

The propagation delay is the total distance in meters divided by the speed in meters per millisecond

$$d_{prop} := \frac{775}{2.4 \cdot 10^{11}}$$

$$3.229166667 \cdot 10^{-9} \quad (1)$$

$$RTT := d_{prop} \cdot 2$$

$$6.458333334 \cdot 10^{-9} \quad (2)$$

The file size must be converted from kilobytes to bits

$$datasize := 640 \cdot 8 \cdot 10^3$$

$$5120000 \quad (3)$$

The final delay is the sum of all the individual transmission delays and the RTT

$$d_{AP} := \frac{datasize}{54 \cdot 10^9}$$

$$\frac{8}{84375} \quad (4)$$

$$d_{modem} := \frac{datasize}{100 \cdot 10^9}$$

$$\frac{4}{78125} \quad (5)$$

$$d_{DSLAM} := \frac{datasize}{2 \cdot 10^9}$$

$$\frac{8}{3125} \quad (6)$$

$$d_{Internet} := \frac{datasize}{10^{12}}$$

$$\frac{2}{390625} \quad (7)$$

$$d_{total} := d_{AP} + d_{modem} + d_{DSLAM} + d_{Internet} + RTT$$

$$0.002711141273 \quad (8)$$