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Ans :→

Given data.
Transmission Rate (R) = 150 bits /sec.
Packet length (L) = 100,000 bits long.
control data = 200 bits
object data = 100 Kbits
Distance (d) = 10 meter.
N = 10.

d = dp (propagation delay) + dt (transmission delay)

$dt = \frac{L}{R}$ seconds.

$dp = \frac{d}{S} = Tp.$

Bandwidth = 150 bits /sec.
Number of connections (N) = 10
[As referenced object]

Bandwidth = $\frac{150}{10}$ bits/sec.

= 15 bits /sec.

Time for all received objects.

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$$\Rightarrow \left(\frac{200}{150} + T_p + \frac{200}{150} + T_p + \frac{200}{150} + T_p + \frac{100,000}{150} + T_p\right) +$$

$$\left(\frac{200}{15} + T_p + \frac{200}{15} + T_p + \frac{200}{15} + T_p + \frac{100,000}{150} + T_p\right).$$

$$\Rightarrow \left(\frac{100,600}{150} + 4T_p\right) + \left(\frac{100,600}{150} + 4T_p\right)$$

$\Rightarrow$ 7377 + 8 X Tp seconds.

Total time for persistent HTTP connections -

$$\left(\frac{200}{150} + T_p + \frac{200}{150} + T_p + \frac{200}{150} + T_p + \frac{100,000}{150} + T_p\right) +$$

$$10 \times \left(\frac{200}{150} + T_p + \frac{100,000}{150} + T_p\right).$$

$$= \left(\frac{100,600}{150} + 4T_p\right) + 10 \times \left(\frac{100,200}{150} + 2T_p\right).$$

$$= (670 + 4T_p) + (6680 + 20T_p)$$

$$= 7350 + 24 \times T_p.$$

Let us that the propagation speed of the medium is 300×10^6 m/sec.

Then $T_p = \frac{10}{300 \times 10^6} = 0.03$ micro second.

No expect significant gains over the non-persistant