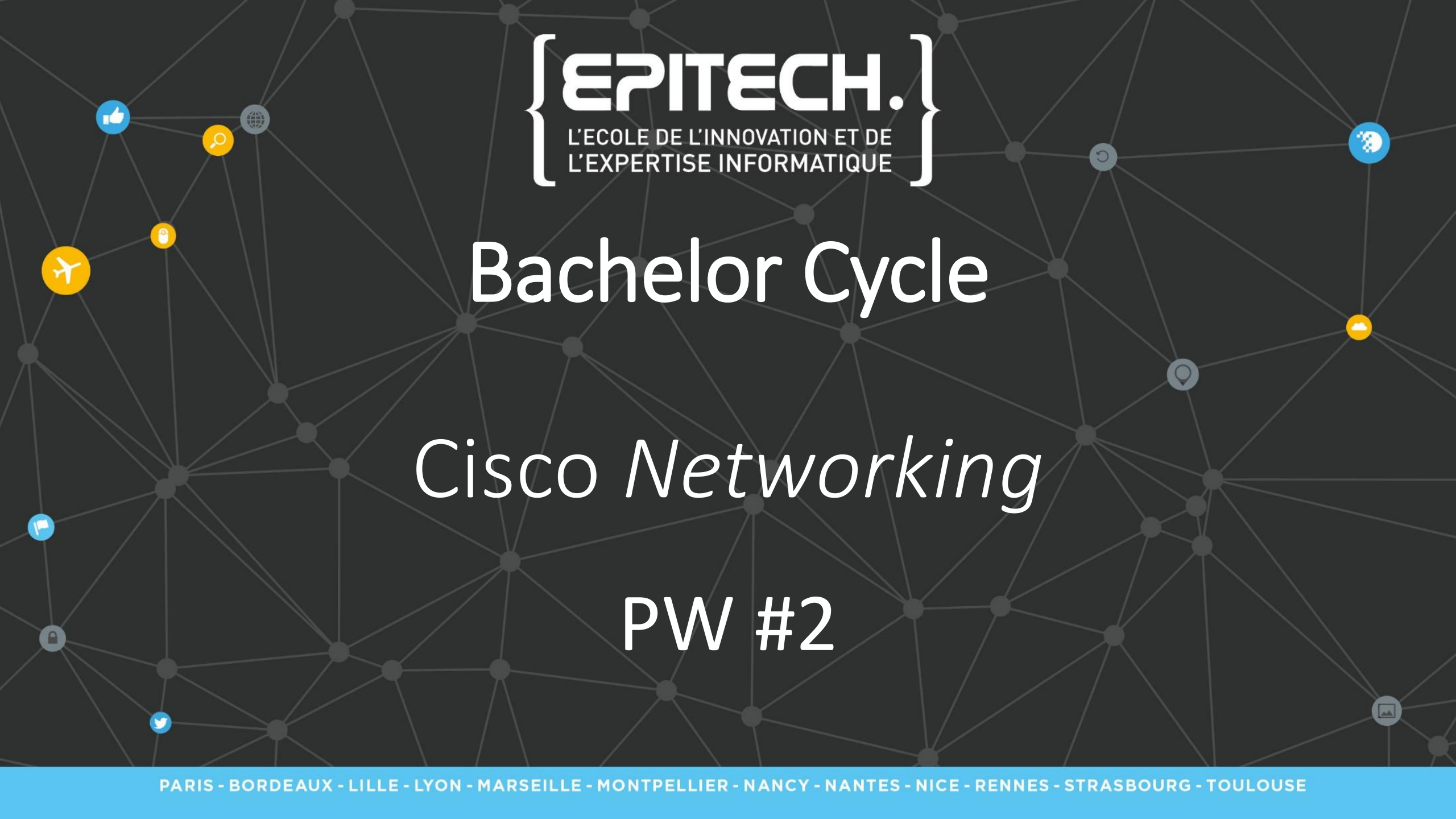


Bachelor Cycle

Cisco *Networking*

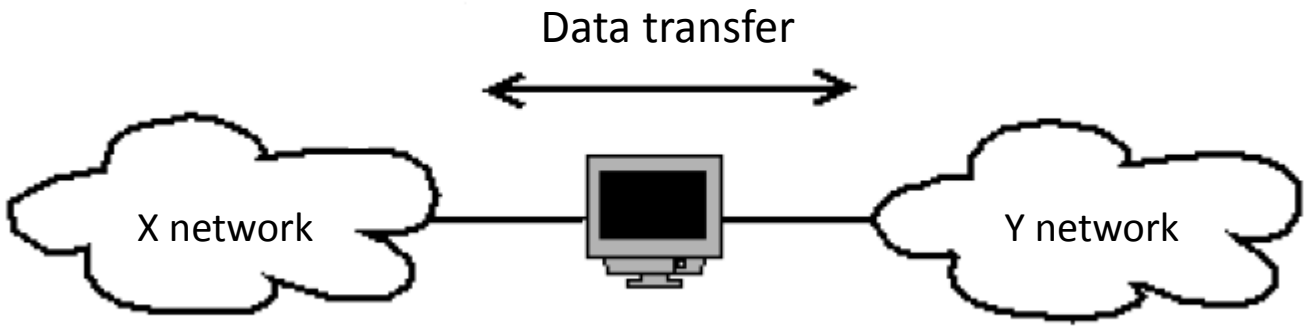
PW #2

Summary

- IP Forwarding
- Gateway
- Tracepath
- IP Aliasing

IP Forwarding (1/3)

- It can transfer the packets from one network to another
- This is part of the layer 3 of the OSI model
- The data are not changed, they are just transferred.



IP Forwarding (2/3)

- To determine if IP forwarding is enabled, there are two options :

```
Linux#cat /proc/sys/net/ipv4/ip_forward
```

```
Linux#sysctl net.ipv4.ip_forward
Net.ipv4.ip_forward = 0
```

- To activate it temporarily, there are two options :

```
Linux#echo –n 1 >/proc/sys/net/ipv4/ip_forward
```

```
Linux#sysctl –w net.ipv4.ip_forward=1
```

IP Forwarding (3/3)

- To activate it permanently :
  - On Debian

```
Debian#emacs /etc/network/options
Ip_forward=yes
Debian#/etc/init.d/networking restart
```

  - On Linux

```
Linux#emacs /etc/sysctl.conf
#uncomment the next line to enable packet forwarding for IPv4
#net.ipv4.conf.default.forwarding=1
Linux#sysctl –p /etc/sysctl.conf
```

Gateway

- To add a temporary gateway

```
Linux#route add default gw 192.168.1.254
```

- To add a permanent gateway

```
Linux#emacs /etc/network/interfaces
Auto eth0
Iface eth0 inet static
Address 192.168.1.1
Netmask 255.255.255.0
Gateway 192.168.1.254
Linux#/etc/init.d/networking restart
```

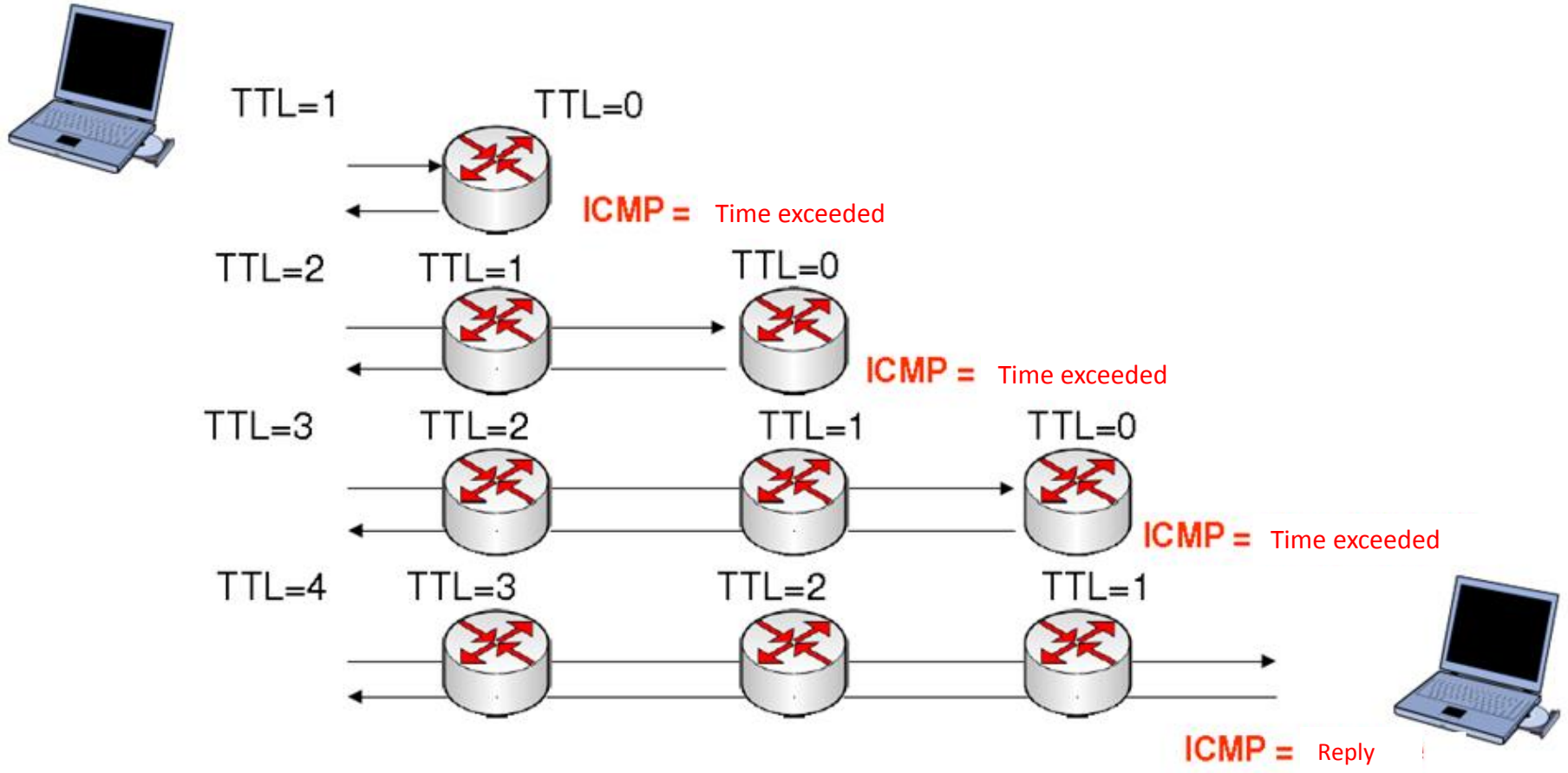
Tracepath (1/3)

- Debugging tool
- To discover the network topology
- Show the path used by the IP datagram
- Uses ICMP protocol (layer 3 of OSI model)
- Helps error handling

Tracepath (2/3)

- Tracepath uses the IP TTL protocol
- When a datagram is destroyed (TTL to 0), an ICMP error is sent by the initiator of the shipment. This message contains details about the router which discards the datagram.
- When a datagramm passes through a router, its TTL is decremented by one.
- The Linux default TTL is 255.

Tracepath (3/3)

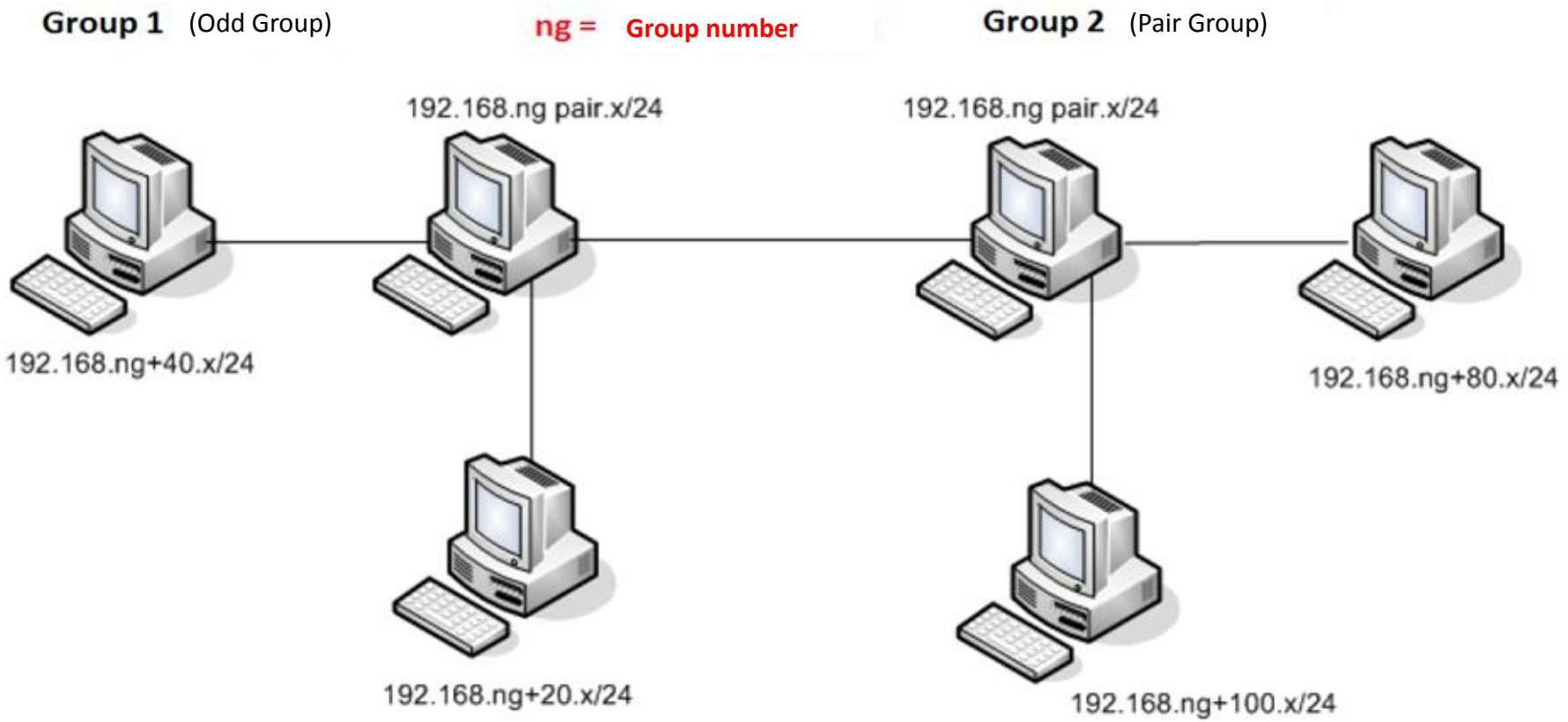


IP Aliasing

- Create an IP alias is the fact of assigning multiple IP addresses to a single network interface.
- On Linux :

```
Linux#ifconfig eth0:0 10.0.0.1 netmask 255.0.0.0
```

Practical Work (1/2)



Practical Work (2/2)

- You need to configure a small network :
  - One of your machines will be the gateway ;
  - The other two will be on two differents network ;
  - They will all be able to communicate through the gateway.
- Connect your gateway on the one of an other group
- You should be able to use « tracepath » to / from any computer

*Note : Every machines are **physically** on the same network. You must use your group number for your IP addressing.*