

TP2 : ProgSys - TFTP

```

ensea@StudentLab:~/ProgSys/tp2$ ./tp2 127.0.0.1 zeros256 1069
Client started.
buf_senddata[0] = 0
buf_senddata[1] = 1
buf_senddata[2] = z
buf_senddata[3] = e
buf_senddata[4] = r
buf_senddata[5] = o
buf_senddata[6] = s
buf_senddata[7] = 2
buf_senddata[8] = 5
buf_senddata[9] = 6
buf_senddata[10] = 0
buf_senddata[11] = o
buf_senddata[12] = c
buf_senddata[13] = t
buf_senddata[14] = e
buf_senddata[15] = t
buf_senddata[16] = 0
buf_senddata[17] =
buf_senddata[18] =
buf_senddata[19] =
buf_senddata[20] =
buf_senddata[21] =
buf_senddata[22] =
buf_senddata[23] =
buf_senddata[24] =
buf_senddata[25] =
buf_senddata[26] =
buf_senddata[27] =
buf_senddata[28] =
buf_senddata[29] =
buf_senddata[30] =
buf_senddata[31] =
Client ended.
ensea@StudentLab:~/ProgSys/tp2$

```

Note :

Dans le code, la taille du tableau de caractère est de 32 octets :
`#define BUF_SIZE 32`
 Or la taille utile est de 17 octets.

Demande de Lecture du fichier zeros256

RFC 1350

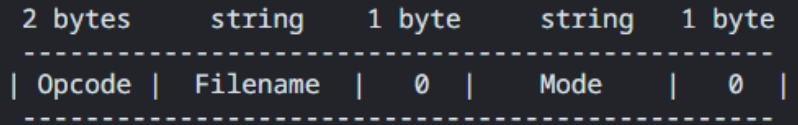


Figure 5-1: RRQ/WRQ packet

Opcode = 0b01 pour Read request (RRQ)

Filename : zeros256

Mode: octet

opcode	operation
1	Read request (RRQ)
2	Write request (WRQ)
3	Data (DATA)
4	Acknowledgment (ACK)
5	Error (ERROR)

eclipse-workspace - /home/ensea/ProgSys/tp2/tp2vautre.c - Eclipse IDE

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No Launch Configurations on: --

tp2.c tp2vautre.c

```
1 #include <sys/socket.h>
2 #include <netdb.h>
3 #include <string.h>
4 #include <stdio.h>
5 #include <stdlib.h>
6 #include <unistd.h>
7 #include <sys/types.h>
8
9 #define BUF_SIZE 32
10
11 int main(int argc, char *argv[]){
12
13     printf("Client started.\n");
14
15     const char *hostName = argv[1];
16     const char *fileName = argv[2];
17     const char *portNumber = argv[3]; //1069
18
19     int clientSocket;
20     struct sockaddr_in hints;
21     struct addrinfo *results;
22     struct addrinfo *record;
23
24     char buf_senddata[BUF_SIZE] = {};
25
26     memset(&hints, 0, sizeof(struct addrinfo));
27
28     hints.ai_family = AF_INET;
29     hints.ai_protocol = IPPROTO_UDP;
30     hints.ai_socktype = SOCK_DGRAM;
31
32     if (getaddrinfo(hostName, portNumber, &hints, &results) != 0){
33         perror("getaddrinfo Failed.");
34         exit(EXIT_FAILURE);
35     }
36
37     for (record = results; record != NULL; record = record->ai_next){
38         clientSocket = socket(record->ai_family, record->ai_socktype, record->ai_protocol);
39         if (clientSocket == -1) continue;
40     }
41
42     // buffer creation for sending message according to RFC 1350
43     /*
44     2 bytes  string  1 byte  string  1 byte
45     .....
46     | Opcode | Filename | 0 | Mode | 0 |
47     .....
48     */
49     char *mode = "octet";
50     buf_senddata[0] = '0'; // Opcode 1/2
51     buf_senddata[1] = '1'; // Opcode 2/2 : Read request (RRQ)
52     for (int i = 0; i < strlen(fileName); i++){ // Filename
53         buf_senddata[i+2] = fileName[i];
54     }
55     buf_senddata[2 + strlen(fileName)] = '0';
56     for (int i = 0; i < strlen(mode); i++){ // Mode
57         buf_senddata[2 + strlen(fileName) + 1 + i] = mode[i];
58     }
59     buf_senddata[3 + strlen(fileName) + strlen(mode)] = '0';
60 }
```

ensea@StudentLab: ~/ProgSys/tp2/serveur

```
ensea@StudentLab:~/ProgSys$ cd ProgSys
ensea@StudentLab:~/ProgSys$ ls
tp2
ensea@StudentLab:~/ProgSys$ cd tp2/serveur
ensea@StudentLab:~/ProgSys/tp2/serveur$ ls
alt256  go.sh  ones1024  ones256  tftpd  zeros2048  zeros512
ensea.png  mold.txt  ones2048  ones512  zeros1024  zeros256
ensea@StudentLab:~/ProgSys/tp2/serveur$ ./go.sh
Démarrage du serveur TFTP en écoute sur le port 1069
Liste des fichiers disponibles:
-rw-rw-r-- 1 ensea ensea 256 déc. 17 2017 alt256
-rw-rw-r-- 1 ensea ensea 21418 déc. 17 2017 ensea.png
-rw-rw-rw- 1 ensea ensea 1024 janv. 6 2019 ones1024
-rw-rw-rw- 1 ensea ensea 2048 janv. 29 2018 ones2048
-rw-rw-r-- 1 ensea ensea 256 janv. 6 2019 ones256
-rw-rw-r-- 1 ensea ensea 512 janv. 6 2019 ones512
-rw-rw-r-- 1 ensea ensea 1024 déc. 17 2017 zeros1024
-rw-rw-r-- 1 ensea ensea 2048 déc. 17 2017 zeros2048
-rw-rw-r-- 1 ensea ensea 256 déc. 17 2017 zeros256
-rw-rw-r-- 1 ensea ensea 512 déc. 17 2017 zeros512
Ctrl-C pour arrêter...
```

Capturing from any

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	UDP	61	46669 → 1069 Len=17

1 0.000000000 127.0.0.1 127.0.0.1 UDP 61 46669 → 1069 Len=17

Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0

Linux cooked capture

Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1

User Datagram Protocol, Src Port: 46669, Dst Port: 1069

Data (17 bytes)

0000 00 00 03 04 00 06 00 00 00 00 00 00 00 08 00
0010 45 00 02 0d 80 d7 40 00 40 11 bb e6 7f 00 00 01 E.....@.....
0020 7f 00 00 01 06 4d 04 2d 00 19 fe 2c 30 31 7a 65M....size
0030 72 6f 73 32 35 36 30 6f 63 74 65 74 30 ros25600 ctet0

any: <live capture in progress> ... Packets: 1 - Displayed: 1 (100,0%) Profile: Default

Problems Tasks Console Properties Call Graph

0 items

Description	Resource	Path	Location	Type
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Writable Smart Insert 60:61

FR 02:01

CTRL DROITE

Filter: Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	UDP	61	46669 → 1069 Len=17

1 0.000000000 127.0.0.1 127.0.0.1 UDP 61 46669 → 1069 Len=17

- ▶ Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0
- ▶ Linux cooked capture
- ▼ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
 - 0100 = Version: 4
 - 0101 = Header Length: 20 bytes (5)
 - ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
 - Total Length: 45
 - Identification: 0x80d7 (32983)
 - ▶ Flags: 0x4000, Don't fragment
 - Time to live: 64
 - Protocol: UDP (17)
 - Header checksum: 0xbbe6 [validation disabled]
 - [Header checksum status: Unverified]
 - Source: 127.0.0.1
 - Destination: 127.0.0.1
- ▶ User Datagram Protocol, Src Port: 46669, Dst Port: 1069
- ▼ Data (17 bytes)
 - Data: 30317a65726f73323536306f6374657430
 - [Length: 17]

```

0000  00 00 03 04 00 06 00 00 00 00 00 00 00 08 00  .....
0010  45 00 00 2d 80 d7 40 00 40 11 bb e6 7f 00 00 01  E...@. @.....
0020  7f 00 00 01 b6 4d 04 2d 00 19 fe 2c 30 31 7a 65  ....M.- ...0lze
0030  72 6f 73 32 35 36 30 6f 63 74 65 74 30         ros2560o ctet0

```

any: <live capture in progress> ... Packets: 1 · Displayed: 1 (100,0%) Profile: Default

▼ User Datagram Protocol, Src Port: 46669, Dst Port: 1069

Source Port: 46669

Destination Port: 1069

Length: 25

Checksum: 0xfe2c [unverified]

[Checksum Status: Unverified]

[Stream index: 0]

▼ Data (17 bytes)

Data: 30317a65726f73323536306f6374657430

[Length: 17]

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	UDP	61	40796 → 1069 Len=17
2	0.000700202	127.0.0.1	127.0.0.1	UDP	304	51446 → 40796 Len=260
3	0.000705591	127.0.0.1	127.0.0.1	ICMP	332	Destination unreachable (Port unreachable)

▼ Frame 1: 61 bytes on wire (488 bits), 61 bytes captured (488 bits) on interface 0

▶ Linux cooked capture

▼ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1

0100 = Version: 4

.... 0101 = Header Length: 20 bytes (5)

▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)

Total Length: 45

Identification: 0x6ec3 (28355)

▶ Flags: 0x4000, Don't fragment

Time to live: 64

Protocol: UDP (17)

Header checksum: 0xcdfa [validation disabled]

[Header checksum status: Unverified]

Source: 127.0.0.1

Destination: 127.0.0.1

▼ User Datagram Protocol, Src Port: 40796, Dst Port: 1069

Source Port: 40796

Destination Port: 1069

Length: 25

Checksum: 0xfe2c [unverified]

[Checksum Status: Unverified]

[Stream index: 0]

▼ Data (17 bytes)

Data: 00017a65726f73323536006f6374657400

[Length: 17]

0000	00 00 03 04 00 06 00 00	00 00 00 00 00 00 08 00	.....
0010	45 00 00 2d 6e c3 40 00	40 11 cd fa 7f 00 00 01	E..-n.@. @.....
0020	7f 00 00 01 9f 5c 04 2d	00 19 fe 2c 00 01 7a 65	.....\.- ....,..ze
0030	72 6f 73 32 35 36 00 6f	63 74 65 74 00	ros256.o ctet.

2	119.93973236	127.0.0.1	127.0.0.1	UDP	61 44489 → 1069 Len=17
3	119.94050517	127.0.0.1	127.0.0.1	UDP	304 45466 → 44489 Len=260
4	119.94051158	127.0.0.1	127.0.0.1	ICMP	332 Destination unreachable (Port unreachable)

- ▶ Frame 3: 304 bytes on wire (2432 bits), 304 bytes captured (2432 bits) on interface 0
- ▶ Linux cooked capture
- ▶ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- ▶ User Datagram Protocol, Src Port: 45466, Dst Port: 44489
- ▼ Data (260 bytes)

Data: 0003000100...

[Length: 260]

0000	00 00 03 04 00 06 00 00	00 00 00 00 00 00 08 00	.....
0010	45 00 01 20 6c 87 00 00	40 11 0f 44 7f 00 00 01	E.. l... @..D....
0020	7f 00 00 01 b1 9a ad c9	01 0c ff 1f 00 03 00 01	.....
0030	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0040	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0050	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0060	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0070	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0080	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0090	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00a0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00b0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00c0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00d0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00e0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
00f0	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0100	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0110	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....
0120	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	.....

5	728.44324743	127.0.0.1	127.0.0.1	UDP	62 59395 → 1069 Len=18
6	728.44540062	127.0.0.1	127.0.0.1	UDP	560 50691 → 59395 Len=516
7	728.44540729	127.0.0.1	127.0.0.1	ICMP	588 Destination unreachable

- ▶ Frame 5: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface 0
- ▶ Linux cooked capture
- ▶ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- ▶ User Datagram Protocol, Src Port: 59395, Dst Port: 1069
- ▼ Data (18 bytes)

Data: 0001656e7365612e706e67006f6374657400
[Length: 18]

```

0000 00 00 03 04 00 06 00 00 00 00 00 00 00 08 00 .....
0010 45 00 00 2e 4a 03 40 00 40 11 f2 b9 7f 00 00 01 E...J.@. @.....
0020 7f 00 00 01 e8 03 04 2d 00 1a fe 2d 00 01 65 6e .....- ...-..en
0030 73 65 61 2e 70 6e 67 00 6f 63 74 65 74 00 sea.png. octet.

```

6	728.44540062	127.0.0.1	127.0.0.1	UDP	560 50691 → 59395 Len=516
7	728.44540729	127.0.0.1	127.0.0.1	ICMP	588 Destination unreachable

- ▶ Frame 6: 560 bytes on wire (4480 bits), 560 bytes captured (4480 bits) on interface 0
- ▶ Linux cooked capture
- ▶ Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- ▶ User Datagram Protocol, Src Port: 50691, Dst Port: 59395
- ▼ Data (516 bytes)

Data: 0003000189504e470d0a1a0a0000000d494844520000012c...
[Length: 516]

```

0000 00 00 03 04 00 06 00 00 00 00 00 00 00 08 00 .....
0010 45 00 02 20 4a 04 00 00 40 11 30 c7 7f 00 00 01 E.. J... @.0....
0020 7f 00 00 01 c6 03 e8 03 02 0c 00 20 00 03 00 01 .....
0030 89 50 4e 47 0d 0a 1a 0a 00 00 00 0d 49 48 44 52 .PNG.... IHDR
0040 00 00 01 2c 00 00 01 56 08 03 00 00 01 93 1d 60 ,,...V .....
0050 76 00 00 00 09 70 48 59 73 00 00 0b 13 00 00 0b v....PHY s.....
0060 13 01 00 9a 9c 18 00 00 0a 4f 69 43 43 50 50 68 ..... .0iCCPPH
0070 6f 74 6f 73 68 6f 70 20 49 43 43 20 70 72 6f 66 otoshop ICC prof
0080 69 6c 65 00 00 78 da 9d 53 67 54 53 e9 16 3d f7 ile..x.. SgTS..=.
0090 de f4 42 4b 88 80 94 4b 6f 52 15 08 20 52 42 8b ..BK...K oR.. RB.
00a0 80 14 91 26 2a 21 09 10 4a 88 21 a1 d9 15 51 c1 ...&*!.. J.!...Q.
00b0 11 45 45 04 1b c8 a0 88 03 8e 8e 80 8c 15 51 2c .EE.....Q,
00c0 0c 8a 0a d8 07 e4 21 a2 8e 83 a3 88 8a ca fb e1 .....!.....
00d0 7b a3 6b d6 bc f7 e6 cd fe b5 d7 3e e7 ac f3 9d {.k.....>...
00e0 b3 cf 07 c0 08 0c 96 48 33 51 35 80 0c a9 42 1e .....H 3Q5...B.
00f0 11 e0 83 c7 c4 c6 e1 e4 2e 40 81 0a 24 70 00 10 .....@..$.p...
0100 08 b3 64 21 73 fd 23 01 00 f8 7e 3c 3c 2b 22 c0 ..d!s.#. ...~<<+".
0110 07 be 00 01 78 d3 0b 08 00 c0 4d 9b c0 30 1c 87 ....X....M..0..
0120 ff 0f ea 42 99 5c 01 80 84 01 c0 74 91 38 4b 08 ...B.\...t.8K.
0130 80 14 00 40 7a 8e 42 a6 00 40 46 01 80 9d 98 26 ...@z.B. oF...&
0140 53 00 a0 04 00 60 cb 63 62 e3 00 50 2d 00 60 27 S....c b..P-`'
0150 7f e6 d3 00 80 9d f8 99 7b 01 00 5b 94 21 15 01 .....{..[!...
0160 a0 91 00 20 13 65 88 44 00 68 3b 00 ac cf 56 8a ...e.D ;h;...V.
0170 45 00 58 30 00 14 66 4b c4 39 00 d8 2d 00 30 49 E Y0 fK 9 - 0T

```

No.	Time	Source	Destination	Protocol	Length	Info
7	9.223521946	127.0.0.1	127.0.0.1	TFTP	62	Read Request, File: ensea.png, Transfer type: octet
8	9.253694284	127.0.0.1	127.0.0.1	TFTP	560	Data Packet, Block: 1

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	127.0.0.1	127.0.0.1	TFTP	62	Read Request, File: ensea.png, Transfer type: octet
2	0.001344780	127.0.0.1	127.0.0.1	TFTP	560	Data Packet, Block: 1
3	0.001397619	127.0.0.1	127.0.0.1	TFTP	48	Acknowledgement, Block: 1
4	0.001827832	127.0.0.1	127.0.0.1	TFTP	560	Data Packet, Block: 2
5	0.001854973	127.0.0.1	127.0.0.1	ICMP	588	Destination unreachable (Port unreachable)

► Frame 3: 48 bytes on wire (384 bits), 48 bytes captured (384 bits) on interface 0

► Linux cooked capture

► Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1

► User Datagram Protocol, Src Port: 59741, Dst Port: 45611

▼ Trivial File Transfer Protocol

Opcode: Acknowledgement (4)

[Source File: ensea.png]

Block: 1

```

0000  00 00 03 04 00 06 00 00 00 00 00 00 00 00 08 00  .....
0010  45 00 00 20 27 65 40 00 40 11 15 66 7f 00 00 01  E.. 'e@. @..f....
0020  7f 00 00 01 e9 5d b2 2b 00 0c fe 1f 00 04 00 01  ....].+ ....

```