

P1: Switching Vlan

Exercise1– The goal of this practice is to test a LLC over Ethernet transmission with emulated equipment (hosts and switches). In particular, we will use the simple LLC1 client/server chat. Since you are root on the virtual machine you can simply execute them as:

```
simctl switching-vlan sh
start
vms
get user
usuari: root
contrasenya: xxxx
```

a.

we get the MAC of bob by using ifconfig

```
root@bob:~# server-chat-LLC1.py
```

(bob waits)

```
root@alice:~# send-frame-LLC1.py -d fe:fd:00:00:02:00
```

(we write a message as alice)

```
root@alice:~# server-chat-LLC1.py
```

(alice waits)

(we write a message as bob)

(conversations continues)

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	20 U,	func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
2	3.153574736	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	19 U,	func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
3	52.663365514	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	19 U,	func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
4	67.397100946	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	18 U,	func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
5	76.918200011	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	34 U,	func=UI; DSAP 0x88 Individual, SSAP 0x88 Command

b.

```
root@bob:~# server-chat-LLC1.py --sap 0x70
```

(bob listens)

```
root@alice:~# send-frame-LLC1.py -d fe:fd:00:00:02:00 --ssap 0x70 --dsap 0x70
```

(we write a message as alice.0)

```
root@alice:~# server-chat-LLC1.py --sap 0x70
```

(alice.0 listens)

(we write a message as bob)

//Now we chat with carla

```
root@carla:~# server-chat-LLC1.py
```

(carla waits)

```
root@alice:~# send-frame-LLC1.py -d fe:fd:00:00:03:00
```

(we write a message as alice.1)

```
root@alice:~# server-chat-LLC1.py
```

(alice.1 listens)

(we write a message as carla)

No.	Time	Source	Destination	Protocol	Length	Info
2	29.483709579	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	20	U, func=UI; DSAP 0x70 Individual, SSAP 0x70 Command
3	125.756286448	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	22	U, func=UI; DSAP 0x70 Individual, SSAP 0x70 Command
4	133.188157144	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	24	U, func=UI; DSAP 0x70 Individual, SSAP 0x70 Command
5	136.461249227	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	21	U, func=UI; DSAP 0x70 Individual, SSAP 0x70 Command
6	325.755977405	fe:fd:00:00:01:00	fe:fd:00:00:03:00	LLC	23	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
7	390.918393865	fe:fd:00:00:03:00	fe:fd:00:00:01:00	LLC	19	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command

Exercise2– The goal of this practice is to study switching and the MAC learning process of switches using the emulated scenario. To do so, we are going to use a simple application called send-frame-LLC1.py that you can find in the directory /tmp. This application can be used to send LLC1 frames (use the -h option to see how it works).

simctl switching-vlan sh

start

vms

get L1

get L2

get L3

root@L1:~# watch -n 5 brctl showmacs br1

port	no	mac addr	is local?	ageing timer
1		fe:fd:00:00:07:00	yes	0.00
2		fe:fd:00:00:07:01	yes	0.00
3		fe:fd:00:00:07:02	yes	0.00

L1.12078.0			
File Edit View Search Terminal Help			
Every 1,0s: brctl showmacs br1		Thu Sep 22 12:18:27 2022	
port	no	mac addr	is local? ageing timer
1		fe:fd:00:00:01:00	no 23.19
3		fe:fd:00:00:02:00	no 27.44
1		fe:fd:00:00:07:00	yes 0.00
2		fe:fd:00:00:07:01	yes 0.00
3		fe:fd:00:00:07:02	yes 0.00

Capturing from SimNet1						
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help						
Apply a display filter ... <Ctrl-/>						
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0

Capturing from SimNet2						
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help						
Apply a display filter ... <Ctrl-/> Expression... +						
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0:
2	3.197917308	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0:
3	7.454844314	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0:

```

root@alice:~# send-frame-LLC1.py -d fe:fd:00:00:02:00
root@bob:~# send-frame-LLC1.py -d fe:fd:00:00:01:00
root@alice:~# send-frame-LLC1.py -d fe:fd:00:00:02:00

```

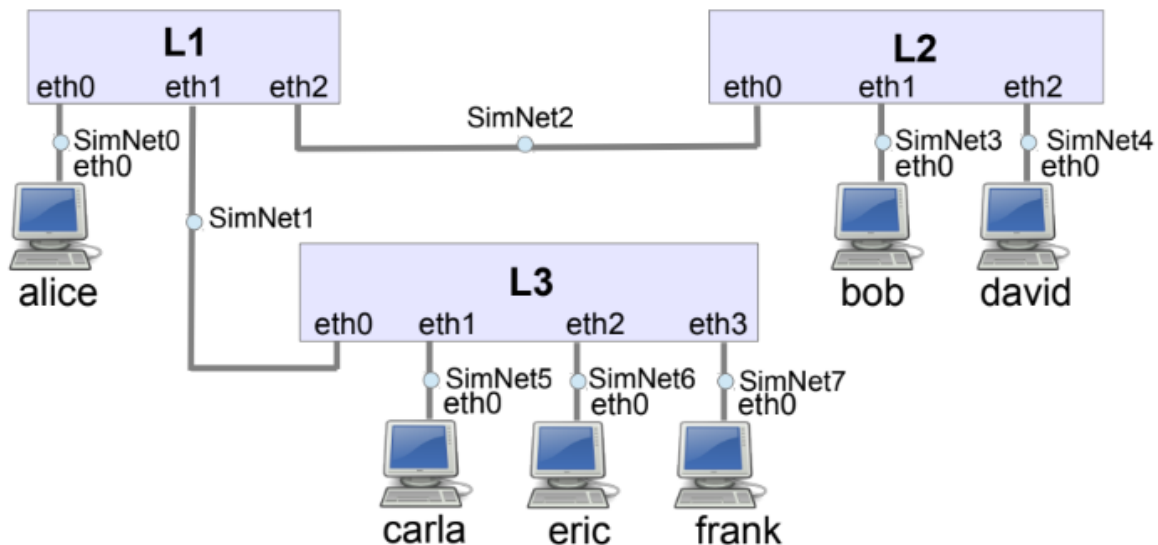


Figure 1.1: Scenario for testing Switching

MAC learning:

The first message sent from alice to bob goes to simnet1 and simnet2. (The switch L1 learns that alice is on eth0)

Bob sends a message to alice that only goes to simnet2. (The switch L1 learns that bob is on eth2)

The next message that alice sends goes only to simnet2 because L1 already knows that bob is on eth2.

The table of MAC addresses refreshes in 1 minute.

4.

```
root@L1:~# brctl setageing br1 600
```

(put 10min to the timer of the mac reset)

```
root@L1:~# watch -n 1 brctl showmacs br1
```

```
root@L1:~# brctl setageing br1 10
```

```
root@carla:~# server-chat-LLC1.py
```

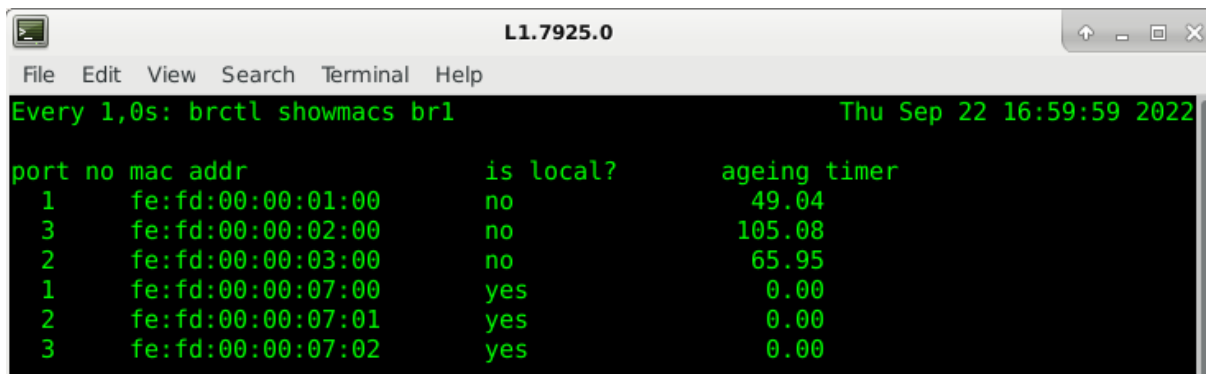
```
root@alice:~# client-chat-LLC1.py -d fe:fd:00:00:03:00
```

(alice 0 sends a message to carla with ssap 0x80)

```
root@bob:~# server-chat-LLC1.py
```

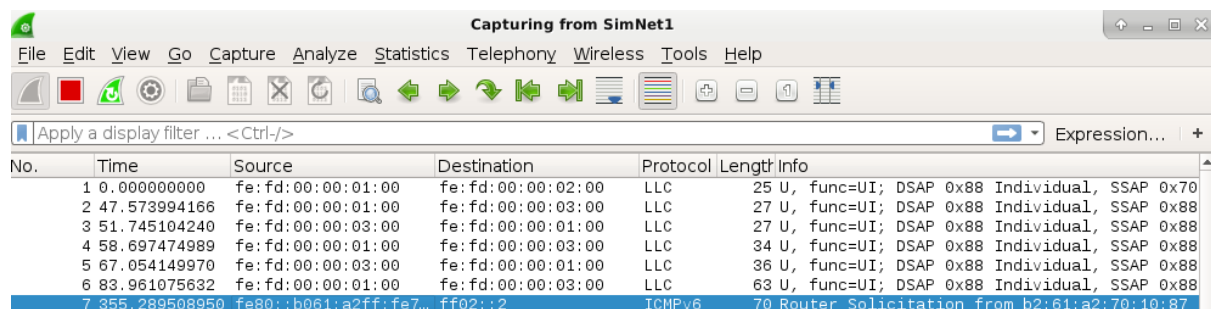
```
root@alice:~# client-chat-LLC1.py -d fe:fd:00:00:02:00 --ssap 0x70
```

(alice 1 sends a message to bob th ssap 0x70)

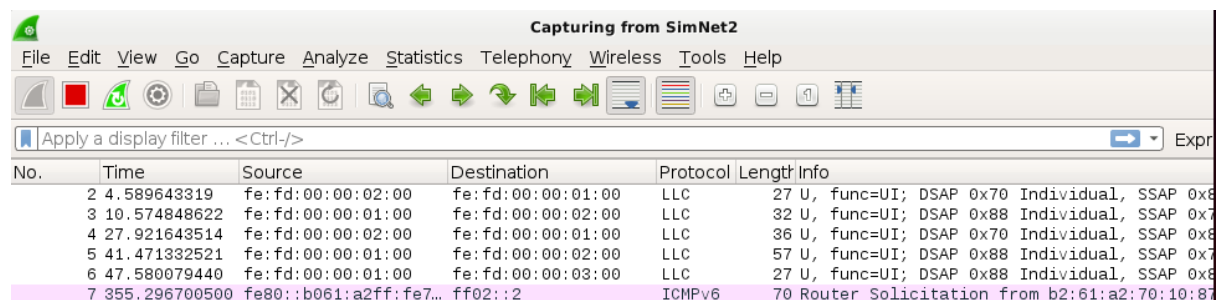


```
L1.7925.0
File Edit View Search Terminal Help
Every 1,0s: brctl showmacs br1 Thu Sep 22 16:59:59 2022

port no mac addr is local? ageing timer
1 fe:fd:00:00:01:00 no 49.04
3 fe:fd:00:00:02:00 no 105.08
2 fe:fd:00:00:03:00 no 65.95
1 fe:fd:00:00:07:00 yes 0.00
2 fe:fd:00:00:07:01 yes 0.00
3 fe:fd:00:00:07:02 yes 0.00
```



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	25	U, func=UI; DSAP 0x88 Individual, SSAP 0x70
2	47.573994166	fe:fd:00:00:01:00	fe:fd:00:00:03:00	LLC	27	U, func=UI; DSAP 0x88 Individual, SSAP 0x88
3	51.745104240	fe:fd:00:00:03:00	fe:fd:00:00:01:00	LLC	27	U, func=UI; DSAP 0x88 Individual, SSAP 0x88
4	58.697474989	fe:fd:00:00:01:00	fe:fd:00:00:03:00	LLC	34	U, func=UI; DSAP 0x88 Individual, SSAP 0x88
5	67.054149970	fe:fd:00:00:03:00	fe:fd:00:00:01:00	LLC	36	U, func=UI; DSAP 0x88 Individual, SSAP 0x88
6	83.961075632	fe:fd:00:00:01:00	fe:fd:00:00:03:00	LLC	63	U, func=UI; DSAP 0x88 Individual, SSAP 0x88
7	355.289508950	fe80::b061:a2ff:fe7... ff02::2		ICMPv6	70	Router Solicitation from b2:61:a2:70:10:87



No.	Time	Source	Destination	Protocol	Length	Info
2	4.589643319	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	27	U, func=UI; DSAP 0x70 Individual, SSAP 0x8
3	10.574848622	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	32	U, func=UI; DSAP 0x88 Individual, SSAP 0x7
4	27.921643514	fe:fd:00:00:02:00	fe:fd:00:00:01:00	LLC	36	U, func=UI; DSAP 0x70 Individual, SSAP 0x8
5	41.471332521	fe:fd:00:00:01:00	fe:fd:00:00:02:00	LLC	57	U, func=UI; DSAP 0x88 Individual, SSAP 0x7
6	47.580079440	fe:fd:00:00:01:00	fe:fd:00:00:03:00	LLC	27	U, func=UI; DSAP 0x88 Individual, SSAP 0x8
7	355.296700500	fe80::b061:a2ff:fe7... ff02::2		ICMPv6	70	Router Solicitation from b2:61:a2:70:10:87

We can observe that the first message of each communication goes to both nets because the switch doesn't know in which net is the destination mac, then it does a broadcast. If we wait until the time limit, then the memory of the switch is reseted and it does broadcast again.

Exercise3– The goal of this practice is to study and test VLANs. In the first exercise you have to configure a port level VLAN. In the second exercise, you have to configure switching between tagged and untagged frames. Finally, in the last exercise, you have to configure switching between trunks.

1. In L3, modify the bridge configuration (removing the previous one) to create one VLAN for the ports 1 and 3 and another VLAN for the ports 2 and 4. Explain your configuration. Do you need any VLAN id? Test your configuration with send-frame-LLC1.py

and the Ethernet broadcast address.

//from L3

```
ifconfig br3 down
brctl delbr br3
brctl addbr br3a
brctl addif br3a eth0
brctl addif br3a eth2
ifconfig br3a 192.168.1.1
```

```
brctl addbr br3b
brctl addif br3b eth1
brctl addif br3b eth3
ifconfig br3b 192.168.1.2
```

We separate the bridge in to bridges:

br3a has the ports eth0 and eth2

br3b has the ports eth1 and eth3

```
root@L3:~# brctl show
bridge name      bridge id        STP enabled      interfaces
br3a              8000.fefd00000900  no               eth0
                  8000.fefd00000900  no               eth2
br3b              8000.fefd00000901  no               eth1
                  8000.fefd00000901  no               eth3
```

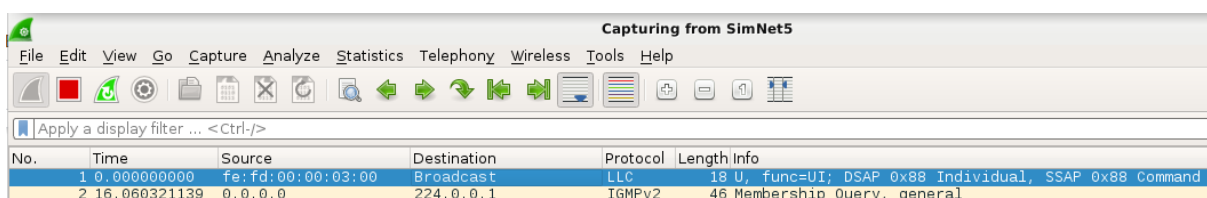
We don't need VLAN ids because they are separated and we don't mix the traffic.

If we send a broadcast frame from carla:

```
root@carla:~# send-frame-LLC1.py -d ff:ff:ff:ff:ff:ff
```

only simnet5(carla's net) and simnet7(franks net) receive the message, but simnet6(eric's net) doesn't receive the message.

¿¿¿Porque al enviar un mensaje en broadcast el server-chat.py no lo recibe, pero al enviarse a la mac en específico sí lo lee???



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:03:00	Broadcast	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
2	16.060321139	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:03:00	Broadcast	LLC	18	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
2	16.060198473	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

2. Create a configuration in the switches in which all the hosts send untagged frames but:

- alice and carla belong to one data link network (use VLAN id 10).
- bob, david, eric and frank belong to another data link network.

Explain your configuration.

Capture traffic in the interfaces SimNet0 and SimNet1. Then, test your configuration appropriately using

the Ethernet broadcast address and send-frame-LLC1.py. Discuss the results and the format of the VLAN

frames.

//from L3

ifconfig br3 down

brctl delbr br3

brctl addbr br3a

vconfig add eth0 10

brctl addif br3a eth0.10

brctl addif br3a eth1

ifconfig eth0.10 up

ifconfig eth1 up

ifconfig br3a 192.168.1.1

brctl addbr br3b

brctl addif br3b eth0

brctl addif br3b eth2

brctl addif br3b eth3

ifconfig eth0 up

ifconfig eth2 up

ifconfig eth3 up

ifconfig br3b 192.168.2.1

```

root@L3:~# brctl show
bridge name      bridge id        STP enabled      interfaces
br3a             8000.fefd00000900  no              eth0.10
br3b             8000.fefd00000900  no              eth1
               eth0
               eth2
               eth3
root@L3:~# br3b: port 3(eth3) entered forwarding state
               br3b: port 2(eth2) entered forwarding state
               br3b: port 1(eth0) entered forwarding state

```

//from L1

```

ifconfig br1 down
brctl delbr br1

```

```

vconfig add eth1 10
brctl addbr br1a
brctl addif br1a eth0
brctl addif br1a eth1.10
ifconfig eth0 up
ifconfig eth1.10 up
ifconfig br1a 192.168.3.1

```

```

brctl addbr br1b
brctl addif br1b eth1
brctl addif br1b eth2
ifconfig eth1 up
ifconfig eth2 up
ifconfig br1b 192.168.4.1

```

//configurations

```

root@L1:~# brctl show
bridge name      bridge id        STP enabled      interfaces
br1a             8000.fefd00000700  no              eth0
br1b             8000.fefd00000701  no              eth1
               eth2

```

```

root@L3:~# brctl show
bridge name      bridge id        STP enabled      interfaces
br3a             8000.fefd00000900  no              eth0.10
br3b             8000.fefd00000900  no              eth1
               eth0
               eth2
               eth3

```

//broadcast from carla

```

root@carla:~# send-frame-LLC1.py -d ff:ff:ff:ff:ff:ff
Using interface: eth0
Using ssap: 0x88
Using dsap: 0x88
Type payload for LLC1 frame: hello soy carla

```

TCGI 20/21 [S'està executant] - Oracle VM VirtualBox

Fitxer Màquina Visualitza Entrada Dispositius Ajuda

Applications carla.4900.0 L3.0 L1.11424.0 Capturing from SimN... Capturing from SimN... Capturing from SimN...

Capturing from SimNet1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
2	13.738971593	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
3	18.957890665	fe:fd:00:00:03:00	Broadcast	LLC	36	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
4	39.680763758	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

simnet 1 (alice-carla link)

TCGI 20/21 [S'està executant] - Oracle VM VirtualBox

Fitxer Màquina Visualitza Entrada Dispositius Ajuda

Applications carla.4900.0 L3.0 L1.11424.0 Capturing from SimN... Capturing from SimN... Capturing from SimN...

Capturing from SimNet2

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
2	22.064018262	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

simnet 2 (bob,david-erik,frank link)

TCGI 20/21 [S'està executant] - Oracle VM VirtualBox

Fitxer Màquina Visualitza Entrada Dispositius Ajuda

Applications Applications carla.4900.0 L3.0 L1.11424.0 Capturing from SimN... Capturing from SimN... Capturing from SimN...

Capturing from SimNet5

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
2	13.738358835	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
3	18.957411814	fe:fd:00:00:03:00	Broadcast	LLC	32	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command

simnet 5 (carla)

TCGI 20/21 [S'està executant] - Oracle VM VirtualBox

Fitxer Màquina Visualitza Entrada Dispositius Ajuda

Applications Applications carla.4900.0 L3.0 L1.11424.0 Capturing from SimN... Capturing from SimN... Capturing from SimN... Capturing from SimN...

Capturing from SimNet0

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

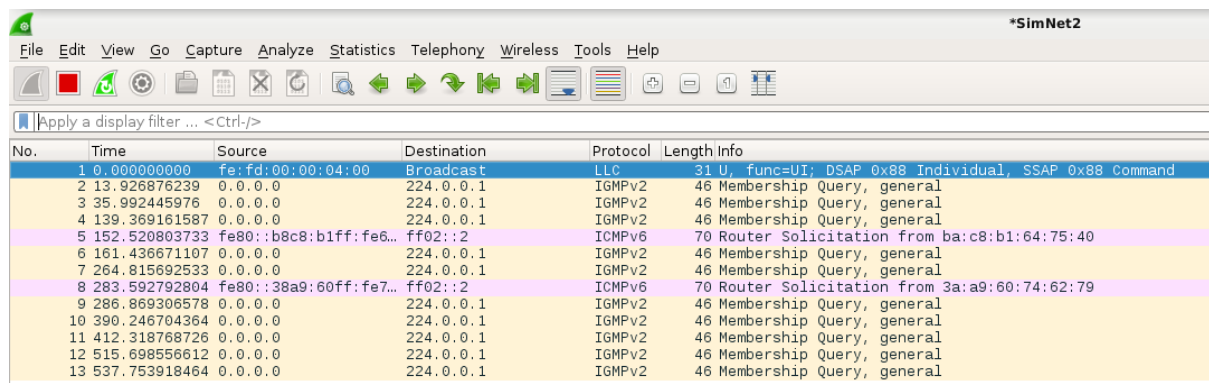
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
2	5.218867942	fe:fd:00:00:03:00	Broadcast	LLC	32	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command

simnet 0 (alice)

From wireshark we can see that the broadcast sent from carla is only received by alice.

//broadcast from david

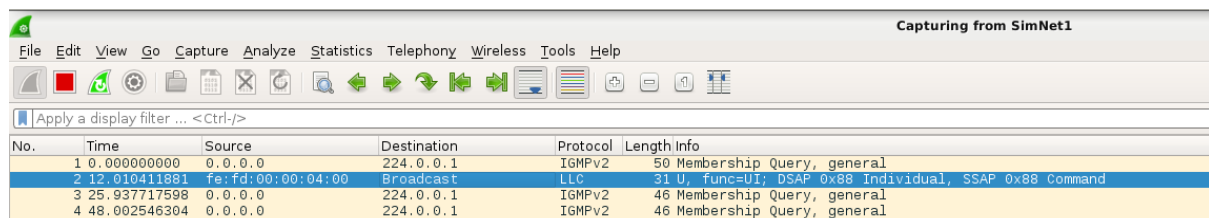
```
root@david:~# send-frame-LLC1.py -d ff:ff:ff:ff:ff:ff
Using interface: eth0
Using ssap: 0x88
Using dsap: 0x88
Type payload for LLC1 frame: Hola soy david
.
Sent 1 packets.
```



Wireshark capture from SimNet2. The interface shows a list of captured packets. The first packet is a broadcast frame from fe:fd:00:00:04:00 to Broadcast, LLC, 31 U, func=UI, DSAP 0x88 Individual, SSAP 0x88 Command. Subsequent packets are IGMPv2 Membership Queries from 224.0.0.1 to 224.0.0.1. There are also two ICMPv6 Router Solicitation packets from ba:c8:b1:64:75:40 and 3a:a9:60:74:62:79 to ff02::2.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:04:00	Broadcast	LLC	31	U, func=UI, DSAP 0x88 Individual, SSAP 0x88 Command
2	13.926876239	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
3	35.992445976	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
4	139.369161587	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
5	152.520803733	fe80::b8c8:b1ff:fe6...	ff02::2	ICMPv6	70	Router Solicitation from ba:c8:b1:64:75:40
6	161.436671107	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
7	264.815692533	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
8	283.592792804	fe80::38a9:60ff:fe7...	ff02::2	ICMPv6	70	Router Solicitation from 3a:a9:60:74:62:79
9	286.869306578	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
10	390.246704364	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
11	412.318768726	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
12	515.698556612	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
13	537.753918464	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

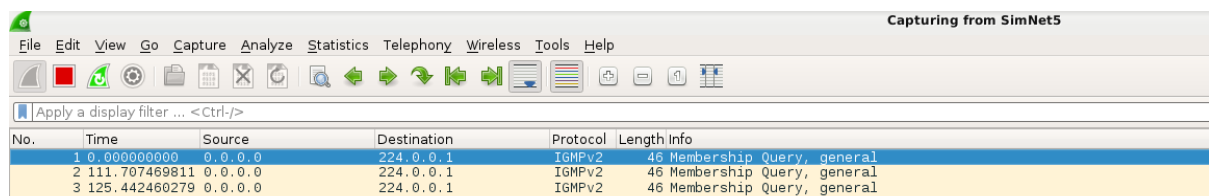
simnet 2 link I2-I1



Wireshark capture from SimNet1. The interface shows a list of captured packets. The first packet is a broadcast frame from fe:fd:00:00:04:00 to Broadcast, LLC, 31 U, func=UI, DSAP 0x88 Individual, SSAP 0x88 Command. Subsequent packets are IGMPv2 Membership Queries from 224.0.0.1 to 224.0.0.1.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
2	12.010411881	fe:fd:00:00:04:00	Broadcast	LLC	31	U, func=UI, DSAP 0x88 Individual, SSAP 0x88 Command
3	25.937717598	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
4	48.002546304	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

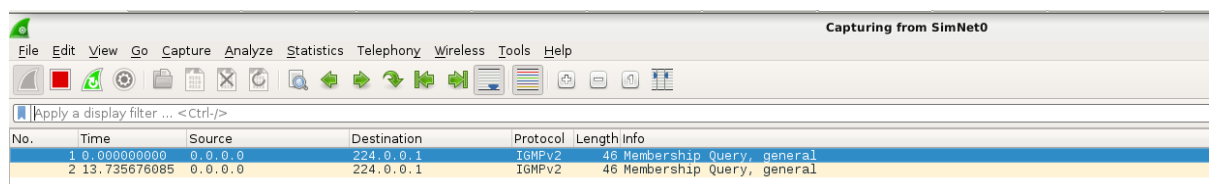
simnet 1 link I2-I3



Wireshark capture from SimNet5. The interface shows a list of captured packets. The first packet is an IGMPv2 Membership Query from 224.0.0.1 to 224.0.0.1. Subsequent packets are IGMPv2 Membership Queries from 224.0.0.1 to 224.0.0.1.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
2	111.707469811	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
3	125.442460279	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

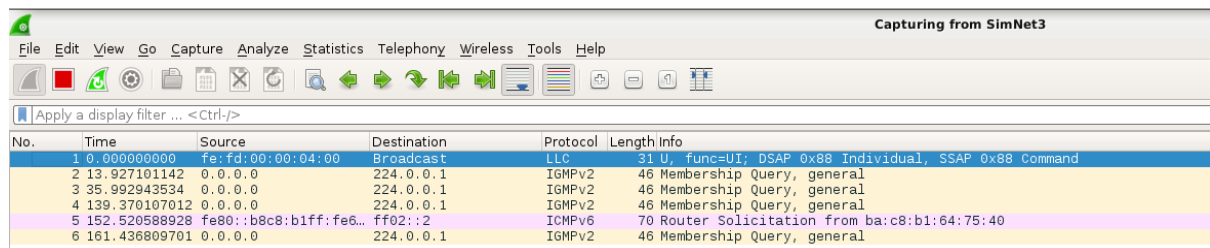
simnet 5 (carla)



Wireshark capture from SimNet0. The interface shows a list of captured packets. The first packet is an IGMPv2 Membership Query from 224.0.0.1 to 224.0.0.1. Subsequent packets are IGMPv2 Membership Queries from 224.0.0.1 to 224.0.0.1.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
2	13.735676085	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

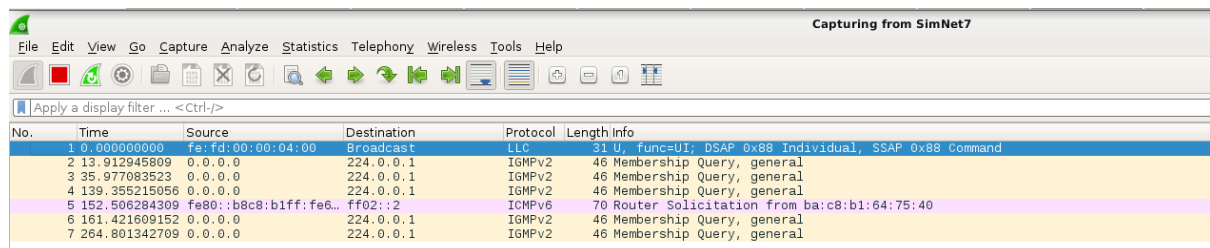
simnet 0 (alice)



Wireshark interface showing a capture from SimNet3. The packet list table is as follows:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:04:00	Broadcast	LLC	31	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
2	13.927101142	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
3	35.992943534	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
4	139.370107012	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
5	152.520588928	fe80::b8c8:b1ff:fe6...	ff02::2	ICMPv6	70	Router Solicitation from ba:c8:b1:64:75:40
6	161.436809701	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

simnet 3 (bob)



Wireshark interface showing a capture from SimNet7. The packet list table is as follows:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:04:00	Broadcast	LLC	31	U, func=UI; DSAP 0x88 Individual, SSAP 0x88 Command
2	13.912945809	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
3	35.977083523	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
4	139.355215056	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
5	152.506284309	fe80::b8c8:b1ff:fe6...	ff02::2	ICMPv6	70	Router Solicitation from ba:c8:b1:64:75:40
6	161.421609152	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general
7	264.801342709	0.0.0.0	224.0.0.1	IGMPv2	46	Membership Query, general

simnet 7 (frank)

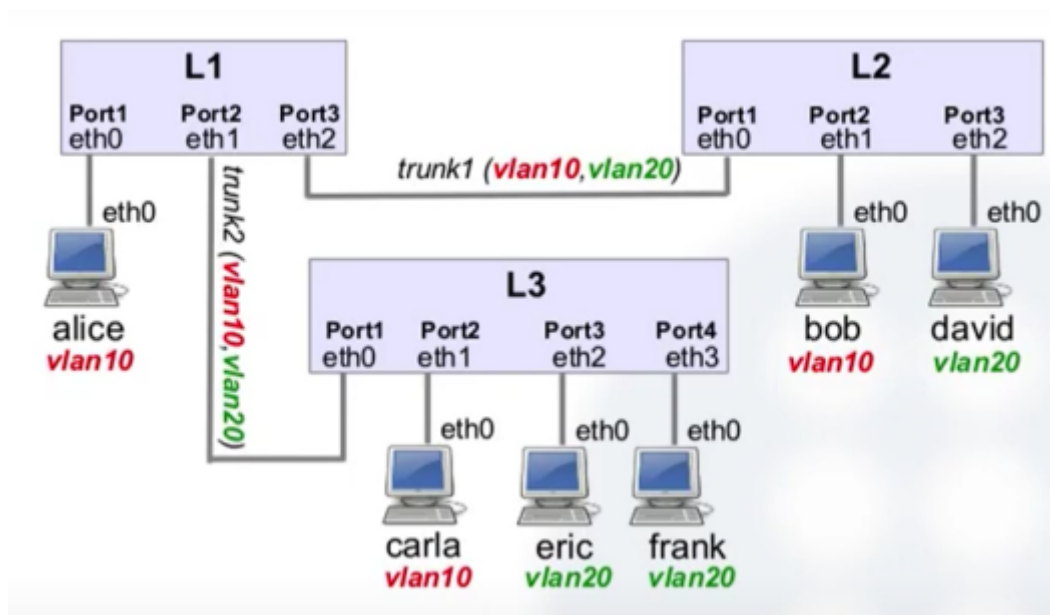
If we make a broadcast from david the receivers are bob, erik and frank, but alice and carla don't receive the broadcast trace.

3. Create a configuration in the switches in which all the hosts send untagged frames but they belong to the following VLANs:

- VLAN 10: alice, bob and carla.
- VLAN 20: david, eric and frank.

Explain your configuration.

Capture traffic in the trunk interfaces (SimNet1 and SimNet2) and in any other SimNet interface that you consider useful. Then, test your configuration appropriately using send-frame-LLC1.py and the Ethernet broadcast address. Discuss the results and the format of the VLAN frames.



we will use the previous configuration so en L1 we will add vlan 10 to eth2

```

//from L1
ifconfig br1 down
brctl delbr br1

vconfig add eth1 10
vconfig add eth1 20
vconfig add eth2 10
vconfig add eth2 20

brctl addbr br1a
brctl addif br1a eth0
brctl addif br1a eth1.10
brctl addif br1a eth2.10
ifconfig eth0 up
ifconfig eth1.10 up
ifconfig eth2.10 up
  
```

ifconfig br1a 192.168.1.1/24

brctl addbr br1b

brctl addif br1b eth1.20

brctl addif br1b eth2.20

ifconfig eth1.20 up

ifconfig eth2.20 up

ifconfig br1b 192.168.2.1/24

//from L2

ifconfig br2 down

brctl delbr br2

vconfig add eth0 10

vconfig add eth0 20

brctl addbr br2a

brctl addif br2a eth0.10

brctl addif br2a eth1

ifconfig eth0.10 up

ifconfig eth1 up

ifconfig br2a 192.168.3.1/24

brctl addbr br2b

brctl addif br2b eth0.20

brctl addif br2b eth2

ifconfig eth0.20 up

ifconfig eth1 up

ifconfig br2b 192.168.4.1/24

//from L3

ifconfig br3 down

brctl delbr br3

vconfig add eth0 10

vconfig add eth0 20

brctl addbr br3a

brctl addif br3a eth0.10

brctl addif br3a eth1

ifconfig eth0.10 up

ifconfig eth1 up

ifconfig br3a 192.168.5.1/24

brctl addbr br3b

brctl addif br3b eth0.20

brctl addif br3b eth2

brctl addif br3b eth3

```

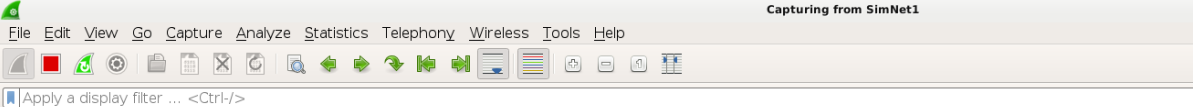
ifconfig eth0.20 up
ifconfig eth2 up
ifconfig eth3 up
ifconfig br3b 192.168.6.1/24

```

```

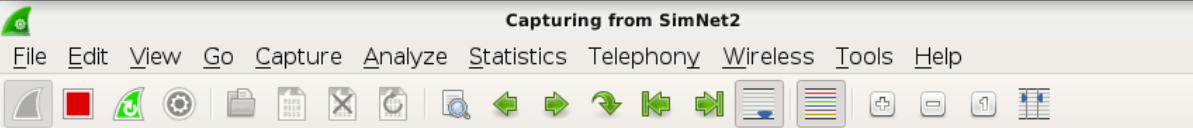
//broadcast from alice
send-frame-LLC1.py -d ff:ff:ff:ff:ff:ff

```



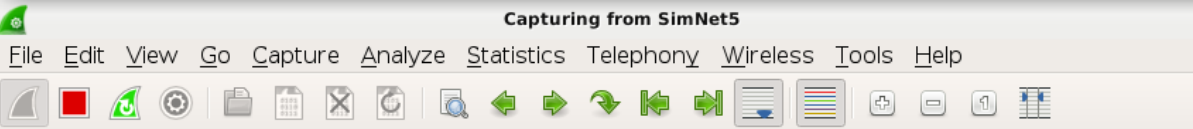
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
2	0.001140864	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
3	14.193429384	0.0.0.0	224.0.0.1	IGMPv2	50	Membership Query, general
4	69.583919312	fe:fd:00:00:01:00	Broadcast	LLC	35	U, func=UI, DSAP 0x88 Individual, SSAP 0x88 Command

L1 to L3



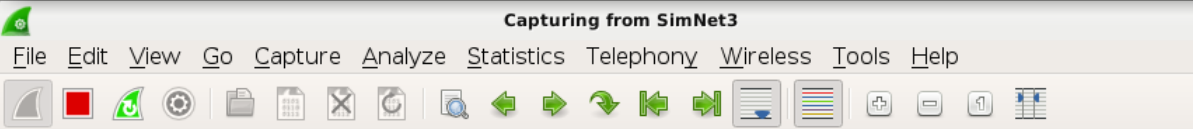
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Members
2	0.000620507	0.0.0.0	224.0.0.1	IGMPv2	50	Members
3	14.193288789	0.0.0.0	224.0.0.1	IGMPv2	50	Members
4	69.583151722	fe:fd:00:00:01:00	Broadcast	LLC	35	U, func

L1 to L2



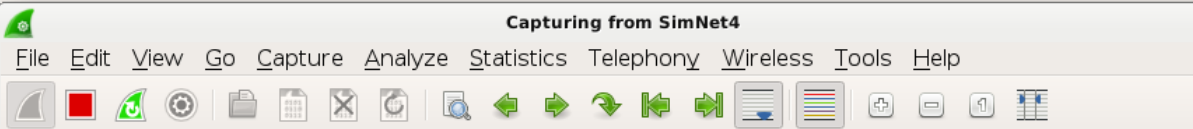
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	Broadcast	LLC	31	U, func

carla



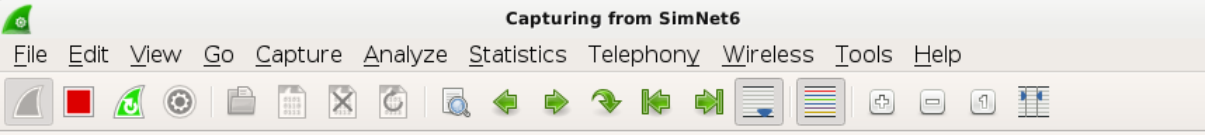
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:01:00	Broadcast	LLC	31	U, func

bob



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Members

david



Capturing from SimNet6

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

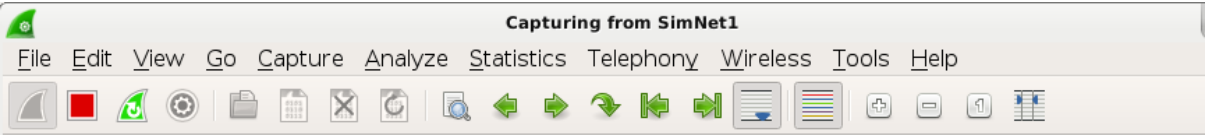
Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Members
2	55.570808962	0.0.0.0	224.0.0.1	IGMPv2	46	Members
3	125.448552771	0.0.0.0	224.0.0.1	IGMPv2	46	Members

eric

Only bob and carla receive alice's broadcast.

//broadcast from frank
send-frame-LLC1.py -d ff:ff:ff:ff:ff:ff



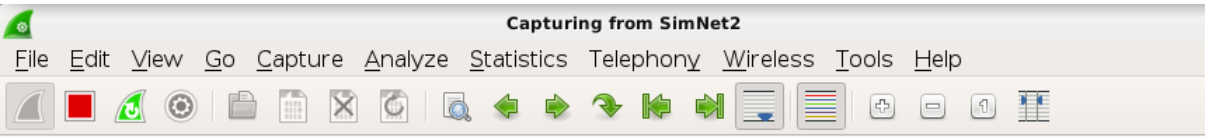
Capturing from SimNet1

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Members
2	4.702086057	0.0.0.0	224.0.0.1	IGMPv2	50	Members
3	47.214608966	fe:fd:00:00:06:00	Broadcast	LLC	35	U, func

L1 to L3




Capturing from SimNet2

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Members
2	4.701479196	0.0.0.0	224.0.0.1	IGMPv2	50	Members
3	47.214474862	fe:fd:00:00:06:00	Broadcast	LLC	35	U, func

L1 to L2



Capturing from SimNet0

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Members
2	65.058506135	0.0.0.0	224.0.0.1	IGMPv2	46	Members
3	66.228191220	0.0.0.0	224.0.0.1	IGMPv2	46	Members
4	125.435118005	0.0.0.0	224.0.0.1	IGMPv2	46	Members

alice

Capturing from SimNet5

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Members
2	50.867222612	0.0.0.0	224.0.0.1	IGMPv2	46	Members
3	65.057990969	0.0.0.0	224.0.0.1	IGMPv2	46	Members
4	125.435400719	0.0.0.0	224.0.0.1	IGMPv2	46	Members

carla

Capturing from SimNet6

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	fe:fd:00:00:06:00	Broadcast	LLC	31	U, func

eric

Capturing from SimNet3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	46	Members
2	14.190836084	0.0.0.0	224.0.0.1	IGMPv2	46	Members
3	74.567000665	0.0.0.0	224.0.0.1	IGMPv2	46	Members
4	125.445388927	0.0.0.0	224.0.0.1	IGMPv2	46	Members
5	139.635981362	0.0.0.0	224.0.0.1	IGMPv2	46	Members

bob

Capturing from SimNet2

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Express

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	0.0.0.0	224.0.0.1	IGMPv2	50	Members
2	1.679489457	fe:fd:00:00:06:00	Broadcast	LLC	35	U, func

david

If we send a broadcast from frank only david and eric receive it.