



**SNS COLLEGE OF TECHNOLOGY**  
**Coimbatore-35**  
**An Autonomous Institution**



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **19ECT301- COMMUNICATION NETWORKS**

III YEAR/ V SEMESTER

#### **UNIT 3 TRANSPORT LAYER & APPLICATION LAYER**

#### **TOPIC – PERFORMANCE ISSUES**



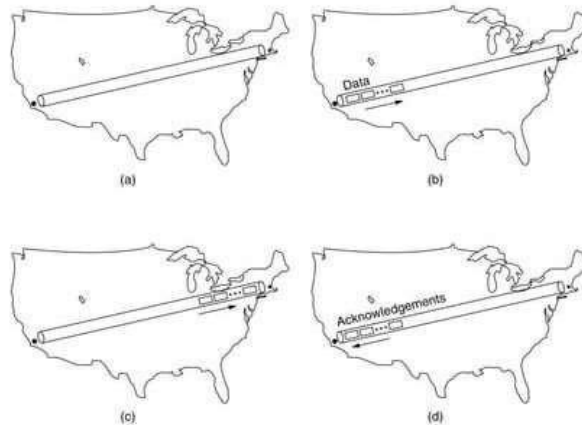
# Performance Issues



Performance Problems in Computer Networks  
Network Performance Measurement  
System Design for Better Performance  
Fast TPDU Processing  
Protocols for Gigabit Networks



## Performance Problems in Computer Networks



The state of transmitting one megabit from San Diego to Boston  
(a) At  $t = 0$ , (b) After 500  $\mu\text{sec}$ , (c) After 20 msec, (d) after 40 msec.



# Network Performance Measurement

The basic loop for improving network performance.

1. Measure relevant network parameters, performance.
2. Try to understand what is going on.
3. Change one parameter.



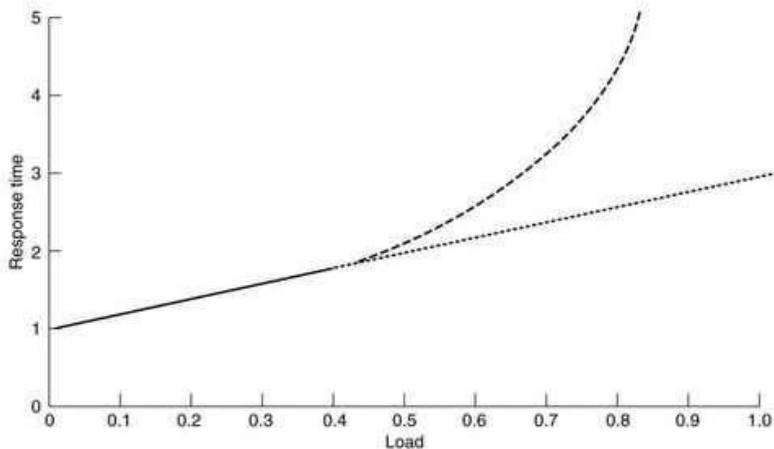
# System Design for Better Performance

## Rules:

1. CPU speed is more important than network speed.
2. Reduce packet count to reduce software overhead.
3. Minimize context switches.
4. Minimize copying.
5. You can buy more bandwidth but not lower delay.
6. Avoiding congestion is better than recovering from it.
7. Avoid timeouts.



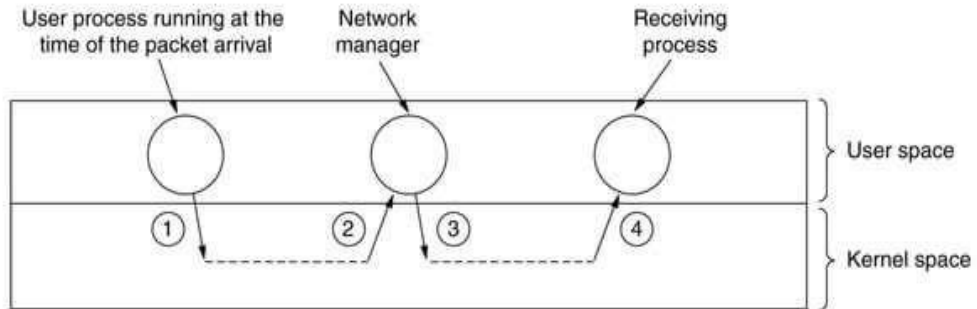
## System Design for Better Performance (2)



Response as a function of load.



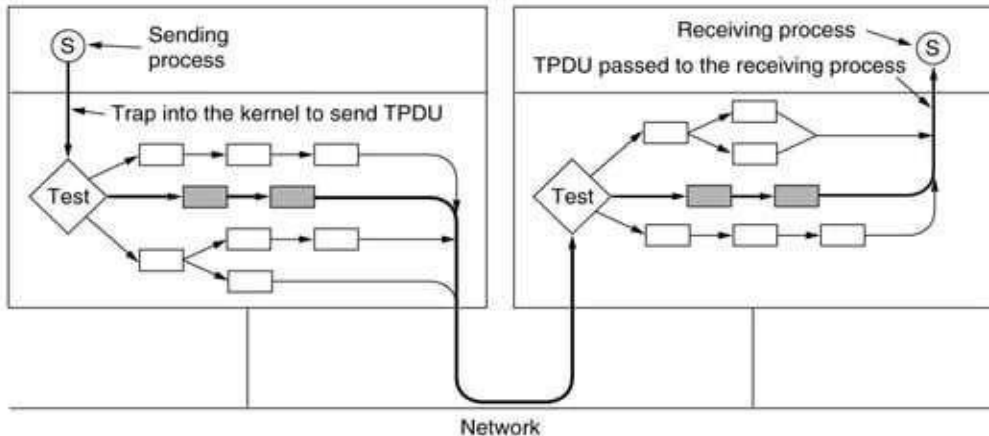
# System Design for Better Performance (3)



Four context switches to handle one packet  
with a user-space network manager.



# Fast TPDU Processing



The fast path from sender to receiver is shown with a heavy line.  
The processing steps on this path are shaded.





# Fast TPDU Processing (2)



Source port		Destination port	
Sequence number			
Acknowledgement number			
Len	Unused	Window size	
Checksum		Urgent pointer	

(a)

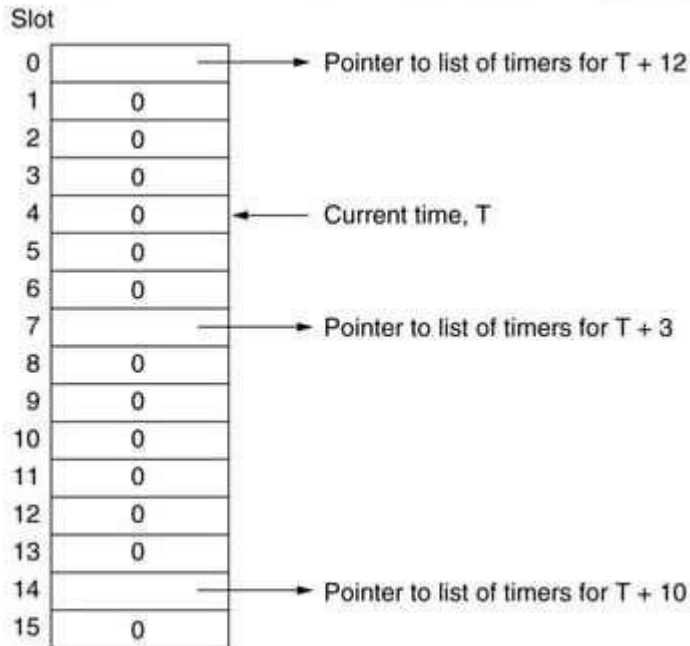
VER.	IHL	TOS	Total length	
Identification			Fragment offset	
TTL		Protocol	Header checksum	
Source address				
Destination address				

(b)

(a) TCP header. (b) IP header. In both cases, the shaded fields are taken from the prototype without change.



# Fast TPDU Processing (3)



A timing wheel.



**THANK YOU**