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6. a. $d_{prop} = m/s$

b. $d_{trans} = L/R$.

c. $d_{端到端} = d_{prop} + d_{trans} = m/s + L/R$.

d. $d = d_{trans}$，所有比特刚好传输完成，最后一个比特在传播ms走之点.

e. $N = t \cdot s = d_{trans} \cdot s = \frac{L}{R} \cdot s$. 第一个在传播的路上，距离A $\frac{L}{R} \cdot s$ 处

f. 第一个比特已传到B.

g. $\frac{m}{s} = \frac{L}{R}$ ∴ $m = 2.5 \times 10^8 \times 1500 \div 10 \times 10^6 = 37500\ m$

7. $t_{转换} = \frac{56B \times 8b}{64\ kbps} = 0.875 \times 10^{-3}\ s. \times 8 = 7 \times 10^{-3}\ s$

$d_{trans} = \frac{56B \times 8b}{10 \times 10^6\ bps} = 5.6 \times 10^{-6}\ s \times 8 = 44.8 \times 10^{-6}\ s$

$t_{总} = 2 \times t_{转换} + 10\ ms + d_{trans} =$ ~~14.2556 ms~~ 24.0448 ms.

25. a. $R \cdot t_{prop} = R \cdot \frac{m}{s} = 5 \times 10^6 \times \frac{2 \times 10^7 m}{2.5 \times 10^8 m/s} = 4 \times 10^5$

b. $t_{trans} = \frac{L}{R} = \frac{8 \times 10^5 b}{5 \times 10^6\ bps} = 0.16\ s.$

每个比特需传输的时间：$\frac{0.16\ s}{8 \times 10^5} = 0.02 \times 10^{-5}$

$t_{prop} = \frac{m}{s} = \frac{2 \times 10^7 m}{2.5 \times 10^8 m/s} = 0.08\ s.$

∴ $n = \frac{0.08\ s}{0.02 \times 10^{-5}} = 4 \times 10^5$ 个比特.

c. 由 a. b 可知，$R \cdot t_{prop}$ 与在链路上具有的最大比特数量相等.

可知，$R \cdot t_{prop}$ 即传播时的最大比特值.

d. $w = \dfrac{2 \times 10^7}{4 \times 10^5} = 50\ m$. 比足球场长度短.

e. $w = \dfrac{m}{R \cdot \frac{m}{s}} = \dfrac{s}{R}$.

33. $t_{trans} = \dfrac{L}{R} = \dfrac{80+S}{R}$. $n = \dfrac{F}{S}$ 个分组.

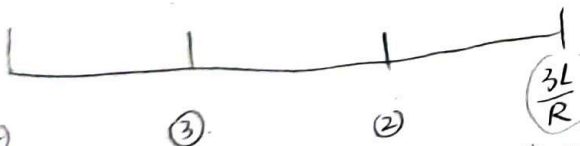
~~$t_{总} = n \cdot \frac{L}{R} = \frac{F}{S} \cdot \frac{80+S}{R} \times 3 = 3 \cdot \frac{80+S}{R}$~~

~~$t_{AB} = 3 \cdot t_{总} = \frac{3F}{R} \cdot \frac{80+S}{S} = \frac{3F}{R}(1 + \frac{80}{S})$~~

~~$t_{AB} = \frac{F}{R} + 3 \cdot \frac{80+S}{R}$.~~

~~$t = \frac{80+S}{R} + 2 \times \frac{80+S}{R}$~~ $t = (\dfrac{F}{S} + 2) \dfrac{80+S}{R}$.

$= \dfrac{160+2S}{R} + \dfrac{F}{R} \cdot \dfrac{80+S}{S}$



$= \dfrac{160}{R} + \dfrac{2S}{R} + \dfrac{F \cdot 80}{RS} + \dfrac{F}{R}$.

$= \dfrac{2S}{R} + \dfrac{F \cdot 80}{RS} + \dfrac{160+F}{R}$

$\therefore = \dfrac{2}{R}(S + \dfrac{40F}{S}) + \dfrac{160+F}{R}$

$\frac{F}{S}$ $\frac{F}{S}-1$ $\frac{F}{S}-2$ $\frac{F}{S}-3$ ①

$\therefore S_{min} = \sqrt{40F}$.

$\frac{3L}{R} + (\frac{F}{S} - 4)\frac{L}{R} + 3\frac{L}{R}$

$= (\frac{F}{S} + 2)\frac{L}{R}$

$\therefore$ n个分组，m个路由器

$\Rightarrow t = (n+m)\frac{L}{R}$