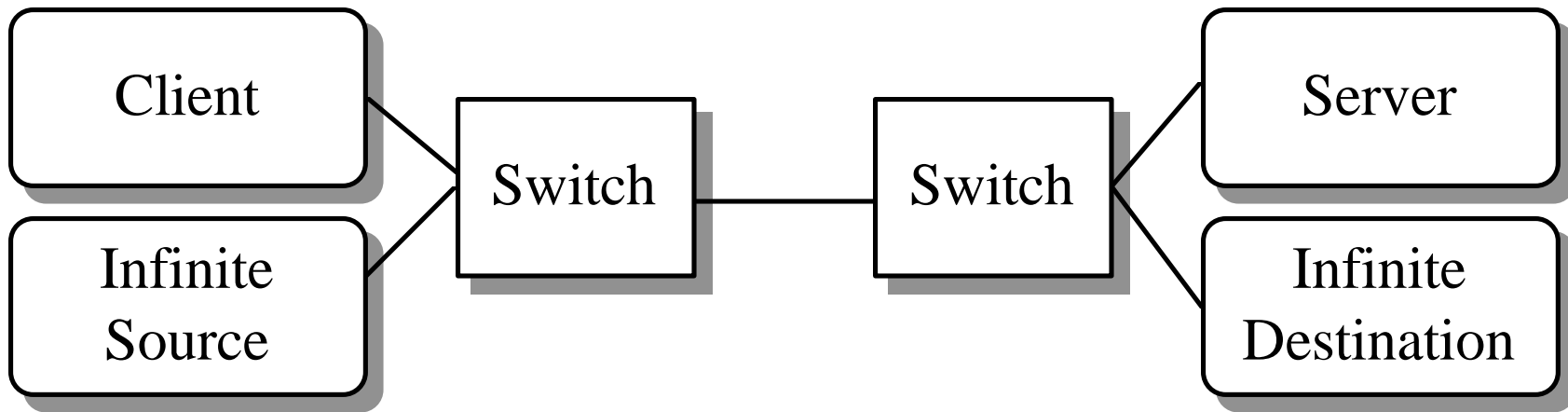
Bursty Traffic Model: WWW



Burst Throughput



Single-Client Configuration



- ❑ All links 155 Mbps
- ❑ Infinite source as the background traffic
- ❑ Goal: If the scheme has problem with single-source, it will have problems with more complex configurations

Simulation Parameters

- Source: Parameters selected to maximize ACR
 - Nrm = 32
 - AIRF = 1 \Rightarrow AIR = PCR/Nrm \Rightarrow ACR is not limited by AIR
 - RDF = 512 cells
 - {TDF, PNI} = {1/8, 0} or {0, 1} \Rightarrow Rule 5 on or off
 - CIF = 512, 4096
 - RTT = Propagation delay \times multipliers of 1, 10
 - XDF = 1/2
- Traffic: Bi-directional
- Switch:
 - Target Utilization = 90%
 - Averaging interval = min{30 cells, 200 μ s}

Rule 5 and 6

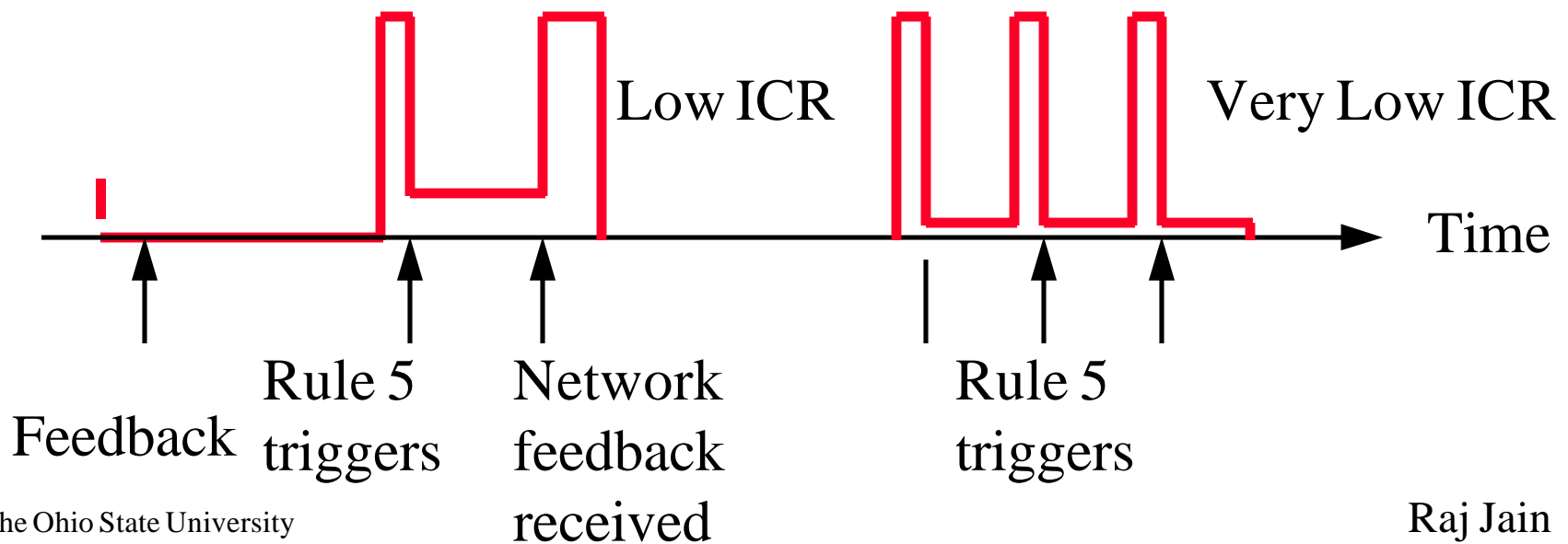
ICR

		ICR	
		Low	High
XRM	Low	Rule 5, 6	Rule 6
	High	Rule 6	

- ❑ $ICR = \text{Min}\{PCR, a * CIF / RTT\}$
- ❑ $XRM = \text{Min}\{CIF / N_{rm}, PCR * RTT / N_{rm}\}$
- ❑ Small RTT \Rightarrow Small XRM
- ❑ Large RTT \Rightarrow Small ICR

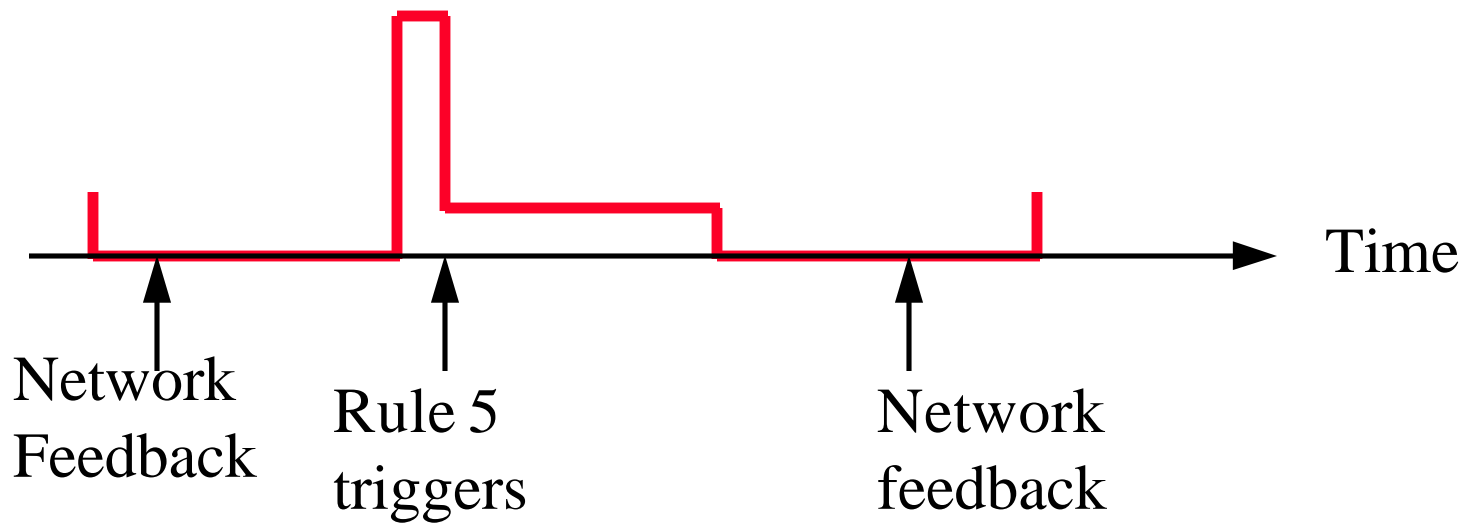
Large Bursts

- ❑ Large Bursts: Burst Time $>$ RTT and Burst Size $>$ Nrm
- ❑ Burst Time = $\text{fn}(\text{ACR})$
- ❑ Gap \Rightarrow Rule 5 triggers and brings the rate down to ICR
- ❑ Some part of the burst transmitted at low rate
- ❑ Very low ICR \Rightarrow The process is repeated



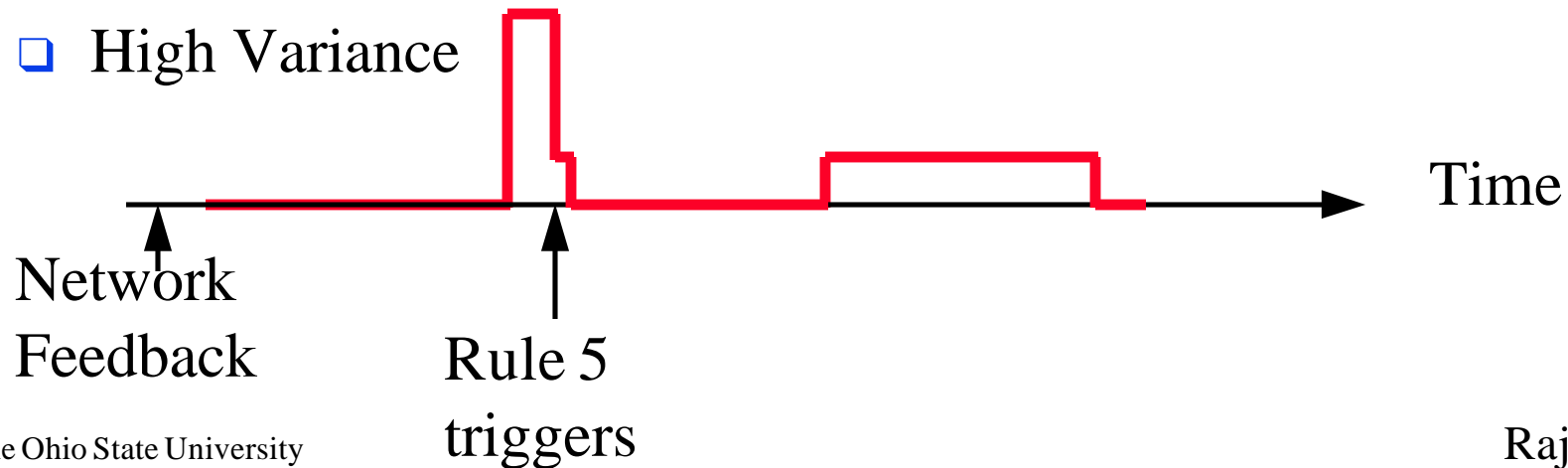
Medium Bursts

- ❑ Medium Bursts: $N_{rm} < \text{Burst Size}$ and $\text{Burst Time} < \text{Round trip delay w queueing RTT}_q$
- ❑ Network feedback comes after the burst is gone.
- ❑ Rule 5 triggers and brings the rate down to ICR
- ❑ Entire burst transmitted at low rate

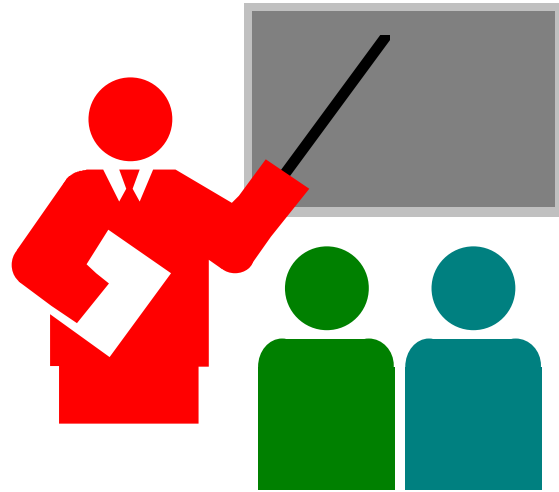


Small Bursts

- ❑ Small Bursts: Burst Size $< N_{rm}$
- ❑ No RM cells transmitted during some bursts
No source rules triggered during these bursts
Entire burst transmitted at one rate
- ❑ RM Cells transmitted during some bursts
Rule 5 triggers and brings the rate down to ICR
Burst transmitted at low rate
- ❑ High Variance



Summary



- ❑ Round trip delay with queueing is highly random
Network performance unpredictable.
- ❑ Rule 5 is not “burst-friendly.”
- ❑ Small burst throughput highly variable.
- ❑ Medium burst throughput equal to ICR
- ❑ Large burst throughput depends upon ICR (and rule 5)