P7. $T = 2RTT_0 + RTT_1 + \cdots RTT_n$.

P8. a. ~~$2RTT \times 8 =$~~

$RTT_1 + \cdots RTT_n + 8 \times 2RTT_0 = 16RTT_0 + RTT_1 + \cdots RTT_n$.

b. $RTT_1 + \cdots RTT_n + 2 \times 2RTT_0 = 4RTT_0 + RTT_1 + \cdots RTT_n$.

c. $RTT_1 + \cdots RTT_n + RTT_0 + 8RTT_0 = 9RTT_0 + RTT_1 + \cdots RTT_n$.

P22. 客户-服务端 $D_{cs} \geq \max\left\{\frac{NF}{u_s}, \frac{F}{d_{min}}\right\}$.

P2P. $D_{P2P} = \max\left\{\frac{F}{u_s}, \frac{F}{d_{min}}, \frac{NF}{u_s + \sum_{i=1}^{N} u_i}\right\}$.

$N = 10$, $u = 300\text{Kbps}$. $D_{cs} = \max\left\{\frac{10 \cdot 20\text{Gb}}{30\text{Mbps}}, \frac{20\text{Gb}}{2\text{Mbps}}\right\}$

$= 10 \times 10^3\text{s} = 1 \times 10^4\text{s}$

$D_{P2P} = \max\left\{\frac{20\text{Gb}}{30\text{Mbps}}, \frac{20\text{Gb}}{2\text{Mbps}}, \frac{10 \cdot 20\text{Gb}}{30\text{Mbps} + 10 \cdot 300\text{kbps}}\right\}$

$= 1 \times 10^4\text{s}$.

$u = 700\ Kbps$. $D_{cs} = 1 \times 10^4 s$

$D_{p2p} = 1 \times 10^4 s$.

$u = 2 Mbps$. $D_{cs} = 1 \times 10^4 s$. $D_{p2p} = 1 \times 10^4 s$.

$N = 100$. $D_{cs} = 6.6 \times 10^4 s$.

$u = 300 kbps$ $D_{p2p} = 3.3 \times 10^4 s$.

$u = 700 kbps$ $D_{p2p} = 2 \times 10^4 s$.

$u = 2 Mbps$ $D_{p2p} = 1 \times 10^4 s$.

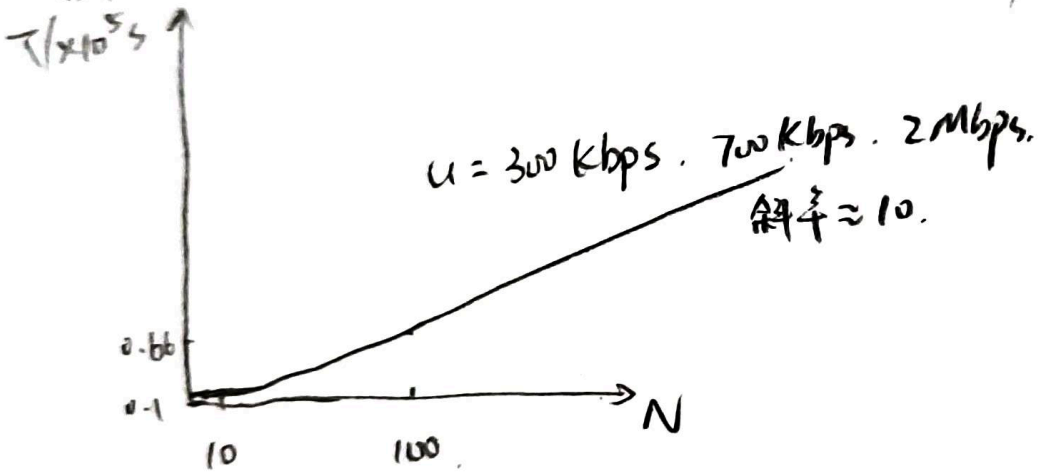
$N = 1000$ $D_{cs} = 6.6 \times 10^5 s$.

$u = 300$ kbps. $D_{P2P} = 6.06 \times 10^4$ s.

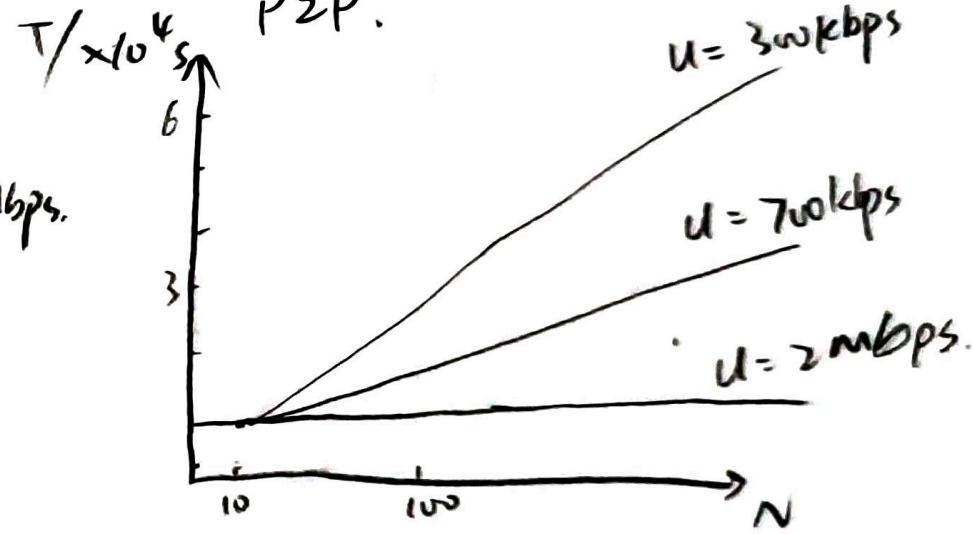
$u = 700$ kbps $D_{P2P} = 2.7 \times 10^4$ s.

$u = 2$ Mbps $D_{P2P} = 1 \times 10^4$ s.

客户-服务器



P2P.



P25 每个活跃的对等方都有TCP连接

∴ N个TCP连接. ⇒ 2个节点，1条边.

N台路由器不贡献额外的边和点.

∴ 共 2N个节点. N条边.

P27. a. $N \times N$ 个

b. $N + N = 2N$ 个.