

Bonjour!

A42
3 / 6 / 2014
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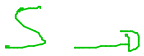


Paquet / Fichier

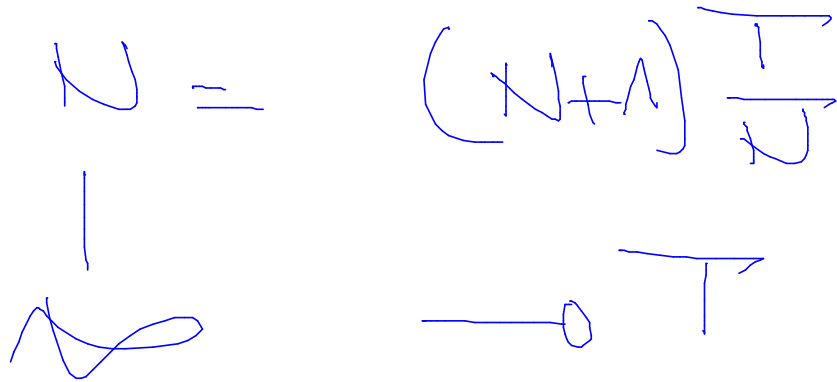
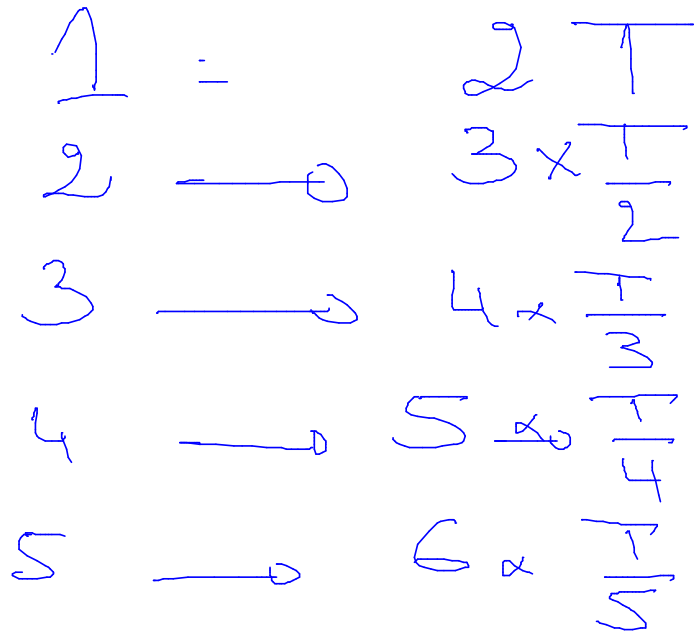
1



SW

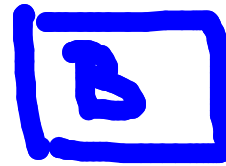
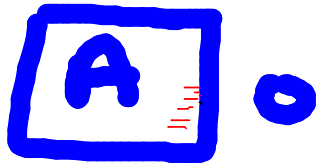


5 étapes



$$N = \frac{H}{S} \quad \text{nb de paquets}$$

$$= S + 40 \quad \text{Taille}$$



$$v = f(\text{support})$$

ex $\left\{ \begin{array}{l} 300 \times 10^3 \text{ Km/s} \\ \text{vide} \\ 100\,000 \text{ kbps} \\ \text{Ethernet} \end{array} \right.$

① $T_{\text{prop}} = \frac{\text{distance}}{\text{vitesse}} = \frac{m}{s}$

② $T_{\text{trans}} = \frac{\text{Taille}}{\text{débit}} = \frac{L}{R}$

$$T = T_{\text{prop}} + T_{\text{trans}}$$

$$= \frac{m}{v} + \frac{L}{R}$$

③

④ : en entrée

⑤ $= v = \frac{\text{dist}}{\text{tmp}} \Rightarrow \text{dist} = v \times \text{tmp}$

⑥ $= \text{Arrivé à B, } \text{dist} = v \times t_{\text{trans}}$

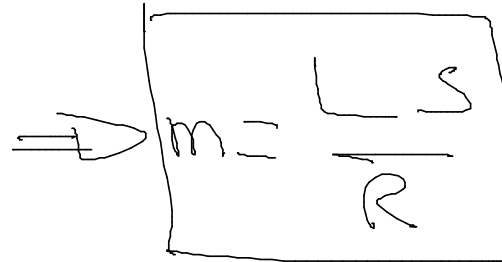
$$S = 2.5 \times 10^8 \text{ m/s}$$

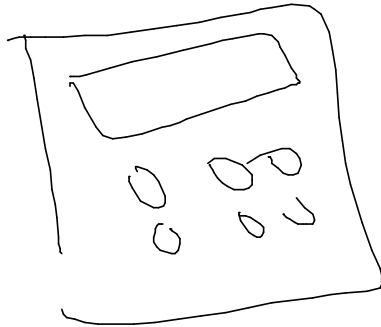
$$L = 100 \text{ bit}$$

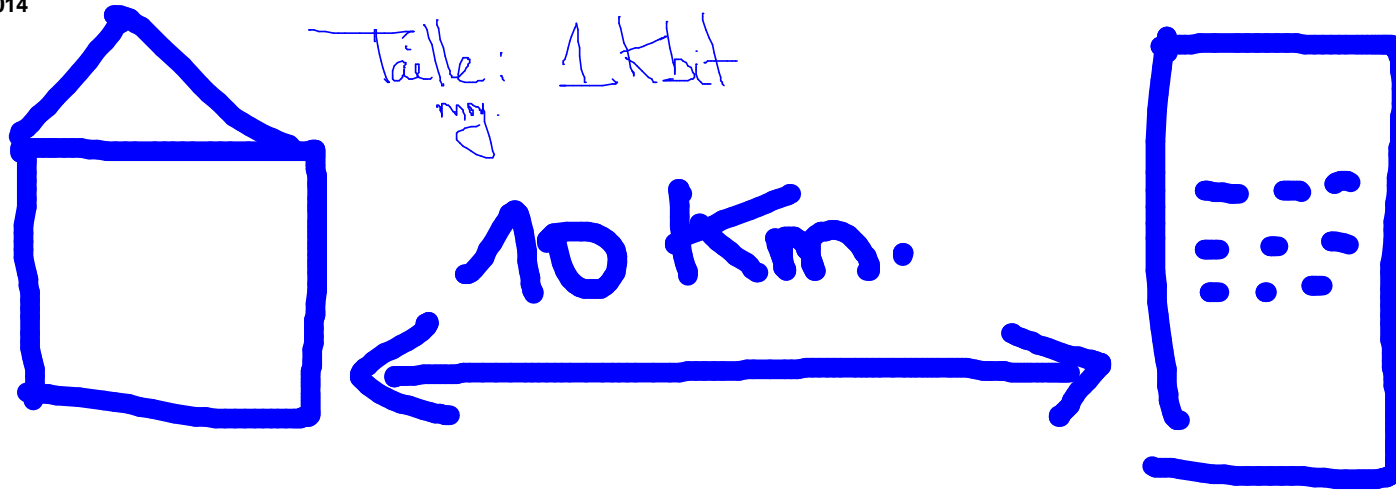
$$R = 28000 \text{ bits/s}$$

$$t_{\text{trans}} = t_{\text{prop}}$$

$$\frac{L}{R} = \frac{m}{S}$$


$$m = \frac{L \cdot S}{R}$$





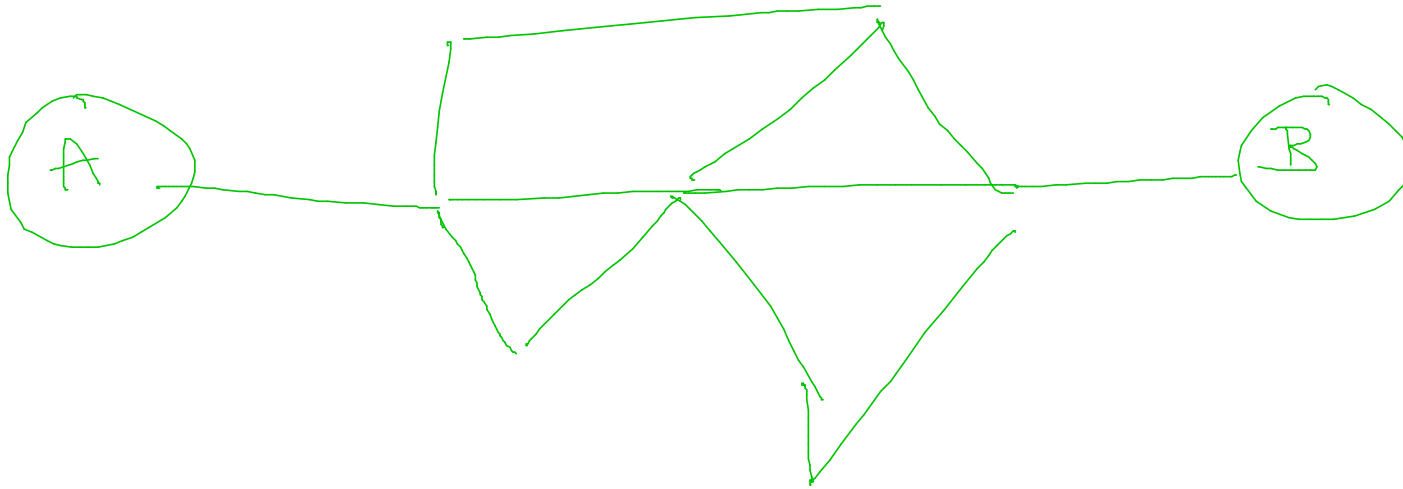
Solution 1: LS : { débit : 2 Mbps
 { vitesse : 200 000 km/s

Solution 2 Sat { débit : 2 Gbps
 { vitesse : 300 000 km/s
 { 36 000 km d'Alt.

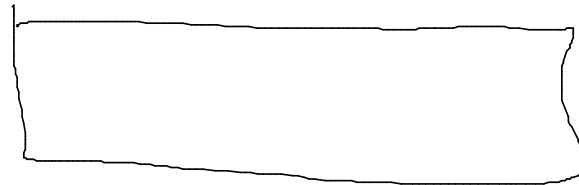
$$1^{\text{st}} \text{ Cas} = \frac{10000}{200000000} + \frac{1000}{200000000}$$

$$2^{\text{nd}} \text{ Cas} = \frac{36000 \times 2}{300000000} + \frac{1000}{200000000}$$

Seq 4

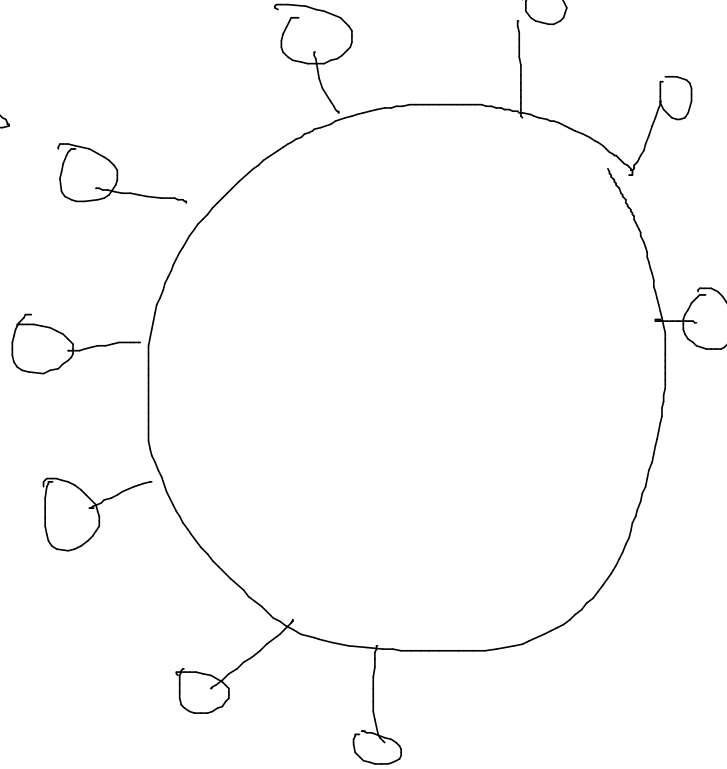


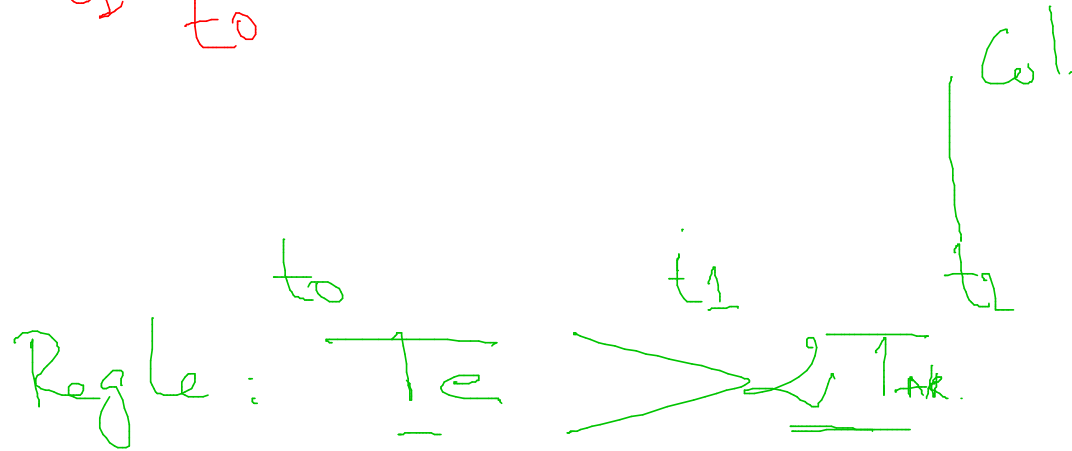
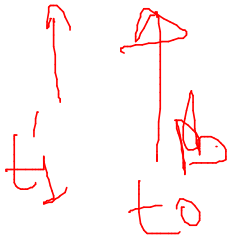
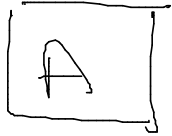
Encapsulation.



Reseau

- distance de 50 km.
- vitesse = 200 000 km/s.
- CSMA/CD comme methode d'accès.
- debit = 2 Mbit/s





$$T_{PR} = \frac{50 \text{ km}}{200 \text{ 000 km/s}} = 0,25 \text{ ms}$$

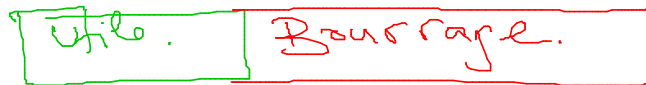
$$T_e \geq 2 \times 0,25 \text{ ms} = 0,5 \text{ ms}$$

Taille minimale

$$T_e = \frac{\text{Taille}}{\text{debit}} > 0,5 \text{ ms}$$

$$\begin{aligned} \text{Taille} &= \text{debit} \times 0,5 \text{ ms} \\ &= 2 \times 10^6 \times 0,5 \times 10^{-3} = 1000 \text{ bits} \end{aligned}$$

Consq :

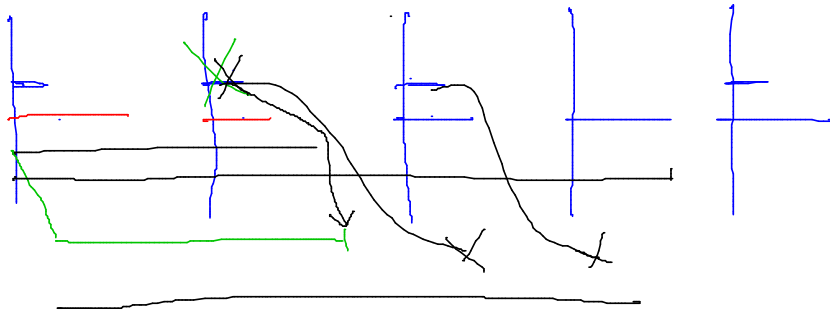


Seq 7

Taille max d'un paquet
d'une trame

éviter qu'une trame ne monopolise la liaison.

mécanisme de QoS.



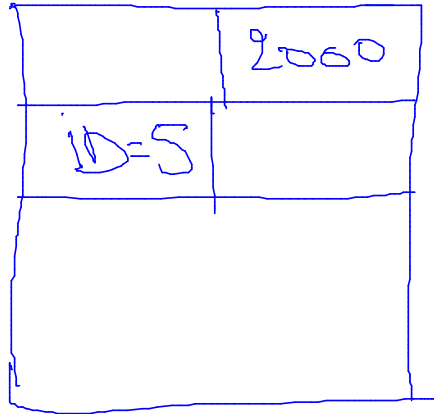
ping → option pour fixe une
taille. (-l)

indicateur pour (-f)
interdire la fragmentation.

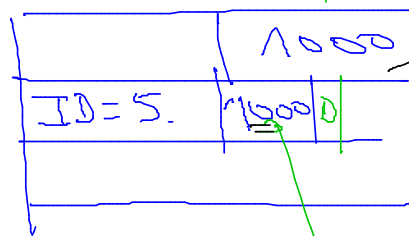
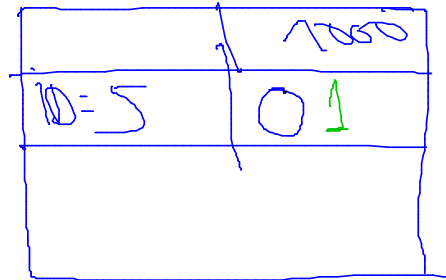
ping -l 20000

paquet doit être frag +
indicateur DF activé

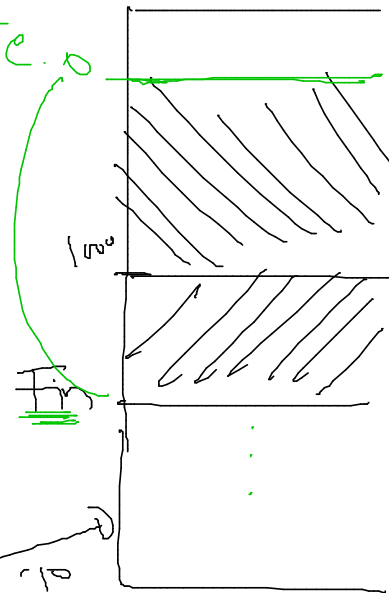
MTU : 1000



2 frag. du
in paquet

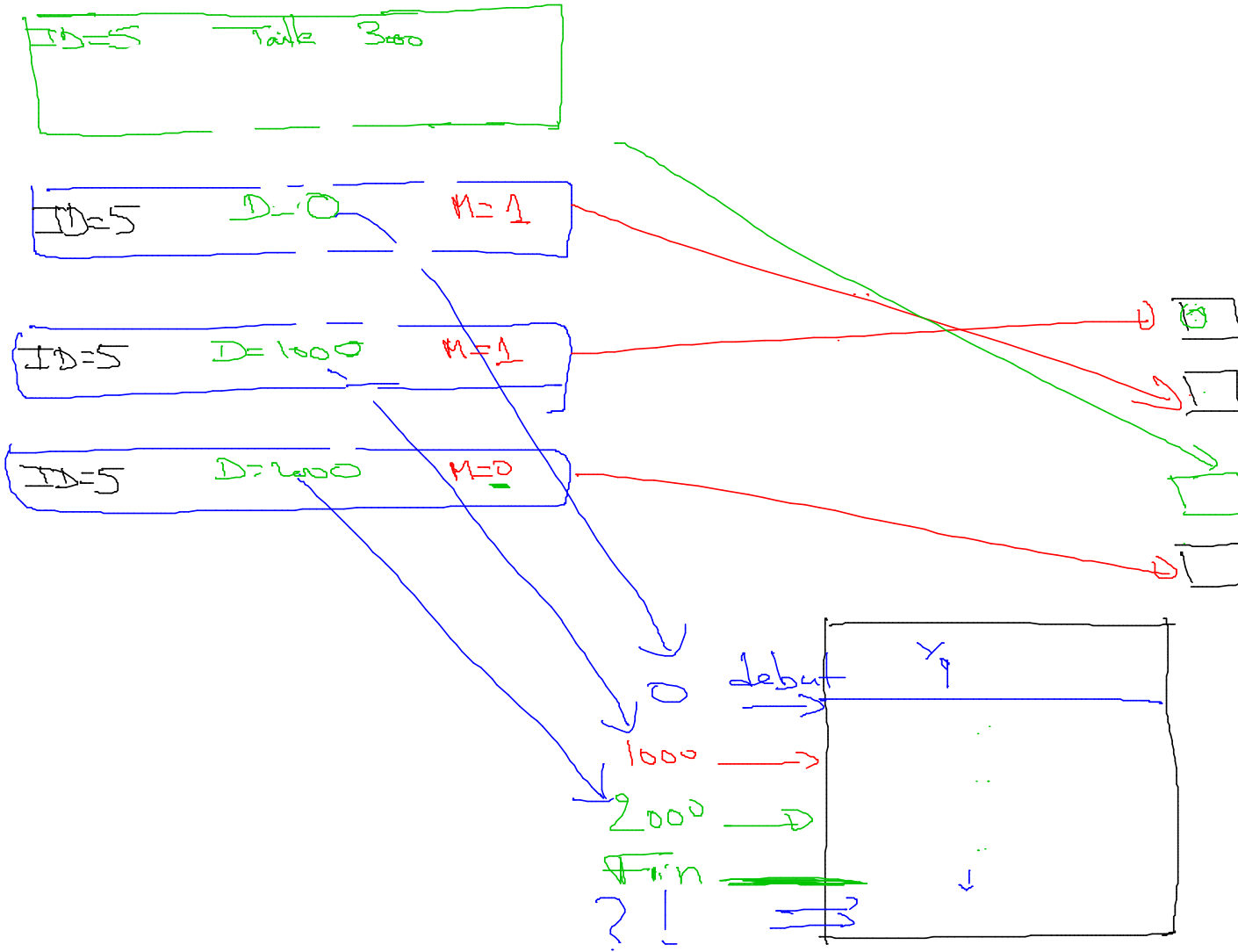


buffer dest



les données correspondent aux
derniers à partir du 1000^e octet.

MTU = 1000



Q2:

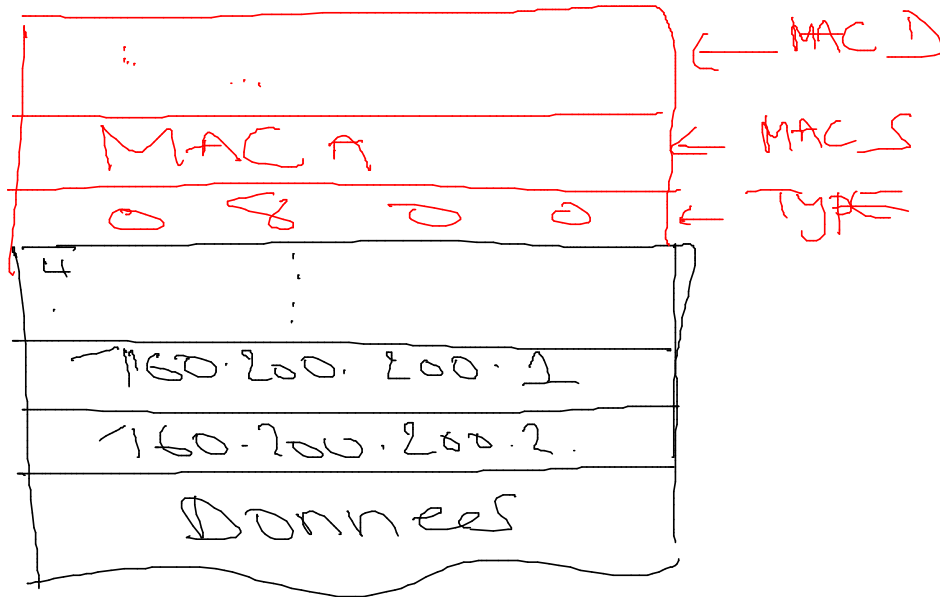
reçoit un message ICMP
pour indiquer que le paquet
n'a pas été envoyé.

Seq 8



160.200.200.1 → 160.200.200.2
① Req Diffusion ARP (160.200.200.2, -----)
Rep arp: (160.200.200.2, MAC C)

Entete MAC



Entete IP



Si l'AD n'est pas configuré, la requête n'est pas envoyée.

A: Req ARP (160.100.200.X)
~~Interim.~~

Passerelle: Rep ARP (160.100.200.X, MAC Passerelle)

si elle existe

MAC Passerelle
MAC A
0 8 0 0
⋮
160.200.200.1
160.100.200.3

Routers ou commutateurs de niveau 3

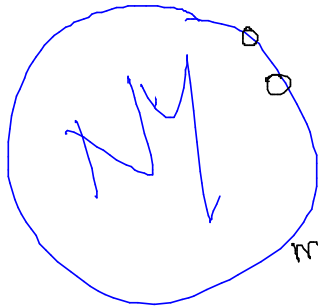
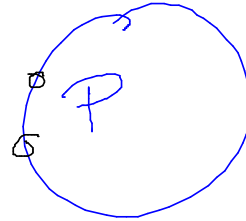
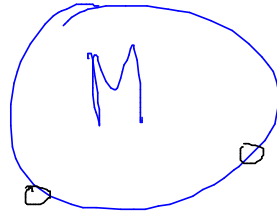
Si la passerelle n'existe pas le paquet n'est pas envoyé

ne sont pas dans

le même réseau

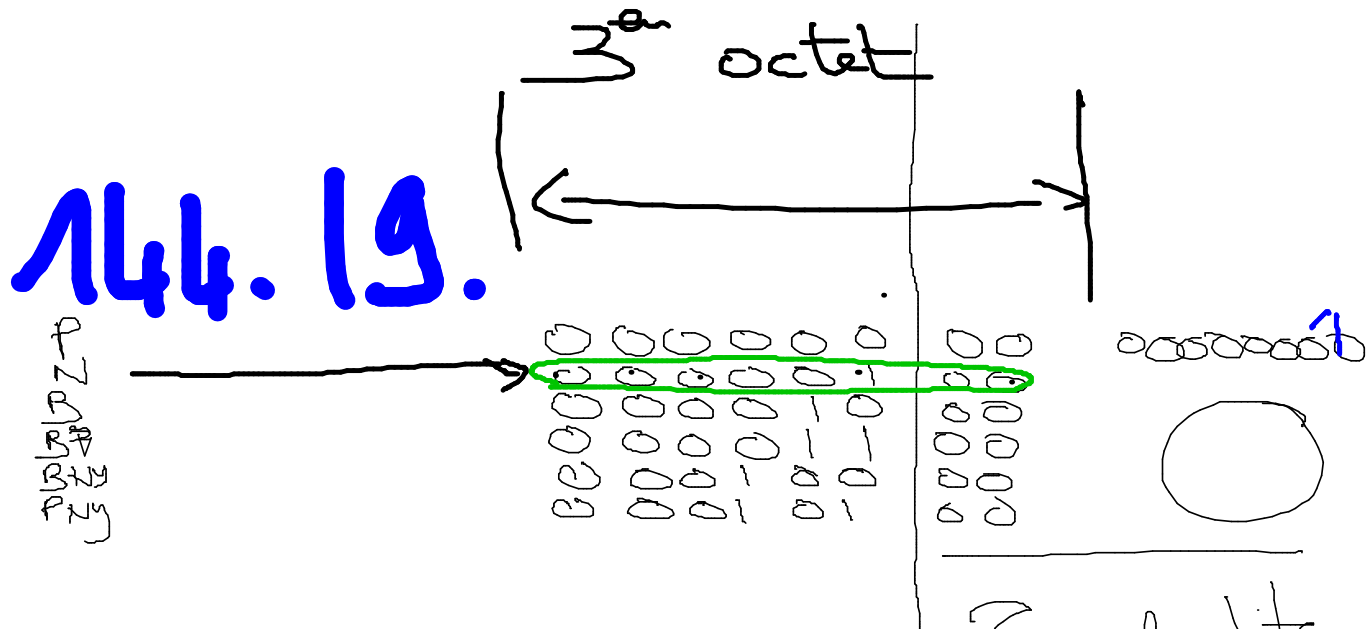
Adresse Réseau: 144.19.0.0

SP: 255.255.252.0
ou
/22



masque . 111111 00 00000000

10 bits
 $2^{10} - 2 = 1024 - 2$
 $= 1022 @$

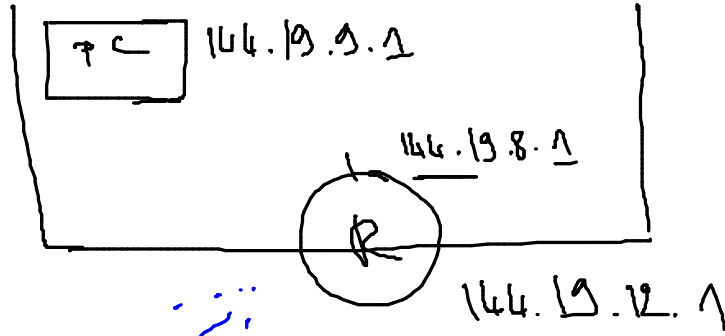


Les bits machine sont à 0.

	Réseau		Plage	
IP	144.19.0.0	144.19.0.1/22	→	144.19.3.254/22
Z	144.19.4.0	144.19.4.1/22	→	144.19.7.254/22
B	144.19.8.0			
B-P	144.19.12.0			
B-Z	144.19.16.0			
P-Z	144.19.20.0	144.19.20.1/22	→	144.19.23.254/22

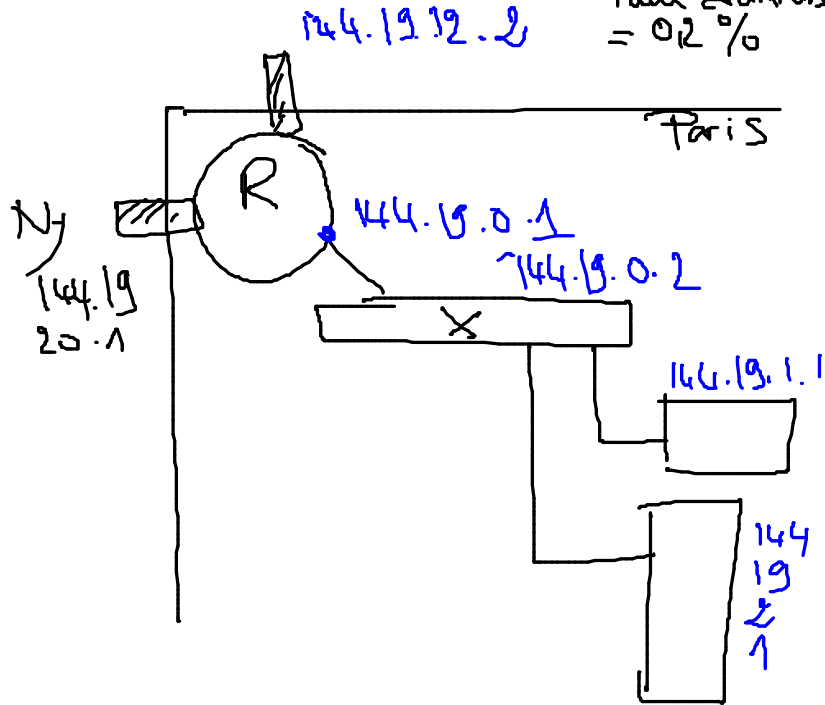
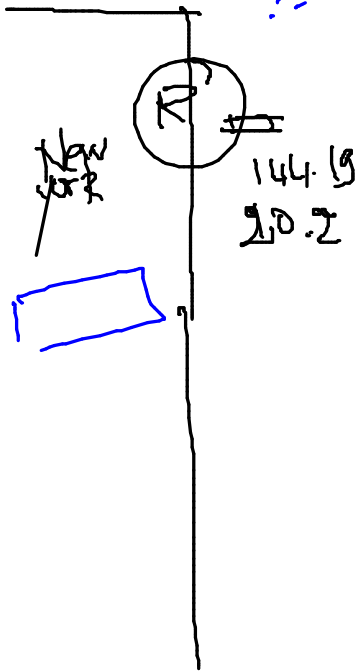
exp Paris

144. 19. 00000000 00 00000001
144. 19 000000 11 1111 111 0



Pb: { besoin = 2
 { reservation = 1022.

⇓
taux d'intégration
= 0.2 %



1100000

191

a besoin d'un routeur.

127

dans int routeur

130

0

64

128

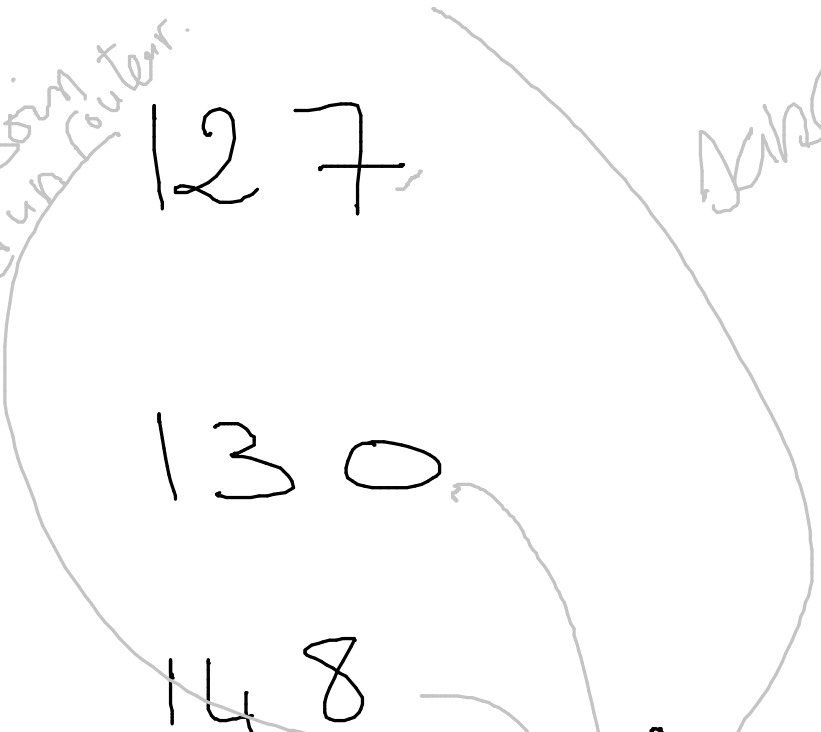
192

148

0 64 128 192.

255

AC



144 100

127 0111 1111

130 1000 0000

148 100

191 101

130. 12. 127

~~A~~ ~~B~~

64 0100 0000

167 101

127 0111 1111