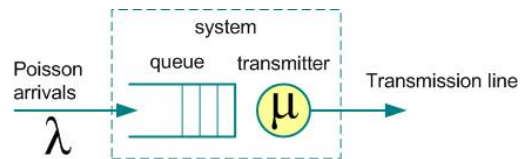


Example: Applying the M/M/1 Results to a Single Network Link



- Poisson packet arrivals with rate $\lambda = 2000$ packets/sec
- Link capacity $C = 1.544$ MB/sec
- Approximate the packet length distribution by an exponential with mean $L = 515$ B
- What is the mean service time W_s ? The transmitter utilization ρ ? Average number of packets in the system L ? Average time spent in the system W ?

Example: Applying the M/M/1 Results to a Single Network Link (Cont'd)

Solution:

- The service time $W_s = 1/\mu$, where μ is found using (link capacity/packet size). To determine how many packets/sec can be sent:
 $\mu = C/L = (1.544 \text{ MB/sec}) / 515 \text{ B} = 3000$ packet/sec, then
 $1/\mu = 1 / 3000 \text{ p/s} = 0.33 \text{ ms / packet}$
- $\rho = \lambda / \mu = 2000 / 3000 = 0.67$
- $L = \rho / (1 - \rho) = 0.67 / 0.33 = 2.0$ packets
- $W = L / \lambda = 2.0 / 2000 = 1.0 \text{ ms}$
- Also, it's easy to get average number of packets in the queue (L_q) and average time in the queue (W_q).