Exercice 1 (Demande de connexion et Terminaison)

1) A quoi servent les numéros de ports ? Proposer quelques numéros de ports utilisés par des applications classiques.
2) Pourquoi procéder à une demande de connexion en 3 phases lors de l'utilisation de TCP ? Donner un chronogramme illustrant une telle demande.
3) Lors d'une création de connexion entre 2 stations, 2 circuits sont créés (2 flots indépendants de sens contraire). Donner le chronogramme illustrant une terminaison de connexion. Est-il possible de ne fermer qu'un circuit ?

Exercice 2 (Acquittement et temporisation)

Lors de l'utilisation de TCP/IP, à chaque envoi de segment, un acquittement doit être envoyé par le récepteur s'il reçoit le segment. L'émetteur quant à lui, arme un temporisateur qui lui sert de délai d'attente de réception de l'acquittement. Si le temporisateur expire, l'émetteur réexpédie le segment.

1) Remplir les schémas illustrés par la figure 1, sachant que pour le premier, le message a une taille de 2048o et que pour le deuxième, le message a une taille de 3072o.
2) Donner un schéma proposant une duplication de paquet. Que propose TCP pour reconnaître les paquets dupliqués ?
3) Donner les avantages à utiliser une fenêtre d'acquittement.
4) Donner les différents états de la fenêtre utilisée avec le chronogramme de la figure 2.

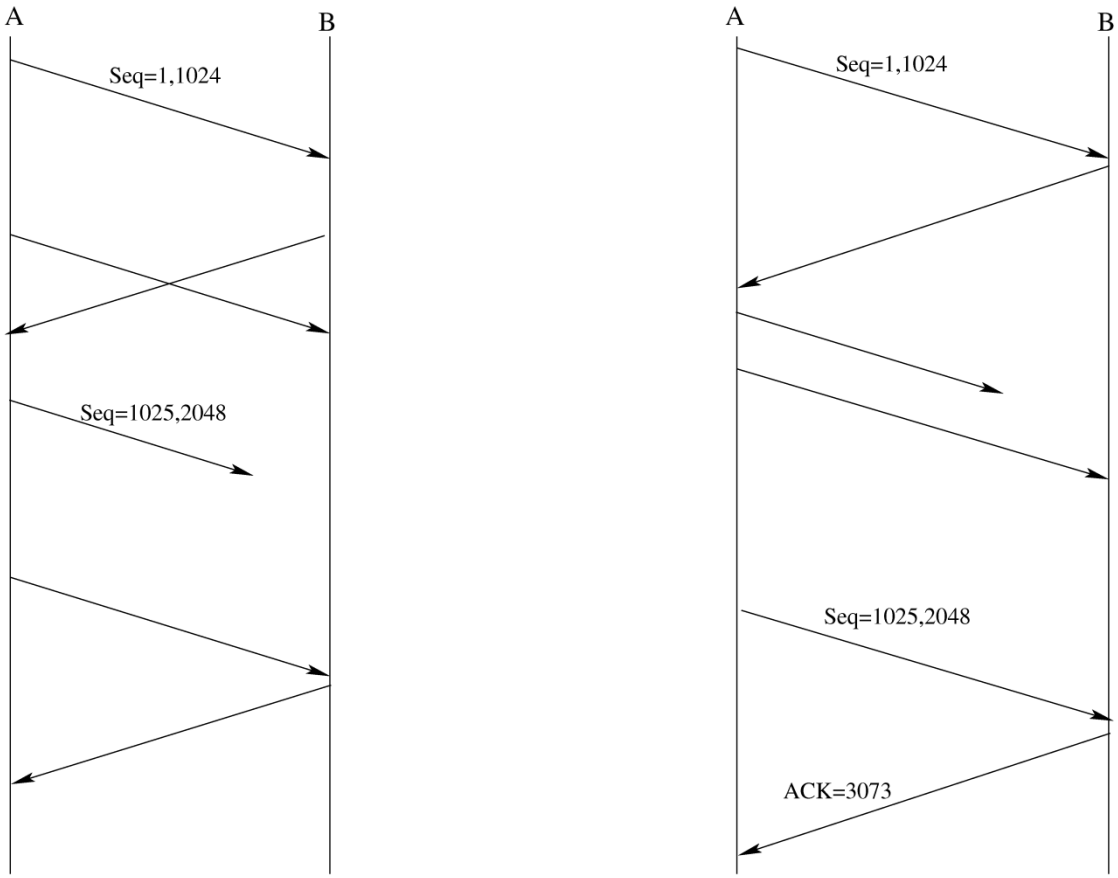

Figure 1 – Chronogrammes TCP à compléter

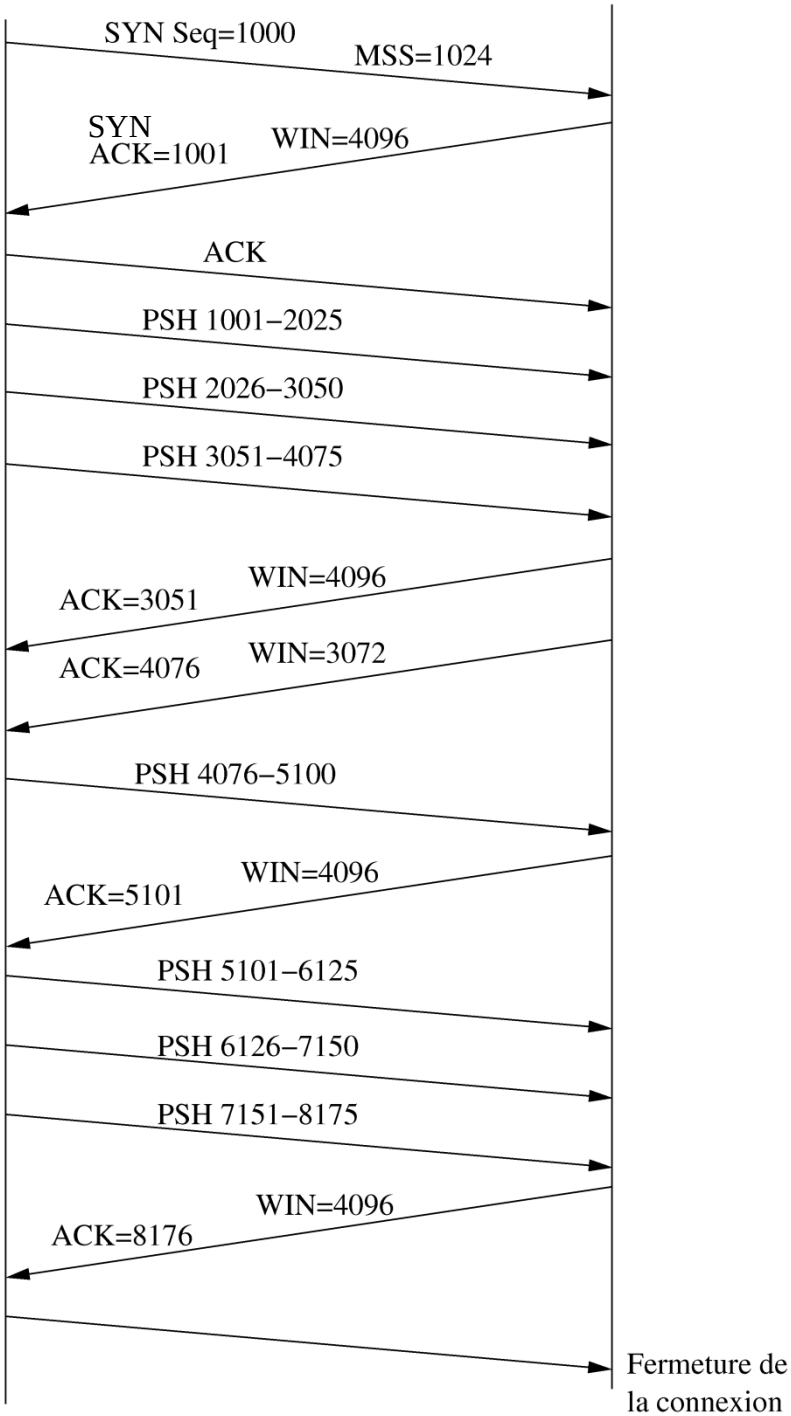

Figure 2 – Chronogramme TCP

Exercice 3 (les fichiers *ethers*, *hosts*, *services*)

On considère un réseau local ayant la configuration suivante : un ensemble de machines SUN et d'ordinateurs compatibles IBM-PC reliés par le même réseau Ethernet. Les machines UNIX de ce réseau contiennent les trois fichiers */etc/ethers*, */etc/hosts*, */etc/services* dont le contenu est décrit en Annexe 1.

1) Que contiennent ces fichiers ?
2) A partir de la RFC 1700 (Assigned Numbers) (voir Annexe 2), retrouvez les constructeurs des cartes Ethernet dont l'adresse figure dans le fichier */etc/ethers*.
3) De quelle classe sont les adresses IP ?

Exercice 4 (Capture de trames)

Un analyseur de trames est connecté au réseau, il permet de garder le contenu des trames qui circulent sur le réseau. Pour ne pas avoir trop de données à traiter, les trames sont filtrées pour ne garder que celles qui ont un rapport avec la machine *buro1*. Le résultat est décrit dans l'Annexe 3.

1) Quels champs sont générés par l'analyseur de trames et quels champs font partis des trames Ethernet ?
2) Quelles sont les tailles minimale et maximale de trames Ethernet ?
3) Avec combien de stations *buro1* établit-elle un dialogue ? Pouvez-vous donner le nom de ces stations ?
4) Comment (pourcentage) est réparti le trafic entre ces machines ?

Exercice 5 (Analyse de trames)

En fait l'analyseur de trames est beaucoup plus performant et peut faire le désassemblage automatique des trames jusqu'au niveau 4. Maintenant, nous ne nous intéressons plus qu'aux trames ayant participé au trafic FTP entre *buro1* et *ER1* correspondant aux actions données dans l'Annexe 4. Les trames ayant circulé pour cette application sont décrites dans l'Annexe 5.

1) Repérez les séquences d'ouverture de connexion, de fermeture et de transfert de données.
2) L'acquittement à la volée (piggy backing) est-il intéressant ?
3) Mettez en correspondance, à l'aide d'un chronogramme, les actions de l'utilisateur et les trames émises ou reçues.
4) Pourquoi la trame 224 "tranfer complete" arrive-t-elle avant la fin du transfert ?
5) Pourquoi chaque message émis par le serveur FTP commence-t-il par un numéro ?

Annexes

Annexe 1 - les fichiers *ethers*, *hosts*, *services*

```
$ cat /etc/ethers
2:60:8c:75:85:27 cei49    2:c0:8c:02:41:75 cei28   2:60:8c:73:98:32 cei22  2:60:8c:75:85:63 cei21
2:60:8c:73:86:44 cei19    2:60:8c:74:10:21 cei17   2:60:8c:73:90:62 cei13  2:60:8c:73:99:35 cei12
8:0:20:0:44:5    buro2    8:0:20:6:20:b8   cti1    2:60:8c:73:98:31 cei9   2:60:8c:73:96:36 cei6
2:60:8c:73:86:49 cei5     2:60:8c:73:84:12 cei4    2:60:8c:74:10:20 cei3   2:60:8c:74:10:24 cei2
2:60:8c:73:86:53 cei1     2:60:8c:51:77:70 cei0    8:0:20:0:6f:ea   SI5    8:0:20:1:b4:32   ER1
2:60:8c:75:85:17 pcrobot1 2:60:8c:75:63:20 pcburo1 2:60:8c:75:88:46 pccti1 2:60:8c:75:58:19 cei25
2:60:8c:75:88:63 cei24    2:60:8c:75:85:22 cei23   2:60:8c:73:86:57 cei20  2:60:8c:73:93:27 cei18
2:60:8c:74:10:22 cei16    2:60:8c:74:3:17  cei15   2:60:8c:73:99:40 cei14  2:60:8c:74:10:18 cei11
2:60:8c:73:96:35 cei10    8:0:20:0:61:f3   buro1   2:60:8c:74:10:26 cei8   2:60:8c:73:87:9  cei7
8:0:20:0:ad:2    SI1

$ cat /etc/hosts
127.0.0.1     localhost 192.9.200.12  buro2  192.9.200.213 cei13       192.9.200.221 cei21
192.9.200.222 cei22     192.9.200.228 cei28  192.9.200.58  imp8        192.9.200.215 cei15
192.9.200.204 cei4      192.9.200.223 cei23  192.9.200.55  imp5        192.9.200.212 cei12
192.9.200.56  imp6      192.9.200.219 cei19  192.9.200.52  imp2        192.9.200.205 cei5
192.9.200.53  imp3      192.9.200.214 cei14  192.9.200.10  ER4         192.9.200.150 pcburo1
192.9.200.51  imp1      192.9.200.206 cei6   192.9.200.5   SI1 loghost 192.9.200.120 vme0
192.9.200.9   SI3       192.9.200.203 cei3   192.9.200.226 cei26       192.9.200.14  cti1
192.9.200.1   ER1       192.9.200.127 vme7   192.9.200.217 cei17       192.9.200.2   ER2
192.9.200.249 cei49     192.9.200.50  imp0   192.9.200.210 cei10       192.9.200.227 cei27
192.9.200.225 cei25     192.9.200.3   pc1    192.9.200.207 cei7        192.9.200.218 cei18
192.9.200.216 cei16     192.9.200.250 sysV68 192.9.200.152 pccti1      192.9.200.209 cei9
192.9.200.208 cei8      192.9.200.220 cei20  192.9.200.121 vme1        192.9.200.200 cei0
192.9.200.201 cei1      192.9.200.211 cei11  192.9.200.57  imp7        192.9.200.8   SI4
192.9.200.151 pcrobot1  192.9.200.202 cei2   192.9.200.13  SI5         192.9.200.6   SI2
192.9.200.59  imp9      192.9.200.60  imp10  192.9.200.11  buro1
192.9.200.54  imp4      192.9.200.7   ER3    192.9.200.224 cei24
```

```
$ cat /etc/services
echo                7/udp                                   link                87/tcp  ttylink
discard             9/udp  sink null                        supdup              95/tcp
systat              11/tcp                                  csnet-ns            105/tcp
daytime             13/tcp                                  uucp-path           117/tcp
netstat             15/tcp                                  untp                119/tcp usenet
ftp-data            20/tcp                                  ntp                 123/tcp
ftp                 21/tcp                                  # UNIX specific services
telnet              23/tcp                                  exec                512/tcp
smtp                25/tcp mail                             login               513/tcp
name                42/udp nameserver                       shell               514/tcp cmd # no passwords used
whois               43/tcp nicname # usually to sri-nic     printer             515/tcp spooler # experimental
domain              53/udp                                  courier 530/tcp rpc # experimental
domain              53/tcp                                  biff    512/udp comsat
hostnames           101/tcp hostname # usually to sri-nic   who     513/udp whod
sunrpc              111/udp                                 syslog  514/udp
sunrpc              111/tcp                                 talk    517/udp
# Host specific functions                                   route   520/udp router routed
tftp                69/udp
finger              79/tcp
```

Annexe 2 - Extrait de la RFC 1700 (Assigned Numbers)

```
RFC 1700 - [Page 172-174] - October 1994
ETHERNET VENDOR ADDRESS COMPONENTS

Ethernet hardware addresses are 48 bits, expressed as 12
hexadecimal digits (0-9, plus A-F, capitalized).  These 12
hex digits consist of the first/left 6 digits (which should
match the vendor of the Ethernet interface within the
station) and the last/right 6 digits which specify the
interface serial number for that interface vendor.

Ethernet addresses might be written unhyphenated (e.g.,
123456789ABC), or with one hyphen (e.g., 123456-789ABC),
but should be written hyphenated by octets (e.g., 12-34-56-
78-9A-BC).

These addresses are physical station addresses, not
multicast nor broadcast, so the second hex digit (reading
from the left) will be even, not odd.

At present, it is not clear how the IEEE assigns Ethernet
block addresses.  Whether in blocks of 2**24 or 2**25, and
whether multicasts are assigned with that block or
separately.  A portion of the vendor block address is
reportedly assigned serially, with the other portion
intentionally assigned randomly.  If there is a global
algorithm for which addresses are designated to be physical
(in a chipset) versus logical (assigned in software), or
globally-assigned versus locally-assigned addresses, some
of the known addresses do not follow the scheme (e.g.,
AA0003; 02xxxx).

00000C  Cisco
00000E  Fujitsu
00000F  NeXT
000010  Sytek
00001D  Cabletron
000020  DIAB (Data Intdustrier AB)
000022  Visual Technology
00002A  TRW
000032  GPT Limited (reassigned from GEC Computers Ltd)
00005A  S & Koch
00005E  IANA
000065  Network General
00006B  MIPS
000077  MIPS
00007A  Ardent
000089  Cayman Systems  Gatorbox
000093  Proteon
00009F  Ameristar Technology
0000A2  Wellfleet
```

```
0000A3  Network Application Technology
0000A6   Network General (internal assignment, not for
products)
0000A7  NCD             X-terminals
0000A9  Network Systems
0000AA  Xerox           Xerox machines
0000B3  CIMLinc
0000B7  Dove            Fastnet
0000BC  Allen-Bradley
0000C0  Western Digital
0000C5  Farallon phone net card
0000C6   HP Intelligent Networks Operation (formerly Eon
Systems)
0000C8  Altos
0000C9  Emulex          Terminal Servers
0000D7  Dartmouth College (NED Router)
0000D8  3Com? Novell?   PS/2
0000DD  Gould
0000DE  Unigraph
0000E2  Acer Counterpoint
0000EF  Alantec
0000FD  High Level Hardvare (Orion, UK)
000102  BBN             BBN internal usage (not registered)
0020AF  3COM ???
001700  Kabel
008064  Wyse Technology / Link Technologies
00802B  IMAC ???
00802D  Xylogics, Inc.  Annex terminal servers
00808C  Frontier Software Development
0080C2  IEEE 802.1 Committee
0080D3  Shiva
00AA00  Intel
00DD00  Ungermann-Bass
00DD01  Ungermann-Bass
020701  Racal InterLan
020406  BBN             BBN internal usage (not registered)
026086  Satelcom MegaPac (UK)
02608C  3Com            IBM PC; Imagen; Valid; Cisco
02CF1F  CMC               Masscomp; Silicon Graphics; Prime
EXL
080002  3Com (Formerly Bridge)
080003  ACC (Advanced Computer Communications)
080005  Symbolics       Symbolics LISP machines
080008  BBN
080009  Hewlett-Packard
08000A  Nestar Systems
08000B  Unisys
080011  Tektronix, Inc.
080014   Excelan            BBN Butterfly, Masscomp, Silicon
Graphics
080017  NSC
08001A  Data General
08001B  Data General
08001E  Apollo
080020  Sun             Sun machines
080022  NBI
080025  CDC
080026  Norsk Data (Nord)
080027  PCS Computer Systems GmbH
080028  TI              Explorer
08002B  DEC
08002E  Metaphor
08002F  Prime Computer  Prime 50-Series LHC300
080036  Intergraph      CAE stations
080037  Fujitsu-Xerox
080038  Bull
080039  Spider Systems
080041  DCA Digital Comm. Assoc.
080045   ???? (maybe Xylogics, but they claim not to know
this number)
080046  Sony
080047  Sequent
080049  Univation
08004C  Encore
08004E  BICC
080056  Stanford University
080058  ???             DECsystem-20
08005A  IBM
080067  Comdesign
080068  Ridge
080069  Silicon Graphics
08006E  Concurrent      Masscomp
080075  DDE (Danish Data Elektronik A/S)
08007C  Vitalink        TransLAN III
080080  XIOS
080086  Imagen/QMS
080087  Xyplex          terminal servers
080089  Kinetics        AppleTalk-Ethernet interface
08008B  Pyramid
08008D  XyVision        XyVision machines
```

Annexe 3 – Capture de trames

```
:Created On 02/21/89 11:26:15 Elapsed Time 00:01:38 Total Packets 317
:#   Len  Absolut_Timestmp Dest Addr    Source Addr  Ty/L :        :38  102  11:26:18.611.474 0800200061F3 0800010166DE 0800 :
:1   150  11:26:17.938.951 080020008679 0800200061F3 0800 :        :39  130  11:26:18.778.681 0800010166DE 0800200061F3 0800 :
:2   142  11:26:17.942.044 0800200061F3 080020008679 0800 :        :40  150  11:26:18.791.302 0800200061F3 0800010166DE 0800 :
:3   158  11:26:17.947.242 080020008679 0800200061F3 0800 :        :41  122  11:26:18.804.776 0800010166DE 0800200061F3 0800 :
:4   74   11:26:17.950.459 0800200061F3 080020008679 0800 :        :42  94   11:26:18.817.691 0800200061F3 0800010166DE 0800 :
:5   86   11:26:18.329.327 0800010166DE 0800200061F3 0800 :        :43  64   11:26:18.826.020 08002001B432 0800200061F3 0800 :
:6   70   11:26:18.333.073 0800200061F3 0800010166DE 0800 :        :44  64   11:26:18.828.001 0800200061F3 08002001B432 0800 :
:7   118  11:26:18.348.309 0800010166DE 0800200061F3 0800 :        :45  64   11:26:18.830.161 08002001B432 0800200061F3 0800 :
:8   110  11:26:18.365.158 0800200061F3 0800010166DE 0800 :        :46  128  11:26:19.324.786 0800200061F3 08002001B432 0800 :
:9   130  11:26:18.373.200 0800010166DE 0800200061F3 0800 :        :47  150  11:26:19.435.772 080020008679 0800200061F3 0800 :
:10  106  11:26:18.377.789 0800200061F3 0800010166DE 0800 :        :48  142  11:26:19.438.584 0800200061F3 080020008679 0800 :
:11  130  11:26:18.385.660 0800010166DE 0800200061F3 0800 :        :49  150  11:26:19.443.647 080020008679 0800200061F3 0800 :
:12  106  11:26:18.390.492 0800200061F3 0800010166DE 0800 :        :50  142  11:26:19.446.099 0800200061F3 080020008679 0800 :
:13  130  11:26:18.398.220 0800010166DE 0800200061F3 0800 :        :51  142  11:26:19.454.014 0800200061F3 080020008679 0800 :
:14  134  11:26:18.402.809 0800200061F3 0800010166DE 0800 :        :52  74   11:26:20.078.939 08002000AD02 0800200061F3 0800 :
:15  130  11:26:18.411.318 0800010166DE 0800200061F3 0800 :        :53  130  11:26:18.521.786 0800010166DE 0800200061F3 0800 :
:16  106  11:26:18.416.453 0800200061F3 0800010166DE 0800 :        :54  106  11:26:18.598.719 0800200061F3 0800010166DE 0800 :
:17  130  11:26:18.424.272 0800010166DE 0800200061F3 0800 :        :55  64   11:26:19.471.514 08002001B432 0800200061F3 0800 :
:18  134  11:26:18.431.324 0800200061F3 0800010166DE 0800 :        :56  102  11:26:20.072.706 0800200061F3 08002000AD02 0800 :
:19  130  11:26:18.448.885 0800010166DE 0800200061F3 0800 :        :57  74   11:26:20.078.939 08002000AD02 0800200061F3 0800 :
:20  64   11:26:19.459.269 FFFFFFFFFFFF 0800200061F3 0806 :        :58  138  11:26:20.083.577 0800200061F3 08002000AD02 0800 :
:21  130  11:26:18.480.857 0800010166DE 0800200061F3 0800 :        :59  70   11:26:20.666.457 08002000AD02 0800200061F3 0800 :
:22  106  11:26:18.485.456 0800200061F3 0800010166DE 0800 :        :60  86   11:26:20.934.939 0800010166DE 0800200061F3 0800 :
:23  130  11:26:18.494.870 0800010166DE 0800200061F3 0800 :        :61  70   11:26:20.938.351 0800200061F3 0800010166DE 0800 :
:24  138  11:26:18.499.720 0800200061F3 0800010166DE 0800 :        :62  114  11:26:20.953.542 0800010166DE 0800200061F3 0800 :
:25  130  11:26:18.508.281 0800010166DE 0800200061F3 0800 :        :63  82   11:26:20.965.384 0800200061F3 0800010166DE 0800 :
:26  106  11:26:18.513.506 0800200061F3 0800010166DE 0800 :        :64  86   11:26:20.982.895 0800010166DE 0800200061F3 0800 :
:27  64   11:26:19.463.036 0800200061F3 08002001B432 0806 :        :65  70   11:26:20.985.865 0800200061F3 0800010166DE 0800 :
:28  114  11:26:18.526.968 0800200061F3 0800010166DE 0800 :        :66  122  11:26:21.011.452 0800010166DE 0800200061F3 0800 :
:29  130  11:26:18.553.912 0800010166DE 0800200061F3 0800 :        :67  102  11:26:21.023.646 0800200061F3 0800010166DE 0800 :
:30  106  11:26:18.559.085 0800200061F3 0800010166DE 0800 :        :68  102  11:26:21.048.747 08002000AD02 0800200061F3 0800 :
:31  130  11:26:18.567.020 0800010166DE 0800200061F3 0800 :        :69  74   11:26:21.060.732 0800200061F3 08002000AD02 0800 :
:32  114  11:26:18.572.694 0800200061F3 0800010166DE 0800 :        :70  86   11:26:21.068.317 08002000AD02 0800200061F3 0800 :
:33  130  11:26:18.580.866 0800010166DE 0800200061F3 0800 :        :71  70   11:26:21.071.362 0800200061F3 08002000AD02 0800 :
:34  110  11:26:18.585.807 0800200061F3 0800010166DE 0800 :        :72  114  11:26:21.093.240 08002000AD02 0800200061F3 0800 :
:35  130  11:26:18.593.924 0800010166DE 0800200061F3 0800 :        :73  78   11:26:21.106.151 0800200061F3 08002000AD02 0800 :
:36  106  11:26:18.598.719 0800200061F3 0800010166DE 0800 :        :74  114  11:26:21.111.842 08002000AD02 0800200061F3 0800 :
:37  130  11:26:18.606.447 0800010166DE 0800200061F3 0800 :        :75  82   11:26:21.116.012 0800200061F3 08002000AD02 0800 :
```

```
:76  102  11:26:21.470.995 08002000AD02 0800200061F3 0800 :
:77  74   11:26:21.474.126 0800200061F3 08002000AD02 0800 :
:78  64   11:26:21.481.039 08002000AD02 0800200061F3 0800 :
:79  64   11:26:21.483.123 0800200061F3 08002000AD02 0800 :
:80  64   11:26:21.485.405 08002000AD02 0800200061F3 0800 :
:81  130  11:26:21.492.052 08002000AD02 0800200061F3 0800 :
:82  1082 11:26:21.560.486 0800200061F3 08002000AD02 0800 :
:83  632  11:26:21.562.140 0800200061F3 08002000AD02 0800 :
:84  64   11:26:21.574.406 08002000AD02 0800200061F3 0800 :
:85  1082 11:26:21.590.365 0800200061F3 08002000AD02 0800 :
:86  632  11:26:21.591.962 0800200061F3 08002000AD02 0800 :
:87  1082 11:26:21.614.170 0800200061F3 08002000AD02 0800 :
:88  632  11:26:21.615.816 0800200061F3 08002000AD02 0800 :
:89  958  11:26:21.639.337 0800200061F3 08002000AD02 0800 :
:90  64   11:26:21.670.827 08002000AD02 0800200061F3 0800 :
:91  64   11:26:21.790.529 08002000AD02 0800200061F3 0800 :
:92  1082 11:26:21.793.709 0800200061F3 08002000AD02 0800 :
:93  64   11:26:21.870.501 08002000AD02 0800200061F3 0800 :
:94  1082 11:26:21.873.390 0800200061F3 08002000AD02 0800 :
:95  1082 11:26:21.875.219 0800200061F3 08002000AD02 0800 :
:96  984  11:26:21.877.320 0800200061F3 08002000AD02 0800 :
:97  64   11:26:22.071.245 08002000AD02 0800200061F3 0800 :
:98  64   11:26:22.317.640 08002000AD02 0800200061F3 0800 :
:99  1082 11:26:22.320.915 0800200061F3 08002000AD02 0800 :
:100 64   11:26:22.471.033 08002000AD02 0800200061F3 0800 :
:101 1082 11:26:22.474.149 0800200061F3 08002000AD02 0800 :
:102 1082 11:26:22.476.098 0800200061F3 08002000AD02 0800 :
:103 984  11:26:22.478.369 0800200061F3 08002000AD02 0800 :
:104 64   11:26:22.657.940 08002000AD02 0800200061F3 0800 :
:105 1082 11:26:22.661.587 0800200061F3 08002000AD02 0800 :
:106 174  11:26:22.662.213 0800200061F3 08002000AD02 0800 :
:107 1082 11:26:22.664.870 0800200061F3 08002000AD02 0800 :
:108 64   11:26:22.670.542 08002000AD02 0800200061F3 0800 :
:109 632  11:26:22.689.105 0800200061F3 08002000AD02 0800 :
:110 1082 11:26:22.687.508 0800200061F3 08002000AD02 0800 :
:111 632  11:26:22.689.105 0800200061F3 08002000AD02 0800 :
:112 64   11:26:22.870.596 08002000AD02 0800200061F3 0800 :
:113 64   11:26:22.984.588 08002000AD02 0800200061F3 0800 :
:114 1082 11:26:22.987.054 0800200061F3 08002000AD02 0800 :
:115 64   11:26:23.071.151 08002000AD02 0800200061F3 0800 :
:116 1082 11:26:23.074.632 0800200061F3 08002000AD02 0800 :
:117 1082 11:26:23.077.127 0800200061F3 08002000AD02 0800 :
:118 1082 11:26:23.079.812 0800200061F3 08002000AD02 0800 :
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:127 64   11:26:23.746.399 08002000AD02 0800200061F3 0800 :
:128 1082 11:26:23.750.120 0800200061F3 08002000AD02 0800 :
:129 1082 11:26:23.760.227 0800200061F3 08002000AD02 0800 :
:130 1082 11:26:23.762.387 0800200061F3 08002000AD02 0800 :
:131 984  11:26:23.764.894 0800200061F3 08002000AD02 0800 :
:132 64   11:26:23.870.546 08002000AD02 0800200061F3 0800 :
:133 64   11:26:24.172.604 08002000AD02 0800200061F3 0800 :
:134 1082 11:26:24.175.814 0800200061F3 08002000AD02 0800 :
:135 64   11:26:24.270.697 08002000AD02 0800200061F3 0800 :
:135 64   11:26:24.270.697 08002000AD02 0800200061F3 0800 :
:136 1082 11:26:24.273.557 0800200061F3 08002000AD02 0800 :
:137 1082 11:26:24.275.321 0800200061F3 08002000AD02 0800 :
:138 984  11:26:24.277.393 0800200061F3 08002000AD02 0800 :
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:140 64   11:26:24.533.726 08002000AD02 0800200061F3 0800 :
:141 1082 11:26:24.537.091 0800200061F3 08002000AD02 0800 :
:142 64   11:26:24.671.602 08002000AD02 0800200061F3 0800 :
:143 1082 11:26:24.674.720 0800200061F3 08002000AD02 0800 :
:144 1082 11:26:24.676.799 0800200061F3 08002000AD02 0800 :
:145 984  11:26:24.679.075 0800200061F3 08002000AD02 0800 :
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:150 1082 11:26:25.073.783 0800200061F3 08002000AD02 0800 :
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:153 64   11:26:25.271.589 08002000AD02 0800200061F3 0800 :
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:156 64   11:26:25.471.096 08002000AD02 0800200061F3 0800 :
:157 1082 11:26:25.474.221 0800200061F3 08002000AD02 0800 :
:158 1082 11:26:25.476.256 0800200061F3 08002000AD02 0800 :
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:161 1082 11:26:25.656.150 0800200061F3 08002000AD02 0800 :

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:163 1082 11:26:25.659.439 0800200061F3 08002000AD02 0800 :
:164 64   11:26:25.672.902 08002000AD02 0800200061F3 0800 :
:165 184  11:26:25.674.684 0800200061F3 08002000AD02 0800 :
:166 1082 11:26:25.683.162 0800200061F3 08002000AD02 0800 :
:167 632  11:26:25.684.738 0800200061F3 08002000AD02 0800 :
:168 64   11:26:25.872.068 08002000AD02 0800200061F3 0800 :
:169 72   11:26:26.054.296 08002001B432 0800200061F3 0800 :
:170 94   11:26:26.137.506 0800200061F3 08002001B432 0800 :
:171 73   11:26:26.195.526 08002001B432 0800200061F3 0800 :
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:175 1082 11:26:26.274.883 0800200061F3 08002000AD02 0800 :
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:178 64   11:26:26.393.615 0800200061F3 08002001B432 0800 :
:179 80   11:26:26.409.541 0800200061F3 08002001B432 0800 :
:180 64   11:26:26.470.855 08002000AD02 0800200061F3 0800 :
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:186 1082 11:26:26.675.027 0800200061F3 08002000AD02 0800 :
:187 984  11:26:26.677.061 0800200061F3 08002000AD02 0800 :
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:195 64   11:26:28.729.067 08002000AD02 0800200061F3 0800 :
:196 64   11:26:29.870.896 08002000AD02 0800200061F3 0800 :
:197 64   11:26:29.872.406 0800200061F3 08002000AD02 0800 :
:198 64   11:26:29.878.607 0800200061F3 08002000AD02 0800 :
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:200 114  11:26:29.887.041 08002000AD02 0800200061F3 0800 :
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:204 64   11:26:30.471.311 08002001B432 0800200061F3 0800 :
:205 94   11:26:32.188.449 08002000AD02 0800200061F3 0800 :
:206 70   11:26:32.193.896 0800200061F3 08002000AD02 0800 :
:207 73   11:26:32.986.956 08002001B432 0800200061F3 0800 :
:208 64   11:26:32.994.484 0800200061F3 08002001B432 0800 :
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:212 82   11:26:36.247.810 0800200061F3 08002001B432 0800 :
:213 64   11:26:36.254.639 08002001B432 0800200061F3 0800 :
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:218 64   11:26:36.471.261 08002001B432 0800200061F3 0800 :
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:224 82   11:26:37.129.420 0800200061F3 08002001B432 0800 :
:225 570  11:26:37.132.191 0800200061F3 08002001B432 0800 :
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:230 64   11:26:37.986.482 08002001B432 0800200061F3 0800 :
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:234 64   11:26:55.872.660 08002001B432 0800200061F3 0800 :
:235 150  11:27:00.977.981 08002000B473 0800200061F3 0800 :
:236 142  11:27:01.027.533 0800200061F3 08002000B473 0800 :
:237 162  11:27:01.036.395 08002000B473 0800200061F3 0800 :
:238 74   11:27:01.057.940 0800200061F3 08002000B473 0800 :
:239 81   11:27:02.504.108 08002001B432 0800200061F3 0800 :
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:241 64   11:27:02.672.447 08002001B432 0800200061F3 0800 :
:242 82   11:27:04.108.997 08002001B432 0800200061F3 0800 :
:243 82   11:27:04.112.588 0800200061F3 08002001B432 0800 :
:244 64   11:27:04.118.347 08002001B432 0800200061F3 0800 :
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:246 64   11:27:04.171.846 0800200061F3 08002001B432 0800 :
:247 64   11:27:04.175.312 08002001B432 0800200061F3 0800 :
:248 64   11:27:04.176.901 0800200061F3 08002001B432 0800 :
```

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:251 79   11:27:04.368.227 0800200061F3 08002001B432 0800 :
:252 64   11:27:04.369.241 0800200061F3 08002001B432 0800 :
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:254 64   11:27:04.449.714 08002001B432 0800200061F3 0800 :
:255 64   11:27:04.451.138 0800200061F3 08002001B432 0800 :
:256 64   11:27:04.473.232 08002001B432 0800200061F3 0800 :
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:258 94   11:27:06.496.679 08000010166DE 0800200061F3 0800 :
:259 150  11:27:13.395.135 080020008679 0800200061F3 0800 :
:260 142  11:27:13.398.034 0800200061F3 080020008679 0800 :
:261 166  11:27:13.403.255 080020008679 0800200061F3 0800 :
:262 174  11:27:13.406.492 0800200061F3 080020008679 0800 :
:263 82   11:27:13.416.564 08002001B432 0800200061F3 0800 :
:264 82   11:27:13.422.351 0800200061F3 08002001B432 0800 :
:265 75   11:27:13.452.076 08002001B432 0800200061F3 0800 :
:266 136  11:27:13.471.474 0800200061F3 08002001B432 0800 :
:267 64   11:27:13.472.871 0800200061F3 08002001B432 0800 :
:268 64   11:27:13.477.039 08002001B432 0800200061F3 0800 :
:269 64   11:27:13.478.441 0800200061F3 08002001B432 0800 :
:270 198  11:27:13.486.867 080020008679 0800200061F3 0800 :
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:272 570  11:27:13.557.473 0800200061F3 08002001B432 0800 :
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:277 174  11:27:13.613.531 0800200061F3 080020008679 0800 :
:278 150  11:27:13.620.249 080020008679 0800200061F3 0800 :
:279 142  11:27:13.622.897 0800200061F3 080020008679 0800 :
:280 64   11:27:13.631.858 08002001B432 0800200061F3 0800 :
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:282 64   11:27:13.666.727 0800200061F3 08002001B432 0800 :
:283 162  11:27:13.670.129 080020008679 0800200061F3 0800 :
:284 64   11:27:13.672.491 08002001B432 0800200061F3 0800 :
:285 146  11:27:13.673.438 0800200061F3 080020008679 0800 :
:286 82   11:27:13.673.701 0800200061F3 08002001B432 0800 :
:287 1518 11:27:13.751.565 080020008679 0800200061F3 0800 :
:288 1082 11:27:13.753.057 080020008679 0800200061F3 0800 :
:289 142  11:27:13.793.360 0800200061F3 080020008679 0800 :
:290 64   11:27:13.872.539 08002001B432 0800200061F3 0800 :
:291 65   11:27:22.535.331 08002001B432 0800200061F3 0800 :
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:297 410  11:27:32.876.342 0800200061F3 08002001B432 0800 :
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:299 96   11:27:33.075.510 0800200061F3 08002001B432 0800 :
:300 64   11:27:33.273.479 08002001B432 0800200061F3 0800 :
:301 70   11:27:37.454.830 08002001B432 0800200061F3 0800 :
:302 64   11:27:37.600.867 0800200061F3 08002001B432 0800 :
:303 83   11:27:37.893.774 0800200061F3 08002001B432 0800 :
:304 64   11:27:38.073.544 08002001B432 0800200061F3 0800 :
:305 69   11:27:40.815.580 08002001B432 0800200061F3 0800 :
:306 81   11:27:40.819.546 0800200061F3 08002001B432 0800 :
:307 64   11:27:40.874.331 08002001B432 0800200061F3 0800 :
:308 64   11:27:44.705.934 08002001B432 0800200061F3 0800 :
:309 64   11:27:44.801.501 0800200061F3 08002001B432 0800 :
:310 114  11:27:45.039.038 0800200061F3 08002001B432 0800 :
:311 64   11:27:45.074.470 08002001B432 0800200061F3 0800 :
:312 64   11:27:48.655.840 08002001B432 0800200061F3 0800 :
:313 72   11:27:48.660.606 0800200061F3 08002001B432 0800 :
:314 64   11:27:48.665.411 08002001B432 0800200061F3 0800 :
:315 64   11:27:48.666.750 0800200061F3 08002001B432 0800 :
:316 64   11:27:48.703.100 0800200061F3 08002001B432 0800 :
:317 64   11:27:48.706.556 08002001B432 0800200061F3 0800 :
```

Annexe 4 – Analyse de trames : les actions

```
toutain@buro1 [4]</usr/u4/labo/toutain/VME> :ftp ER1
Connected to ER1.
220 ER1 FTP server (Version 4.7 Sun Sep 14 12:44:57 PDT 1986) ready.
Name (ER1:toutain):
Password (ER1:toutain):
331 Password required for toutain.
530 Login incorrect.
Login failed.
ftp> user toutain
331 Password required for toutain.
Password:
230 User toutain logged in.
ftp> dir
200 PORT command okay.
150 Opening data connection for /bin/ls (192.9.200.11,1107) (0 bytes).
total 86
-rw-r--r-- 1 toutain wheel          8668 Jan 26 15:38 .XXXdef
-rw-r--r-- 1 toutain wheel          3013 Feb 3 11:19 .Xdefaults
-rw-r--r-- 1 toutain wheel           204 Feb 20 09:34 .appointment
                     .
                     .
drwxr-xr-x 2 toutain wheel             512 Feb 21 09:03 transfert
drwxrwxrwx 2 toutain wheel            1044 Feb 20 14:58 wrk
226 Transfer complete.
2617 bytes received in 1.66 seconds (1.5 Kbytes/s)
ftp> cd commandes/source
550 commandes/source: No such file or directory.
ftp> cd commandes/sources
200 CWD command okay.
ftp> ls
200 PORT command okay.
150 Opening data connection for /bin/ls (192.9.200.11,1108) (0 bytes).
dmp.c.Z
sun_fond.c
226 Transfer complete.
21 bytes received in 0.26 seconds (0.079 Kbytes/s)
ftp> recv sun_fond.c
200 PORT command okay.
150 Opening data connection for sun_fond.c (192.9.200.11,1109) (2394 bytes).
226 Transfer complete.
2476 bytes received in 0.04 seconds (60 Kbytes/s)
ftp> cd
(remote-directory) ~
200 CWD command okay.
ftp> remotehelp
214-The following commands are recognized (* =>?s unimplemented).
  USER      PORT     RETR      MSND*    ALLO      DELE      SITE*     XRMD
  PASS      PASV*    STOR      MSOM*    REST*     CWD       STAT*     XPWD
```

```
  ACCT*     TYPE      APPE      MSAM*     RNFR      XCWD      HELP      XCUP
  REIN*     STRU      MLFL*     MRSQ*     RNTO      LIST      NOOP
  QUIT      MODE      MAIL*     MRCP*     ABOR*     NLST      XMKD
214 Direct comments to ftp-bugs@ER1.
ftp> mkdir essai
200 MKDIR command okay.
ftp> cd essai
200 CWD command okay.
ftp> pwd
251 "/usr/u4/labo/toutain/essai" is current directory.
ftp> quit
221 Goodbye.
toutain@buro1 [5]</usr/u4/labo/toutain/VME> :
```

Annexe 5 – Analyse de trames

```
Packet 43 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11    -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    SYN
      seq:      452609   ack:          0   win: 4096
      Options
           Maximum Segment Size
               Size                        1024
           End of Option List
Packet 44 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   SYN ACK
      seq:      8404417   ack:       452610   win: 4096
Packet 45 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    ACK
      seq:      452610   ack:      8404418   win: 4096
Packet 46 Frame Length: 128       Slice Length: 124
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404418   ack:       452610   win: 4096
0000  32 32 30 20 45 52 31 20  46 54 50 20 73 65 72 76  |220 ER1 FTP serv|
0010  65 72 20 28 56 65 72 73  69 6F 6E 20 34 2E 37 20  |er (Version 4.7 |
0020  53 75 6E 20 53 65 70 20  31 34 20 31 32 3A 34 34  |Sun Sep 14 12:44|
0030  3A 35 37 20 50 44 54 20  31 39 38 36 29 20 72 65  |:57 PDT 1986) re|
0040  61 64 79 2E 0D 0A                                 |ady...          |
Packet 55 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    ACK
      seq:      452610   ack:      8404488   win: 4096
Packet 169 Frame Length: 72       Slice Length: 68
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452610   ack:      8404488   win: 4096
0000 55 53 45 52 20 74 6F 75  74 61 69 6E 0D 0A       |USER toutain..  |
Packet 170 Frame Length: 94       Slice Length: 90
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404488   ack:       452624   win: 4096
0000  33 33 31 20 50 61 73 73  77 6F 72 64 20 72 65 71  |331 Password req|
0010  75 69 72 65 64 20 66 6F  72 20 74 6F 75 74 61 69  |uired for toutai|
0020  6E 2E 0D 0A                                       |n...            |
Packet 171 Frame Length: 73       Slice Length: 69
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452624   ack:      8404524   win: 4096
0000  50 41 53 53 20 74 6F 6B  65 6E 62 75 73 0D 0A     |PASS tokenbus.. |
Packet 178 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   ACK
      seq:      8404524   ack:       452639   win: 4096
Packet 179 Frame Length: 80       Slice Length: 76
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404524   ack:       452639   win: 4096
0000  35 33 30 20 4C 6F 67 69  6E 20 69 6E 63 6F 72 72  |530 Login incorr|
0010  65 63 74 2E 0D 0A                                 |ect...          |
Packet 181 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32
      Type    IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    ACK
      seq:      452639   ack:      8404546   win: 4096
Packet 202 Frame Length: 72       Slice Length: 68
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452639   ack:      8404546   win: 4096
0000  55 53 45 52 20 74 6F 75  74 61 69 6E 0D 0A       |USER toutain..  |
Packet 203 Frame Length: 94       Slice Length: 90
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404546   ack:       452653   win: 4096
0000  33 33 31 20 50 61 73 73  77 6F 72 64 20 72 65 71  |331 Password req|
0010  75 69 72 65 64 20 66 6F  72 20 74 6F 75 74 61 69  |uired for toutai|
0020  6E 2E 0D 0A                                       |n...            |
Packet 204 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    ACK
      seq:      452653   ack:      8404582   win: 4096
Packet 207 Frame Length: 73       Slice Length: 69
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452653   ack:      8404582   win: 4096
0000  50 41 53 53 20 65 74 68  65 72 6E 65 74 0D 0A     |PASS ethernet.. |
Packet 208 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   ACK
      seq:      8404582   ack:       452668   win: 4096
Packet 209 Frame Length: 87       Slice Length: 8|
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404582   ack:       452668   win: 4096
0000  32 33 30 20 55 73 65 72  20 74 6F 75 74 61 69 6E  |230 User toutain|
0010  20 6C 6F 67 67 65 64 20  69 6E 2E 0D 0A           | logged in...   |
Packet 210 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    ACK
      seq:      452668   ack:      8404611   win: 4096
Packet 211 Frame Length: 82       Slice Length: 78
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452668   ack:      8404611   win: 4096
0000  50 4F 52 54 20 31 39 32  2C 39 2C 32 30 30 2C 31  |PORT 192,9,200,1|
0010  31 2C 34 2C 38 33 0D 0A                          |1,4,8...        |
Packet 212 Frame Length: 82       Slice Length: 78
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404611   ack:       452692   win: 4096
0000  32 30 30 20 50 4F 52 54  20 63 6F 6D 6D 61 6E 64  |200 PORT command|
0010  20 6F 6B 61 79 2E 0D 0A                          | okay...        |
Packet 213 Frame Length: 64       Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP          192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104               -> FTP                    PSH ACK
      seq:      452692   ack:      8404635   win: 4096
0000  4C 49 53 54 0D 0A                                 |LIST..          |
Packet 214 Frame Length: 130      Slice Length: 126
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP          192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                -> 1104                   PSH ACK
      seq:      8404635   ack:       452698   win: 4096
0000  31 35 30 20 4F 70 65 6E  69 6E 67 20 64 61 74 61  |150 Opening data|
```

```
0010  20 63 6F 6E 6E 65 63 74  69 6F 6E 20 66 6F 72 20  | connection for |
0020  2F 62 69 6E 2F 6C 73 20  28 31 39 32 2E 39 2E 32  |/bin/ls (192.9.2|
0030  30 30 2E 31 31 2C 31 31  30 37 29 20 28 30 20 62  |00.11,1107) (0 b|
0040  79 74 65 73 29 2E 0D 0A                          |ytes)...        |
Packet 215 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  SYN
      seq:      8406849   ack:           0  win: 4096
Packet 216 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1107               -> FTP-DATA              SYN ACK
      seq:      455105   ack:     8406850   win: 4096
      Options
          Maximum Segment Size
              Size                        1024
          End of Option List
Packet 217 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  ACK
      seq:      8406850   ack:      455106   win: 4096
Packet 218 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                   ACK
      seq:      452698    ack:     8404707   win: 4096
Packet 219 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  ACK
      seq:      8406850   ack:      455106   win: 4096
0000  74 6F 74 61 6C 20 38 36  0D 0A 2D 72 77 2D 72 2D  |total 86..-rw-r-|
0010  2D 72 2D 2D 20 20 31 20  74 6F 75 74 61 69 6E 20  |-r-- 1 toutain  |
0020  20 77 68 65 65 6C 20 20  20 20 20 20 20 38 36     | wheel         86|
0030  36 38 20 4A 61 6E 20 32  36 20 31 35 3A 33 38 20  |68 Jan 26 15:38 |
0040  2E 58 58 58 64 65 66 0D  0A 2D 72 77 2D 72 2D 2D  |.XXXdef..-rw-r--|
0050  72 2D 2D 20 20 31 20 74  6F 75 74 61 69 6E 20 20  |r-- 1 toutain   |
0060  77 68 65 65 6C 20 20 20  20 20 20 20 20 33 30 31  |wheel         301|
0070  33 20 46 65 62 20 20 33  20 31 31 3A 31 39 20 2E  |3 Feb  3 11:19 .|
0080  58 64 65 66 61 75 6C 74  73 0D 0A 2D 72 77 2D 72  |Xdefaults..-rw-r|
Packet 220 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  ACK
      seq:      8407362   ack:      455106   win: 4096
0000  2E 64 65 66 61 75 6C 74  73 0D 0A 2D 72 77 2D 72  |.defaults..-rw-r|
0010  2D 2D 72 2D 2D 20 20 31  20 74 6F 75 74 61 69 6E  |--r--  1 toutain|
0020  20 20 77 68 65 65 6C 20  20 20 20 20 20 20 34     |  wheel         4|
0030  35 31 37 20 4A 61 6E 20  32 36 20 31 35 3A 33 34  |517 Jan 26 15:34|
0040  20 2E 65 6D 61 63 73 0D  0A 2D 72 77 78 72 2D 78  | .emacs..-rwxr-x|
0050  72 2D 78 20 20 31 20 74  6F 75 74 61 69 6E 20 20  |r-x  1 toutain  |
0060  77 68 65 65 6C 20 20 20  20 20 20 20 20 33 35     |wheel          35|
0070  31 20 4A 61 6E 20 32 36  20 31 35 3A 33 34 20 2E  |1 Jan 26 15:34 .|
0080  65 78 72 63 0D 0A 2D 72  77 2D 72 2D 2D 72 2D 2D  |exrc..-rw-r--r--|
Packet 221 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  ACK
      seq:      8407874   ack:      455106   win: 4096
0000  65 65 6C 20 20 20 20 20  20 20 20 20 34 39 36 20  |eel          496 |
0010  4A 61 6E 20 32 36 20 31  35 3A 33 34 20 2E 70 6C  |Jan 26 15:34 .pl|
0020  61 6E 0D 0A 64 72 77 78  72 2D 78 72 2D 78 20 20  |an..drwxr-xr-x  |
0030  32 20 74 6F 75 74 61 69  6E 20 20 77 68 65 65 6C  |2 toutain  wheel|
0040  20 20 20 20 20 20 20 20  20 35 31 32 20 4A 61 6E  |         512 Jan|
0050  20 32 36 20 31 35 3A 33  34 20 2E 70 6F 75 62 65  | 26 15:34 .poube|
0060  6C 6C 65 0D 0A 2D 72 77  2D 2D 2D 2D 2D 2D 2D 20  |lle..-rw------- |
0070  20 31 20 74 6F 75 74 61  69 6E 20 20 77 68 65 65  | 1 toutain  whee|
0080  6C 20 20 20 20 20 20 20  32 38 32 39 36 20 46 65  |l       28296 Fe|
Packet 222 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  PSH ACK
      seq:      8408386   ack:      455106   win: 4096
0000  2D 2D 20 20 31 20 74 6F  75 74 61 69 6E 20 20 77  |--  1 toutain  w|
0010  68 65 65 6C 20 20 20 20  20 20 20 20 20 33 37 34  |heel          374|
0020  20 46 65 62 20 20 33 20  30 39 3A 34 37 20 2E 72  | Feb  3 09:47 .r|
0030  6F 6F 74 6D 65 6E 75 2E  75 74 69 6C 0D 0A 2D 72  |ootmenu.util..-r|
0040  77 2D 72 2D 2D 72 2D 2D  20 20 31 20 74 6F 75 74  |w-r--r--  1 tout|
0050  61 69 6E 20 20 77 68 65  65 6C 20 20 20 20 20 20  |ain wheel       |
0060  20 20 20 35 38 30 20 46  65 62 20 31 33 20 31 30  |   580 Feb 13 10|
0070  3A 33 36 20 2E 72 6F 6F  74 6D 65 6E 75 2E 75 74  |:36 .rootmenu.ut|
0080  69 6C 32 0D 0A 2D 72 77  2D 72 2D 2D 72 2D 2D 20  |il2..-rw-r--r-- |
Packet 223 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1107               -> FTP-DATA              ACK
      seq:      455106   ack:     8408898   win: 4096
Packet 224 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                  PSH ACK
      seq:      8404707   ack:      452698   win: 4096
0000  32 32 36 20 54 72 61 6E  73 66 65 72 20 63 6F 6D  |226 Transfer com|
0010  70 6C 65 74 65 2E 0D 0A                          |plete...        |
Packet 225 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3       Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           ->   1107                ACK
      seq:      8408898   ack:      455106   win:   4096
0000  39 20 2E 77 69 6E 64 72  63 0D 0A 2D 72 77 2D 72  |9 .windrc..-rw-r|
0010  2D 2D 72 2D 2D 20 20 31  20 74 6F 75 74 61 69 6E  |--r--  1 toutain|
0020  20 20 77 68 65 65 6C 20  20 20 20 20 20 20 20 20  |  wheel         |
0030  32 34 36 20 46 65 62 20  20 33 20 31 30 3A 30 39  |246 Feb  3 10:09|
0040  20 2E 78 69 6E 69 74 72  63 0D 0A 64 72 77 78 2D  | .xinitrc..drwx-|
0050  2D 2D 2D 2D 2D 20 20 32  20 74 6F 75 74 61 69 6E  |-----  2 toutain|
0060  20 20 77 68 65 65 6C 20  20 20 20 20 20 20 20 20  |  wheel         |
0070  35 31 32 20 46 65 62 20  32 30 20 30 39 3A 35 33  |512 Feb 20 09:53|
0080  20 54 44 0D 0A 64 72 77  78 72 2D 78 72 2D 78 20  | TD..drwxr-xr-x |
Packet 226 Frame Length: 115       Slice Length: 111
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  PSH ACK
      seq:      8409410   ack:      455106   win: 4096
0000  77 78 72 77 78 72 77 78  20 20 32 20 74 6F 75 74  |wxrwxrwx  2 tout|
0010  61 69 6E 20 20 77 68 65  65 6C 20 20 20 20 20 20  |ain wheel       |
0020  20 20 31 30 34 34 20 46  65 62 20 32 30 20 31 34  |  1044 Feb 20 14|
0030  3A 35 38 20 77 72 6B 0D  0A                      |:58 wrk..       |
Packet 227 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  FIN ACK
      seq:      8409467   ack:      455106   win: 4096
Packet 228 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1107               -> FTP-DATA              ACK
      seq:      455106   ack:     8409468   win: 3527
Packet 229 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                   ACK
      seq:      452698    ack:     8404731   win: 4072
Packet 230 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1107               -> FTP-DATA              FIN ACK
      seq:      455106   ack:     8409468   win: 4096
Packet 231 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1107                  ACK
      seq:      8409468   ack:      455107   win: 4096
Packet 232 Frame Length: 80        Slice Length: 76
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                   PSH ACK
      seq:      452698    ack:     8404731   win: 4096
0000  43 57 44 20 63 6F 6D 6D  61 6E 64 65 73 2F 73 6F  |CWD commandes/so|
0010  75 72 63 65 0D 0A                                |urce..          |
Packet 233 Frame Length: 108       Slice Length: 104
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                  PSH ACK
      seq:      8404731   ack:      452720   win: 4096
0000  35 35 30 20 63 6F 6D 6D  61 6E 64 65 73 2F 73 6F  |550 commandes/so|
0010  75 72 63 65 3A 20 4E 6F  20 73 75 63 68 20 66 69  |urce: No such fi|
0020  6C 65 20 6F 72 20 64 69  72 65 63 74 6F 72 79 2E  |le or directory.|
0030  0D 0A                                            |..              |
Packet 234 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                   ACK
      seq:      452720    ack:     8404781   win: 4096
Packet 239 Frame Length: 81        Slice Length: 77
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                   PSH ACK
      seq:      452720    ack:     8404781   win: 4096
0000  43 57 44 20 63 6F 6D 6D  61 6E 64 65 73 2F 73 6F  |CWD commandes/so|
0010  75 72 63 65 73 0D 0A                             |urces..         |
Packet 240 Frame Length: 81        Slice Length: 77
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
```

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  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404781    ack:      452743   win: 4096
0000  32 30 30 20 43 57 44 20  63 6F 6D 6D 61 6E 64 20  |200 CWD command |
0010  6F 6B 61 79 2E 0D 0A                             |okay...          |
Packet 241 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  ACK
      seq:      452743    ack:      8404804   win: 4096
Packet 242 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  PSH ACK
      seq:      452743    ack:      8404804   win: 4096
0000  50 4F 52 54 20 31 39 32  2C 39 2C 32 30 30 2C 31  |PORT 192,9,200,1|
0010  31 2C 34 2C 38 34 0D 0A                         |1,4,84..         |
Packet 243 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 01 B4 32     ----> 08 00 20 00 61 F3      Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404804    ack:      452767   win: 4096
0000  32 30 30 20 50 4F 52 54  20 63 6F 6D 6D 61 6E 64  |200 PORT command|
0010  20 6F 6B 61 79 2E 0D 0A                         | okay...         |
Packet 244 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  PSH ACK
      seq:      452767    ack:      8404828   win: 4096
0000  4E 4C 53 54 0D 0A                               3NLST..         |
Packet 245 Frame Length: 130       Slice Length: 126
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20    00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404828    ack:      452773   win:   4096
0000  31 35 30 20 4F 70 65 6E  69 6E 67 20 64 61 74 61  |150 Opening data|
0010  20 63 6F 6E 6E 65 63 74  69 6F 6E 20 66 6F 72 20  | connection for |
0020  2F 62 69 6E 2F 6C 73 20  28 31 39 32 2E 39 2E 32  |/bin/ls (192.9.2|
0030  30 30 2E 31 31 2C 31 31  30 38 29 20 28 30 20 62  |00.11,1108) (0 b|
0040  79 74 65 73 29 2E 0D 0A                         |ytes)...         |
Packet 246 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1108                 SYN
      seq:      8410561    ack:         0   win: 4096
Packet 247 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1108              -> FTP-DATA             SYN ACK
      seq:      458753    ack:      8410562   win: 4096
      Options
          Maximum Segment Size
              Size                      1024
          End of Option List
Packet 248 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1108                 ACK
      seq:      8410562    ack:      458754   win: 4096
Packet 249 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  ACK
      seq:      452773    ack:      8404900   win: 4096
Packet 250 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404900    ack:      452773   win: 4096
0000  32 32 36 20 54 72 61 6E  73 66 65 72 20 63 6F 6D  |226 Transfer com|
0010  70 6C 65 74 65 2E 0D 0A                         |plete...         |
Packet 251 Frame Length: 79        Slice Length: 75
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1108                 PSH ACK
      seq:      8410562    ack:      458754   win: 4096
0000  64 6D 70 2E 63 2E 5A 0D  0A 73 75 6E 5F 66 6F 6E  |dmp.c.Z..sun_fon|
0010  64 2E 63 0D 0A                                  |d.c..            |
Packet 252 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1108                 FIN ACK
      seq:      8410583    ack:      458754   win: 4096
Packet 253 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1108              -> FTP-DATA             ACK
      seq:      458754    ack:      8410584   win: 4075
Packet 254 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1108              -> FTP-DATA             FIN ACK
      seq:      458754    ack:      8410584   win: 4096
Packet 255 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1108                 ACK
      seq:      8410584    ack:      458755   win: 4096
Packet 256 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  ACK
      seq:      452773    ack:      8404924   win: 4096
Packet 263 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  PSH ACK
      seq:      452773    ack:      8404924   win: 4096
0000  50 4F 52 54 20 31 39 32  2C 39 2C 32 30 30 2C 31  |PORT 192,9,200,1|
0010  31 2C 34 2C 38 35 0D 0A                         |1,4,85..         |
Packet 264 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404924    ack:      452797   win: 4096
0000  32 30 30 20 50 4F 52 54  20 63 6F 6D 6D 61 6E 64  |200 PORT command|
0010  20 6F 6B 61 79 2E 0D 0A                         | okay...         |
Packet 265 Frame Length: 75        Slice Length: 71
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1104              -> FTP                  PSH ACK
      seq:      452797    ack:      8404948   win: 4096
0000  52 45 54 52 20 73 75 6E  5F 66 6F 6E 64 2E 63 0D  |RETR sun_fond.c.|
0010  0A                                             |.                |
Packet 266 Frame Length: 136       Slice Length: 132
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP               -> 1104                 PSH ACK
      seq:      8404948    ack:      452814   win: 4096
0000  31 35 30 20 4F 70 65 6E  69 6E 67 20 64 61 74 61  |150 Opening data|
0010  20 63 6F 6E 6E 65 63 74  69 6F 6E 20 66 6F 72 20  | connection for |
0020  73 75 6E 5F 66 6F 6E 64  2E 63 20 28 31 39 32 2E  |sun_fond.c (192.|
0030  39 2E 32 30 30 2E 31 31  2C 31 31 30 39 29 20 28  |9.200.11,1109) (|
0040  32 33 39 34 20 62 79 74  65 73 29 2E 0D 0A       |2394 bytes)...   |
Packet 267 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1109                 SYN
      seq:      8411969    ack:         0   win: 4096
Packet 268 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9    200 11      -> 192 9    200 1
 tcp: Port: 1109              -> FTP-DATA             SYN ACK
      seq:      460033    ack:      8411970   win: 4096
      Options
          Maximum Segment Size
              Size                      1024
          End of Option List
Packet 269 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1109                 ACK
      seq:      8411970    ack:      460034   win: 4096
Packet 271 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1109                 ACK
      seq:      8411970    ack:      460034   win: 4096
0000  23 69 6E 63 6C 75 64 65  20 3C 73 74 64 69 6F 2E  |#include <stdio.|
0010  68 3E 0D 0A 23 69 6E 63  6C 75 64 65 20 3C 73 79  |h>..#include <sy|
0020  73 2F 74 79 70 65 73 2E  68 3E 0D 0A 23 69 6E 63  |s/types.h>..#inc|
0030  6C 75 64 65 20 3C 73 79  73 2F 74 69 6D 65 62 2E  |lude <sys/timeb.|
0040  68 3E 0D 0A 73 74 72 75  63 74 20 74 69 6D 65 62  |h>..struct timeb|
0050  20 2A 74 70 3B 0D 0A 0D  0A 6D 61 69 6E 20 28 6E  | *tp;....main (n|
0060  2C 76 29 0D 0A 69 6E 74  20 6E 3B 0D 0A 63 68 61  |,v)..int n;..cha|
0070  72 2A 2A 20 76 3B 0D 0A  7B 0D 0A 63 68 61 72 2A  |r** v;..{..char*|
0080  20 69 6D 20 5B 31 30 30  5D 3B 0D 0A 69 6E 74 09  | im [100];..int.|
Packet 272 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9    200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA          -> 1109                 ACK
      seq:      8412482    ack:      460034   win: 4096
0000  5D 20 3D 20 22 63 68 65  72 79 6C 2E 69 6D 31 22  |] = "cheryl.im1"|
0010  3B 0D 0A 09 64 69 72 5B  69 5D 20 3D 20 30 3B 20  |;...dir[i] = 0; |
```

```
0020  69 6D 5B 69 2B 2B 5D 20  3D 20 22 63 69 72 63 6C  |im[i++] = "circl|
0030  65 73 2E 69 6D 31 22 3B  0D 0A 09 64 69 72 5B 69  |es.iml";...dir[i|
0040  5D 20 3D 20 30 3B 20 69  6D 5B 69 2B 2B 5D 20 3D  |] = 0; im[i++] =|
0050  20 22 64 61 6D 61 31 2E  69 6D 31 22 3B 0D 0A 09  | "dama1.iml";...|
0060  64 69 72 5B 69 5D 20 3D  20 30 3B 20 69 6D 5B 69  |dir[i] = 0; im[i|
0070  2B 2B 5D 20 3D 20 22 64  61 6D 61 32 2E 69 6D 31  |++] = "dama2.iml|
0080  22 3B 0D 0A 09 64 69 72  5B 69 5D 20 3D 20 30 3B  |";...dir[i] = 0;|
Packet 273 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1109                 ACK
      seq:      8412994    ack:      460034   win: 4096
0000  64 69 72 5B 69 5D 20 3D  20 30 3B 20 69 6D 5B 69  |dir[i] = 0; im[i|
0010  2B 2B 5D 20 3D 20 22 66  6F 75 6E 64 65 72 73 2E  |++] = "founders.|
0020  69 6D 31 22 3B 0D 0A 09  64 69 72 5B 69 5D 20 3D  |im1";...dir[i] =|
0030  20 30 3B 20 69 6D 5B 69  2B 2B 5D 20 3D 20 22 67  | 0; im[i++] = "g|
0040  61 6C 61 78 69 65 2E 69  6D 31 22 3B 0D 0A 09 64  |alaxie.iml";...d|
0050  69 72 5B 69 5D 20 3D 20  30 3B 20 69 6D 5B 69 2B  |ir[i] = 0; im[i+|
0060  2B 5D 20 3D 20 22 67 6C  6F 62 65 2E 69 6D 31 22  |+] = "globe.iml"|
0070  3B 0D 0A 09 64 69 72 5B  69 5D 20 3D 20 30 3B 20  |;...dir[i] = 0; |
0080  69 6D 5B 69 2B 2B 5D 20  3D 20 22 67 6F 64 7A 69  |im[i++] = "godzi|
Packet 274 Frame Length: 570       Slice Length: 566
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3       Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           ->  1109                PSH ACK
      seq:      8413506    ack:      460034   win:   4096
0000  20 30 3B 20 69 6D 5B 69  2B 2B 5D 20 3D 20 22 69  | 0; im[i++] = "i|
0010  74 61 6C 69 61 2E 69 6D  31 22 3B 0D 0A 09 64 69  |talia.iml";...di|
0020  72 5B 69 5D 20 3D 20 30  3B 20 69 6D 5B 69 2B 2B  |r[i] = 0; im[i++|
0030  5D 20 3D 20 22 6B 65 79  6C 6F 63 6B 2E 69 6D 31  |] = "keylock.im1|
0040  22 3B 0D 0A 09 64 69 72  5B 69 5D 20 3D 20 30 3B  |";...dir[i] = 0;|
0050  20 69 6D 5B 69 2B 2B 5D  20 3D 20 22 6C 61 6B 65  | im[i++] = "lake|
0060  2E 69 6D 31 22 3B 0D 0A  09 64 69 72 5B 69 5D 20  |.iml";...dir[i] |
0070  3D 20 30 3B 20 69 6D 5B  69 2B 2B 5D 20 3D 20 22  |= 0; im[i++] = "|
0080  6C 65 6E 6E 6F 6E 2E 69  6D 31 22 3B 0D 0A 09 64  |lennon.iml";...d|
Packet 275 Frame Length: 486       Slice Length: 482
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1109                 PSH FIN ACK
      seq:      8414018    ack:      460034   win: 4096
0000  3D 20 22 73 68 61 6B 65  73 70 2E 69 6D 31 22 3B  |= "shakesp.iml";|
0010  0D 0A 09 64 69 72 5B 69  5D 20 3D 20 30 3B 20 69  |...dir[i] = 0; i|
0020  6D 5B 69 2B 2B 5D 20 3D  20 22 73 70 61 63 65 2E  |m[i++] = "space.|
0030  69 6D 31 22 3B 0D 0A 09  64 69 72 5B 69 5D 20 3D  |im1";...dir[i] =|
0040  20 30 3B 20 69 6D 5B 69  2B 2B 5D 20 3D 20 22 73  | 0; im[i++] = "s|
0050  75 6E 66 6C 2E 69 6D 31  22 3B 0D 0A 09 64 69 72  |unfl.iml";...dir|
0060  5B 69 5D 20 3D 20 30 3B  20 69 6D 5B 69 2B 2B 5D  |[i] = 0; im[i++]|
0070  20 3D 20 22 77 70 73 31  2E 69 6D 31 22 3B 0D 0A  | = "wps1.iml";..|
0080  0D 0A 09 74 70 20 3D 20  6D 61 6C 6C 6F 63 20 28  |...tp = malloc (|
Packet 276 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1109               -> FTP-DATA             ACK
      seq:       460034    ack:      8414447   win: 1620
Packet 280 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1109               -> FTP-DATA             ACK
      seq:       460034    ack:      8414447   win: 3668
Packet 281 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1109               -> FTP-DATA             FIN ACK
      seq:       460034    ack:      8414447   win: 4096
Packet 282 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP-DATA           -> 1109                 ACK
      seq:      8414447    ack:      460035   win: 4096
Packet 284 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452814    ack:      8405026   win: 4096
Packet 286 Frame Length: 82        Slice Length: 78
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405026    ack:      452814   win: 4096
0000  32 32 36 20 54 72 61 6E  73 66 65 72 20 63 6F 6D  |226 Transfer com|
0010  70 6C 65 74 65 2E 0D 0A                          |plete...        |
Packet 290 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452814    ack:      8405050   win: 4096
Packet 291 Frame Length: 65        Slice Length: 61
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  PSH ACK
      seq:       452814    ack:      8405050   win: 4096
0000  43 57 44 20 7E 0D 0A                             |CWD ~..         |
Packet 292 Frame Length: 81        Slice Length: 77
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405050    ack:      452821   win: 4096
0000  32 30 30 20 43 57 44 20  63 6F 6D 6D 61 6E 64 20  |200 CWD command |
0010  6F 6B 61 79 2E 0D 0A                             |okay...         |
Packet 293 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452821    ack:      8405073   win: 4096
Packet 294 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  PSH ACK
      seq:       452821    ack:      8405073   win: 4096
0000  48 45 4C 50 0D 0A                             |HELP..          |
Packet 295 Frame Length: 125       Slice Length: 121
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405073    ack:      452827   win: 4096
0000  32 31 34 2D 54 68 65 20  66 6F 6C 6C 6F 77 69 6E  |214-The followin|
0010  67 20 63 6F 6D 6D 61 6E  64 73 20 61 72 65 20 72  |g commands are r|
0020  65 63 6F 67 6E 69 7A 65  64 20 28 2A 20 3D 3E 27  |ecognized (* =>'|
0030  73 20 75 6E 69 6D 70 6C  65 6D 65 6E 74 65 64 29  |s unimplemented)|
0040  2E 0D 0A                                         |...             |
Packet 296 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452827    ack:      8405140   win: 4029
Packet 297 Frame Length: 410       Slice Length: 406
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405140    ack:      452827   win: 4096
0000  20 20 20 20 55 53 45 52  20 20 20 20 20 50 4F 52  |    USER     POR|
0010  54 20 20 20 20 20 52 45  54 52 20 20 20 20 20 4D  |T     RETR     M|
0020  53 4E 44 2A 20 20 20 20  41 4C 4C 4F 20 20 20 20  |SND*    ALLO    |
0030  20 44 45 4C 45 20 20 20  20 20 53 49 54 45 2A 20  | DELE     SITE* |
0040  20 20 20 58 52 4D 44 20  0D 0A 20 20 20 20 50 41  |   XRMD ..    PA|
0050  53 53 20 20 20 20 20 50  41 53 56 2A 20 20 20 20  |SS     PASV*     |
0060  53 54 4F 52 20 20 20 20  20 4D 53 4F 4D 2A 20 20  |STOR     MSOM*  |
0070  20 20 52 45 53 54 2A 20  20 20 20 43 57 44 20 20  | REST*     CWD  |
0080  20 20 20 20 53 54 41 54  2A 20 20 20 20 58 50 57  |    STAT*     XPW|
Packet 298 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452827    ack:      8405492   win: 4096
Packet 299 Frame Length: 96        Slice Length: 92
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405492    ack:      452827   win: 4096
0000  32 31 34 20 44 69 72 65  63 74 20 63 6F 6D 6D 65  |214 Direct comme|
0010  6E 74 73 20 74 6F 20 66  74 70 2D 62 75 67 73 40  |nts to ftp-bugs@|
0020  45 52 31 2E 0D 0A                                |ER1...          |
Packet 300 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  ACK
      seq:       452827    ack:      8405530   win: 4096
Packet 301 Frame Length: 70        Slice Length: 66
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP           192 9   200 11      -> 192 9    200 1
 tcp: Port: 1104               -> FTP                  PSH ACK
      seq:       452827    ack:      8405530   win: 4096
0000  58 4D 4B 44 20 65 73 73  61 69 0D 0A              |XMKD essai..    |
Packet 302 Frame Length: 64        Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 ACK
      seq:      8405530    ack:      452839   win: 4096
Packet 303 Frame Length: 83        Slice Length: 79
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP           192 9   200 1       -> 192 9    200 11
 tcp: Port: FTP                -> 1104                 PSH ACK
      seq:      8405530    ack:      452839   win: 4096
0000  32 30 30 20 4D 4B 44 49  52 20 63 6F 6D 6D 61 6E  |200 MKDIR comman|
```

```
0010  64 20 6F 6B 61 79 2E 0D  0A                    |d okay...       |
Packet 304 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      ACK
      seq:       452839   ack:      8405555   win: 4096
Packet 305 Frame Length: 69          Slice Length: 65
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      PSH ACK
      seq:       452839   ack:      8405555   win: 4096
0000  43 57 44 20 65 73 73 61  69 0D 0A                 |CWD essai..     |
Packet 306 Frame Length: 81          Slice Length: 77
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP            192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                 -> 1104                     PSH ACK
      seq:      8405555   ack:       452850   win: 4096
0000  32 30 30 20 43 57 44 20  63 6F 6D 6D 61 6E 64 20  |200 CWD command |
0010  6F 6B 61 79 2E 0D 0A                             |okay...         |
Packet 307 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      ACK
      seq:       452850   ack:      8405578   win: 4096
Packet 308 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      PSH ACK
      seq:       452850   ack:      8405578   win: 4096
0000  58 50 57 44 0D 0A                               |XPWD..          |
Packet 309 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP            192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                 -> 1104                     ACK
      seq:      8405578   ack:       452856   win: 4096
Packet 310 Frame Length: 114         Slice Length: 110
ethr: Station 08 00 20 01 B4 32    ----> 08 00 20 00 61 F3     Type IP
  ip: TCP            192 9    200 1       -> 192 9     200 11
 tcp: Port: FTP                  ->  1104                    PSH ACK
      seq:      8405578    ack:       452856   win: 4096
0000  32 35 31 20 22 2F 75 73  72 2F 75 34 2F 6C 61 62  |251 "/usr/u4/lab|
```

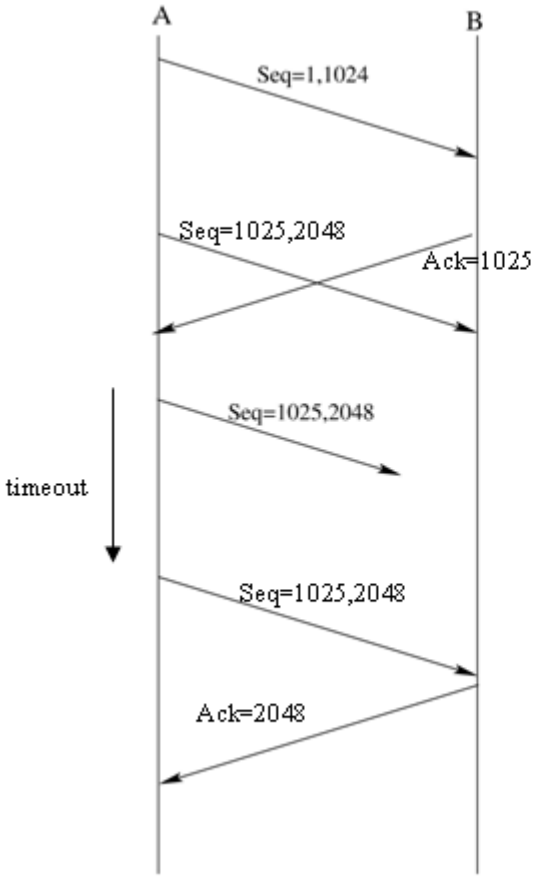
```
0010  6F 2F 74 6F 75 74 61 69  6E 2F 65 73 73 61 69 22  |o/toutain/essai"|
0020  20 69 73 20 63 75 72 72  65 6E 74 20 64 69 72 65  | is current dire|
0030  63 74 6F 72 79 2E 0D 0A                          |ctory...        |
Packet 311 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      ACK
      seq:       452856   ack:      8405634   win: 4096
Packet 312 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      PSH ACK
      seq:       452856   ack:      8405634   win: 4096
0000  51 55 49 54 0D 0A                               |QUIT..          |
Packet 313 Frame Length: 72          Slice Length: 68
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP            192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                 -> 1104                     PSH ACK
      seq:      8405634   ack:       452862   win: 4096
0000  32 32 31 20 47 6F 6F 64  62 79 65 2E 0D 0A        |221 Goodbye...  |
Packet 314 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      FIN ACK
      seq:       452862   ack:      8405648   win: 4096
Packet 315 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP            192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                 -> 1104                     ACK
      seq:      8405648   ack:       452863   win: 4096
Packet 316 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 01 B4 32 ----> 08 00 20 00 61 F3 Type IP
  ip: TCP            192 9   200 1       -> 192 9     200 11
 tcp: Port: FTP                 -> 1104                     FIN ACK
      seq:      8405648   ack:       452863   win: 4096
Packet 317 Frame Length: 64          Slice Length: 60
ethr: Station 08 00 20 00 61 F3 ----> 08 00 20 01 B4 32 Type IP
  ip: TCP            192 9   200 11      -> 192 9     200 1
 tcp: Port: 1104                -> FTP                      ACK
      seq:       452863   ack:      8405649   win: 4096
```

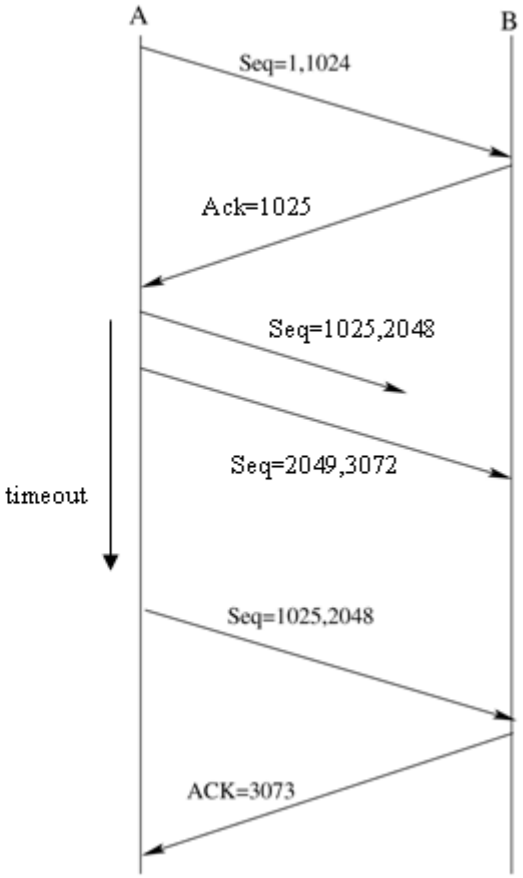
Exercice 1 (solution) :

1) Les ports permettent d'accéder aux différents services sur une même machine, ainsi que les identifier. Ex : POP3 : 110, SMTP : 25, HTTP : 80, HTTPS : 443, etc…
2) Les 2 premiers paquets sont utiles (et indispensable) pour la connexion et le 3ème pour un accusé de bonne réception.
3) Oui, il est possible de ne fermer qu'un seul circuit (car la déconnexion se passe en deux phases).

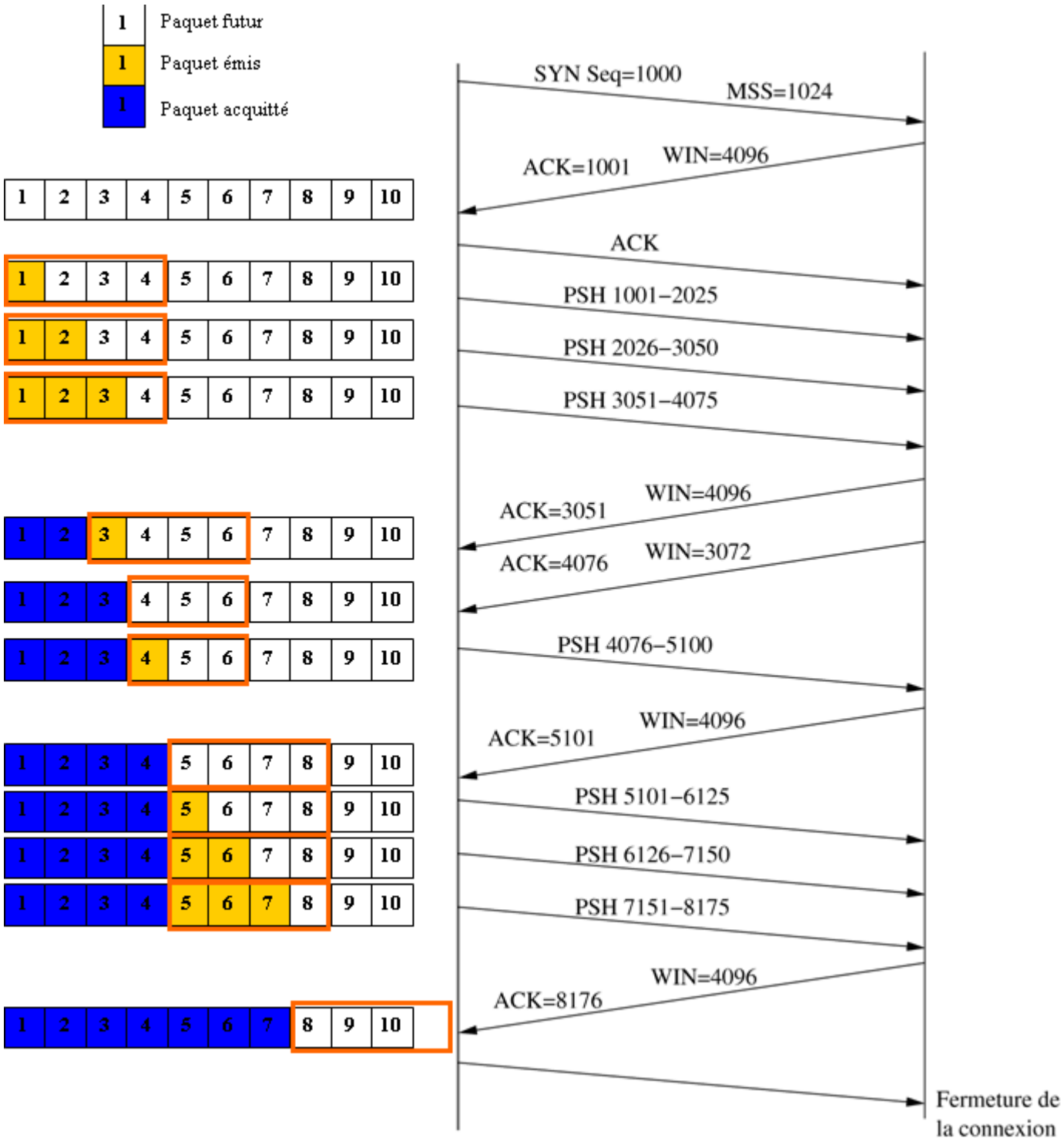
Exercice 2 (solution) :

1)





2)



Exercice 3 (solution) :

1)
   - *ehters* : correspondance entre adresse mac et IP
   - *hosts* : correspondance entre IP et noms d'hôtes
   - *services* : correspondance entre port et nom de service
2) 02:60:8C pour 3COM, 08:00:20 pour Sun et 02:C0:8C pour 3COM également
3) classe C

Exercice 4 (solution) :

1) #, Len (car Ethernet), Time
2) 64 et 1518 (#287)
3) 08-00-20-00-86-79
   08-00-20-00-61-F3 (buro1, donc lui-même)
   08-00-01-01-66-DE
   08-00-20-01-b4-32 (ER1)
   08-00-20-00-AD-02 (SI1)
   08-00-20-00-B4-73 (#235)
4) 86-79 : 24 soit 8%
   B4-32 : 106 soit 33%
   AD-02 : 135 soit 43%
   B4-73 : 4 soit 1%
   66-DE : 48 soit 15%

Exercice 5 (Solution)

1) SYN : paquets : 43 (connexion #1), 215 (#2), 246 (#3), 267 (#4)
   FIN : paquets : 314(#1), 227 (#2), 252 (#3), 275 (#4)
2) permet d'envoyer des données en même temps qu'un ack
3)
   émetteur : 192.9.200.11\\
   récepteur : 192.9.200.1\\
   -> 43\\
   44 <-\\
   -> 45\\
   46 <-\\
   -> 55\\
   timer\\
   -> 169\\
   170 <-\\
   -> 171\\
   178 <-\\
   179 <-\\
   -> 181\\
   -> 202\\
   203 <-\\
   ...
4) envoyer par deux connexions différentes (FTP et FTP-data)
5) c'est le protocole FTP : chaque question ou demande à un numéro bien précis