ANNEXES :

Annexe1 :

- Extrait du rapport de recette d'un canal horizontal,
- Désignation des prises au sein de Paule de Viguier,
- Extrait de la norme 11801,
- Quelques informations sur les mesures physiques des liaisons cuivres.

Annexe2 :

- Logiciel d'analyse de trames : Ethereal,
- An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware:
- Transmission control protocol
- User datagram protocol
- Well known port numbers

ANNEXE 1 :

EXTRAIT DU RAPPORT DE RECETTE D'UN CANAL HORIZONTAL :

ID Câble: PRM01403
CHU TOULOUSE
SITE: HOPITAL MERE
OPERATEUR: COLLIN BRUNO
Version des normes: 4.9
Version du logiciel: 3.8
NVP: 69.3%
TEST DE BLINDAGE/ECRAN: Activer
Schéma de câblage CORRECT

Résumé de test: CORRECT
MARGE DE SECURITE: 6.0 dB (NEXT Distant 12-36)
Date / Heure: 03/05/2003 03:23:31pm
Norme de test: TIA Cat 5e BL (1999)
Type de Câble: ScTP 100 Ohm Cat 5e
FLUKE DSP-4000 Num. Sér.: 7650025 LIA101
FLUKE DSP-4000SR Num. Sér.: 7650025 LIA101

Résult. Broche RJ45: 1 2 3 4 5 6 7 8 B

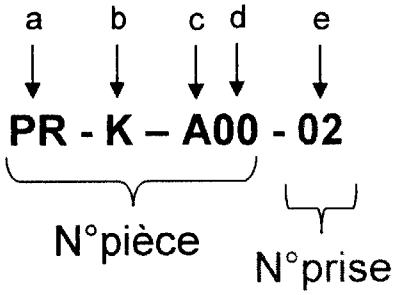
Broche RJ45: 1 2 3 4 5 6 7 8 B

Paire	Longueur (m)	Lim.	Délai de prop. ns	Lim.	Divergen. de prop. ns	Lim.	Résistance ohms	Lim.	Impédance ohms	Lim.	Anom. (m)	Atténuation Résult. (dB)	Fréq. MHz	Lim. (dB)
12	70.3	94.0	338	518	4	45						13.7	100.0	21.6
36	69.8	94.0	336	518	2	45						14.4	100.0	21.6
45	71.9	94.0	346	518	12	45						14.5	100.0	21.6
78	69.4	94.0	334	518	0	45						14.7	100.0	21.6

	Résultats du testeur						Résultats de l'injecteur					
	Pire marge			Pire valeur			Pire marge			Pire valeur		
Paire	Résult. (dB)	Fréq. MHz	Lim. (dB)	Résult. (dB)	Fréq. MHz	Lim. (dB)	Résult. (dB)	Fréq. MHz	Lim. (dB)	Résult. (dB)	Fréq. MHz	Lim. (dB)
RL												
12	26.1	4.7	17.0	26.0	65.4	13.4	27.3	9.8	17.0	26.0	49.6	14.3
36	23.3	4.6	17.0	22.1	86.8	12.6	18.5	98.4	12.2	18.5	98.4	12.2
45	26.0	23.9	16.5	26.0	23.9	16.5	27.1	15.1	17.0	26.0	92.6	12.4
78	25.9	4.9	17.0	24.8	35.8	15.2	25.2	9.6	17.0	22.5	50.0	14.2
PSNEXT												
12	38.4	88.4	30.2	38.4	88.4	30.2	41.4	56.6	33.4	38.7	92.2	29.9
36	43.0	47.6	34.6	39.0	88.4	30.2	50.3	15.2	42.6	38.6	86.2	30.4
45	39.3	98.2	29.5	39.3	98.2	29.5	44.6	48.4	34.5	40.0	98.2	29.5
78	55.9	10.6	45.1	41.9	100.0	29.3	44.0	56.4	33.4	40.6	100.0	29.3
PSACR												
12	47.0	15.0	34.8	25.6	88.4	10.0	44.5	17.5	33.1	25.6	92.2	9.3
36	45.7	15.0	34.8	25.5	88.4	10.0	44.8	15.2	34.6	25.3	86.2	10.5
45	55.6	7.4	42.2	24.9	98.2	8.0	55.4	7.4	42.2	25.6	98.2	8.0
78	51.3	10.6	38.5	27.2	100.0	7.7	52.4	10.5	38.6	25.9	100.0	7.7
NEXT												
12-36	39.4	88.4	33.2	39.4	88.4	33.2	42.3	56.8	36.3	40.0	86.0	33.4
12-45	47.1	47.8	37.6	42.8	98.0	32.5	46.5	48.2	37.5	44.0	92.0	33.0
12-78	47.1	56.4	36.4	44.8	90.4	33.1	47.6	46.0	37.8	43.2	92.4	32.9
36-45	45.1	81.2	33.8	44.4	95.8	32.6	53.7	31.4	40.5	47.2	96.8	32.6
36-78	49.3	47.6	37.6	46.8	99.8	32.3	48.9	40.6	38.7	43.6	100.0	32.3
45-78	47.3	50.4	37.2	42.8	98.2	32.5	41.8	98.6	32.4	41.8	98.6	32.4
ACR												
12-36	47.2	15.0	37.8	25.9	88.4	13.0	46.2	15.2	37.6	26.7	86.0	13.5
12-45	54.6	10.4	41.7	28.4	98.0	11.1	66.0	3.2	52.8	30.1	92.0	12.3
12-78	54.8	10.4	41.7	30.8	90.4	12.6	37.8	46.0	23.5	29.1	92.4	12.2
36-45	45.4	31.6	28.9	30.2	95.8	11.5	60.1	7.4	45.2	32.9	96.8	11.3
36-78	51.9	15.3	37.6	32.1	99.8	10.7	50.7	15.3	37.6	28.9	100.0	10.7
45-78	37.0	50.4	22.3	28.2	98.2	11.0	60.3	7.2	45.4	27.2	98.6	11.0
ELFEXT												
12-36	75.2	1.0	60.0	37.7	95.8	20.3	75.3	1.0	60.0	38.4	95.8	20.3
12-45	55.3	36.0	28.8	48.4	99.6	20.0	55.7	36.0	28.8	49.3	99.8	20.0
12-78	50.0	33.4	29.5	45.5	99.6	20.0	50.4	33.4	29.5	46.5	83.8	21.5
36-12	75.4	1.0	60.0	38.6	97.2	20.2	75.3	1.0	60.0	37.9	97.2	20.2
36-45	76.9	1.0	60.0	41.7	99.4	20.0	76.8	1.0	60.0	41.8	99.2	20.0
36-78	47.3	63.4	23.9	46.9	95.8	20.3	47.5	63.4	23.9	47.2	95.8	20.3
45-12	56.0	28.6	30.9	49.3	84.4	21.4	55.6	28.6	30.9	48.6	84.8	21.4
45-36	76.8	1.0	60.0	42.0	100.0	20.0	76.9	1.0	60.0	41.9	100.0	20.0
45-78	83.7	1.0	60.0	52.2	63.6	23.9	83.7	1.0	60.0	52.3	63.6	23.9
78-12	56.1	18.2	34.8	44.1	94.4	20.5	55.8	18.2	34.8	43.1	94.4	20.5
78-36	45.5	100.0	20.0	45.5	100.0	20.0	45.2	100.0	20.0	45.2	100.0	20.0
78-45	82.6	1.0	60.0	47.8	98.0	20.2	82.6	1.0	60.0	47.6	98.0	20.2
ELFEXT												
12	74.7	1.0	57.0	37.6	97.2	17.2	74.9	1.0	57.0	37.7	94.6	17.4
36	72.9	1.0	57.0	36.2	94.6	17.4	73.0	1.0	57.0	36.6	97.0	17.2
45	75.8	1.0	57.0	40.3	100.0	17.0	76.0	1.0	57.0	41.6	100.0	17.0
78	43.8	63.4	20.9	43.3	93.6	17.5	79.8	1.0	57.0	40.7	100.0	17.0

DESIGNATION DES PRISES AU SEIN DE PAULE DE VIGUIER :

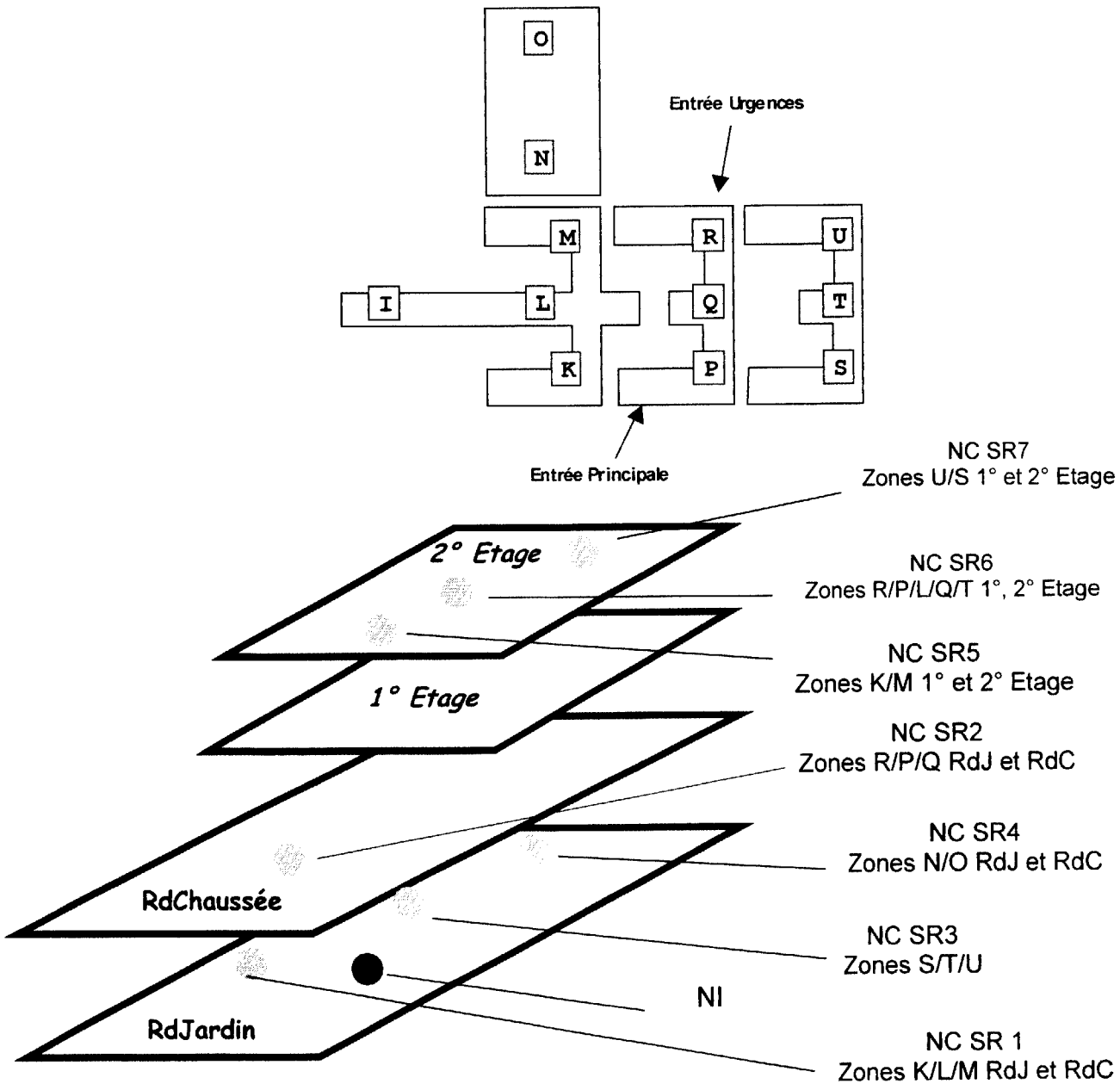
Le repérage prend en compte différentes informations.



N° pièce est décomposé en plusieurs parties :

a) **PR** signifie Prise,
b) représente les zones du bâtiment,
c) représente l'étage où est situé la pièce, niveau : A (pour l'étage -1), 0, 1, 2,
d) représente le numéro de la pièce,
e) représente le numéro de la prise.

Les zones du bâtiment :



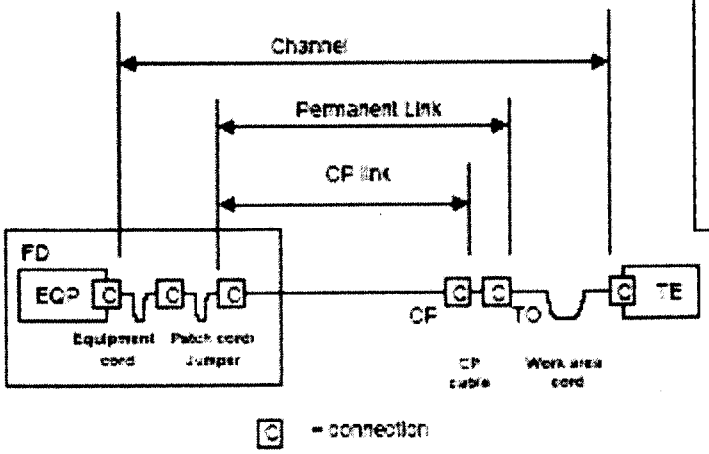
EXTRAIT DE LA NORME 11801 :

ISO JTC 1

Secretariat : **ANSI**

Voting beggins on : 2002-06-13

Voting terminates on : 2002-08-13



Channel, permanent link and CP link of a balanced cabling

Classification of balanced cabling

This standard specifies the following classes for balanced cabling.

Class A is specified up to 100 kHz.

Class B is specified up to 1 MHz.

Class C is specified up to 16 MHz.

Class D is specified up to 100 MHz.

Class E is specified up to 250 MHz.

Class F is specified up to 600 MHz.

Informative return loss values for channel at key frequencies

Frequency MHz	Minimum return loss dB			
	Class C	Class D	Class E	Class F
1	15.0	17,3	19,0	19,0
16	15.0	17,3	18,0	18,0
100	N/A	10,0	12,0	12,0
250	N/A	N/A	8.0	8,0
600	N/A	N/A	N/A	8,0

Insertion loss / attenuation

Previous editions of this standard use the term "attenuation", which is still widely used in the cable industry. However, due to impedance mismatches in cabling systems, especially at higher frequencies, this characteristic is better described as "insertion loss". In this edition, the term "insertion loss" is adopted throughout, to describe the signal attenuation over the length of channels, links and components. Unlike attenuation, insertion loss does not scale linearly with length.

Informative insertion loss values for channel at key frequencies

Frequency MHz	Maximum insertion loss dB					
	Class A	Class B	Class C	Class D	Class E	Class F
0.1	15.0	5,5	N/A	N/A	N/A	N/A
1	N/A	5,8	4,2	4.0	4.0	4,0
16	N/A	N/A	14.4	9.1	8.3	8,1
100	N/A	N/A	N/A	24,0	21,7	20.8
250	N/A	N/A	N/A	N/A	35,9	33.8
600	N/A	N/A	N/A	N/A	N/A	54.6

Informative NEXT values for channel at key frequencies

Frequency MHz	Minimum channel NEXT dB					
	Class A	Class B	Class C	Class D	Class E	Class F
0,1	27,0	40,0	N/A	N/A	N/A	N/A
1	N/A	25,0	39,1	60,0	65,0	65,0
16	N/A	N/A	19,4	43,5	53,2	65,0
100	N/A	N/A	N/A	30,1	39,9	62,9
250	N/A	N/A	N/A	N/A	33,1	55,9
600	N/A	N/A	N/A	N/A	N/A	51,2

Informative return loss values for permanent link with maximum implementation at key frequencies

Frequency MHz	Minimum return loss dB			
	Class C	Class D	Class E	Class F
1	15,0	19,0	21,0	21,0
16	15,0	19,0	20,0	20,0
100	N/A	12,0	14,0	14,0
250	N/A	N/A	10,0	10,0
600	N/A	N/A	N/A	10,0

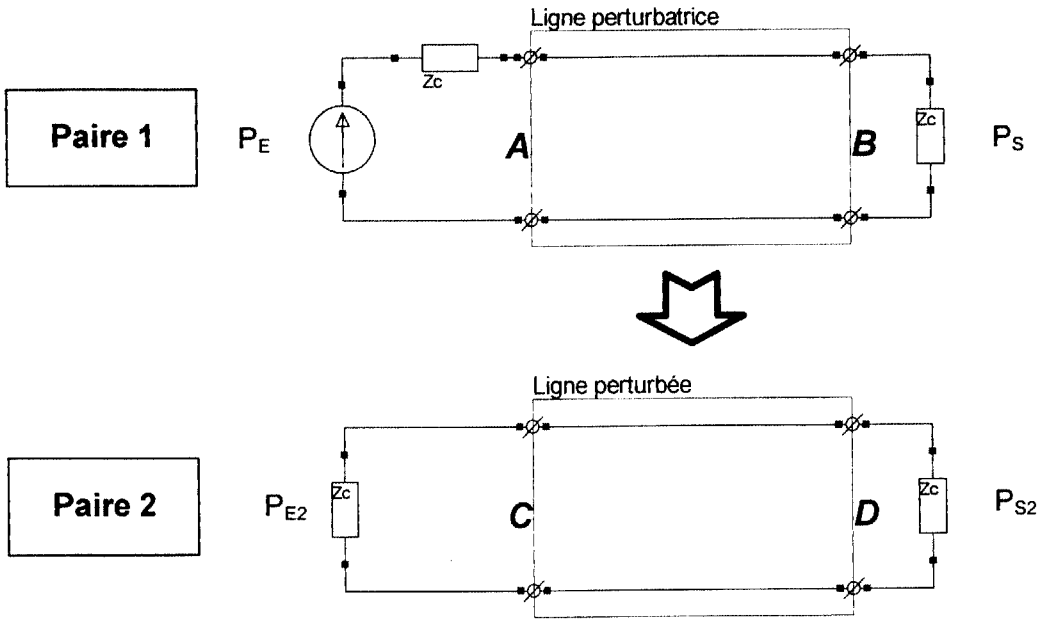
Informative insertion loss values for permanent link with maximum implementation at key frequencies

Frequency MHz	Maximum insertion loss dB					
	Class A	Class B	Class C	Class D	Class E	Class F
0,1	16,0	5,5	N/A	N/A	N/A	N/A
1	N/A	5,5	4,0	4,0	4,0	4,0
16	N/A	N/A	12,2	7,7	7,1	6,9
100	N/A	N/A	N/A	20,4	18,5	17,7
250	N/A	N/A	N/A	N/A	30,7	28,6
600	N/A	N/A	N/A	N/A	N/A	46,6

Informative NEXT values for permanent link with maximum implementation at key frequencies

Frequency MHz	Minimum NEXT dB					
	Class A	Class B	Class C	Class D	Class E	Class F
0,1	27,0	40,0	N/A	N/A	N/A	N/A
1	N/A	25,0	40,1	60,0	65,0	65,0
16	N/A	N/A	21,1	45,2	54,6	65,0
100	N/A	N/A	N/A	32,3	41,8	65,0
250	N/A	N/A	N/A	N/A	36,3	60,4
600	N/A	N/A	N/A	N/A	N/A	54,7

QUELQUES INFORMATIONS SUR LES MESURES PHYSIQUES DES LIAISONS CUIVRES :



- Puisance absorbée

$$P = \frac{U^2}{R}$$

- Affaiblissement de transmission (de A vers B) : Il augmente avec la fréquence du signal et la longueur du câble.

$$A = 10\log\frac{P_E}{P_S}$$

- Affaiblissement paradiaphonique (de A vers C) : appelé NEXT pour Near End Cross Talk.

$$A = 10\log\frac{P_E}{P_{E2}}$$

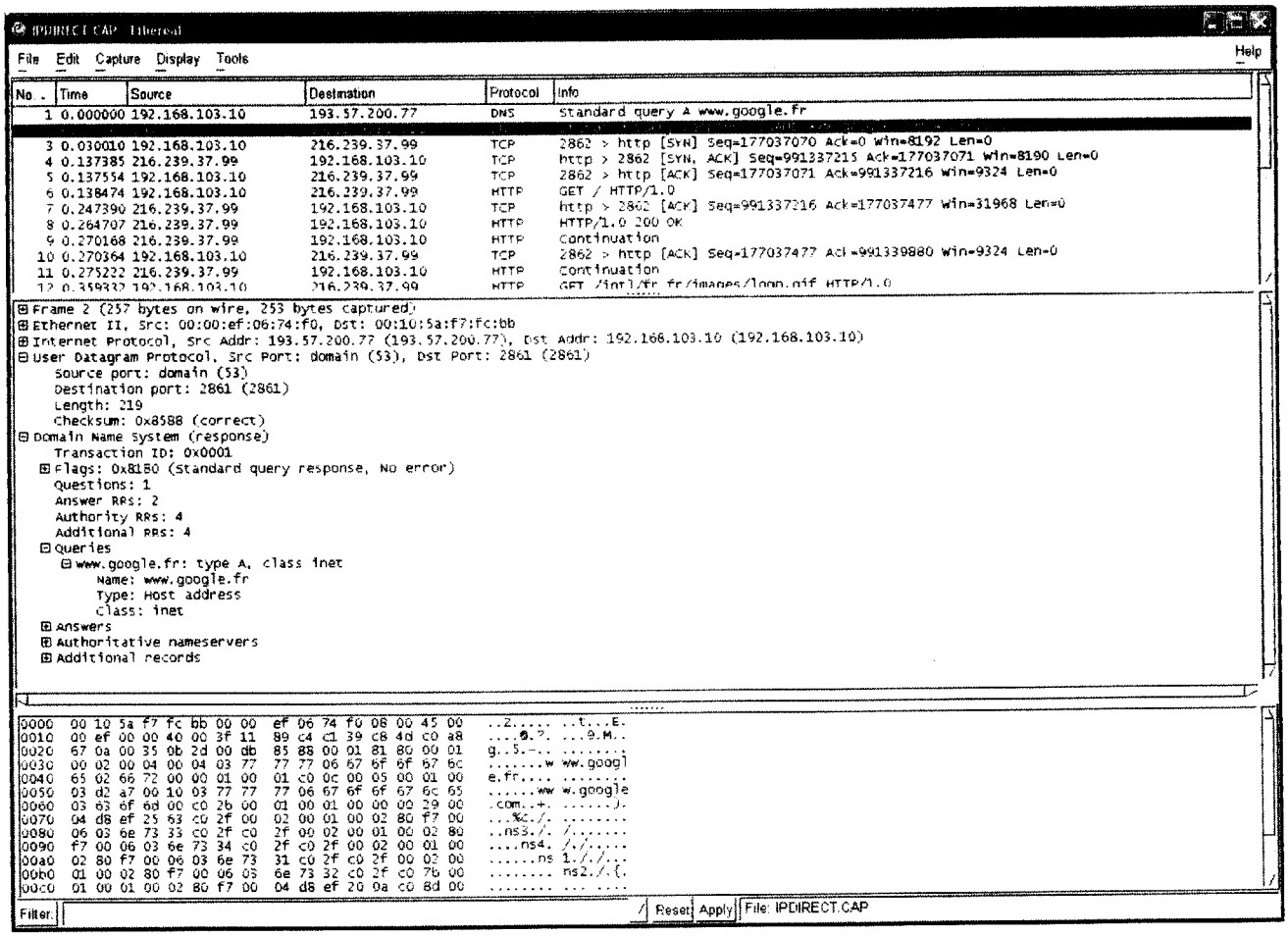
- Affaiblissement télédiaphonique (de A vers D) appelé également FEXT pour Far End Cross Talk.

$$A = 10\log\frac{P_E}{P_{S2}}$$

- Puissance Transmise :

dB	% transmis (au dixième près)	Perte
0	100	0
0,1	97,7	2,3
1	79,4	20,6
3	50	50
10	10	90
20	1	99

LOGICIEL D'ANALYSE DE TRAMES : ETHEREAL



AN ETHERNET ADDRESS RESOLUTION PROTOCOL -- OR -- CONVERTING NETWORK PROTOCOL ADDRESSES TO 48.BIT ETHERNET ADDRESS FOR TRANSMISSION ON ETHERNET HARDWARE:

The implementation of protocol P on a sending host S decides, through protocol P's routing mechanism, that it wants to transmit to a target host T located some place on a connected piece of 10Mbit Ethernet cable. To actually transmit the Ethernet packet a 48.bit Ethernet address must be generated. The addresses of hosts within protocol P are not always compatible with the corresponding Ethernet address (being different lengths or values). Presented here is a protocol that allows dynamic distribution of the information needed to build tables to translate an address A in protocol P's address space into a 48.bit Ethernet address.

Generalizations have been made which allow the protocol to be used for non-10Mbit Ethernet hardware. Some packet radio networks are examples of such hardware.

Packet format:
To communicate mappings from <protocol, address> pairs to 48.bit Ethernet addresses, a packet format that embodies the Address Resolution protocol is needed. The format of the packet follows.

Ethernet transmission layer (not necessarily accessible to the user):

```
48.bit: Ethernet address of destination
48.bit: Ethernet address of sender
16.bit: Protocol type = ether_type$ADDRESS_RESOLUTION
```

Ethernet packet data:

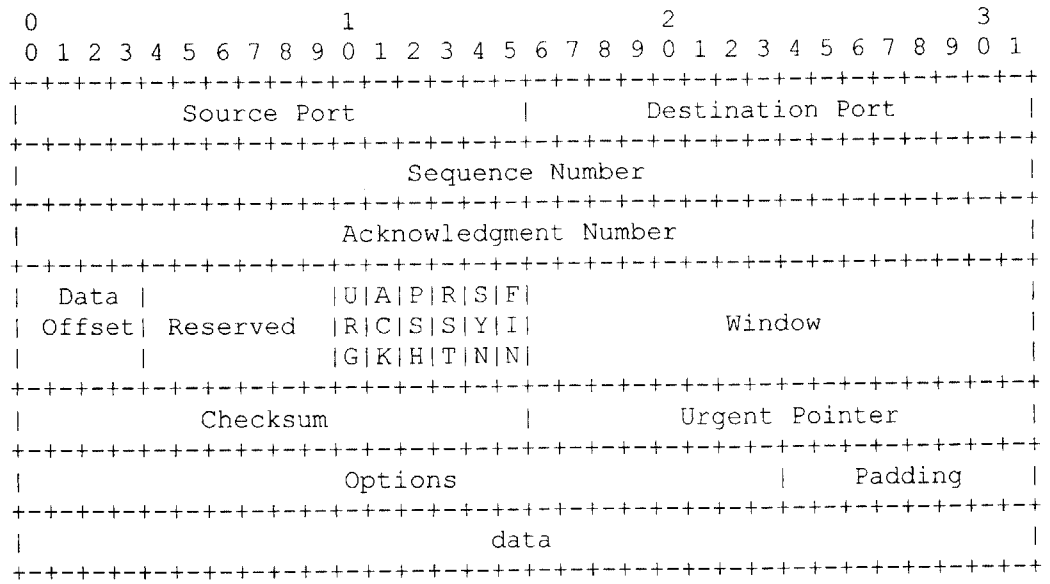
```
16.bit: (ar$hrd) Hardware address space (e.g., Ethernet, Packet Radio Net.)
16.bit: (ar$pro) Protocol address space.  For Ethernet hardware, this is from
        the set of type fields ether_typ$<protocol>.
8.bit:  (ar$hln) byte length of each hardware address
8.bit:  (ar$pln) byte length of each protocol address
```

```
16.bit:  (ar$op)   opcode (ares_op$REQUEST | ares_op$REPLY)
nbytes:  (ar$sha)  Hardware address of sender of this packet, n from the ar$hln
         field.
mbytes:  (ar$spa)  Protocol address of sender of this packet, m from the ar$pln
         field.
nbytes:  (ar$tha)  Hardware address of target of this packet (if known).
mbytes:  (ar$tpa)  Protocol address of target.
```

TRANSMISSION CONTROL PROTOCOL

The Transmission Control Protocol (TCP) is intended for use as a highly reliable host-to-host protocol between hosts in packet-switched computer communication networks, and in interconnected systems of such networks.

TCP Header Format :



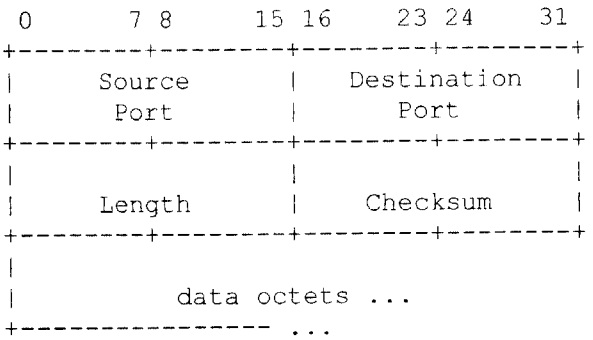
Source Port : 16 bits	The source port number.
Destination Port : 16 bits	The destination port number Port TCP de l'hôte de destination.
Sequence Number: 32 bits	The sequence number of the first data octet in this segment (except when SYN is present). If SYN is present the sequence number is the initial sequence number (ISN) and the first data octet is ISN+1.
Acknowledgment Number: 32 bits	If the ACK control bit is set this field contains the value of the next sequence number the sender of the segment is expecting to receive. Once a connection is established this is always sent.
Data Offset: 4 bits	The number of 32 bit words in the TCP Header. This indicates where the data begins. The TCP header (even one including options) is an integral number of 32 bits long.
Reserved: 6 bits	Reserved for future use. Must be zero.
Control Bits: 6 bits (from left to right):	URG: Urgent Pointer field significant, ACK: Acknowledgment field significant, PSH: Push Function, RST: Reset the connection, SYN: Synchronize sequence numbers, FIN: No more data from sender.
Window: 16 bits	The number of data octets beginning with the one indicated in the acknowledgment field which the sender of this segment is willing to accept.
Checksum: 16 bits	The checksum field is the 16 bit one's complement of the one's complement sum of all 16 bit words in the header and text. If a segment contains an odd number of header and text octets to be checksummed, the last octet is padded on the right with zeros to form a 16 bit word for checksum purposes. The pad is not transmitted as part of the segment. While computing the checksum, the checksum field itself is replaced with zeros. The checksum also covers a 96 bit pseudo header conceptually

USER DATAGRAM PROTOCOL

This User Datagram Protocol (UDP) is defined to make available a datagram mode of packet-switched computer communication in the environment of an interconnected of computer networks. This protocol assumes that the Internet Protocol (IP) is used as the underlying protocol.

This protocol provides a procedure for application programs to send messages to other programs with a minimum of protocol mechanism. The protocol is transaction oriented, and delivery and duplicate protection are not guaranteed. Applications requiring ordered reliable delivery of streams of data should use the Transmission Control Protocol (TCP).

Format :



Field :

Source Port is an optional field, when meaningful, it indicates the port of the sending process, and may be assumed to be the port to which a reply should be addressed in the absence of any other information. If not used, a value of zero is inserted.

Destination Port has a meaning within the context of a particular internet destination address.

Length is the length in octets of this user datagram including this header and the data. (This means the minimum value of the length is eight.)

Checksum is the 16-bit one's complement of the one's complement sum of a pseudo header of information from the IP header, the UDP header, and the data, padded with zero octets at the end (if necessary) to make a multiple of two octets.

WELL KNOWN PORT NUMBERS

The Well Known Ports are controlled and assigned by the IANA and on most systems can only be used by system (or root) processes or by programs executed by privileged users.

Keyword	Decimal	Description	References
	0/tcp	Reserved	
	0/udp	Reserved	
#		Jon Postel <postel@isi.edu>	
ftp-data	20/tcp	File Transfer [Default Data]	
ftp-data	20/udp	File Transfer [Default Data]	
ftp	21/tcp	File Transfer [Control]	
ftp	21/udp	File Transfer [Control]	
domain	53/tcp	Domain Name Server	
domain	53/udp	Domain Name Server	
#		Paul Mockapetris <PVM@ISI.EDU>	
www-http	80/tcp	World Wide Web HTTP	
www-http	80/udp	World Wide Web HTTP	
audionews	114/tcp	Audio News Multicast	
audionews	114/udp	Audio News Multicast	
snmp	161/tcp	SNMP	
snmp	161/udp	SNMP	

DOCUMENT REPONSE DR1

Question B-1

Nom du Vlan	@ de début	@ de fin	@ de broadcast	Espace public/Privé
Pédia				
Pucent				

Question B-2

	@ de début	@ de fin	@ de passerelle
Equipements réseaux			
Serveurs applicatifs			
Postes de travail			

Question B-4

Nom du Vlan	@ du Vlan	@ de la passerelle
Defpu		

DOCUMENT REPONSE DR2

Question B-7

Table de routage partielle de XPU4

Destination	Subnet Mask	Gateway	Metric	Prf	RtSrc
0.0.0.0	0.0.0.0	192.168.1.254	1	1	static
10.0.0.0	255.0.0.0	----------	0	16	ripd
10.0.0.0	255.0.0.0	192.168.1.254	2	16	rip
10.1.0.0	255.255.0.0	10.1.0.252	0	0	direct
10.1.0.252	255.255.255.255	10.1.0.252	0	0	direct
10.1.21.25	255.255.255.255	193.57.217.122	1	1	static
10.1.21.25	255.255.255.255	192.168.1.254	2	16	rip
10.10.0.0	255.255.0.0	192.168.1.254	1	1	static
10.31.0.0	255.255.0.0	192.168.1.254	1	1	static
133.90.0.0	255.255.0.0	192.168.1.254	2	16	rip
134.100.0.0	255.255.0.0	192.168.1.254	2	16	rip
172.16.0.0	255.255.0.0	172.16.1.254	0	0	direct
172.16.1.254	255.255.255.255	172.16.1.254	0	0	direct
172.25.82.174	255.255.255.255	192.168.1.254	2	16	rip
172.25.82.175	255.255.255.255	192.168.1.254	2	16	rip
172.31.0.0	255.255.0.0	192.168.1.254	2	16	rip
192.168.1.0	255.255.255.0	192.168.1.253	0	0	direct
192.168.1.253	255.255.255.255	192.168.1.253	0	0	direct
193.57.200.0	255.255.255.0	192.168.1.254	2	16	rip
193.57.201.0	255.255.255.0	192.168.1.254	2	16	rip
193.57.202.0	255.255.255.0	193.57.202.224	0	0	direct
193.57.202.224	255.255.255.255	193.57.202.224	0	0	direct
193.57.203.0	255.255.255.0	192.168.1.252	2	16	rip
193.57.204.0	255.255.255.0	192.168.1.254	2	16	rip
193.57.205.0	255.255.255.0	192.168.1.254	2	16	rip
193.57.206.0	255.255.255.0	192.168.1.254	2	16	rip
193.57.207.0	255.255.255.0	192.168.1.252	2	16	rip
193.57.209.0	255.255.255.0	193.57.209.224	0	0	direct

DOCUMENT REPONSE DR3

Question B-8

Table de routage partielle de XHD4

Destination	Subnet Mask	Gateway	Metric	Prf	RtSrc
0.0.0.0	0.0.0.0	193.57.200.72	1	16	static
10.0.0.0	255.0.0.0	----------	0	16	rip
10.0.0.0	255.0.0.0	192.168.1.253	2	16	rip
10.1.0.0	255.255.0.0	10.1.0.254	0	0	direct
10.1.0.254	255.255.255.255	10.1.0.254	0	0	direct
10.1.21.25	255.255.255.255	192.168.1.253	1	1	static
10.1.21.25	255.255.255.255	192.168.1.253	2	16	rip
10.10.0.0	255.255.0.0	193.57.201.252	1	1	static
10.31.0.0	255.255.0.0	193.57.200.228	1	1	static
133.90.10.0	255.255.255.0	193.57.200.228	1	1	static
134.100.10.0	255.255.255.0	193.57.200.228	1	1	static
172.16.0.0	255.255.0.0	192.168.1.253	2	16	rip
192.168.1.0	255.255.255.0	192.168.1.254	0	0	direct
192.168.1.254	255.255.255.255	192.168.1.254	0	0	direct
193.56.156.98	255.255.255.255	193.57.200.228	1	1	static
193.57.198.0	255.255.255.0	193.57.200.228	1	1	static
193.57.199.214	255.255.255.255	193.57.200.228	1	1	static
193.57.200.0	255.255.255.0	193.57.200.254	0	0	direct
193.57.200.254	255.255.255.255	193.57.200.254	0	0	direct
193.57.205.0	255.255.255.0	192.168.200.253	1	1	static
193.57.205.0	255.255.255.0	192.168.200.252	1	2	static
193.57.206.0	255.255.255.0	193.57.206.249	0	0	direct
193.57.206.249	255.255.255.255	193.57.206.249	0	0	direct
193.57.207.0	255.255.255.0	192.168.1.252	2	16	rip
193.57.209.0	255.255.255.0	192.168.1.253	2	16	rip

DOCUMENT REPONSE DR4

Question C 1 - :

Requête 1

Protocole	=
Question	=
Réponse = adresse physique	=
Nombre de trames	= 2

Requête 2

Protocole	=
Question :	=
Réponse :	=
Nombre de trames	=

Requête 3

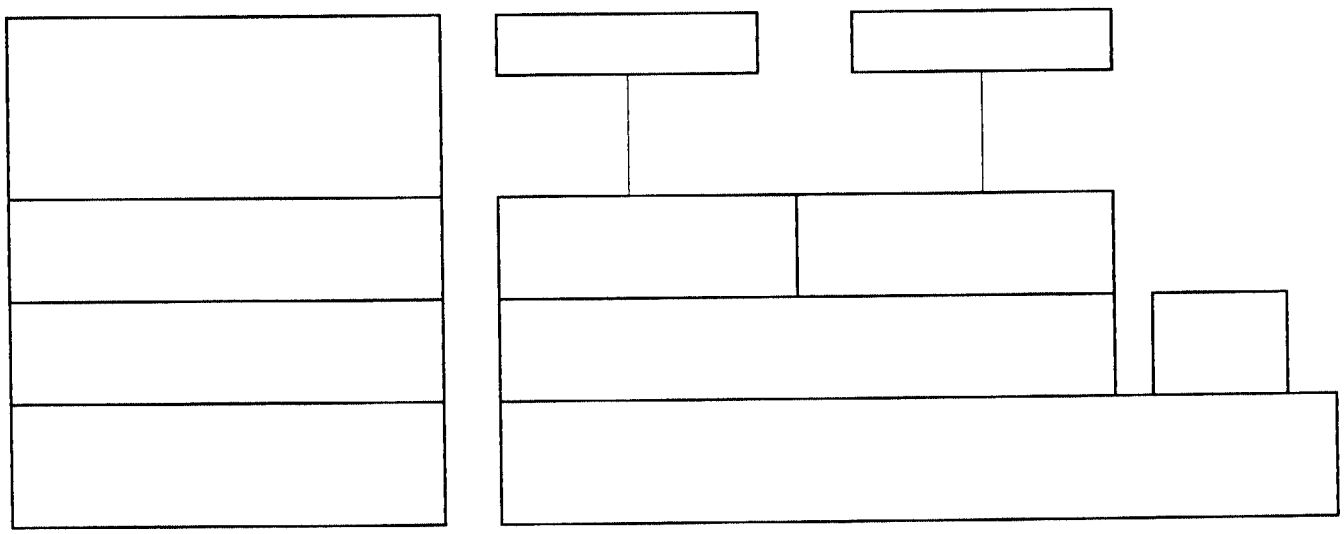
Protocole	=
Nombre de trames	=
Rôle de ces trames	=

Requête 4

Protocole	=
Nombre de trames	= 1
Syntaxe de l'ouverture	=

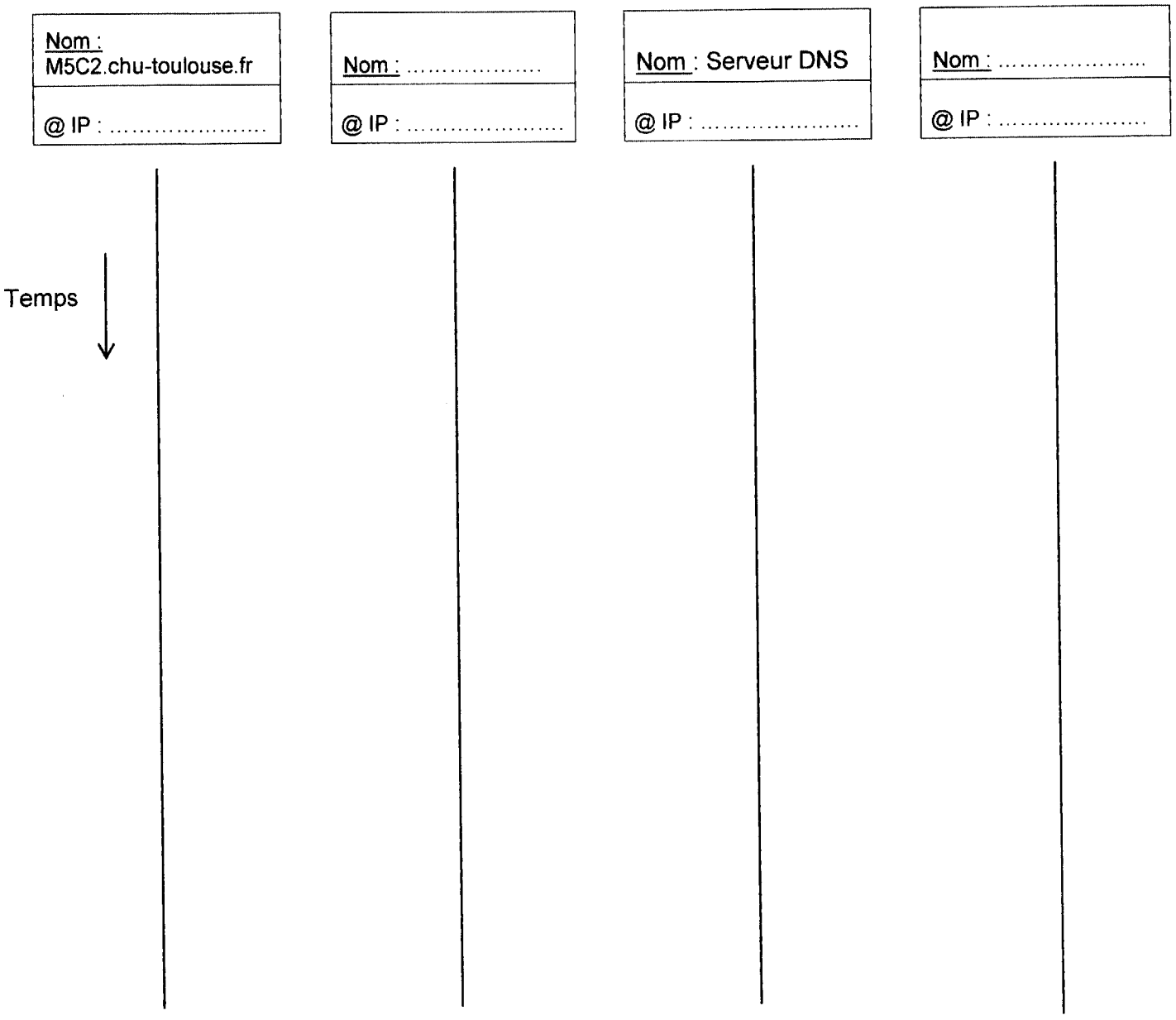
Question C 5 - :

Modèle DoD	Protocoles utilisés lors des échanges



DOCUMENT REPONSE DR5

Question C 4 - : *Diagramme des échanges :*



Question C 4 - : *Tableau des adresses associées à ces échanges :*

	@ physique source	@ physique destination	@IP source	@IP destination
Trame 1				
Trame 2				
Trame 3				
Trame 4				
Trame 5				
Trame 6				
Trame 7				
Trame 8				

DOCUMENT REPONSE DR6

Question C8 - : Comparaison :

Dialogue avant modification		
Nom de machine : ..... @IP :	tcp, http ⟷	Nom de machine : ..... @IP .....

Dialogue après modification		
Nom de machine : ..... @IP :	tcp, http ⟷	Nom de machine : Cyberbox.chu-toulouse.fr @IP .....

Question C10 - : Le Schéma de l'installation :