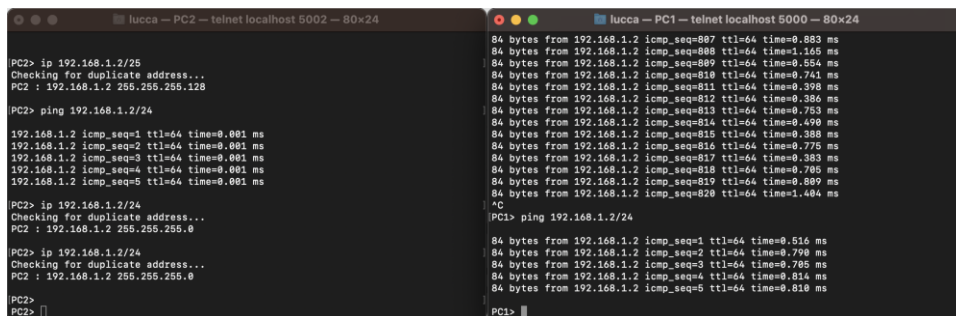


# F29DC Lab 1

## Part 1:

### Proof of Completion:

I had to redo the first steps to get screenshots after I completed the lab due to me not taking screenshots. Please ignore some of the console history.



```
lucca ~ PC2 — telnet localhost 5002 — 80x24
PC2> ip 192.168.1.2/25
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.128
PC2> ping 192.168.1.2/24
192.168.1.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=5 ttl=64 time=0.001 ms
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
PC2>
PC2>

lucca ~ PC1 — telnet localhost 5000 — 80x24
84 bytes from 192.168.1.2 icmp_seq=807 ttl=64 time=0.883 ms
84 bytes from 192.168.1.2 icmp_seq=808 ttl=64 time=1.165 ms
84 bytes from 192.168.1.2 icmp_seq=809 ttl=64 time=0.554 ms
84 bytes from 192.168.1.2 icmp_seq=810 ttl=64 time=0.741 ms
84 bytes from 192.168.1.2 icmp_seq=811 ttl=64 time=0.390 ms
84 bytes from 192.168.1.2 icmp_seq=812 ttl=64 time=0.356 ms
84 bytes from 192.168.1.2 icmp_seq=813 ttl=64 time=0.753 ms
84 bytes from 192.168.1.2 icmp_seq=814 ttl=64 time=0.490 ms
84 bytes from 192.168.1.2 icmp_seq=815 ttl=64 time=0.368 ms
84 bytes from 192.168.1.2 icmp_seq=816 ttl=64 time=0.775 ms
84 bytes from 192.168.1.2 icmp_seq=817 ttl=64 time=0.383 ms
84 bytes from 192.168.1.2 icmp_seq=818 ttl=64 time=0.705 ms
84 bytes from 192.168.1.2 icmp_seq=819 ttl=64 time=0.689 ms
84 bytes from 192.168.1.2 icmp_seq=820 ttl=64 time=1.404 ms
^C
PC1> ping 192.168.1.2/24
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=0.516 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.790 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.705 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=0.514 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.810 ms
PC1>
```

## Part 2:

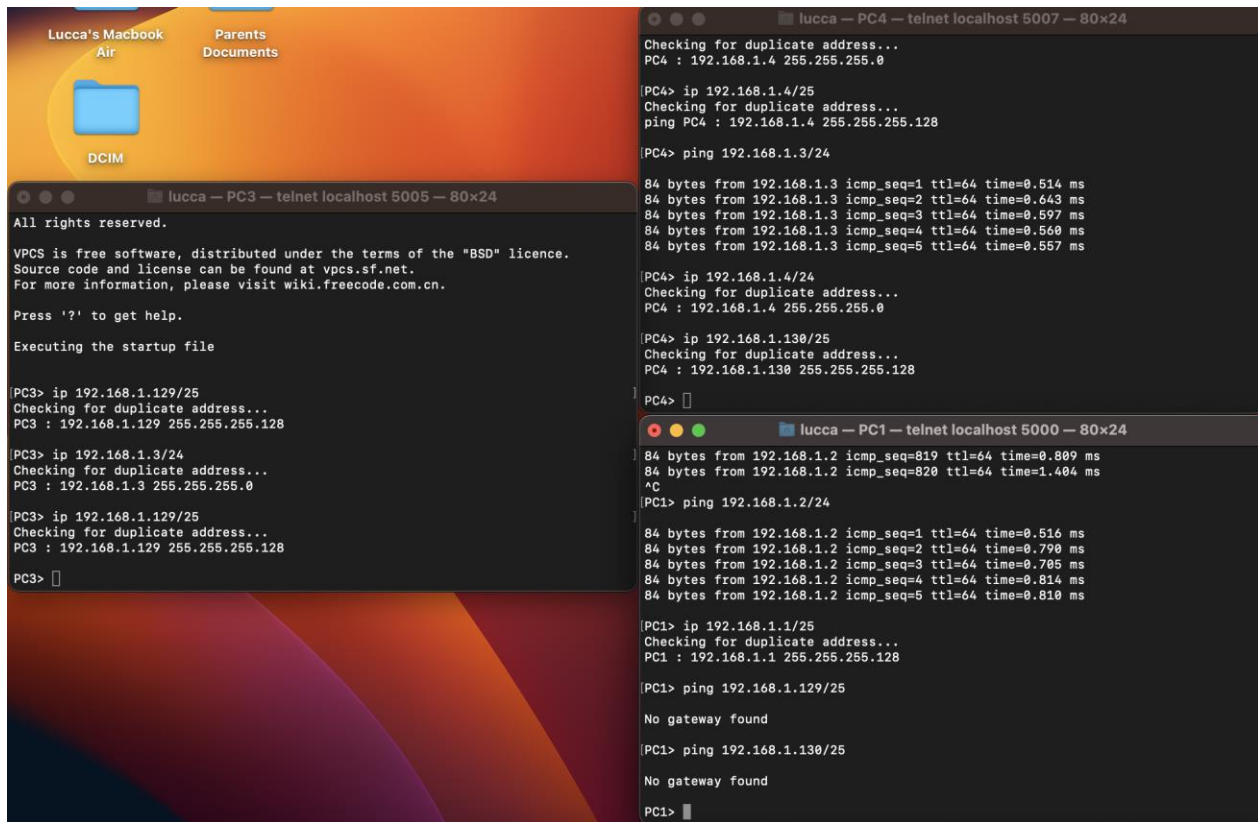
Change the network mask of the first two PCs from /24 to /25. Can they ping each other?

Yes they can. In a class B network (what this simulation is running off of) the subnetwork mask /24 means that there are no configured subnetworks. That means that PC1 and PC2 can communicate with each other with no problems since they are in the same “subnetwork”. Now, with the network mask /25, there are 2 configured subnetworks. One from hosts 0-127 and one from hosts 128-255. Host 0 and host 1 are both still in the same subnetwork.

Can you ping PC3 or PC4 from PC1? Why?

No you cannot. As I previously mentioned, they are all now using the subnetwork mask /25. PC3 & PC4 are in the subnetwork 128-255 and PC1 is in subnetwork 0-127. They physically cannot communicate each other with this configuration.

### Proof of Completion:

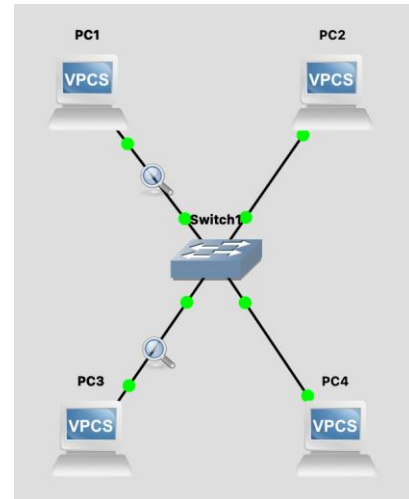
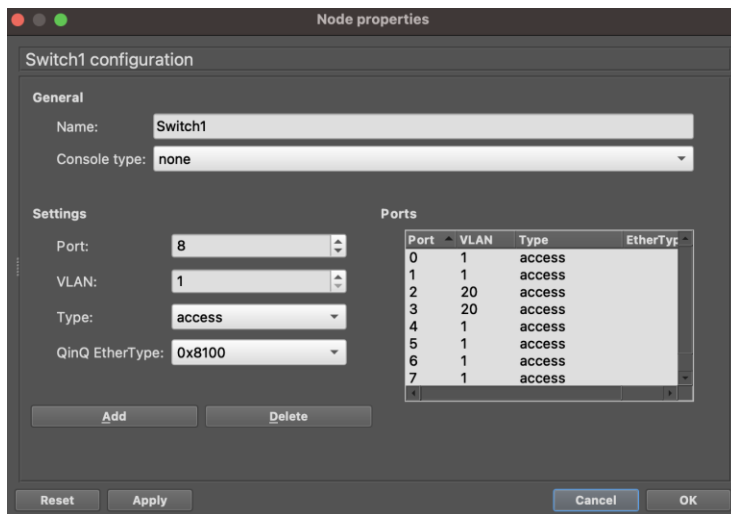


## Part 3:

Try to ping PC1 from PC2, then PC3 from PC1, then PC4 from PC2, then PC4 from PC3. How would you explain your findings?

They are on a different virtual local area network. Since they each act like isolated networks, the hosts on said networks cannot communicate with each other despite having the same network mask and are on the same IP address.

Proof of Completion:



```

lucca — PC2 — telnet localhost 5002 — 80x24
PC2 : 192.168.1.2 255.255.255.128
PC2> ping 192.168.1.2/24
192.168.1.2 icmp_seq=1 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=2 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=3 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=4 ttl=64 time=0.001 ms
192.168.1.2 icmp_seq=5 ttl=64 time=0.001 ms
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
PC2>
PC2> ip 192.168.1.2/24
Checking for duplicate address...
PC2 : 192.168.1.2 255.255.255.0
PC2>

lucca — PC4 — telnet localhost 5007 — 80x24
Checking for duplicate address...
ping PC4 : 192.168.1.4 255.255.255.128
PC4> ping 192.168.1.3/24
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=0.514 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=0.643 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=0.597 ms
84 bytes from 192.168.1.3 icmp_seq=4 ttl=64 time=0.560 ms
84 bytes from 192.168.1.3 icmp_seq=5 ttl=64 time=0.557 ms
PC4> ip 192.168.1.4/24
Checking for duplicate address...
PC4 : 192.168.1.4 255.255.255.0
PC4> ip 192.168.1.130/25
Checking for duplicate address...
PC4 : 192.168.1.130 255.255.255.128
PC4> ip 192.168.1.4/24
Checking for duplicate address...
PC4 : 192.168.1.4 255.255.255.0
PC4>

lucca — PC3 — telnet localhost 5005 — 80x24
For more information, please visit wiki.freecode.com.cn.
Press '?' to get help.
Executing the startup file
PC3> ip 192.168.1.129/25
Checking for duplicate address...
PC3 : 192.168.1.129 255.255.255.128
PC3> ip 192.168.1.3/24
Checking for duplicate address...
PC3 : 192.168.1.3 255.255.255.0
PC3> ip 192.168.1.129/25
Checking for duplicate address...
PC3 : 192.168.1.129 255.255.255.128
PC3> ip 192.168.1.3/24
Checking for duplicate address...
PC3 : 192.168.1.3 255.255.255.0
PC3>

lucca — PC1 — telnet localhost 5000 — 80x24
No gateway found
PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0
PC1> ping 192.168.1.2/24
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=0.402 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.716 ms
^[[84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.726 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=0.771 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.745 ms
PC1> ping 192.168.1.3/24
host (192.168.1.3) not reachable
PC1> ping 192.168.1.4/24
host (192.168.1.4) not reachable
PC1>

```

## Part 4:

Start sniffing on PC1's link using Wireshark. Which protocol is used for pings?

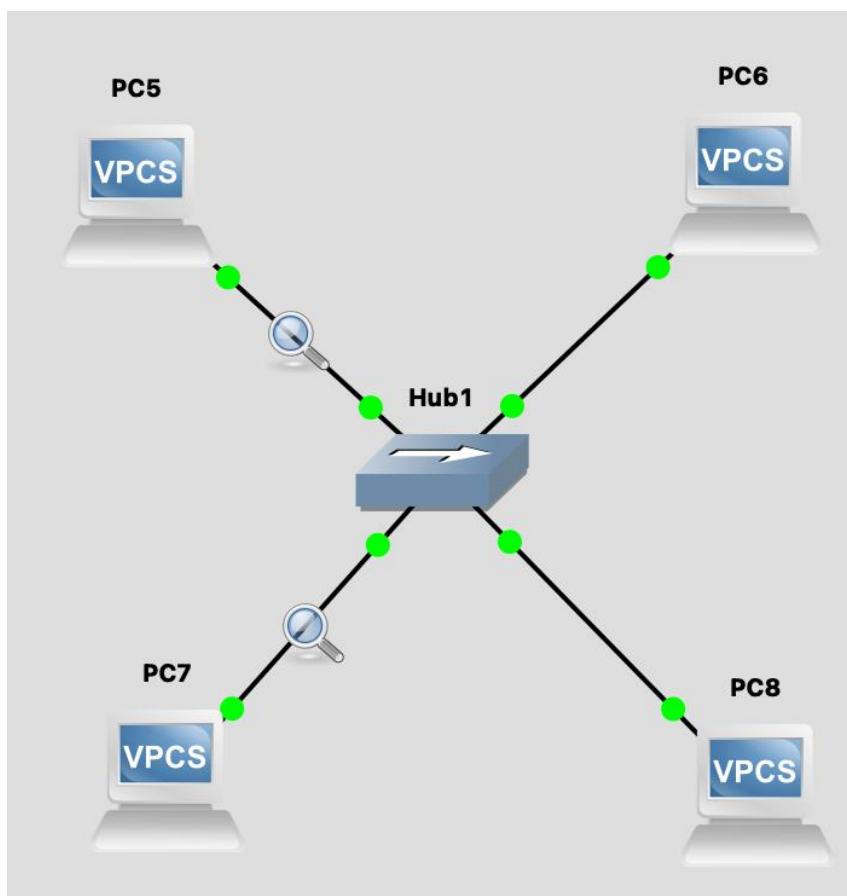
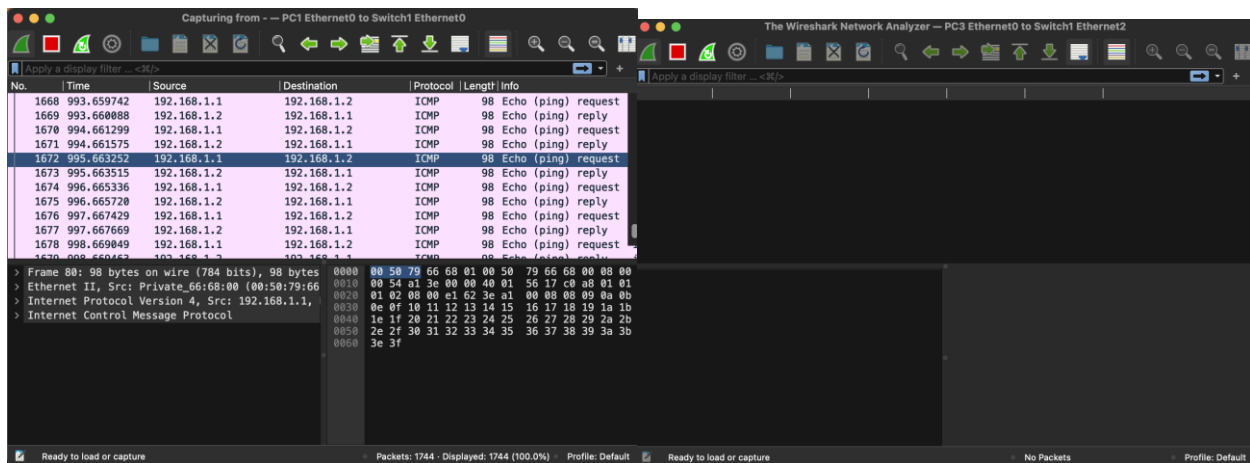
ICMP

Start sniffing on PC3's link using Wireshark. Can you see the pings from there? Why?

You cannot. The switch doesn't send information to Hosts that aren't directly involved in the route. This is unlike hubs, which send information to all hosts connected to it. That's because the Switch works using the Link Layer and the Hub works using the Physical layer of the OSI Model. Inherently, the Switch is smarter. The Link layer is also involved in data quality and cleanliness, and hosts/routes/links that aren't directly related to the route the data is taking should not be burdened with useless bandwidth.

Proof of Completion:

<pre>lucca — PC1 — telnet localhost 5000 — 80x24 84 bytes from 192.168.1.2 icmp_seq=34 ttl=64 time=0.500 ms 84 bytes from 192.168.1.2 icmp_seq=35 ttl=64 time=0.538 ms 84 bytes from 192.168.1.2 icmp_seq=36 ttl=64 time=0.425 ms 84 bytes from 192.168.1.2 icmp_seq=37 ttl=64 time=0.752 ms 84 bytes from 192.168.1.2 icmp_seq=38 ttl=64 time=0.849 ms 84 bytes from 192.168.1.2 icmp_seq=39 ttl=64 time=1.070 ms 84 bytes from 192.168.1.2 icmp_seq=40 ttl=64 time=0.623 ms 84 bytes from 192.168.1.2 icmp_seq=41 ttl=64 time=0.552 ms 84 bytes from 192.168.1.2 icmp_seq=42 ttl=64 time=0.500 ms 84 bytes from 192.168.1.2 icmp_seq=43 ttl=64 time=1.113 ms 84 bytes from 192.168.1.2 icmp_seq=44 ttl=64 time=0.772 ms 84 bytes from 192.168.1.2 icmp_seq=45 ttl=64 time=0.485 ms 84 bytes from 192.168.1.2 icmp_seq=46 ttl=64 time=1.015 ms 84 bytes from 192.168.1.2 icmp_seq=47 ttl=64 time=0.775 ms 84 bytes from 192.168.1.2 icmp_seq=48 ttl=64 time=0.569 ms 84 bytes from 192.168.1.2 icmp_seq=49 ttl=64 time=0.852 ms 84 bytes from 192.168.1.2 icmp_seq=50 ttl=64 time=0.650 ms 84 bytes from 192.168.1.2 icmp_seq=51 ttl=64 time=0.529 ms 84 bytes from 192.168.1.2 icmp_seq=52 ttl=64 time=0.495 ms 84 bytes from 192.168.1.2 icmp_seq=53 ttl=64 time=0.471 ms 84 bytes from 192.168.1.2 icmp_seq=54 ttl=64 time=0.606 ms 84 bytes from 192.168.1.2 icmp_seq=55 ttl=64 time=0.883 ms 84 bytes from 192.168.1.2 icmp_seq=56 ttl=64 time=0.738 ms PC1&gt;</pre>	<pre>lucca — PC2 — telnet localhost 5002 — 80x24 Dedicated to Daling. Build time: Aug 23 2021 03:18:07 Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com) All rights reserved.  VPCS is free software, distributed under the terms of the "BSD" licence. Source code and license can be found at vpcs.sf.net. For more information, please visit wiki.freecode.com.cn.  Press '?' to get help.  Executing the startup file  PC2&gt; ip 192.168.1.1/24 Checking for duplicate address... 192.168.1.1 is being used by MAC 00:50:79:66:68:00 Address not changed  PC2&gt; ip 192.168.1.2/24 Checking for duplicate address... PC2 : 192.168.1.2 255.255.255.0  PC2&gt;</pre>
<pre>lucca — PC3 — telnet localhost 5005 — 80x24 VPCS is free software, distributed under the terms of the "BSD" licence. Source code and license can be found at vpcs.sf.net. For more information, please visit wiki.freecode.com.cn.  Press '?' to get help.  Executing the startup file  PC3&gt; ip 192.168.1.1/24 Checking for duplicate address... 192.168.1.1 is being used by MAC 00:50:79:66:68:00 Address not changed  PC3&gt; ip 192.168.1.1/24 Checking for duplicate address... 192.168.1.1 is being used by MAC 00:50:79:66:68:00 Address not changed  PC3&gt; ip 192.168.1.3/24 Checking for duplicate address... PC3 : 192.168.1.3 255.255.255.0  PC3&gt;</pre>	<pre>lucca — PC4 — telnet localhost 5007 — 80x24 Trying ::1... Connected to localhost. Escape character is '^['.  Welcome to Virtual PC Simulator, version 0.8.2 Dedicated to Daling. Build time: Aug 23 2021 03:18:07 Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com) All rights reserved.  VPCS is free software, distributed under the terms of the "BSD" licence. Source code and license can be found at vpcs.sf.net. For more information, please visit wiki.freecode.com.cn.  Press '?' to get help.  Executing the startup file  PC4&gt; ip 192.168.1.4/24 Checking for duplicate address... PC4 : 192.168.1.4 255.255.255.0  PC4&gt;</pre>





lucca — PC5 — telnet localhost 5009 — 80x24

84 bytes from 192.168.1.6 icmp\_seq=44 ttl=64 time=0.884 ms  
84 bytes from 192.168.1.6 icmp\_seq=45 ttl=64 time=0.895 ms  
84 bytes from 192.168.1.6 icmp\_seq=46 ttl=64 time=0.798 ms  
84 bytes from 192.168.1.6 icmp\_seq=47 ttl=64 time=0.847 ms  
84 bytes from 192.168.1.6 icmp\_seq=48 ttl=64 time=0.837 ms  
84 bytes from 192.168.1.6 icmp\_seq=49 ttl=64 time=0.681 ms  
84 bytes from 192.168.1.6 icmp\_seq=50 ttl=64 time=0.649 ms  
84 bytes from 192.168.1.6 icmp\_seq=51 ttl=64 time=0.896 ms  
84 bytes from 192.168.1.6 icmp\_seq=52 ttl=64 time=0.885 ms  
84 bytes from 192.168.1.6 icmp\_seq=53 ttl=64 time=0.559 ms  
84 bytes from 192.168.1.6 icmp\_seq=54 ttl=64 time=0.729 ms  
84 bytes from 192.168.1.6 icmp\_seq=55 ttl=64 time=0.520 ms  
84 bytes from 192.168.1.6 icmp\_seq=56 ttl=64 time=0.727 ms  
84 bytes from 192.168.1.6 icmp\_seq=57 ttl=64 time=0.768 ms  
84 bytes from 192.168.1.6 icmp\_seq=58 ttl=64 time=1.945 ms  
84 bytes from 192.168.1.6 icmp\_seq=59 ttl=64 time=0.650 ms  
84 bytes from 192.168.1.6 icmp\_seq=60 ttl=64 time=1.019 ms  
84 bytes from 192.168.1.6 icmp\_seq=61 ttl=64 time=0.758 ms  
84 bytes from 192.168.1.6 icmp\_seq=62 ttl=64 time=1.213 ms  
84 bytes from 192.168.1.6 icmp\_seq=63 ttl=64 time=0.851 ms  
84 bytes from 192.168.1.6 icmp\_seq=64 ttl=64 time=0.862 ms  
84 bytes from 192.168.1.6 icmp\_seq=65 ttl=64 time=1.244 ms  
84 bytes from 192.168.1.6 icmp\_seq=66 ttl=64 time=2.025 ms

lucca — PC6 — telnet localhost 5011 — 80x24

Trying ::1...  
Connected to localhost.  
Escape character is '^J'.  
  
Welcome to Virtual PC Simulator, version 0.8.2  
Dedicated to Daling.  
Build time: Aug 23 2021 03:18:07  
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)  
All rights reserved.  
  
VPCS is free software, distributed under the terms of the "BSD" licence.  
Source code and license can be found at vpcs.sf.net.  
For more information, please visit wiki.freecode.com.cn.  
  
Press '?' to get help.  
  
Executing the startup file  
  
[PC6> ip 192.168.1.6/24  
Checking for duplicate address...  
PC6 : 192.168.1.6 255.255.255.0  
PC6> ]

lucca — PC7 — telnet localhost 5013 — 80x24

Trying ::1...  
Connected to localhost.  
Escape character is '^J'.  
  
Welcome to Virtual PC Simulator, version 0.8.2  
Dedicated to Daling.  
Build time: Aug 23 2021 03:18:07  
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)  
All rights reserved.  
  
VPCS is free software, distributed under the terms of the "BSD" licence.  
Source code and license can be found at vpcs.sf.net.  
For more information, please visit wiki.freecode.com.cn.  
  
Press '?' to get help.  
  
Executing the startup file  
  
PC7> ip 192.168.1.7/24  
Checking for duplicate address...  
PC7 : 192.168.1.7 255.255.255.0  
PC7> ]

lucca — PC8 — telnet localhost 5015 — 80x24

Trying ::1...  
Connected to localhost.  
Escape character is '^J'.  
  
Welcome to Virtual PC Simulator, version 0.8.2  
Dedicated to Daling.  
Build time: Aug 23 2021 03:18:07  
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)  
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VPCS is free software, distributed under the terms of the "BSD" licence.  
Source code and license can be found at vpcs.sf.net.  
For more information, please visit wiki.freecode.com.cn.  
  
Press '?' to get help.  
  
Executing the startup file  
  
[PC8> ip 192.168.1.8/24  
Checking for duplicate address...  
PC8 : 192.168.1.8 255.255.255.0  
PC8> ]

Capturing from — PC5 Ethernet0 to Hub1 Ethernet0

No.	Time	Source	Destination	Protocol	Length	Info
201	144.012301	192.168.1.5	192.168.1.5	ICMP	98	Echo (ping) request
202	144.012985	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
203	145.014231	192.168.1.5	192.168.1.5	ICMP	98	Echo (ping) request
204	145.014499	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
205	146.016167	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
206	146.016600	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
207	147.017780	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
208	147.018048	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
209	148.019643	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
210	148.020095	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
211	149.021862	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
212	149.022270	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply

> Frame 14: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface  
> Ethernet II, Src: Private\_66:68:05 (00:50:79:66:68:05), Dst: 08:00:00:00:00:00  
> Address Resolution Protocol (reply)

Capturing from — PC7 Ethernet0 to Hub1 Ethernet2

No.	Time	Source	Destination	Protocol	Length	Info
201	144.012301	192.168.1.5	192.168.1.5	ICMP	98	Echo (ping) request
202	144.012858	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
203	145.014138	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
204	145.014368	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
205	146.016105	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
206	146.016487	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
207	147.017707	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
208	147.017922	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
209	148.019600	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
210	148.019990	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply
211	149.021824	192.168.1.5	192.168.1.6	ICMP	98	Echo (ping) request
212	149.022179	192.168.1.6	192.168.1.5	ICMP	98	Echo (ping) reply

> Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface  
> Ethernet II, Src: Private\_66:68:04 (00:50:79:66:68:04), Dst: 08:00:00:00:00:01  
> Address Resolution Protocol (request/gratuitous)