

# Deliverables

Part 1) Transfer time =  $\frac{RTT}{2} + \frac{1}{\text{Bandwidth}} \times \text{Size}$

$$\text{Transfer time} = 10\text{ms} + \frac{1}{80 \cdot 2^{20} \text{ bits/s}} \cdot 8 \cdot 2^{20} \text{ bits} = 10\text{ms} + 0.1\text{s} = \boxed{110\text{ms}}$$

Part 2) Transfer time =  $\frac{RTT}{2} + \frac{\text{Size}}{\text{Bandwidth}} + \frac{\text{Size}}{\text{Bandwidth}}$

$$\text{Transfer time} = 10\text{ms} + \frac{8 \cdot 2^{20} \text{ bits}}{80 \cdot 2^{20} \text{ bits/s}} + \frac{8 \cdot 2^{20} \text{ bits}}{60 \cdot 2^{20} \text{ bits/s}} \approx 110\text{ms} + 0.133\text{s} = \boxed{243\text{ms}}$$

Part 3) Transfer time = 240ms +  $\frac{512\text{Kb} = 4 \cdot 2^{20} \text{ bits}}{60 \cdot 2^{20} \text{ bits/s}} \approx 243\text{ms} + 0.067\text{s} = \boxed{310\text{ms}}$

from part 2  $\nearrow$  queuing delay  $\nearrow$