

CSCI 251: Concepts of Parallel and Distributed Systems

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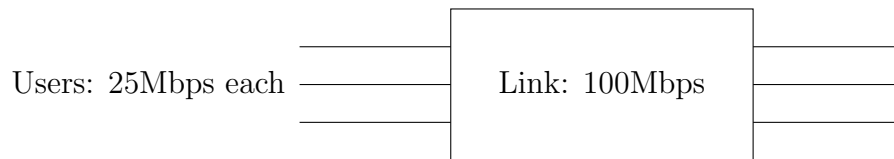
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Networking

Topics:

- Circuit Switching
- Packet Switching

Circuit Switching



The maximum number of users that can be supported is 4 users, each with a dedicated connection.

Packet Switching

In the same scenario, if the number of users is N and each user is transmitting for 30% of the time $p = 0.3$, then the probability of a given user transmitting and all other users not transmitting is:

$$p^1(1 - p)^{n-1}$$

The probability of any user transmitting and the rest not transmitting:

$$\binom{N}{1} p^1 (1-p)^{n-1}$$

The probability of k users transmitting and the rest not transmitting:

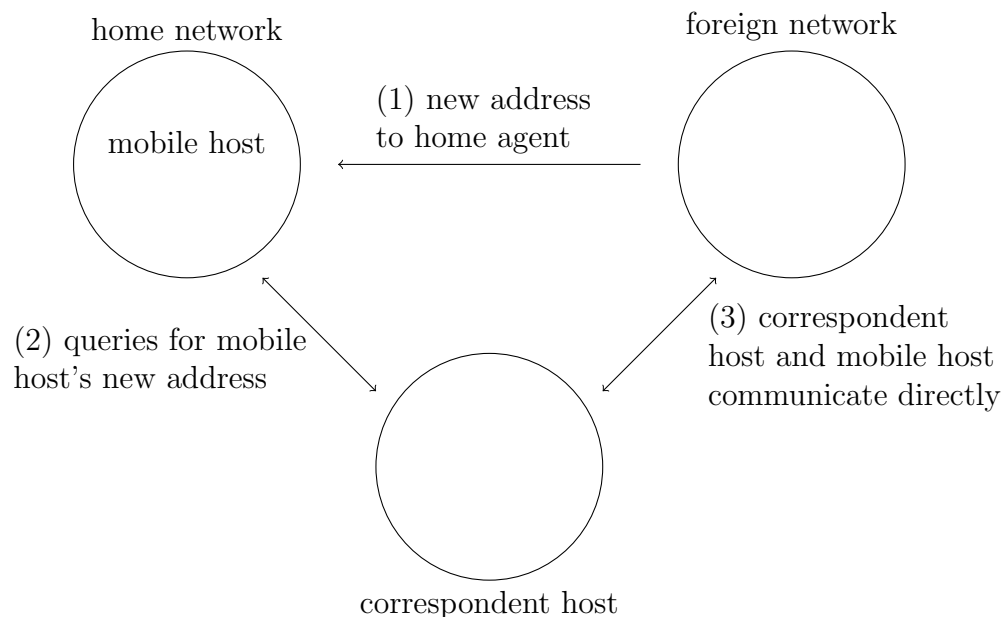
$$\binom{N}{k} p^k (1-p)^{n-k}$$

Delays

Suppose we are transmitting packets of size L Mbits at a transmission rate of R Mbits per second with a delay $d = \frac{L}{R}$ seconds. The number of packets that can be transmitted every seconds is $\frac{1}{d}$. Delays can result from queueing, transmission, processing, and propagation. Propagation delay is usually defined by the speed of light, which is the speed at which packets are transmitted through wires.

Mobility

Wireless networks are networks with low mobility, while cellular networks have high mobility. We can let the routing hardware handle the mobility or have the end systems handle mobility. The former is much more expensive and not scalable.



Reminders

Work on Project 2.

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You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at alvin@omgimanerd.tech