***Experiencia 1 - Configure an IP Network***

***1) What are the ARP packets and what are they used for?***

O ARP é um protocolo de comunicação que serve para descobrir o endereço da camada de ligação associado ao endereço IPv4. Serve para mapear o endereço de rede a um endereço físico como o endereço.

***2) What are the MAC and IP adresses of ARP packets and why?***

O endereço IP é o endereço de rede e o endereço MAC é o endereço físico.

***3) What packets does the ping command generate?***

O comando ping gera ICMP (Internet Control Message Protocol) packets.

***4) What are the MAC and IP adresses of the ping packets?***

***Experiencia 3 – Configure a Router in Linux***

***1) What routes are there in the tuxes? What are their meaning?***

1. As rotas para as vlans associadas:
   1. Tuxy 1 tem uma rota para a vlan 0 (172.16.y0.0) pela gateway 172.16.y0.1.
   2. Tuxy 4 tem uma rota para a vlan 0 (172.16.y0.0) pela gateway 172.16.y0.254 e uma rota para a vlan1 (172.16.y1.0) pela gateway 172.16.y1.253.
   3. Tuxy 2 tem uma rota para a vlan 1 (172.16.y1.0) pela gateway 172.16.y1.1.
2. As rotas que foram criadas durante a experiência:
   1. Tuxy 1 tem uma rota para a vlan 1 (172.16.y1.0) pela gateway 172.16.y0.254.
   2. Tuxy 2 tem uma rota pata a vlan 0 (172.16.y0.0) pela gateway 172.16.y1.253.

O destino das rotas é até onde o tuxy que está na origem da rota consegue chegar.

***2) What information does and entry of the forwarding table contain?***

**Destination***:* o destino da rota.

***Gateway***: o ip do próximo ponto por onde passará a rota.

***Netmask***: usado para determinar o ID da rede a partir do endereço IP do destino.

***Flags***: dá-nos informações sobre a rota.

*U (Up):* Route is valid.

*G (Gateway):* Route is to a gateway router rather than to a directly connected network or host.

*H (Host):* Route is to a host rather than to a network, where the destination address is a complete address.

*R (Reject):* Set by ARP when an entry expires (for example, the IP address could not be resolved into a MAC address).

*D (Dynamic):* Route added by a route redirect or RIP (if routed is enabled).

*M (Modified):* Route modified by a route redirect.

*C (Cloning):* A new route is cloned from this entry when it is used.

*L (Link):* Link-level information, such as the Ethernet MAC address, is presente.

*S (Static):* Route added with the route command.

(<https://library.netapp.com/ecmdocs/ECMP1155586/html/GUID-07F1F043-7AB7-4749-8F8D-727929233E62.html>)

**Metric**: o custo de cada rota.

**Ref:** número de referências para esta rota (não usado no kernel do Linux).

**Use:** contador de pesquisas pela rota, dependendo do uso de -F ou -C isto vai ser o número de falhas da cache (-F) ou o número de sucessos (-C).

**Interface:** qual a placa de rede responsável pela gateway (eth0/eth1).

***3) What ARP messages, and associated MAC addresses, are observed and why?***

If the IP address is not found in the ARP table, the system will then send a broadcast packet to the network using the ARP protocol to ask "who has 192.168.1.1". Because it is a broadcast packet, it is sent to a special MAC address that causes all machines on the network to receive it. Any machine with the requested IP address will reply with an ARP packet that says "I am 192.168.1.1", and this includes the MAC address which can receive packets for that IP.

(<https://www.tummy.com/articles/networking-basics-how-arp-works/>)

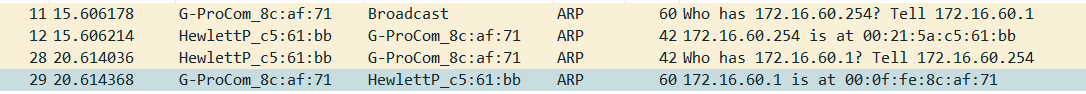
Tuxy 1 (172.16.y0.1) ping tuxy 4 (172.16.y0.254):



Tuxy 1 (172.16.y0.1) ping tuxy 4 (172.16.y1.253):



Tuxy 1 (172.16.y0.1) ping tuxy 2 (172.16.y1.1):

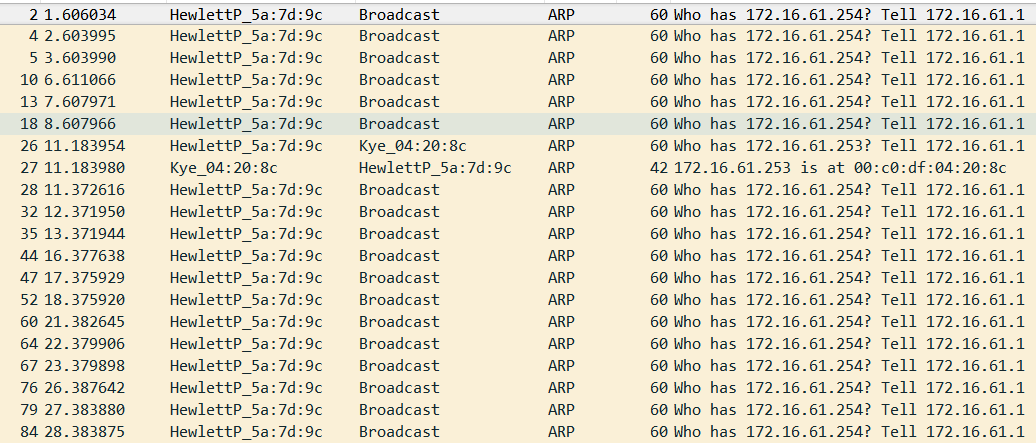




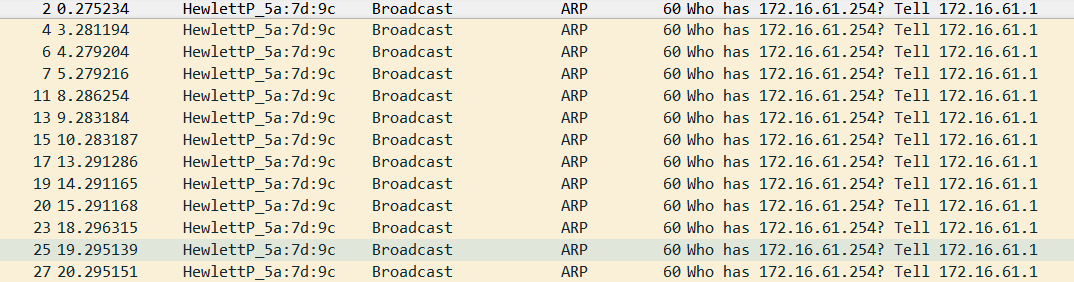
Tuxy 4 (172.16.y0.254) ping tuxy 1 (172.16.y0.1):



Tuxy 4 (172.16.y1.253) ping tuxy 2 (172.16.y1.1):

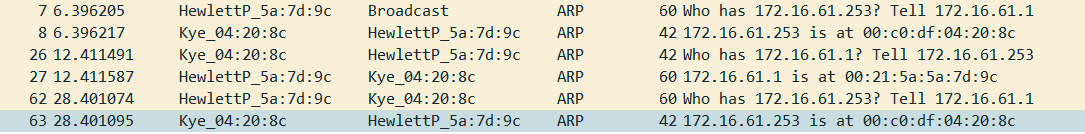


Tuxy 2 (172.16.y1.1) ping tuxy 4 (172.16.y0.254):



Tuxy 2 ping tuxy 4 (172.16.y1.253):

Tuxy 2 (172.16.y1.1) ping tuxy 1 (172.16.y0.1):



***4) What ICMP packets are observed and why?***

Request and Reply?

***5) What are the IP and MAC addresses associated to ICMP packet and why***?