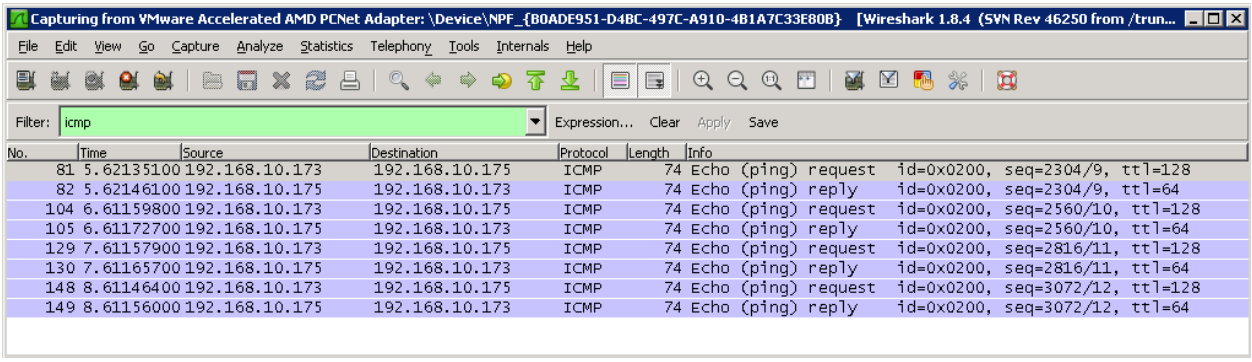
How to monitor network traffic inside an ESXi host

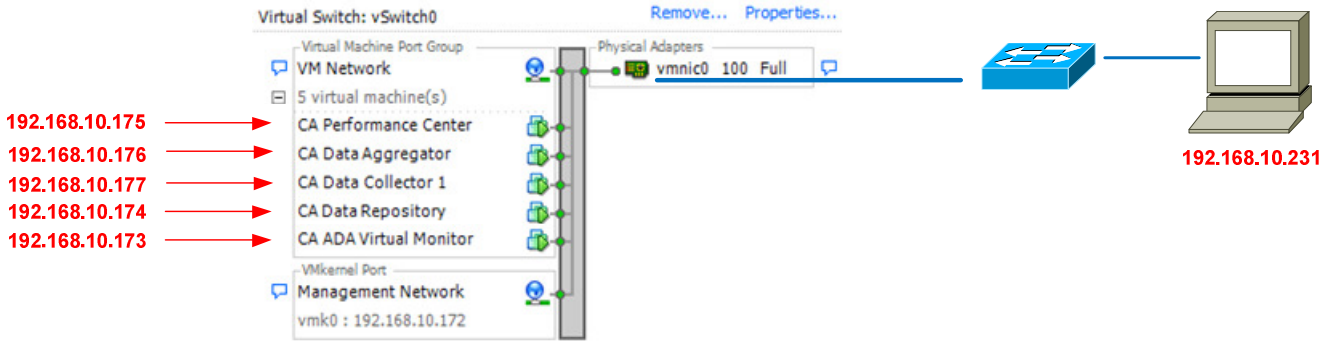
created by: Rainer Bemsel – **Version** 1.0 – **Dated:** Dec/30/2012

I've done several packet analyses on physical wired environment which was easy and pretty straight forward to set up. But with all virtualization efforts, you may need to analyze inside an ESX host. With a standard NIC and all connected virtual machines, it won't work. You will get packets captured from the initiator to the responder, but nothing more.

Let's have a look on my virtual machine, called "CA ADA Virtual Monitor", where I've installed Wireshark. When pinging from this host to 192.168.10.175, I was able to collect packets.



I also ping'd from 192.168.10.231 to 192.168.10.175 and from 192.168.10.174 to 192.168.10.175. Those packets were not seen in Wireshark.



Why is that so?

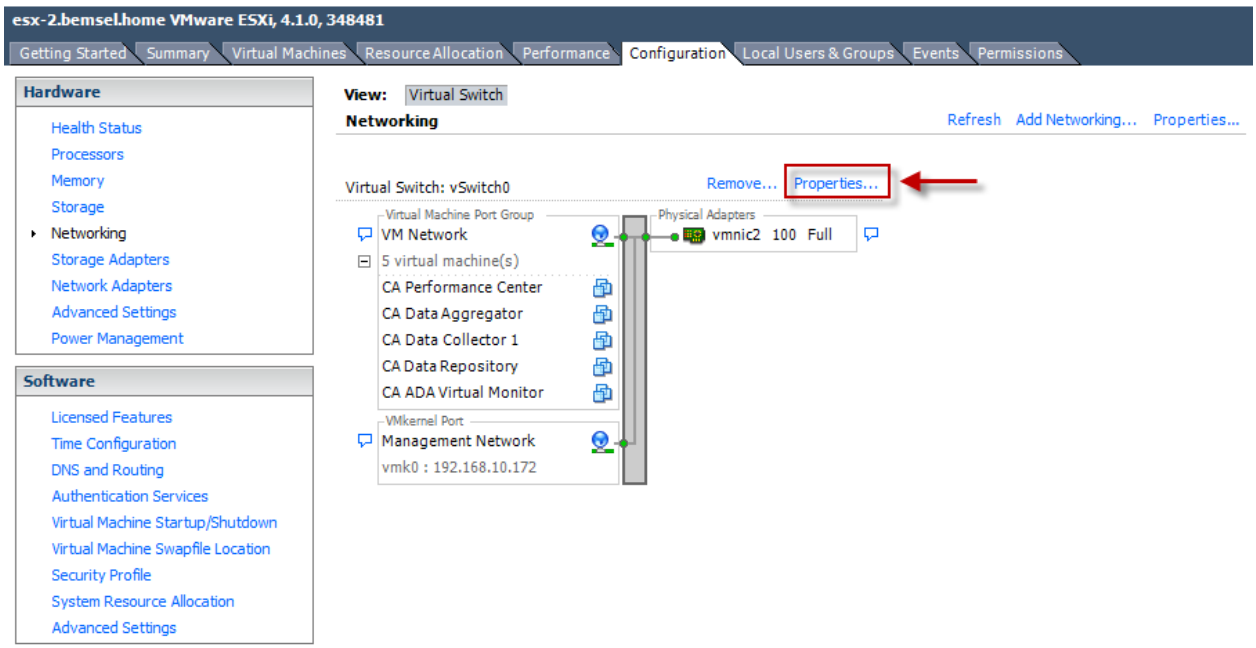
Network switches make use of forwarding tables to know what devices are connected on what network port. That traffic will only flow between those two network ports. Packet Analyzer won't see that traffic, unless the traffic is coming from them. In a physical environment you configure a set of ports to be mirrored to the port, where Wireshark attached Host is connected. This configuration makes copies from all traffic going from specific port(s) to a destination port. On my virtual host, I don't have a SPAN port.

The use of any packet capture tool requires some network configuration on the VMware ESXi host. You must create a dedicated "Management" port group. You could also create a "Monitor" port group under which all your virtual machines will reside, although you may choose to use an existing port group. Promiscuous mode must be enabled for the "Monitor" (or previously existing) port group and disabled for the "Management" port group.

In the example below, vSwitch0 has a Management Network port group, as well as, an existing port group, VM Network, that acts as the "Monitor" port group.

To configure the vSwitch use the VMware vSphere Client

1. Select the Configuration tab for the ESXi Machine
2. Select Networking, located in the Hardware Panel
3. Determine which vSwitch does not host any application traffic that will be monitor by Packet Analyzer. Click on Properties

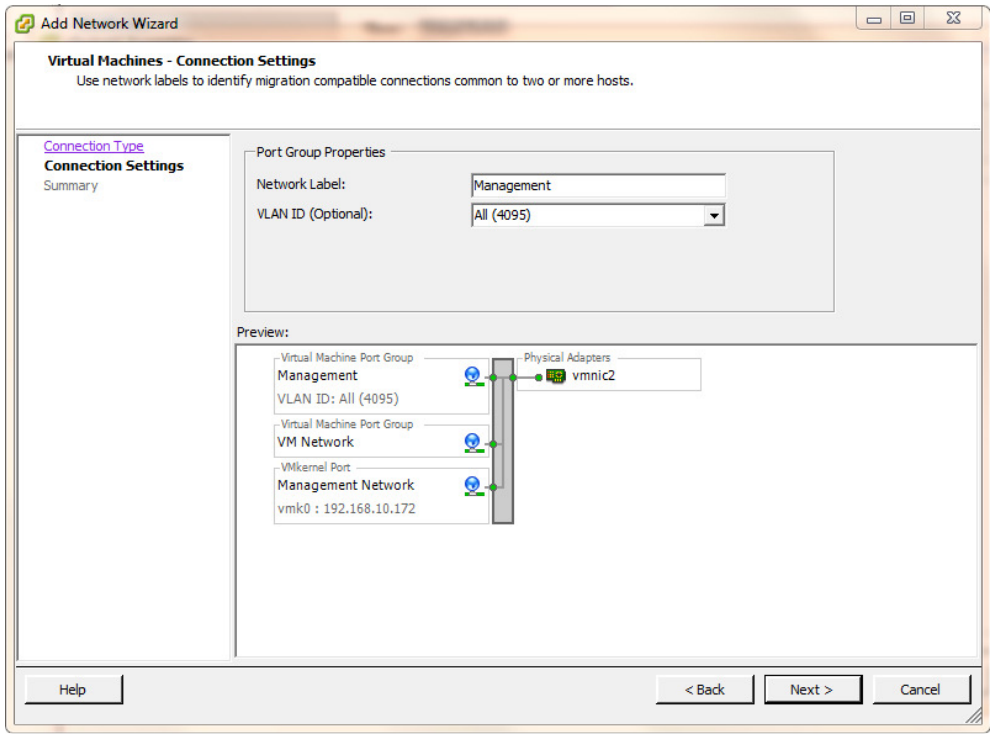


Note: If the ESX host only has one vSwitch connected to the physical network then both the Management and Monitor port groups will exist on the same vSwitch.

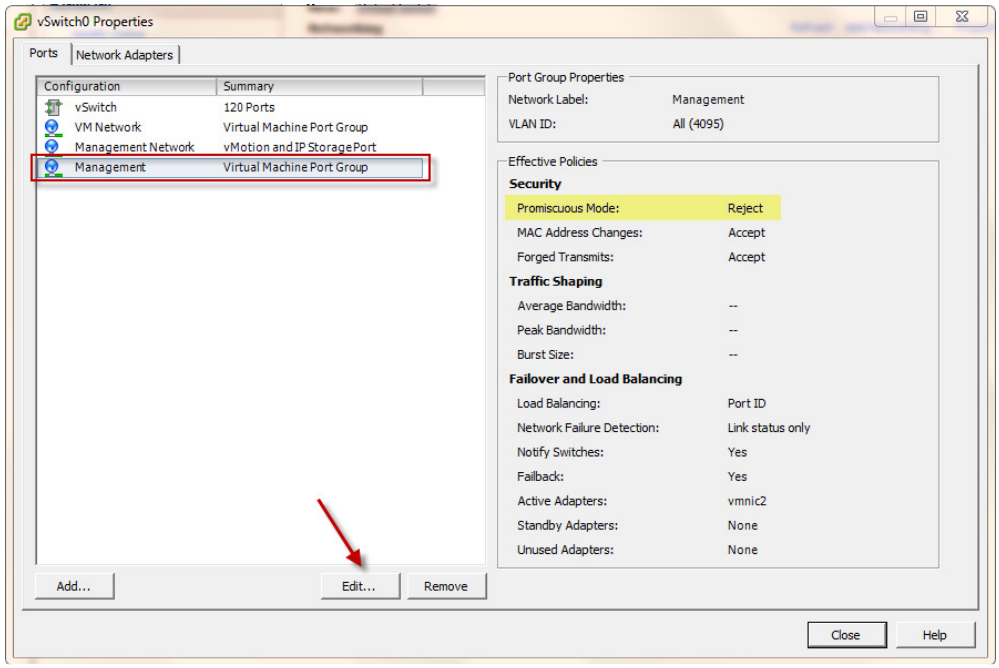
4. On the Port tab, click Add
5. Select Virtual Machine as the connection type.

6. Enter Management as the Network Label and select All (4095) for VLAN ID.

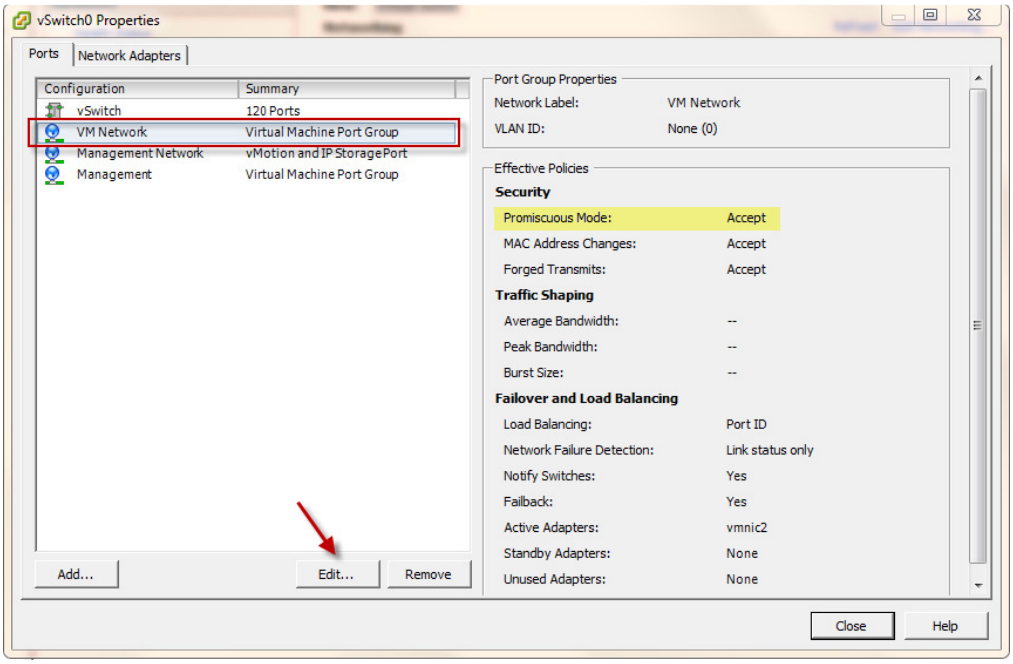
Note: You may choose to enter the specific VLAN ID that has the application traffic you wish to monitor



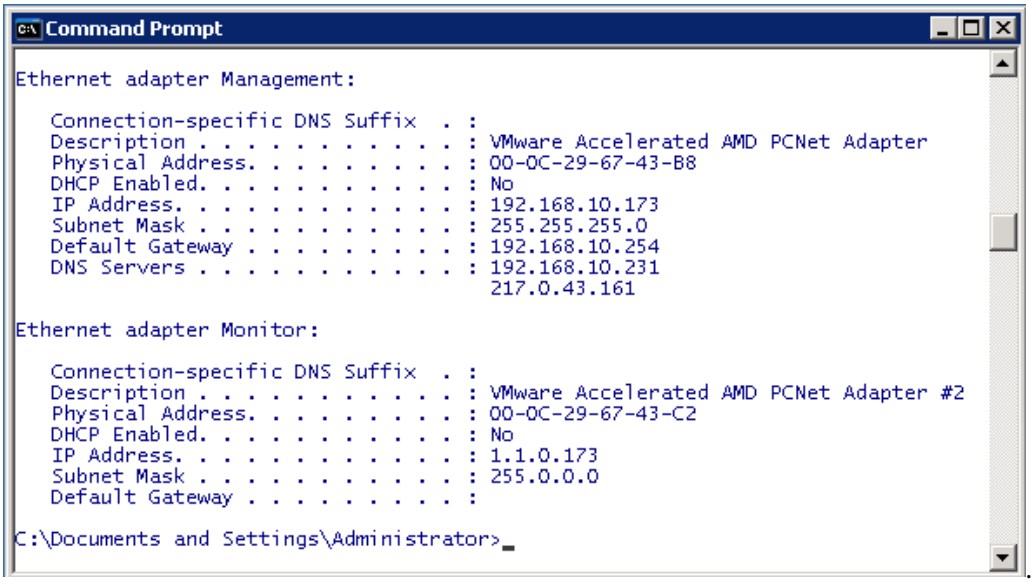
7. Click Next and Finish
8. Go back to Properties and select the newly created Management port group from the list in the Ports tab and click Edit



9. Click OK
10. Determine which Switch hosts the application traffic that will be monitor by Wireshark
11. Select the port group from the Ports tab and click on Edit.

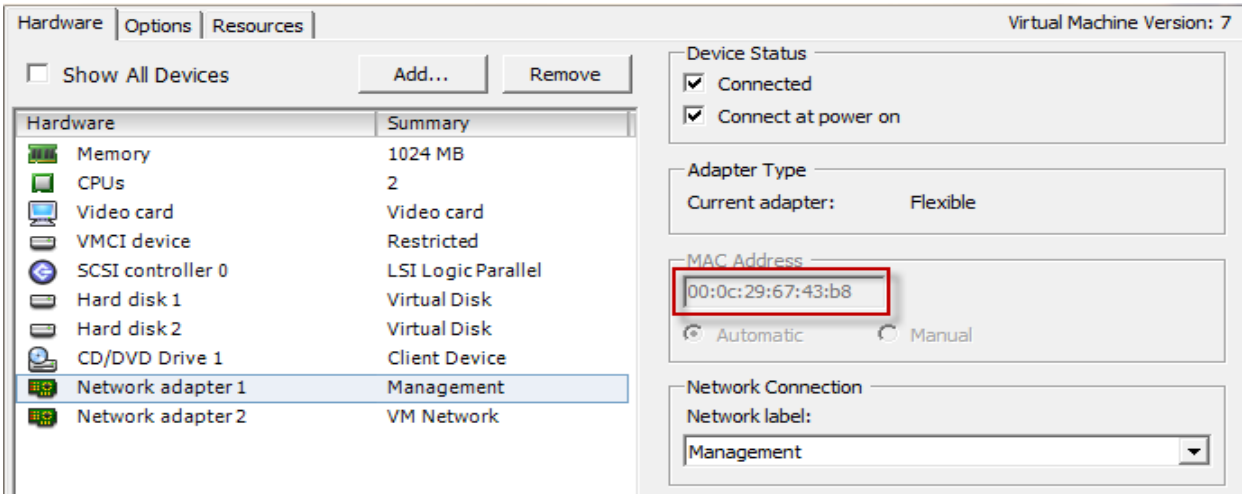


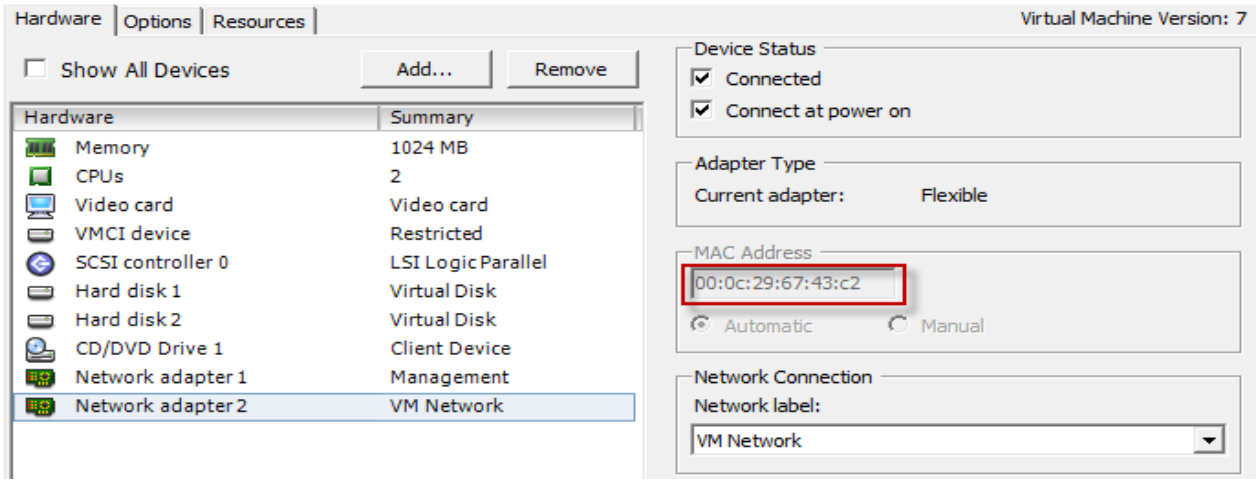
12. Check the Promiscuous Mode option and set as Accept
13. In vSphere Client select the Wireshark PC and add another Network adapter if necessary and make a note of their MAC addresses



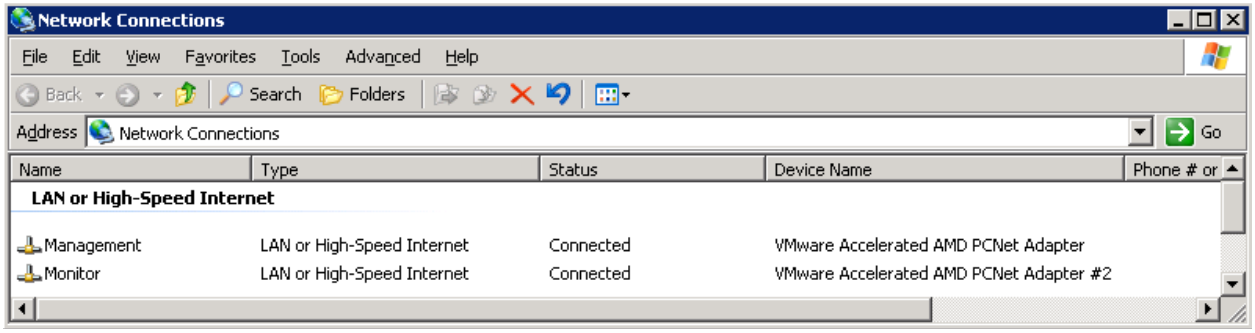
14. I did rename the Adapter to differentiate them easily. The Network Adapter 1 *(Ethernet Adapter Management)* will be connected with Management and Network Adapter 2 (Ethernet Adapter Monitor) will connected with VM Network.

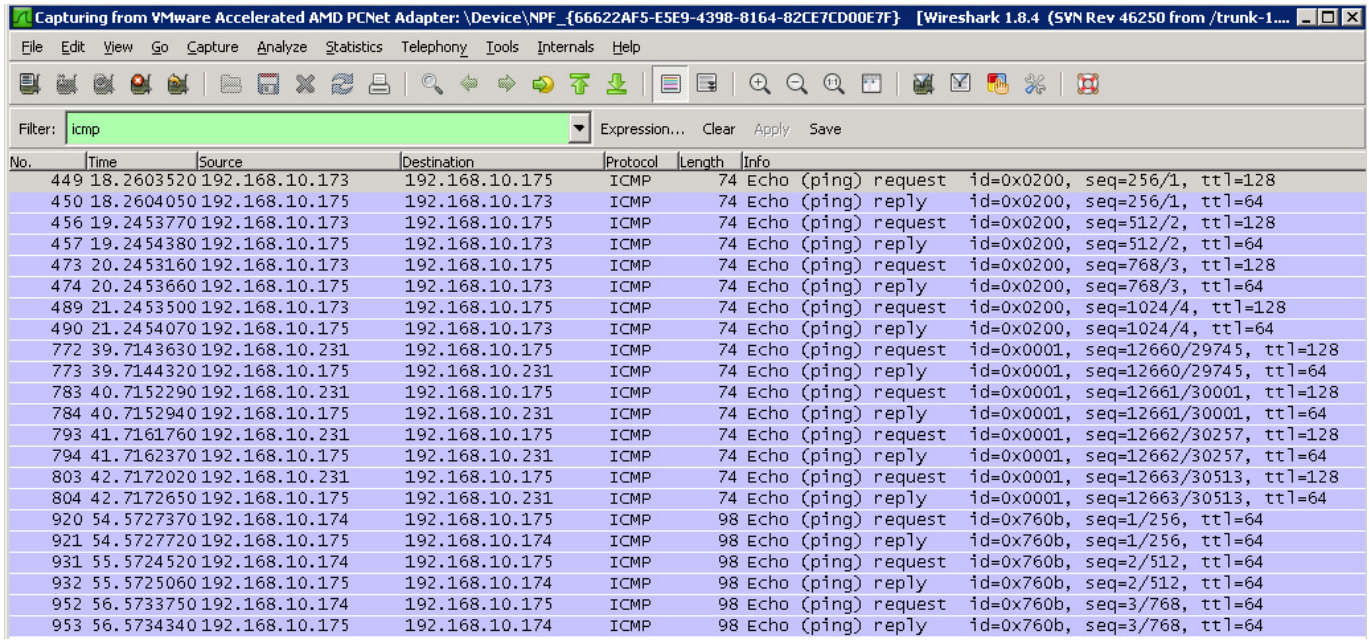
15. You can easily verify the proper assignment by comparing their MAC Addresses





Network Connections on WireShark PC





No.	Time	Source	Destination	Protocol	Length	Info
449	18.2603520	192.168.10.173	192.168.10.175	ICMP	74	Echo (ping) request id=0x0200, seq=256/1, ttl=128
450	18.2604050	192.168.10.175	192.168.10.173	ICMP	74	Echo (ping) reply id=0x0200, seq=256/1, ttl=64
456	19.2453770	192.168.10.173	192.168.10.175	ICMP	74	Echo (ping) request id=0x0200, seq=512/2, ttl=128
457	19.2454380	192.168.10.175	192.168.10.173	ICMP	74	Echo (ping) reply id=0x0200, seq=512/2, ttl=64
473	20.2453160	192.168.10.173	192.168.10.175	ICMP	74	Echo (ping) request id=0x0200, seq=768/3, ttl=128
474	20.2453660	192.168.10.175	192.168.10.173	ICMP	74	Echo (ping) reply id=0x0200, seq=768/3, ttl=64
489	21.2453500	192.168.10.173	192.168.10.175	ICMP	74	Echo (ping) request id=0x0200, seq=1024/4, ttl=128
490	21.2454070	192.168.10.175	192.168.10.173	ICMP	74	Echo (ping) reply id=0x0200, seq=1024/4, ttl=64
772	39.7143630	192.168.10.231	192.168.10.175	ICMP	74	Echo (ping) request id=0x0001, seq=12660/29745, ttl=128
773	39.7144320	192.168.10.175	192.168.10.231	ICMP	74	Echo (ping) reply id=0x0001, seq=12660/29745, ttl=64
783	40.7152290	192.168.10.231	192.168.10.175	ICMP	74	Echo (ping) request id=0x0001, seq=12661/30001, ttl=128
784	40.7152940	192.168.10.175	192.168.10.231	ICMP	74	Echo (ping) reply id=0x0001, seq=12661/30001, ttl=64
793	41.7161760	192.168.10.231	192.168.10.175	ICMP	74	Echo (ping) request id=0x0001, seq=12662/30257, ttl=128
794	41.7162370	192.168.10.175	192.168.10.231	ICMP	74	Echo (ping) reply id=0x0001, seq=12662/30257, ttl=64
803	42.7172020	192.168.10.231	192.168.10.175	ICMP	74	Echo (ping) request id=0x0001, seq=12663/30513, ttl=128
804	42.7172650	192.168.10.175	192.168.10.231	ICMP	74	Echo (ping) reply id=0x0001, seq=12663/30513, ttl=64
920	54.5727370	192.168.10.174	192.168.10.175	ICMP	98	Echo (ping) request id=0x760b, seq=1/256, ttl=64
921	54.5727720	192.168.10.175	192.168.10.174	ICMP	98	Echo (ping) reply id=0x760b, seq=1/256, ttl=64
931	55.5724520	192.168.10.174	192.168.10.175	ICMP	98	Echo (ping) request id=0x760b, seq=2/512, ttl=64
932	55.5725060	192.168.10.175	192.168.10.174	ICMP	98	Echo (ping) reply id=0x760b, seq=2/512, ttl=64
952	56.5733750	192.168.10.174	192.168.10.175	ICMP	98	Echo (ping) request id=0x760b, seq=3/768, ttl=64
953	56.5734340	192.168.10.175	192.168.10.174	ICMP	98	Echo (ping) reply id=0x760b, seq=3/768, ttl=64

Again pinging from Wireshark PC to 192.168.10.231, from 192.168.10.231 to 192.168.10.175 and from 192.168.10.174 to 192.168.10.175. Now I can see ICMP packets from any internal and external hosts

Reference Networking Configuration tab