Question

5. (5 pts) A packet switch receives a packet and determines the outbound link to which the packet should be forwarded. When the packet arrives, one other packet is halfway done being transmitted on this outbound link and four other packets are waiting to be transmitted. Packets are transmitted in order of arrival. Suppose all packets are 1,500 bytes and the link rate is 2.5 Mbps. What is the queuing delay for the packet?

Answer

SOLUTION-

Consider the given data,

Length of the packet = L

Rate of transmission = R

Currently transmitted packet = x bits = L / R

Number of packets present in the queue = n packets

Formula for calculating Queing Delay will be :

$$QueingDelay = \frac{[nL + (L - x)]}{R}$$

Given data,

L = 1500 bytes

R = 2.5 Mbps = 2.5 x 10^{6} bps

x = 1500 / 2 = 750

n = 4

Using the above formula mentioned, we can calculate the result as follows:

= nL + (L - x)

= 4 x 1500 + (1500 - 750) = **6750 bytes**

R = 2.5 Mbps = 2.5×10^6

Since 4 packets are waiting to be transmitted,therefore,

Packets are transmitted at a rate of 2.5 Mbps = 6750 x 2.5 x 4 = 67500

Queuing Delay = 67500 / (2.5×10^6) = **0.027 sec**

Hence, the queuing delay for the packet is 0.027 seconds.