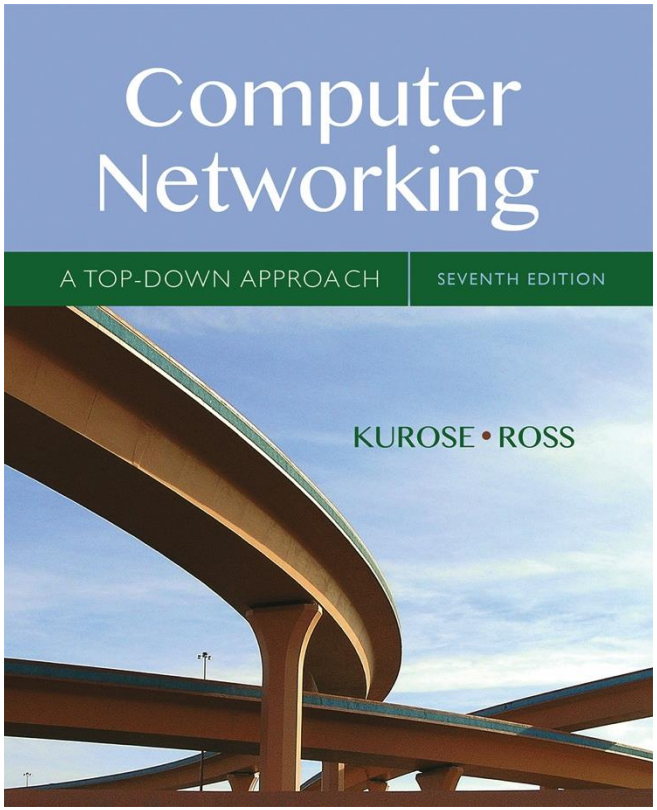
Chapter 1
Introduction



Computer Networking: A Top Down Approach

7th edition

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Summary

covered a "ton" of material!

- Internet overview
- what's a protocol?
- network edge, core, access network
  - packet-switching versus circuit-switching
  - Internet structure
- performance: loss, delay, throughput
- layering, service models
- security
- history

you now have:

- 网络边缘和网络核心
- 电路交换和分组交换
- 经传输速率为R的N段链路发送长度L的P个分组的端到端时延：

  (N+P-1)*L/R
- 几种delay（时延）
- **分组是如何通过网络层层封装的？**
- 网络参考模型

如果将时延带宽积管道比作传输链路，那么宽带链路对应的时延带宽积管道就比较宽。

（T）

13. a) 2 users can be supported because each user requires half of the link bandwidth.

b) Since each user requires 1Mbps when transmitting, if two or fewer users transmit simultaneously, a maximum of 2Mbps will be required. Since the available bandwidth of the shared link is 2Mbps, there will be no queuing delay before the link. Whereas, if three users transmit simultaneously, the bandwidth required will be 3Mbps which is more than the available bandwidth of the shared link. In this case, there will be queuing delay before the link.

c) Probability that a given user is transmitting = 0.2

d) Probability that all three users are transmitting simultaneously $= \binom{3}{3} p^3 (1-p)^{3-3}$

$= (0.2)^3 = 0.008$. Since the queue grows when all the users are transmitting, the fraction of time during which the queue grows (which is equal to the probability that all three users are transmitting simultaneously) is 0.008.

- 计算机网络有哪些常用的性能指标?

✓ **速率，带宽，吞吐量，时延，时延带宽积，往返时间，利用率**

- 试比较电路交换和分组交换。要传送的报文共*x*（*bit*）。从原点到终点共经过*k* 段链路，每段链路的传播时延为*d*（*s*），数据传输速率为*b*（*bit/s*）。电路交换时电路的建立时间为*s*（*s*）。在分组交换时分组长度为*p*（*bit*），且各结点的排队等待时间可忽略不计。问在怎样的条件下，分组交换的时延比电路交换的要小?

✓ **电路交换时延：kd+x/b+s**

✓ **分组交换时延：kd+（x/p）*(p/b)+(k-1)*(p/b)**

✓ **当s>(k-1)*(p/b)时，**

✓ **分组交换的时延比电路交换的要小**

(k-1)次的存储转发延迟