



Réseaux

Durée 2 heures – Sans document et sans téléphone portable 2^{ème} année - Tronc Commun

Question 1

On met un sniffer sur un réseau et on obtient les 65 trames que vous trouverez en annexe 1 :

- 1) Explicitez cette trace, c'est à dire expliquer ce qui se passe, pourquoi, etc... Vous pouvez citer des numéro de trames lors de votre explication afin de permettre une meilleure compréhension de votre argumentation.
- 2) Est-ce que la trame 1 est logiquement la première, ou manque-t-il des trames avant ? Développez votre réponse.
- 3) Calculer le rendement (rapport entre le nombre de données applicatives transmises et le nombre d'octet transmis pour envoyer les données applicatives)
- 4) Quels sont les différents services mis en oeuvre lors de cette communication ? Quelles sont les adresses-IP des machines sur lesquelles sont installés les serveurs ?
- 5) Le résultat de la commande traceroute -I 67.28.114.36, exécuté sur la machine d'adresse-IP 193.55.95.1, est donné en annexe2 :
 - ➔ Quelle information en retire-t-on ?
 - ➔ Indiquez une table de routage minimale de l'ordinateur 193.55.95.1
- 6) Faites un diagramme des échanges de données entre l'ordinateur 193.55.95.1 et le 67.28.114.36 en spécifiant les paramètres importants de la couche 4 (Transport).

Question 2

Deux internautes veulent pouvoir communiquer d'une manière confidentielle, c'est à dire que personne d'autres qu'eux ne puissent lire les messages qu'ils s'envoient. Au départ, il décide d'utiliser l'application **telnet** pour leurs communications.

- 1) Après avoir suivi un cours sur les réseaux, ils s'aperçoivent que leurs messages ne sont pas protégés. Pourquoi ?
- 2) Ils décident donc de chiffrer leurs messages avec une clé asymétrique. Expliquez le fonctionnement d'une clé asymétrique.
- 3) Ils décident d'utiliser le code RSA, et ils veulent être sûres que les messages envoyés proviennent bien de leur copain et qu'il n'y a pas eu de modification. Expliquez la procédure qu'ils utilisent pour envoyer et recevoir des messages.

Question 3

Quel est l'intérêt du découpage en couche ? Citez les couches de l'OSI.

Question 4

Décoder la PDU-Ethernet ci-dessous au maximum (à l'aide de l'annexe 2).

```
00 05 4E 84 22 00 00 50 DA 76 b5 ea 08 00 45 00 00 3a 17 50 40 00 3c 06 51 f5
c1 37 5f 01 43 1c 72 24 c7 da 00 19 31 94 27 c3 2a ab 83 aa 50 18 44 70 fc 6b
00 00 45 48 4c 4f 20 73 70 2e 69 73 69 6d 61 2e 66 72 0d 0a
```

ANNEXE 1

Frame 1 (71 bytes on wire, 71 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
User Datagram Protocol, Src Port: 1038 (1038), Dst Port: domain (53)
Domain Name System (query)
Flags: 0x0100 (Standard query)
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
Queries
sp.isima.fr: type A, class inet

Frame 2 (191 bytes on wire, 191 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
User Datagram Protocol, Src Port: domain (53), Dst Port: 1038 (1038)
Domain Name System (response)
Flags: 0x8580 (Standard query response, No error)
Questions: 1
Answer RRs: 1
Authority RRs: 2
Additional RRs: 3
Queries
sp.isima.fr: type A, class inet
Answers
sp.isima.fr : type A, class inet, addr 193.55.95.1

Frame 3 (62 bytes on wire, 62 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728602, Ack: 0, Len: 0
Header length: 28 bytes, Flags: 0x0002 (SYN), Window size: 16384

Frame 4 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1 Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231145, Ack: 2442728603, Len: 0
Header length: 24 bytes, Flags: 0x0012 (SYN, ACK), Window size: 17520

Frame 5 (54 bytes on wire, 54 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728603, Ack: 2800231146, Len: 0
Header length: 20 bytes, Flags: 0x0010 (ACK), Window size: 17520

Frame 8 (145 bytes on wire, 145 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231146, Ack: 2442728603, Len: 91
Simple Mail Transfer Protocol
Response: 220 sp.isima.fr ESMTP Sendmail 8.9.3/jtjtpda-5.3.1 ready at Thu, 25 Nov 2004
15:43:18 +0100\r\n

Frame 9 (67 bytes on wire, 67 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728603, Ack: 2800231237, Len: 13
Simple Mail Transfer Protocol, Command: HELO nst144\r\n

Frame 10 (130 bytes on wire, 130 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231237, Ack: 2442728616, Len: 76
Simple Mail Transfer Protocol

Response: 250 sp.isima.fr Hello nst144.isima.fr [193.55.95.144], pleased to meet you\r\n

Frame 11 (88 bytes on wire, 88 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728616, Ack: 2800231313, Len: 34
Simple Mail Transfer Protocol
Command: MAIL FROM: <exam_zz@sp.isima.fr>\r\n

Frame 12 (94 bytes on wire, 94 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231313, Ack: 2442728650, Len: 40
Simple Mail Transfer Protocol
Response: 250 <exam_zz@sp.isima.fr>... Sender ok\r\n

Frame 13 (84 bytes on wire, 84 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728650, Ack: 2800231353, Len: 30
Simple Mail Transfer Protocol
Command: RCPT TO: <frognico@yahoo.fr>\r\n

Frame 14 (95 bytes on wire, 95 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231353, Ack: 2442728680, Len: 41
Simple Mail Transfer Protocol
Response: 250 <frognico@yahoo.fr>... Recipient ok\r\n

Frame 15 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728680, Ack: 2800231394, Len: 6
Simple Mail Transfer Protocol
Command: DATA\r\n

Frame 16 (104 bytes on wire, 104 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231394, Ack: 2442728686, Len: 50
Simple Mail Transfer Protocol
Response: 354 Enter mail, end with "." on a line by itself\r\n

Frame 17 (1218 bytes on wire, 1218 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442728686, Ack: 2800231444, Len: 1164
Simple Mail Transfer Protocol
Message: Message-ID: <000001c4d2fd\$0ffc2c40\$905f37c1@nst144>\r\n
Message: From: "examZZ" <exam_zz@sp.isima.fr>\r\n
Message: To: <frognico@yahoo.fr>\r\n
Message: Subject: Hello!\r\n
Message: Date: Thu, 25 Nov 2004 15:41:32 +0100\r\n
Message: Comment vas-tu ?\r\n

Frame 18 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231444, Ack: 2442729850, Len: 0
Header length: 20 bytes, Flags: 0x0010 (ACK), Window size: 17520

Frame 21 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1
TCP, Src Port: 1062, Dst Port: 25, Seq: 2442729855, Ack: 2800231488, Len: 6
Simple Mail Transfer Protocol
Command: QUIT\r\n

Frame 22 (90 bytes on wire, 90 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80
IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144
TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231488, Ack: 2442729861, Len: 36

Simple Mail Transfer Protocol

Response: 221 sp.isima.fr closing connection\r\n

Frame 23 (54 bytes on wire, 54 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea

IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1

TCP, Src Port: 1062, Dst Port: 25, Seq: 2442729861, Ack: 2800231524, Len: 0

Header length: 20 bytes, Flags: 0x0011 (FIN, ACK), Window size: 17142

Frame 24 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:0d:56:36:e2:80

IP, Src Addr: 193.55.95.1, Dst Addr: 193.55.95.144

TCP, Src Port: 25, Dst Port: 1062, Seq: 2800231524, Ack: 2442729861, Len: 0

Header length: 20 bytes, Flags: 0x0011 (FIN, ACK), Window size: 17520

Frame 25 (54 bytes on wire, 54 bytes captured)

Ethernet II, Src: 00:0d:56:36:e2:80, Dst: 00:02:55:76:b5:ea

IP, Src Addr: 193.55.95.144, Dst Addr: 193.55.95.1

TCP, Src Port: 1062, Dst Port: 25, Seq: 2442729862, Ack: 2800231525, Len: 0

Header length: 20 bytes, Flags: 0x0010 (ACK), Window size: 17142

Frame 26 (69 bytes on wire, 69 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00

IP, Src Addr: 193.55.95.1, Dst Addr: 195.221.122.123

User Datagram Protocol, Src Port: 57685 (57685), Dst Port: domain (53)

Domain Name System (query)

Flags: 0x0100 (Standard query)

Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 0

Queries

yahoo.com: type MX, class inet

Frame 27 (200 bytes on wire, 200 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea

IP, Src Addr: 195.221.122.123, Dst Addr: 193.55.95.1

User Datagram Protocol, Src Port: domain (53), Dst Port: 57685 (57685)

Domain Name System (response)

Flags: 0x8580 (Standard query response, No error)

Questions: 1

Answer RRs: 1

Authority RRs: 2

Additional RRs: 3

Queries

yahoo.com: type MX, class inet

Answers

yahoo.com: type MX, class inet, preference 10, mx2.yahoo.com

Authoritative nameservers

Additional records

mx2.yahoo.com : type A, class inet, addr 67.28.114.36

Frame 28 (42 bytes on wire, 42 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: ff:ff:ff:ff:ff:ff

Address Resolution Protocol (request)

Sender MAC address: 00:02:55:76:b5:ea (193.55.95.1)

Sender IP address: 193.55.95.1 (193.55.95.1)

Target MAC address: 00:00:00:00:00:00 (00:00:00_00:00:00)

Target IP address: 193.55.95.254 (193.55.95.254)

Frame 29 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea

Address Resolution Protocol (reply)

Sender MAC address: 00:04:80:84:22:00 (193.55.95.254)

Sender IP address: 193.55.95.254 (193.55.95.254)

Target MAC address: 00:02:55:76:b5:ea (193.55.95.1)

Target IP address: 193.55.95.1 (193.55.95.1)

Frame 31 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00

IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36

TCP, Src Port: 51162, Dst Port: 25, Seq: 831793090, Ack: 0, Len: 0

Header length: 24 bytes, Flags: 0x0002 (SYN), Window size: 16384

Frame 46 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883376, Ack: 831793091, Len: 0
Header length: 24 bytes, Flags: 0x0012 (SYN, ACK), Window size: 65535

Frame 47 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793091, Ack: 715883377, Len: 0
Header length: 20 bytes, Flags: 0x0010 (ACK), Window size: 17520

Frame 48 (111 bytes on wire, 111 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883377, Ack: 831793091, Len: 57
Simple Mail Transfer Protocol
Response: 220 YSmtpt mx2.yahoo.com ESMTP service ready\r\n

Frame 49 (72 bytes on wire, 72 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793091, Ack: 715883434, Len: 18
Simple Mail Transfer Protocol
Command: HELO sp.isima.fr\r\n

Frame 50 (134 bytes on wire, 134 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883434, Ack: 831793109, Len: 80
Simple Mail Transfer Protocol
Response: 250-mx2.mail.yahoo.com\r\n

Frame 51 (93 bytes on wire, 93 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793109, Ack: 715883514, Len: 39
Simple Mail Transfer Protocol
Command: MAIL From:<exam_zz@isima.fr> SIZE=808\r\n

Frame 52 (88 bytes on wire, 88 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883514, Ack: 831793148, Len: 34
Simple Mail Transfer Protocol
Response: 250 sender <exam_zz@isima.fr> ok\r\n

Frame 53 (83 bytes on wire, 83 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793148, Ack: 715883548, Len: 29
Simple Mail Transfer Protocol
Command: RCPT To:<frognico@yahoo.fr>\r\n

Frame 54 (92 bytes on wire, 92 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883548, Ack: 831793177, Len: 38
Simple Mail Transfer Protocol
Response: 250 recipient <frognico@yahoo.fr> ok\r\n

Frame 55 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793177, Ack: 715883586, Len: 6
Simple Mail Transfer Protocol
Command: DATA\r\n

Frame 56 (68 bytes on wire, 68 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883586, Ack: 831793183, Len: 14
Simple Mail Transfer Protocol
Response: 354 go ahead\r\n

Frame 57 (1410 bytes on wire, 1410 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1 , Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831793183, Ack: 715883600, Len: 1356
Simple Mail Transfer Protocol
Message: Received: from nst144 (nst144.isima.fr [193.55.95.144])\r\n
Message: by sp.isima.fr (8.9.3/jtpda-5.3.1) with SMTP id PAA39646\r\n
Message: for <frognico@yahoo.fr>; Thu, 25 Nov 2004 15:43:19 +0100\r\n
Message: Message-ID: <000001c4d2fd\$0ffc2c40\$905f37c1@nst144>\r\n
Message: From: "examZZ" <exam_zz@isima.fr>\r\n
Message: To: <frognico@yahoo.fr>\r\n
Message: Subject: Hello!\r\n
Message: Date: Thu, 25 Nov 2004 15:41:32 +0100\r\n
Message: Comment vas-tu ?\r\n

Frame 58 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883600, Ack: 831794539, Len: 0
Header length: 20 bytes, Flags: 0x0010 (ACK), Window size: 65535

Frame 62 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831794542, Ack: 715883615, Len: 6
Simple Mail Transfer Protocol
Command: QUIT\r\n

Frame 63 (85 bytes on wire, 85 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883615, Ack: 831794548, Len: 31
Simple Mail Transfer Protocol
Response: 221 mx2.mail.yahoo.com\r\n

Frame 64 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:04:80:84:22:00, Dst: 00:02:55:76:b5:ea
IP, Src Addr: 67.28.114.36, Dst Addr: 193.55.95.1
TCP, Src Port: 25, Dst Port: 51162, Seq: 715883646, Ack: 831794548, Len: 0
Header length: 20 bytes, Flags: 0x0011 (FIN, ACK), Window size: 65535

Frame 65 (60 bytes on wire, 60 bytes captured)

Ethernet II, Src: 00:02:55:76:b5:ea, Dst: 00:04:80:84:22:00
IP, Src Addr: 193.55.95.1, Dst Addr: 67.28.114.36
TCP, Src Port: 51162, Dst Port: 25, Seq: 831794548, Ack: 715883646, Len: 0
Header length: 20 bytes, Flags: 0x0011 (FIN, ACK), Window size: 17520

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ANNEXE 2

Format des PDU-Ethernet

synchro	Destination (6)	source (6)	type/lg (2)	Données (<1500)	bourrage	Contrôle (4)
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Quelques OUI

08006F PHILIPS APELDOORN B.V.

- 000009 XEROX CORPORATION
- 00000C CISCO SYSTEMS, INC.
- 00000D FIBRONICS LTD.
- 00000E FUJITSU LIMITED.
- 000010 SYTEK INC.
- 00054D Brans Technologies, Inc.
- 00054E Philips Components
- 000D29 Cisco
- 0050D6 ATLAS COPCO TOOLS AB
- 0050D7 TELSTRAT
- 0050D8 UNICORN COMPUTER CORP.
- 0050D9 ENGETRON-ENGENHARIA ELETRONICA
- 0050DA 3COM CORPORATION
- 0050FC EDIMAX TECHNOLOGY
- 08006E MASSCOMP

Quelques valeurs de type-Ethernet

0000-05DC	-	IEEE802.3 Length Field	[XEROX]	0803	-	-	ECMA Internet	[XEROX]
0800	513 1001	Internet IP (IPv4)	[105, JBP]	0804	-	-	Chaosnet	[XEROX]
0801	-	X.75 Internet	[XEROX]	0805	-	-	X.25 Level 3	[XEROX]
0802	-	NBS Internet	[XEROX]	0806	-	-	ARP	[88, JBP]
				0807	-	-	XNS Compatability	[XEROX]
				0808	-	-	Frame Relay ARP	[XEROX]

Format des PDU-IP

0			31		
version [v]	lg.entête [hl]	service [qos]	longueur totale [lg]		
identificateur de la PDU-IP [id]			flags [off]	position du fragment [off]	
durée de vie [ttl]	protocole encapsulé [p]		somme de contrôle [ck]		
adresse source [Src]					
adresse destination [Dst]					
données (PDU de couche supérieure)					

Les valeurs du champ **service**

bits	signification	valeurs
xxx	niveau de priorité	000=normale à 111
. . . x	délai d'acheminement	0=normal 1=court
. . . . x	débit de transmission	0=normal 1=élevé
. x . . .	confidentialité	0=normale 1=élevée

Les valeurs du champ **off**

bits	signification	valeurs
. x	autorisation de fragmentation	1 = oui
. . x	dernier fragment ?	1 = non
. . . xxxxx XX	position du fragment dans la PDU originelle	

Quelques valeurs du champ **protocole**

1	ICMP	Internet Control Message	[RFC792, JBP]
5	ST	Stream	[RFC1190, IEN119, JWF]
6	TCP	Transmission Control	[RFC793, JBP]
15	XNET	Cross Net Debugger	[IEN158, JFH2]
16	CHAOS	Chaos	[NC3]
17	UDP	User Datagram	[RFC768, JBP]

Format des PDU-TCP

0	4	7	15	16	31					
Port source[Src]			Port Destination[Dst]							
Numéro de séquence [seq]										
Numéro d'acquittement [ack]										
Lg de l'entête TCP[h]			U R G	A C K	P S H	R S T	S Y N	F I N	Fenêtre [win]	
Contrôle d'erreur[ck]					Pointeur[urp]					
Options...										
DONNEES....										

Ports connus : 20, 21 : ftp
 23 : telnet
 25 : mail
 80 : http