Redes de Computadores - 2º Projeto

Segundo projeto da unidade curricular Redes de Computadores (RCOM)

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Introdução

Este projeto teve como objetivo o desenvolvimento e teste de um programa de *download*, usando o protocolo FTP, para aplicação numa rede configurada e estudada durante as aulas práticas. Em suma, no fim deste trabalho devemos ser capazes de transferir um ficheiro da internet utilizando uma rede configurada utilizando um programa desenvolvido por nós.

Parte 1 - Aplicação de Download

A primeira parte do projeto consiste no desenvolvimento, na linguagem C, de uma aplicação muito simples que faz *download* de um ficheiro via protocolo FTP. É nos desafiado a explorar este protocolo através da leitura do RFC959, que inclui toda a documentação necessária para sua utilização.

O programa recebe um argumento, um URL no seguinte formato:

```
ftp://[:@][:]/
```

Este URL indica, segundo o RFC1738, todas as informações necessárias bem como opcionais, para transferir o ficheiro. Os dois únicos parametros obrigatórios são o host e o url-path, este último sendo o caminho para o ficheiro pretendido. Os restantes parametros são valores padrão que o utilizador tem a liberdade de adicionar neste URL.

Arquitetura

O programa segue o seguinte fluxo para que consiga transferir o ficheiro solicitado:

1. Análise do URL passado como argumento

```
typedef struct {
    char *username;
    char *password;
    char *host;
    char *port;
    char *path;
} ParsedURL;

ParsedURL components = parse_url(argv[1]);
```

Esta função é responsável pela extração das informações necessárias para preencher o struct `ParsedURL`. Se não for fornecido nenhum username, será atribuído o valor de `anonymous` e se nenhuma porta for especificada, terá o valor `21`, o padrão do protocolo FTP. A palavra-passe padrão é uma string vazia.

2. Conectar ao servidor remoto e autenticar.

```
int connection_fd = connect_to_host(components.host, components.port);
login(connection_fd, components.username, components.password);
```

Pega-se nas informações anteriormente extraidas e conecta-se ao servidor remoto, no entanto, é ainda necessário conhecer o IP do hostname. Utiliza-se então a função `getaddrinfo`, uma espécie de sistema de resolução de DNS incluído na API do POSIX, que retorna uma lista de IPs a partir de um hostname. O uso de `getaddrinfo` revela-se ser mais flexivel que outros como `gethostbyname`.

A autenticação no servidor é feita através dos comandos `USER` e `PASS`. Todas as mensagens recebidas incluiem um código de 3 dígitos que é lido e utilzado para a confirmação do seguimento do fluxo pretendido. Por exemplo, espera-se

ler o código `230` assim que a autenticação seja bem sucedida.

3. Entrar no modo passivo

```
enter_passive_mode(connection_fd, passive_host, passive_port);
```

Entra-se no modo passivo através do comando `PASV` que, em caso de sucesso, responde com a informação necessária para construir o host e a porta a utilizar para a transferência no formato `(h1, h2, h3, h4, p1, p2)`. No final, temos:

- host: `h1.h2.h3.h4`
- porta: `p1 * 256 + p2`

4. Conectar ao segundo host para a receber o ficheiro e iniciar a transferência.

```
int passive_connection_fd = connect_to_host(passive_host, passive_port);
start_transfer_command(connection_fd, components.path) < 0);
```

Conecta-se ao host que será utilizado para a troca de informação relativas do ficheiro e inicia-se a transferência com o comando `RETR` seguido do *path* para o ficheiro pretendido enviado no primeira conexão.

5. Receção e escrita do ficheiro e fecho das conexões.

```
receive_file(passive_connection_fd, components.path);
close(connection_fd);
close(passive_connection_fd);
```

Ao longo da leitura dos bytes da conexão passiva, escreve-ve para um ficheiro no disco com o mesmo nome que o ficheiro requisitado. No fim da transferênia fecham-se as duas conexões TCP com o função `close`.

Sucesso do *Download*

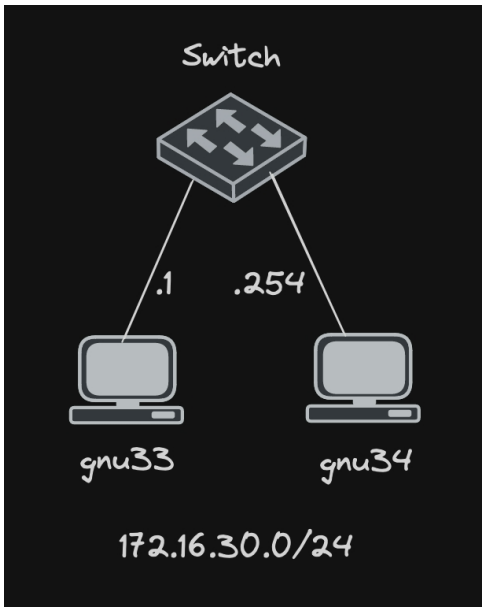
Testámos o funcionamento deste programa transferindo vários ficheiros, de diferetes tamanhos. O programa mostrou-se funcional, correto e consistente. Mostramos, seguidamente, a execução bem sucedida de uma transferência:

```
❯ make run
./bin//main "ftp://ftp.up.pt/pub/kodi/apt/pre-release/ios/Release"
username: anonymous
password:
host: ftp.up.pt
port: 21
path: pub/kodi/apt/pre-release/ios/Release
Connected to 193.137.29.15
passive_host: 193.137.29.15
passive_port: 51456
Connected to 193.137.29.15
Sending file with size: 179
File named 'Release' received
Bytes received: 179
❯ cat Release
Origin: teamXBMC-pre
Label: teamXBMC-pre
Suite: pre-release
Version: 1.0
Codename: XBMC
Architectures: iphoneos-arm
Components: main
Description: The Official teamXBMC Repository!%
```

Parte 2 - Configuração e estudo de uma rede

Experiência 1 - Configurar uma rede IP

Arquitetura da rede



Existem os dispositivos `gnu33` e `gnu34` conectados a um switch.

Objetivos da Experiência

Esta experiência tem como objetivo a configuração dos endereços IP dos dois computadores - gnu33 `(172.16.30.1)` e gnu34 `(172.16.30.254)` - ligados a um *switch*. Pretende-se ainda analisar o funcionamento do protocolo ARP.

Principais comandos de configuração

```
ifconfig eth0 172.16.30.1/24 #gnu33
ifconfig eth0 172.16.30.254/24 #gnu34
```

Análise dos logs

> A captura encontra-se na pasta `logs/exp1` e no `Anexo 1`.

Tratou-se depois de verificar a conectividade entre as duas máquinas, gerando sinais do `gnu33` para o `gnu34`

```
ping 172.16.30.254 #gnu33
```

> `ping <ip>` gera pacotes de 64 bytes enviados da máquina local para a máquina identificada pelo ip especificado.

Consultámos as tabelas ARP, de onde podemos retirar os endereços MAC associados a cada máquina.

```
arp -a
```

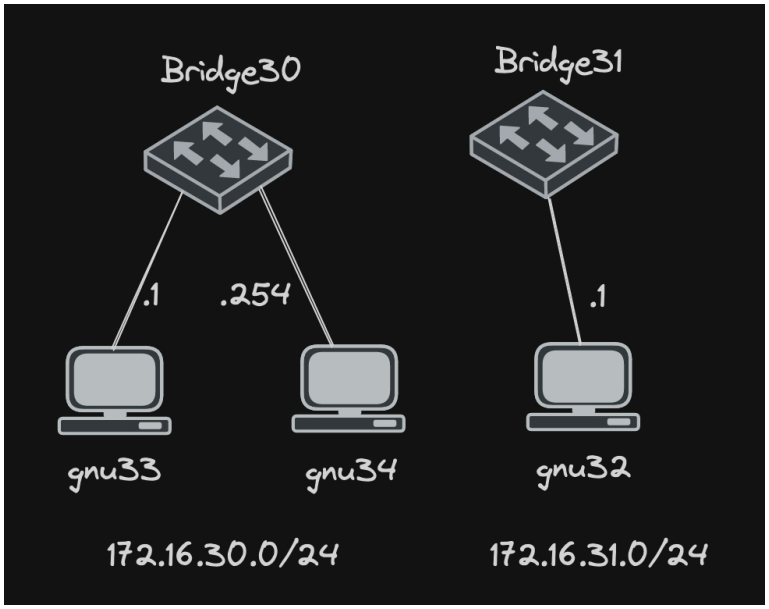
> Os endereços MAC identificam uma placa de rede numa rede local (ao nível da ligação/hardware) enquanto o endereço IP identifica o dispositivo (ao nível da rede).
>
> Os pacotes ARP (ARP packets) são mensagens de solicitação e resposta trocadas entre dispositivos em uma rede local para proceder ao mapeamento de andereços MAC e endereços IP.

Analisaram-se os pacotes de request assim como os respetivos acks de reposta e conclui-se que a partir de dispositvo `gnu33` é possível chegar ao `gnu34`, dado estes dois estarem conectados no switch.

No processo do comando *ping*, o `gnu33` envia primeiramente um pedido ARP para descobrir o endereço MAC do dispositivo identificado no endereço IP do comando. Só após receber o endereço MAC do `gnu34` são mandados os pactos *ping*.

Experiência 2 - Implementar duas *bridges* num *switch*

Arquitetura da rede



No mesmo switch existem duas subnetworks separadas, a `bridge30` e a `bridge31`, os dispositivos anteriormente conectaods pertencem à primeira e liga-se um novo dispositivo `gnu32` à segunda subnetwork `bridge31`.

Objetivos da Experiência

Esta experiência tem como objetivo a configuração de duas LANs (*Local Area Network*), implementando duas *bridges* no *switch* - `bridge30` e `bridge31`. À primeira deverão estar ligadas as máquinas `gnu33` e `gnu34` com os endereços IP configurados na experiência anterior, ao passo que à segunda *bridge* deverá estar ligado o computador gnu32, com o endereço IP `172.16.31.1`.

Principais comandos de configuração

```
# gnu32
ifconfig eth0 172.16.31.1/24

# Consola do switch

# Criar as bridges
/interface bridge add name=bridge30
/interface bridge add name=bridge31

# Remover bridges default dos ethers conectados (9, 13, 14)
/interface bridge port remove [find interface = etherX]

# Conexão dos dispositivos às bridges
/interface bridge port add bridge=bidge30 interface=ether9
/interface bridge port add bridge=bidge30 interface=ether13
/interface bridge port add bridge=bidge31 interface=ether14
```

Análise dos logs

> As capturas encontram-se na pasta `logs/exp2` e nos `Anexos 2.1 a 2.7`.

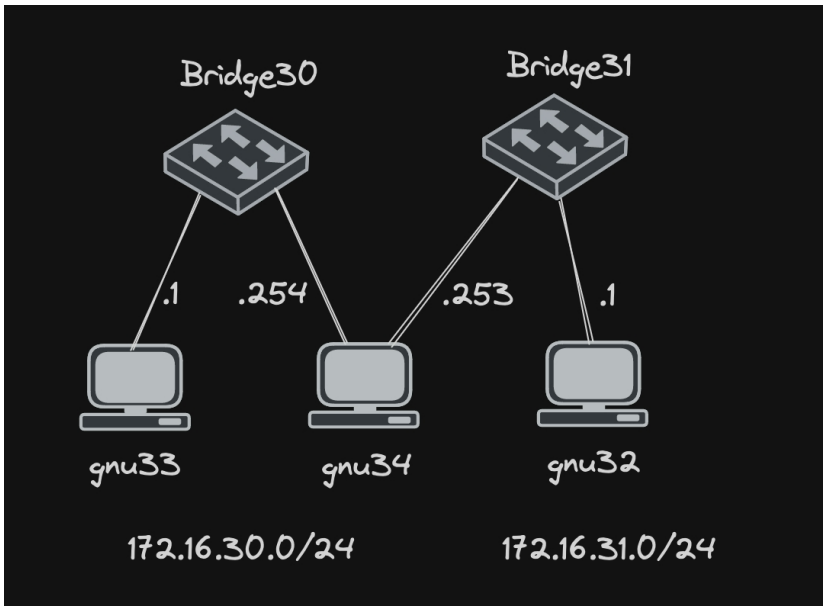
Depois da configuração verificámos que há 2 domínios de *broadcast*. A partir do `gnu33` conseguimos dar *ping* ao `gnu34` mas não ao `gnu32` (sendo inclusivamente reportada uma reposta negativa).

```
# gnu33
ping 172.13.30.254     # para gnu34, funciona
ping 172.13.31.1       # para gnu32, "unreacheable network"
```

Ao executar o comando responsável por dar *ping* a todos os dispositivos associados a uma *broadcast* concluímos que os dispoitivos associados à `bridge30` estão efetivamente isolados dos dispositivos associados à`bridge31`. Isto verifica-se analisando os ficheiros, porque o comando `ping -b 172.16.30.255` executado no gnu33 gera frames do gnu34 para o gnu33 mas não gera nenhum tipo de sinal para o gnu32. Já o comando `ping -b 172.13.31.255` executado no `gnu32` gera sinais no mesmo (sozinho na sua *broadcast*) mas não tem qualquer interferência com os `gnu33` e `gnu34`. Verificamos assim que se configuraram 2 sub-redes diferentes.

Experiência 3 - Configurar um *router* em Linux

Arquitetura da rede



Partindo da configuração anterior, foi conectado o gnu34 à `Bridge31`. No final existe um rede de duas subnetworks com um dispositivo conectado nas duas.

Objetivos da Experiência

Esta experiência tem como objetivo a configuração de um dispositivo em duas redes de tal forma que seja possível a troca de informação entre as duas redes. No final, será possível através do `gnu33` chegar ao `gnu32` através do `gnu34`.

Principais comandos de configuração

```
route add -net 172.16.30.0/24 gw 172.16.31.253 #gnu32
route add -net 172.16.31.0/24 gw 172.16.30.254 #gnu33

sysctl net.ipv4.ip_forward=1 #gnu34
sysctl net.ipv4.icmp_echo_ignore_broadcasts=0 #gnu34
```

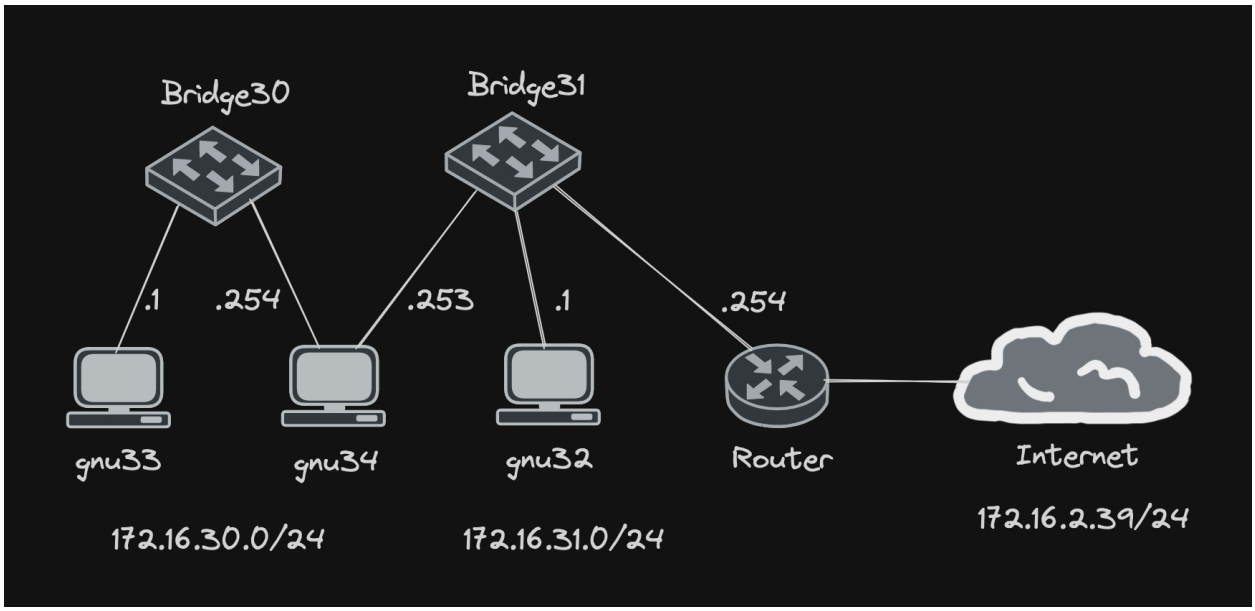
Análise dos logs

> As capturas encontram-se na pasta `logs/exp3` e nos `Anexos 3.1 a 3.3`.

Após configurar o `gnu34` para que esteja incluído em ambas as redes dos `gnu32` e `gnu33`, verificamos que estes conseguem enviar sinais *ping* de um para o outro e, portanto, a configuração foi bem sucedida. Verificamos também que o `gnu34` está configurado em ambas as máquinas como *default gateway* para endereços de redes que não pertencem à sua. Os pacotes ARP e ICMP, computados no `gnu34`, contêm o endereço IP da máquina de destino mas o endereço MAC do `gnu34`, uma vez que este trata do redirecionamento da informação entre as duas redes criadas. As tabelas de encaminhamento geradas através da criação das rotas garante que por cada IP de destino, existe outro endereço IP (*gateway*) para onde a máquina de origem deve reencaminhar a informação.

Experiência 4 - Configurar um *router* comercial implementando NAT

Arquitetura da rede



Na arquitetura anterior adiciona-se um novo dispositivo, `Router` na subrede `bridge31`. Este *router* está conectado à internet do laboratório.

Objetivos da Experiência

Esta experiência tem como objetivo a adição de conexão à internet na rede configurada anteriormente, através de um *router* comercial.

Principais comandos de configuração

```
route add default gw 172.16.31.254 #gnu32
route add default gw 172.16.30.254 #gnu33
route add default gw 172.16.31.254 #gnu34

# Router
/ip route add dst-address=172.16.30.0/24 gateway=172.16.31.253
/ip route add dst-address=0.0.0.0/0 gateway=172.16.2.254
```

Análise dos logs

> As capturas encontram-se na pasta `logs/exp4` e nos `Anexos 4.1 e 4.2`.

Testámos a comunicação do `gnu32` para o `gnu33` em duas situações diferentes: sem e com o `gnu34` como intermediário. Na primeira situação, tendo desativado os redirecionamentos ICMP, a comunicação é feita pela rota *default*, sendo os pacotes reencaminhados pelo *router* configurado na `bridge31`. Assim, o seu percurso é: `gnu32`→`router`→`gnu34`→`gnu33`. Já na segunda situação, reativando os redirecionamentos ICMP, a comunicação é feita de novo usando o `gnu34` imediatamente como intermediário, sendo portanto mais curta (sem recurso à rota *default*). O percurso é então:`gnu32`→`gnu34`→`gnu33`.

Depois tentámos enviar pacotes *ping* do `gnu33` para o `router`, sendo apenas possível se este tiver ativado o NAT.

> O NAT (*Network Adress Translation*) é um processo de mapeamento de endereços IP privados em endereços IP públicos, permitindo que dispositivos de uma LAN se liguem à rede externa sem revelar o seu endereço privado. A comunicação entre a rede interna e a rede externa é sempre feita usando essa interface entre endereços públicos e privados.

Se um dispositivo da rede privada enviar um pedido para a Internet, este é feito com o endereço público mapeado no *router* por meio do NAT e a reposta terá como destino o mesmo endereço, que depois é encaminhado para o endereço privado mapeado.

Como NAT ativado, verificamos então que existe acesso à internet na rede que temos vindo a configurar.

Experiência 5 - DNS

Arquitetura da rede

A arquitetura mantem-se igual à da experiência anterior.

Objetivos da Experiência

Esta experiência tem como objetivo a configuração do DNS (Domain Name Service) nos dispositivos `gnu32`, `gnu33` e `gnu34`. Espera-se que depois da configuração do DNS, através da adição de um sistema de DNS, seja possível conhecer os IPs de determinados domínios.

Principais comandos de configuração

```
echo 'nameserver 193.136.28.10' > /etc/resolv.conf #gnu 32, 33 e 34
```

Análise dos logs

Durante a experiência analisamos os logs resultantes de alguns pings a domínios específicos, como por exemplo `ftp.up.pt`. Foram observados os pacotes responsáveis pela pesquisa de DNS. Isto acontece pois é necessário transcrever o domínio `ftp.up.pt` em um IP de modo a transmitir os pacotes para o destino pretendido.

Experiência 6 - Conexões TCP

Arquitetura da rede

A arquitetura mantem-se igual à da experiência anterior.

Objetivos da Experiência

Esta experiência tem como objetivo a transferência singular ou simultânea de ficheiros através do protocolo FTP a partir de diferentes dispositivos. Será necessário usar a aplicação cliente FTP referida na primeira parte do relatório.

Principais comandos

```
make
make run
```

Análise dos logs

O gráfico resultante da captura encontra-se na pasta `logs/exp6` e no `Anexo 6`.

Para realizar a transferência de um ficheiro, são abertas duas ligações TCP: uma ligação de controlo e outra para proceder à efetiva receção do ficheiro. Uma ligação começa com uma procura DNS que visa encontrar o endereço IP do servidor associado ao nome indicado (por meio de pacotes `DNS`). Depois é estabelecido o TCP *handshake* (com pacotes `SYN-ACK`), de forma a indicar que os servidores estão prontos para se comunicar e podem começar a fazê-lo (usando pacotes `DATA` para a receção de tramas de informação). O protocolo TCP usa o mecanismo ARQ (*Automatic Repeat Request*) para monitorizar a correta receção dos pacotes (por meio de mensagens `ACK`) e eventuais falhas no envio dos mesmos e necessidade de retransmissão (por meio de *timeouts*). Pacotes TCP têm dois campos importantes: `"Sequence number"` e `"Sequence number (raw)"`. Estes campos são importantes para controlar a receção de respostas e possíveis falhas no envio de pacotes. Os campos `"Acnowledgement number"` e `"Ackownledgement number (raw)"` indicam de que forma um pacote foi aceite. Um pacote não ser corretamente recebido depois de 3 tentativas de envio é um indício de que a rede está congestionada e a conexão sofre uma redução do número de pacotes transferidos - de modo a reduzir o efeito de congestionamente da rede. Devido ao mecanismo de controlo da congestão, e pela análiose do gráfico capturado verifica-se que o fluxo de transferência é consideravelmente inferior quando existe uma segunda conexão TCP.

Conclusões

Neste projeto fizemos o desenvolvimento de uma aplicação de download baseada no protocolo FTP e testamos numa rede configurada e estudada durante as aulas práticas.

A primeira parte focou-se no desenvolvimento de um programa em linguagem C capaz de realizar o download de um ficheiro por meio do protocolo FTP, seguindo as especificações do RFC959. A arquitetura do programa foi estruturada para analisar URLs, conectar-se e autenticar com o servidor remoto, entrar no modo passivo e iniciar a transferência do arquivo, concluindo com a escrita do arquivo no disco local.

Na segunda parte, exploramos a configuração e o estudo das redes por meio de diversas experiências. Desde a configuração de redes IP, a análise do funcionamento do protocolo ARP, a implementação de bridges em um switch, a configuração de routers, a configuração do serviço DNS, até a análise das conexões TCP executadas na transferência de ficheiros por FTP.

Conseguimos explorar os conceitos fundamentais das redes de computadores através da análise de vários logs com a ajuda da ferramenta Wireshark.

Em conclusão, este projeto foi fundamental para consolidar o conhecimento teórico adquirido em aulas práticas, proporcionando uma visão prática e detalhada do funcionamento dos componentes em uma rede de computadores.

Referências

RFC959 RFC1738

Anexos

O código da aplicação cliente FTP que faz transferência de ficheiros encontra-se em `main.c`, `include/` e `src/`.

Os logs capturados encontram-se divididos por experiências na pasta `logs`.

Foram sequencialmente listados todos os comandos necessários para a configuração da rede de computadores final na pasta `lab-steup`.

2	2.002238692	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
3	2.781870236	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x4fbf, seq=1/256, ttl=64 (reply in 4)
4	2.782031011	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x4fbf, seq=1/256, ttl=64 (request in 3)
5	3.785039983	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x4fbf, seq=2/512, ttl=64 (reply in 6)
6	3.785173659	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x4fbf, seq=2/512, ttl=64 (request in 5)
7	4.004002255	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
8	4.809041499	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x4fbf, seq=3/768, ttl=64 (reply in 9)
9	4.809171893	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x4fbf, seq=3/768, ttl=64 (request in 8)
10	5.331678910	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
11	5.331711526	Routerboardc_1c:a3:32	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge30
12	5.331759227	Routerboardc_1c:a3:32	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:32 IN/bridge30 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.16 (l…
13	5.833037777	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x4fbf, seq=4/1024, ttl=64 (reply in 14)
14	5.833195129	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x4fbf, seq=4/1024, ttl=64 (request in 13)
15	6.006243252	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
16	7.881003513	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	Who has 172.16.30.254? Tell 172.16.30.1
17	7.881134535	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	172.16.30.254 is at 00:21:5a:5a:74:3e
18	7.913146148	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	Who has 172.16.30.1? Tell 172.16.30.254
19	7.913158510	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	172.16.30.1 is at 00:21:5a:5a:7d:b7
20	8.008492211	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
21	10.010747177	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001

Anexo 1.1

No.	Time	Source	Destination	Protocol	Lengt	Info
1	0.000000000	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
2	2.002282972	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
3	4.004559658	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
4	4.895614380	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x710e, seq=1/256, ttl=64 (reply in 5)
5	4.895768240	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x710e, seq=1/256, ttl=64 (request in 4)
6	5.910839710	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x710e, seq=2/512, ttl=64 (reply in 7)
7	5.910963189	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x710e, seq=2/512, ttl=64 (request in 6)
8	6.006823494	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
9	6.934837384	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x710e, seq=3/768, ttl=64 (reply in 10)
10	6.934960025	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x710e, seq=3/768, ttl=64 (request in 9)
11	7.958836595	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x710e, seq=4/1024, ttl=64 (reply in 12)
12	7.958959167	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x710e, seq=4/1024, ttl=64 (request in 11)
13	8.009099761	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
14	10.011381615	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
15	10.068660198	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	Who has 172.16.30.1? Tell 172.16.30.254
16	10.068675493	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	172.16.30.1 is at 00:21:5a:5a:7d:b7
17	10.134819239	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	Who has 172.16.30.254? Tell 172.16.30.1
18	10.134930706	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	172.16.30.254 is at 00:21:5a:5a:74:3e
19	12.013668219	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
20	14.015938550	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
21	16.018209788	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
22	18.020497858	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
23	20.022767491	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
24	20.658984568	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
25	20.659015648	Routerboardc_1c:a3:32	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge30
26	20.659062372	Routerboardc_1c:a3:32	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:32 IN/bridge30 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.16 (l…

Anexo 2.1

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
2	0.588901703	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
3	0.588921468	Routerboardc_1c:a3:37	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge31
4	0.588956109	Routerboardc_1c:a3:37	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:37 IN/bridge31 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.16 (l…
5	2.002281435	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
6	4.004557702	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
7	6.006831874	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
8	8.009106465	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
9	10.011376307	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
10	12.013664796	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
11	14.015943718	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
12	16.018209509	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
13	18.020482214	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
14	20.012745685	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
15	22.015016016	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
16	24.017294309	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
17	26.019564639	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
18	28.021839789	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
19	30.023710488	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
20	32.025991923	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
21	34.028271962	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
22	36.030540896	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
23	38.022807370	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
24	40.025086361	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
25	42.027367098	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
26	44.029636451	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
27	46.031904687	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
28	48.034181163	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
29	50.036446465	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
30	52.038734955	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
31	54.041017577	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
32	56.043279737	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
33	58.045560753	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
34	60.047287230	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
35	60.589499406	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
36	60.589514562	Routerboardc_1c:a3:37	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge31
37	60.589551508	Routerboardc_1c:a3:37	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:37 IN/bridge31 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.16 (l…
38	62.049565103	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001

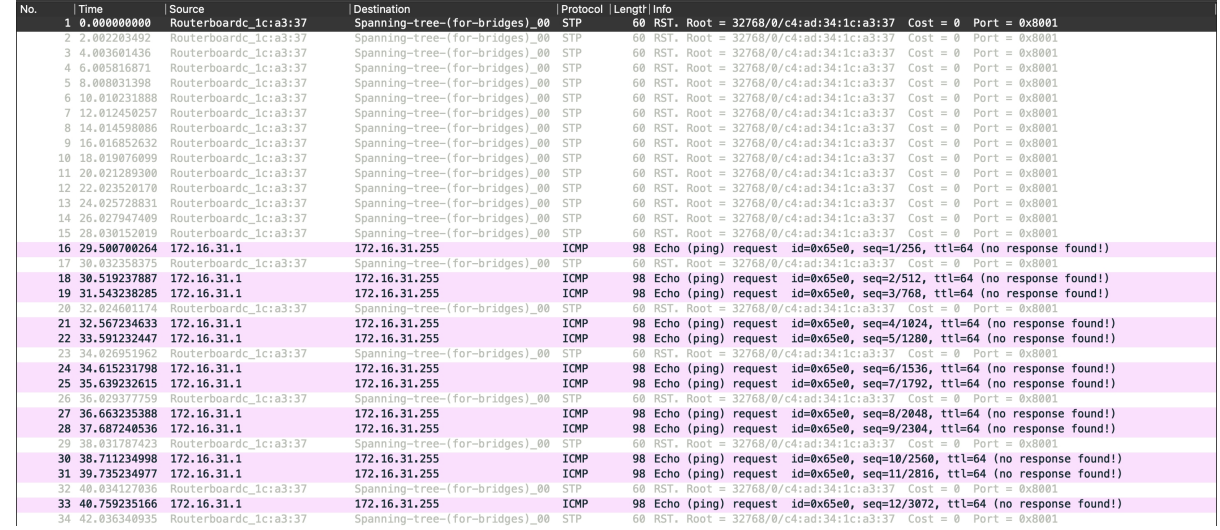
Anexo 2.2

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
2	2.002289257	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
3	4.004568318	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
4	6.006833271	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
5	8.009111564	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
6	10.001380902	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
7	12.003655982	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
8	14.005942166	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
9	16.008212916	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
10	18.010496796	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
11	20.012367076	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
12	22.014652841	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
13	24.016935394	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
14	26.019209636	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
15	28.011484212	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
16	30.013765787	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
17	31.430293755	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=1/256, ttl=64 (no response found!)
18	31.430492453	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=1/256, ttl=64
19	32.016044080	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
20	32.436578004	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=2/512, ttl=64 (no response found!)
21	32.436753026	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=2/512, ttl=64
22	33.460567507	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=3/768, ttl=64 (no response found!)
23	33.460745323	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=3/768, ttl=64
24	34.018320836	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
25	34.484572864	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=4/1024, ttl=64 (no response found!)
26	34.484748864	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=4/1024, ttl=64
27	35.508573123	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=5/1280, ttl=64 (no response found!)
28	35.508748774	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=5/1280, ttl=64
29	36.020589840	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
30	36.467603178	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	Who has 172.16.30.1? Tell 172.16.30.254
31	36.467623362	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	172.16.30.1 is at 00:21:5a:5a:7d:b7
32	36.532571356	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=6/1536, ttl=64 (no response found!)
33	36.532726334	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=6/1536, ttl=64
34	37.556579437	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=7/1792, ttl=64 (no response found!)
35	37.556759418	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=7/1792, ttl=64
36	38.022869738	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
37	38.580579277	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=8/2048, ttl=64 (no response found!)
38	38.580759537	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=8/2048, ttl=64
39	39.604573599	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=9/2304, ttl=64 (no response found!)
40	39.604753510	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=9/2304, ttl=64

Anexo 2.3

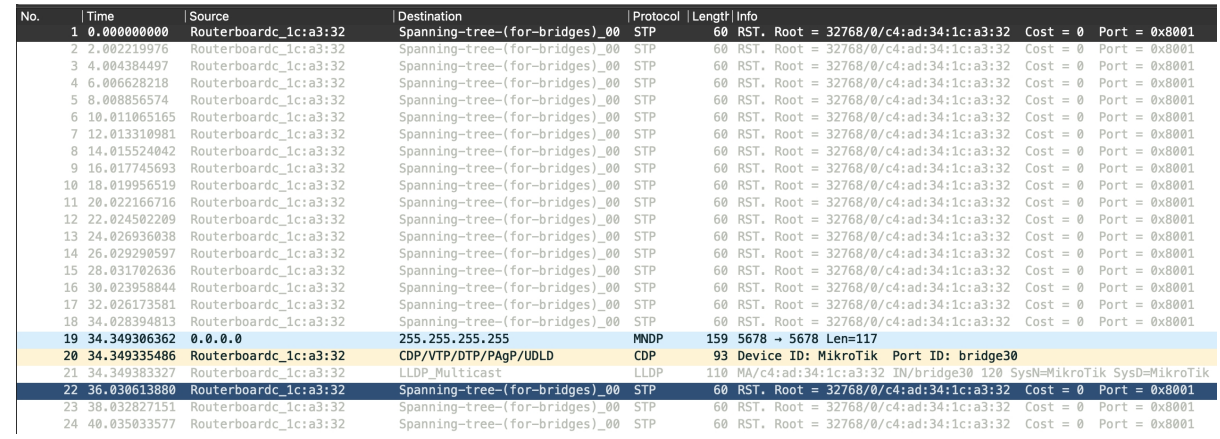
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
2	1.992248386	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
3	3.994507123	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
4	5.996758946	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
5	7.999015029	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
6	10.000864286	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
7	12.003127703	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
8	14.005388186	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
9	16.007644828	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
10	18.009901469	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
11	20.002154954	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
12	22.004410687	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
13	22.419927982	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=1/256, ttl=64 (no response found!)
14	22.419960877	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=1/256, ttl=64
15	23.426180872	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=2/512, ttl=64 (no response found!)
16	23.426213837	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=2/512, ttl=64
17	24.006673685	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
18	24.450163740	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=3/768, ttl=64 (no response found!)
19	24.450194401	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=3/768, ttl=64
20	25.474155897	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=4/1024, ttl=64 (no response found!)
21	25.474188793	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=4/1024, ttl=64
22	26.008919082	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
23	26.498144702	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=5/1280, ttl=64 (no response found!)
24	26.498177318	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=5/1280, ttl=64
25	27.457001691	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	42	Who has 172.16.30.1? Tell 172.16.30.254
26	27.457150802	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	60	172.16.30.1 is at 00:21:5a:5a:7d:b7
27	27.522122472	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=6/1536, ttl=64 (no response found!)
28	27.522146218	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=6/1536, ttl=64
29	28.011172930	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
30	28.546131950	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=7/1792, ttl=64 (no response found!)
31	28.546165613	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=7/1792, ttl=64
32	29.570120545	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=8/2048, ttl=64 (no response found!)
33	29.570153720	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=8/2048, ttl=64
34	30.013433064	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
35	30.594105229	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=9/2304, ttl=64 (no response found!)
36	30.594136658	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=9/2304, ttl=64
37	31.618098015	172.16.30.1	172.16.30.255	ICMP	98	Echo (ping) request id=0x7198, seq=10/2560, ttl=64 (no response found!)
38	31.618130142	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7198, seq=10/2560, ttl=64

Anexo 2.4



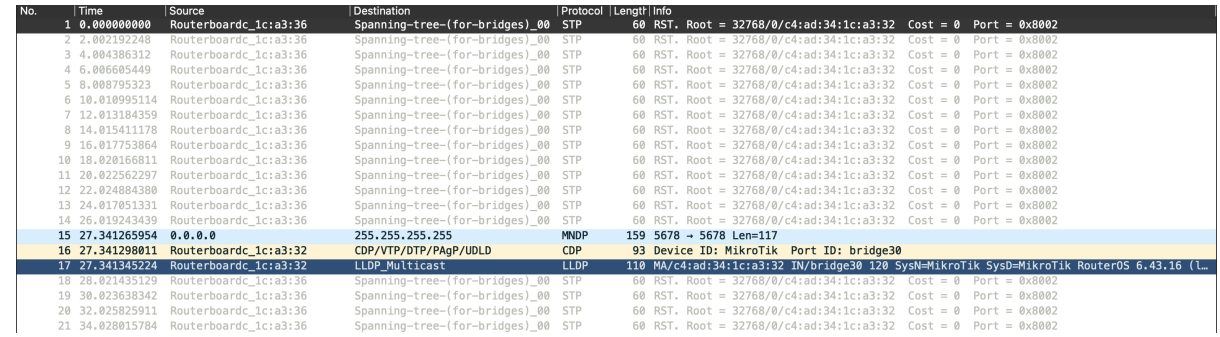
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
2	2.002203492	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
3	4.003601436	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
4	6.005816871	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
5	8.008031398	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
6	10.010231888	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
7	12.012450257	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
8	14.014598086	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
9	16.016852632	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
10	18.019076099	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
11	20.021289300	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
12	22.023520170	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
13	24.025728831	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
14	26.027947409	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
15	28.030152019	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
16	29.500700264	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=1/256, ttl=64 (no response found!)
17	30.032358375	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
18	30.519237887	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=2/512, ttl=64 (no response found!)
19	31.543238285	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=3/768, ttl=64 (no response found!)
20	32.024601174	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
21	32.567234633	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=4/1024, ttl=64 (no response found!)
22	33.591232447	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=5/1280, ttl=64 (no response found!)
23	34.026951962	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
24	34.615231798	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=6/1536, ttl=64 (no response found!)
25	35.639232615	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=7/1792, ttl=64 (no response found!)
26	36.029377759	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
27	36.663235388	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=8/2048, ttl=64 (no response found!)
28	37.687240536	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=9/2304, ttl=64 (no response found!)
29	38.031787423	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
30	38.711234998	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=10/2560, ttl=64 (no response found!)
31	39.735234977	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=11/2816, ttl=64 (no response found!)
32	40.034127036	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001
33	40.759235166	172.16.31.1	172.16.31.255	ICMP	98	Echo (ping) request id=0x65e0, seq=12/3072, ttl=64 (no response found!)
34	42.036340935	Routerboardc_1c:a3:37	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8001

Anexo 2.5



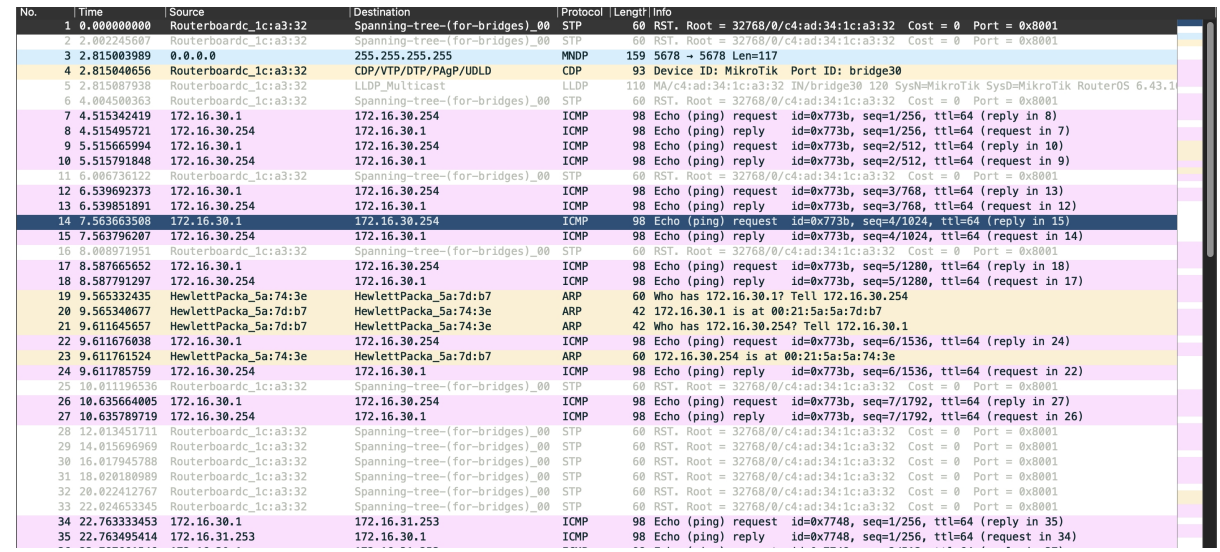
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
2	2.002219976	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
3	4.004384497	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
4	6.006628218	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
5	8.008856574	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
6	10.011065165	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
7	12.013310981	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
8	14.015524042	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
9	16.017745693	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
10	18.019956519	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
11	20.022166716	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
12	22.024502209	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
13	24.026936038	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
14	26.029290597	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
15	28.031702636	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
16	30.023958844	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
17	32.026173581	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
18	34.028394813	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
19	34.349306362	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
20	34.349335486	Routerboardc_1c:a3:32	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge30
21	34.349383327	Routerboardc_1c:a3:32	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:32 IN/bridge30 120 SysN=MikroTik SysD=MikroTik
22	36.030613880	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
23	38.032827151	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
24	40.035033577	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001

Anexo 2.6



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
2	2.002192248	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
3	4.004386312	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
4	6.006605449	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
5	8.008795323	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
6	10.010995114	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
7	12.013184359	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
8	14.015411178	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
9	16.017753864	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
10	18.020166811	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
11	20.022562297	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
12	22.024884380	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
13	24.017051331	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
14	26.019243439	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
15	27.341265954	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
16	27.341298011	Routerboardc_1c:a3:32	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge30
17	27.341345224	Routerboardc_1c:a3:32	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:32 IN/bridge30 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.16 (l…
18	28.021435129	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
19	30.023638342	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
20	32.025825911	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
21	34.028015784	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002

Anexo 2.7



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
2	2.002245607	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
3	2.815003989	0.0.0.0	255.255.255.255	MNDP	159	5678 → 5678 Len=117
4	2.815040656	Routerboardc_1c:a3:32	CDP/VTP/DTP/PAgP/UDLD	CDP	93	Device ID: MikroTik Port ID: bridge30
5	2.815087938	Routerboardc_1c:a3:32	LLDP_Multicast	LLDP	110	MA/c4:ad:34:1c:a3:32 IN/bridge30 120 SysN=MikroTik SysD=MikroTik RouterOS 6.43.1…
6	4.004500363	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
7	4.515342419	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=1/256, ttl=64 (reply in 8)
8	4.515495721	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=1/256, ttl=64 (request in 7)
9	5.515665994	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=2/512, ttl=64 (reply in 10)
10	5.515791848	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=2/512, ttl=64 (request in 9)
11	6.006736122	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
12	6.539692373	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=3/768, ttl=64 (reply in 13)
13	6.539851891	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=3/768, ttl=64 (request in 12)
14	7.563663508	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=4/1024, ttl=64 (reply in 15)
15	7.563796207	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=4/1024, ttl=64 (request in 14)
16	8.008971951	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
17	8.587665652	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=5/1280, ttl=64 (reply in 18)
18	8.587791297	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=5/1280, ttl=64 (request in 17)
19	9.565332435	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	Who has 172.16.30.1? Tell 172.16.30.254
20	9.565340677	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	172.16.30.1 is at 00:21:5a:5a:7d:b7
21	9.611645657	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	42	Who has 172.16.30.254? Tell 172.16.30.1
22	9.611676038	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=6/1536, ttl=64 (reply in 24)
23	9.611761524	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	60	172.16.30.254 is at 00:21:5a:5a:74:3e
24	9.611785759	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=6/1536, ttl=64 (request in 22)
25	10.011196536	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
26	10.635664005	172.16.30.1	172.16.30.254	ICMP	98	Echo (ping) request id=0x773b, seq=7/1792, ttl=64 (reply in 27)
27	10.635789719	172.16.30.254	172.16.30.1	ICMP	98	Echo (ping) reply id=0x773b, seq=7/1792, ttl=64 (request in 26)
28	12.013451711	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
29	14.015696969	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
30	16.017945788	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
31	18.020180989	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
32	20.022412767	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
33	22.024653345	Routerboardc_1c:a3:32	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8001
34	22.763333453	172.16.30.1	172.16.31.253	ICMP	98	Echo (ping) request id=0x7748, seq=1/256, ttl=64 (reply in 35)
35	22.763495414	172.16.31.253	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7748, seq=1/256, ttl=64 (request in 34)

Anexo 3.1

No.	Time	Source	Destination	Protocol	Length	Info
16	28.700160405	HewlettPacka_5a:7d:b7	Broadcast	ARP	60	Who has 172.16.30.254? Tell 172.16.30.1
17	28.700186525	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	42	172.16.30.254 is at 00:21:5a:5a:74:3e
18	28.700299808	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=1/256, ttl=64 (reply in 19)
19	28.700608437	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=1/256, ttl=63 (request in 18)
20	29.711371817	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=2/512, ttl=64 (reply in 21)
21	29.711531474	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=2/512, ttl=63 (request in 20)
22	30.033291455	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
23	30.739390533	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=3/768, ttl=64 (reply in 24)
24	30.739582527	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=3/768, ttl=63 (request in 23)
25	31.759357178	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=4/1024, ttl=64 (reply in 26)
26	31.759516626	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=4/1024, ttl=63 (request in 25)
27	32.035503049	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
28	32.783345704	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=5/1280, ttl=64 (reply in 29)
29	32.783505151	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=5/1280, ttl=63 (request in 28)
30	33.797154373	HewlettPacka_5a:74:3e	HewlettPacka_5a:7d:b7	ARP	42	Who has 172.16.30.1? Tell 172.16.30.254
31	33.797284907	HewlettPacka_5a:7d:b7	HewlettPacka_5a:74:3e	ARP	60	172.16.30.1 is at 00:21:5a:5a:7d:b7
32	33.807313486	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=6/1536, ttl=64 (reply in 33)
33	33.807460782	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=6/1536, ttl=63 (request in 32)
34	34.037716109	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
35	34.831322405	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=7/1792, ttl=64 (reply in 36)
36	34.831481644	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=7/1792, ttl=63 (request in 35)
37	35.855335585	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=8/2048, ttl=64 (reply in 38)
38	35.855526461	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=8/2048, ttl=63 (request in 37)
39	36.039928542	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
40	36.879299875	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=9/2304, ttl=64 (reply in 41)
41	36.879458205	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=9/2304, ttl=63 (request in 40)
42	37.903285886	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=10/2560, ttl=64 (reply in 43)
43	37.903443518	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=10/2560, ttl=63 (request in 42)
44	38.042144955	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
45	38.927276856	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=11/2816, ttl=64 (reply in 46)
46	38.927431555	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=11/2816, ttl=63 (request in 45)
47	39.951260423	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=12/3072, ttl=64 (reply in 48)
48	39.951417636	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=12/3072, ttl=63 (request in 47)
49	40.044365140	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
50	40.975278142	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=13/3328, ttl=64 (reply in 51)
51	40.975465945	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=13/3328, ttl=63 (request in 50)
52	41.999240686	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=14/3584, ttl=64 (reply in 53)
53	41.999405651	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=14/3584, ttl=63 (request in 52)
54	42.046573870	Routerboardc_1c:a3:36	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:32 Cost = 0 Port = 0x8002
55	43.023227954	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=15/3840, ttl=64 (reply in 56)
56	43.023385586	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=15/3840, ttl=63 (request in 55)
57	44.047220950	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=16/4096, ttl=64 (reply in 58)

Anexo 3.2

No.	Time	Source	Destination	Protocol	Length	Info
10	16.687053990	Netronix_b4:b8:94	Broadcast	ARP	42	Who has 172.16.31.1? Tell 172.16.31.253
11	16.687199679	HewlettPacka_61:24:01	Netronix_b4:b8:94	ARP	60	172.16.31.1 is at 00:21:5a:61:24:01
12	16.687217209	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=1/256, ttl=63 (reply in 13)
13	16.687335101	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=1/256, ttl=64 (request in 12)
14	17.698133192	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=2/512, ttl=63 (reply in 15)
15	17.698250386	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=2/512, ttl=64 (request in 14)
16	18.019983338	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
17	18.726151490	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=3/768, ttl=63 (reply in 18)
18	18.726301439	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=3/768, ttl=64 (request in 17)
19	19.746118484	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=4/1024, ttl=63 (reply in 20)
20	19.746236237	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=4/1024, ttl=64 (request in 19)
21	20.022199263	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
22	20.770106730	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=5/1280, ttl=63 (reply in 23)
23	20.770224762	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=5/1280, ttl=64 (request in 22)
24	21.794068507	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=6/1536, ttl=63 (reply in 25)
25	21.794188075	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=6/1536, ttl=64 (request in 24)
26	21.842576491	HewlettPacka_61:24:01	Netronix_b4:b8:94	ARP	60	Who has 172.16.31.253? Tell 172.16.31.1
27	21.842584522	Netronix_b4:b8:94	HewlettPacka_61:24:01	ARP	42	172.16.31.253 is at 00:e0:7d:b4:b8:94
28	22.024409460	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
29	22.818083222	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=7/1792, ttl=63 (reply in 30)
30	22.818201534	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=7/1792, ttl=64 (request in 29)
31	23.842096611	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=8/2048, ttl=63 (reply in 32)
32	23.842245862	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=8/2048, ttl=64 (request in 31)
33	24.026624057	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
34	24.866059784	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=9/2304, ttl=63 (reply in 35)
35	24.866178654	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=9/2304, ttl=64 (request in 34)
36	25.890047053	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=10/2560, ttl=63 (reply in 37)
37	25.890165783	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=10/2560, ttl=64 (request in 36)
38	26.028842845	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
39	26.914037464	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=11/2816, ttl=63 (reply in 40)
40	26.914153680	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=11/2816, ttl=64 (request in 39)
41	27.938022497	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=12/3072, ttl=63 (reply in 42)
42	27.938138573	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=12/3072, ttl=64 (request in 41)
43	28.031058769	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
44	28.962039029	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=13/3328, ttl=63 (reply in 45)
45	28.962186394	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=13/3328, ttl=64 (request in 44)
46	29.986001713	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=14/3584, ttl=63 (reply in 47)
47	29.986122608	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=14/3584, ttl=64 (request in 46)
48	30.033271760	Routerboardc_1c:a3:39	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:1c:a3:37 Cost = 0 Port = 0x8002
49	31.009988841	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=15/3840, ttl=63 (reply in 50)
50	31.010106245	172.16.31.1	172.16.30.1	ICMP	98	Echo (ping) reply id=0x7891, seq=15/3840, ttl=64 (request in 49)
51	32.033981906	172.16.30.1	172.16.31.1	ICMP	98	Echo (ping) request id=0x7891, seq=16/4096, ttl=63 (reply in 52)

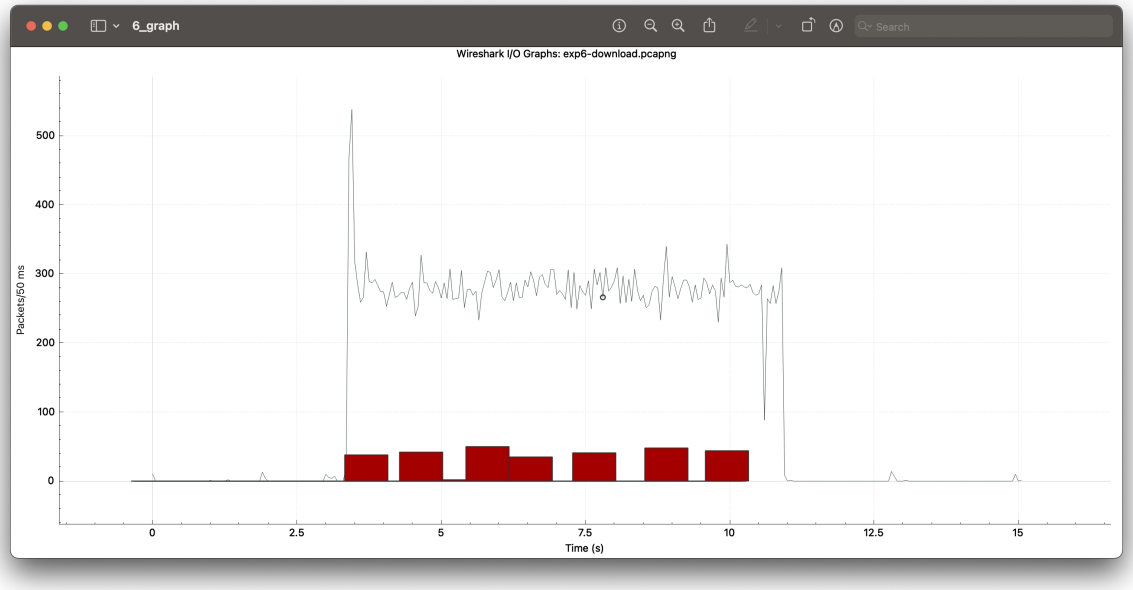
Anexo 3.3

26	14.546456308	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0x39fa No such name PTR 42.246.107.13.in-addr.arpa SOA n
27	16.016145842	Routerboardc_2b:fa:06	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/74:4d:28:eb:24:49 Cost = 10 Port = 0x8001
28	18.018992566	Routerboardc_2b:fa:06	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/74:4d:28:eb:24:49 Cost = 10 Port = 0x8001
29	18.216655980	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=1/256, ttl=64 (reply in 30)
30	18.217123084	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=1/256, ttl=63 (request in 29)
31	19.235858912	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=2/512, ttl=64 (reply in 33)
32	19.236027790	172.16.21.254	172.16.21.1	ICMP	126	Redirect (Redirect for host)
33	19.236231101	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=2/512, ttl=63 (request in 31)
34	19.544613281	172.16.21.1	172.16.2.1	DNS	86	Standard query 0xb3ca PTR 42.246.107.13.in-addr.arpa
35	19.545165034	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0xb3ca No such name PTR 42.246.107.13.in-addr.arpa SOA n
36	19.545353957	172.16.21.1	172.16.2.1	DNS	86	Standard query 0x4548 PTR 42.246.107.13.in-addr.arpa
37	19.545735085	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0x4548 No such name PTR 42.246.107.13.in-addr.arpa SOA n
38	19.545874909	172.16.21.1	172.16.2.1	DNS	86	Standard query 0x2b5d PTR 42.246.107.13.in-addr.arpa
39	19.546266165	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0x2b5d No such name PTR 42.246.107.13.in-addr.arpa SOA n
40	20.021084157	Routerboardc_2b:fa:06	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/74:4d:28:eb:24:49 Cost = 10 Port = 0x8001
41	20.263859577	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=3/768, ttl=64 (reply in 43)
42	20.264024614	172.16.21.254	172.16.21.1	ICMP	126	Redirect (Redirect for host)
43	20.264254395	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=3/768, ttl=63 (request in 41)
44	21.283860107	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=4/1024, ttl=64 (reply in 46)
45	21.284022629	172.16.21.254	172.16.21.1	ICMP	126	Redirect (Redirect for host)
46	21.284205127	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=4/1024, ttl=63 (request in 44)
47	22.023230224	Routerboardc_2b:fa:06	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/74:4d:28:eb:24:49 Cost = 10 Port = 0x8001
48	22.307858190	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=5/1280, ttl=64 (reply in 50)
49	22.308022319	172.16.21.254	172.16.21.1	ICMP	126	Redirect (Redirect for host)
50	22.308229820	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=5/1280, ttl=63 (request in 48)
51	23.331858717	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=6/1536, ttl=64 (reply in 53)
52	23.332036396	172.16.21.254	172.16.21.1	ICMP	126	Redirect (Redirect for host)
53	23.332209604	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=6/1536, ttl=63 (request in 51)
54	23.432776259	Netronix_c8:7c:55	HewlettPacka_5a:76:a8	ARP	60	Who has 172.16.21.1? Tell 172.16.21.253
55	23.432785129	HewlettPacka_5a:76:a8	Netronix_c8:7c:55	ARP	42	172.16.21.1 is at 00:21:5a:5a:76:a8
56	24.025347168	Routerboardc_2b:fa:06	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/74:4d:28:eb:24:49 Cost = 10 Port = 0x8001
57	24.355871816	172.16.21.1	172.16.20.1	ICMP	98	Echo (ping) request id=0x2165, seq=7/1792, ttl=64 (reply in 58)
58	24.356204125	172.16.20.1	172.16.21.1	ICMP	98	Echo (ping) reply id=0x2165, seq=7/1792, ttl=63 (request in 57)
59	24.548409027	172.16.21.1	172.16.2.1	DNS	86	Standard query 0x0693 PTR 42.246.107.13.in-addr.arpa
60	24.549270740	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0x0693 No such name PTR 42.246.107.13.in-addr.arpa SOA n
61	24.549419783	172.16.21.1	172.16.2.1	DNS	86	Standard query 0x042a PTR 42.246.107.13.in-addr.arpa
62	24.550016793	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0x042a No such name PTR 42.246.107.13.in-addr.arpa SOA n
63	24.550141811	172.16.21.1	172.16.2.1	DNS	86	Standard query 0xd7c2 PTR 42.246.107.13.in-addr.arpa
64	24.550717519	172.16.2.1	172.16.21.1	DNS	194	Standard query response 0xd7c2 No such name PTR 42.246.107.13.in-addr.arpa SOA n
65	25.443827477	HewlettPacka_5a:76:a8	Routerboardc_eb:24:49	ARP	42	Who has 172.16.21.254? Tell 172.16.21.1
66	25.443975542	Routerboardc_eb:24:49	HewlettPacka_5a:76:a8	ARP	60	172.16.21.254 is at 74:4d:28:eb:24:49

Anexo 4.1

No.	Time	Source	Destination	Protocol	Length	Info
51	40.735133616	172.16.21.254	172.16.20.1	ICMP	98	Echo (ping) reply id=0x7f37, seq=3/768, ttl=63 (request in 50)
52	41.758850855	172.16.20.1	172.16.21.254	ICMP	98	Echo (ping) request id=0x7f37, seq=4/1024, ttl=64 (reply in 53)
53	41.759121851	172.16.21.254	172.16.20.1	ICMP	98	Echo (ping) reply id=0x7f37, seq=4/1024, ttl=63 (request in 52)
54	42.044232567	Routerboardc_2b:fa:05	Spanning-tree-(for-bridges)_00	STP	60	RST. Root = 32768/0/c4:ad:34:2b:fa:04 Cost = 0 Port = 0x8002
55	42.709370529	172.16.20.1	172.16.2.1	DNS	70	Standard query 0xade7 A google.com
56	42.709379958	172.16.20.1	172.16.2.1	DNS	70	Standard query 0x62ef AAAA google.com
57	42.710203424	172.16.2.1	172.16.20.1	DNS	86	Standard query response 0xade7 A google.com A 142.250.184.174
58	42.710223818	172.16.2.1	172.16.20.1	DNS	98	Standard query response 0x62ef AAAA google.com AAAA 2a00:1450:4003:80c::200e
59	42.710446412	172.16.20.1	142.250.184.174	TCP	74	40460 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=3705219477 TSecr
60	42.725458283	142.250.184.174	172.16.20.1	TCP	74	80 → 40460 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1412 SACK_PERM TSval=12756
61	42.725490760	172.16.20.1	142.250.184.174	TCP	66	40460 → 80 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=3705219492 TSecr=1275653813
62	42.725526660	172.16.20.1	142.250.184.174	HTTP	203	GET / HTTP/1.1
63	42.739952117	142.250.184.174	172.16.20.1	TCP	66	80 → 40460 [ACK] Seq=1 Ack=138 Win=66816 Len=0 TSval=1275653827 TSecr=3705219492
64	42.779064572	142.250.184.174	172.16.20.1	HTTP	839	HTTP/1.1 301 Moved Permanently (text/html)
65	42.779072534	172.16.20.1	142.250.184.174	TCP	66	40460 → 80 [ACK] Seq=138 Ack=774 Win=64128 Len=0 TSval=3705219545 TSecr=12756538
66	42.782838056	172.16.20.1	172.16.21.254	ICMP	98	Echo (ping) request id=0x7f37, seq=5/1280, ttl=64 (reply in 67)
67	42.783057228	172.16.21.254	172.16.20.1	ICMP	98	Echo (ping) reply id=0x7f37, seq=5/1280, ttl=63 (request in 66)
68	43.430118515	172.16.20.1	172.16.2.1	DNS	74	Standard query 0xa597 A www.google.com
69	43.430128852	172.16.20.1	172.16.2.1	DNS	74	Standard query 0x2ca0 AAAA www.google.com
70	43.431053802	172.16.2.1	172.16.20.1	DNS	90	Standard query response 0xa597 A www.google.com A 142.250.185.4
71	43.431072799	172.16.2.1	172.16.20.1	DNS	102	Standard query response 0x2ca0 AAAA www.google.com AAAA 2a00:1450:4003:803::2004
72	43.431268364	172.16.20.1	142.250.185.4	TCP	74	46256 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM TSval=3797710423 TSecr
73	43.450276521	142.250.185.4	172.16.20.1	TCP	74	80 → 46256 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1412 SACK_PERM TSval=30781
74	43.450306065	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=3797710442 TSecr=3078168018
75	43.450338892	172.16.20.1	142.250.185.4	HTTP	207	GET / HTTP/1.1
76	43.466570804	142.250.185.4	172.16.20.1	TCP	66	80 → 46256 [ACK] Seq=1 Ack=142 Win=66816 Len=0 TSval=3078168034 TSecr=3797710442
77	43.468333328	142.250.185.4	172.16.20.1	TCP	66	[TCP Dup ACK 76#1] 80 → 46256 [ACK] Seq=1 Ack=142 Win=66816 Len=0 TSval=30781680
78	43.540844821	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [ACK] Seq=1 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr=37977104
79	43.540871990	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=142 Ack=1401 Win=64128 Len=0 TSval=3797710532 TSecr=3078168
80	43.540952242	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [PSH, ACK] Seq=1401 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr
81	43.540962928	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=142 Ack=2801 Win=63488 Len=0 TSval=3797710532 TSecr=3078168
82	43.541071606	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [ACK] Seq=2801 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr=3797
83	43.541077962	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=142 Ack=4201 Win=62464 Len=0 TSval=3797710532 TSecr=3078168
84	43.541129577	172.16.20.1	142.250.184.174	TCP	66	40460 → 80 [FIN, ACK] Seq=138 Ack=774 Win=64128 Len=0 TSval=3705220307 TSecr=1275
85	43.541191738	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [PSH, ACK] Seq=4201 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr
86	43.541199561	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=142 Ack=5601 Win=61440 Len=0 TSval=3797710532 TSecr=3078168
87	43.541310404	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [ACK] Seq=5601 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr=3797
88	43.541316271	172.16.20.1	142.250.185.4	TCP	66	46256 → 80 [ACK] Seq=142 Ack=7001 Win=64128 Len=0 TSval=3797710533 TSecr=3078168
89	43.541426695	142.250.185.4	172.16.20.1	TCP	1466	80 → 46256 [PSH, ACK] Seq=7001 Ack=142 Win=66816 Len=1400 TSval=3078168110 TSecr

Anexo 4.2



Anexo 6