Two hosts – dwa hosty

- W ramach zajęć zostaną stworzone dwie maszyny wirtualne pełniące role komputerów, na których zainstalowano system operacyjny Linux
- Każdy z komputerów będzie wyposażony w jedną kartę sieciową
- Po stworzeniu odpowiedniej topologii sieciowej, będzie należało:
  - zaadresować każdy z interfejsów z użyciem polecenia **`ifconfig`** i sprawdzić łączność pomiędzy urządzeniami z użyciem polecenia **`ping`**
  - przechwycić oraz przeanalizować wymianę komunikatów z użyciem programów **`tcpdump`** oraz **`Wireshark`**

Two hosts – dwa hosty

- Działania te powinny doprowadzić do
  - prawidłowego przyłączenia komputerów do segmentu sieciowego, reprezentowanego (emulowanego) przez środowisko Kathara
  - uzyskania komunikacji pomiędzy komputerami
- Głównym celem tych działań jest
  - zapoznanie się z podstawami środowiska emulacyjnego Kathara w celu sprawnego korzystania z jego możliwości w rozbudowanych scenariuszach sieciowych, które będą badane podczas kolejnych zajęć

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katharà lab

two-hosts

Version	1.0
Author(s)	G. Di Battista, M. Patrignani, M. Pizzonia, M. Rimondini
E-mail	contact@kathara.org
Web	http://www.kathara.org/
Description	setting up a network between two virtual machines; kathara version of netkit lab two-hosts version 2.2

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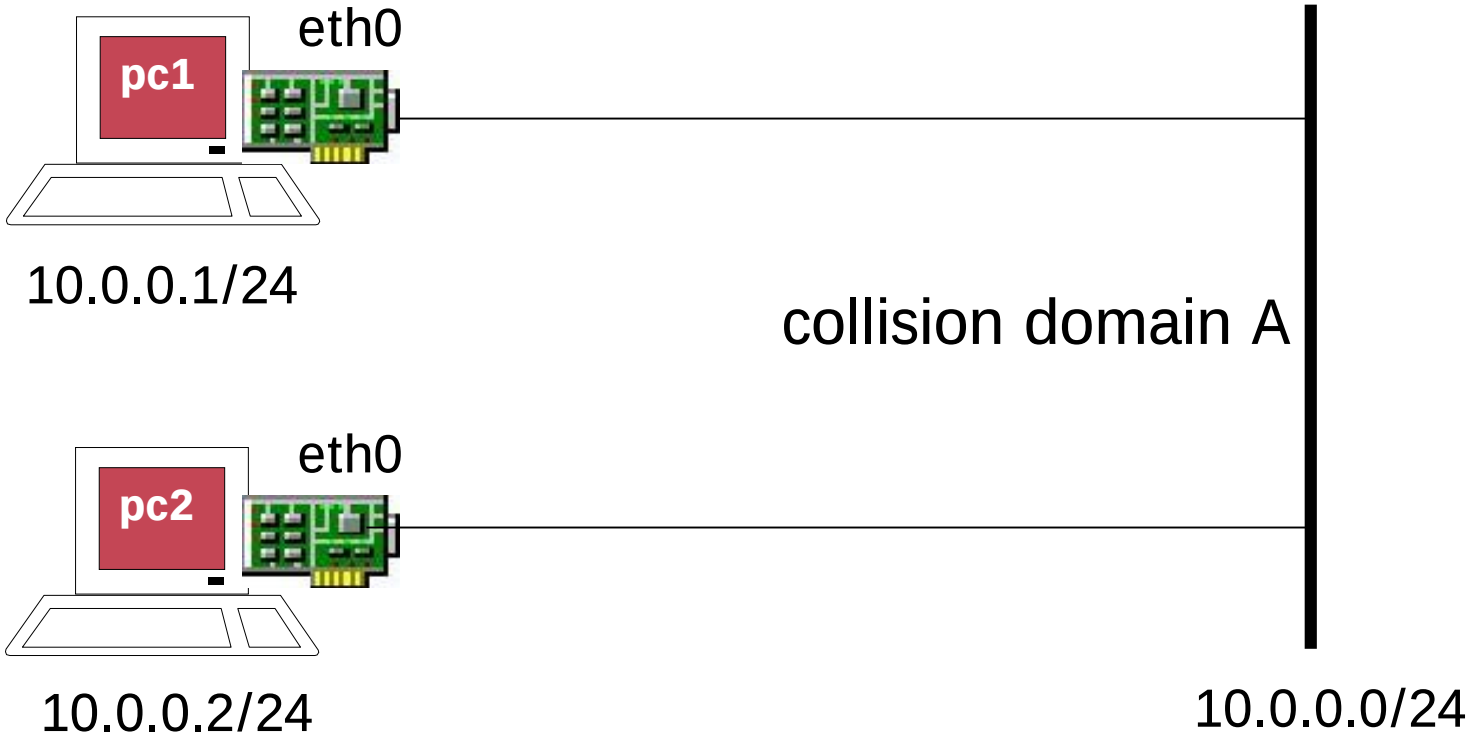
two hosts

- a simple network with two hosts connected to the same collision domain



step 1 – creating the vms

host machine

```
user@localhost:~$ kathara vstart --eth 0:A –n pc1

======================== Starting Lab ========================
bb423a23157cde000990e9a94dab36928d0ba0aecff38570d653e8b60b429550
6ff9da2ece5f418d7fbf89f0b382e33bc9a4aadbe90f9ebaa1c2b203f005a76a
```

pc1 is created and a console window opens for **pc1**

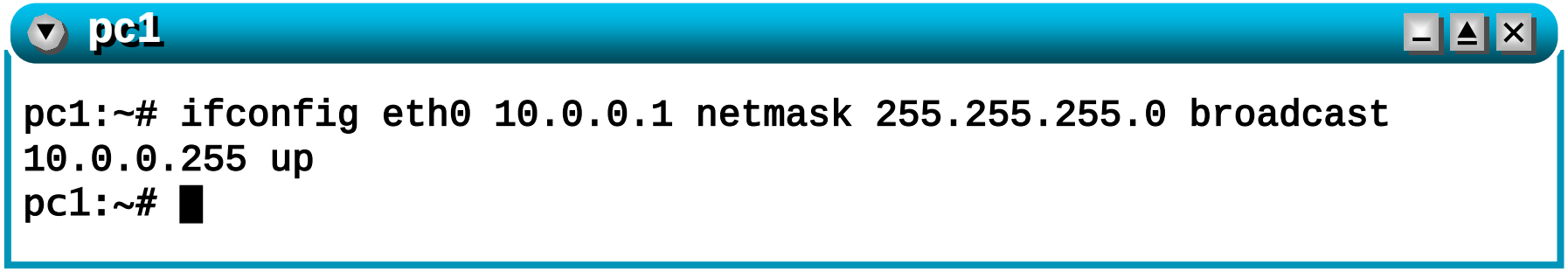
```
user@localhost:~$ kathara vstart --eth 0:A –n pc2

======================== Starting Lab ========================
Error response from daemon: network with name netkit_nt_A already exists
c2ad58fae2a38b7ad7f003695c20bdac192b14f7b3bdd2b0f3294741d7b21f1
```

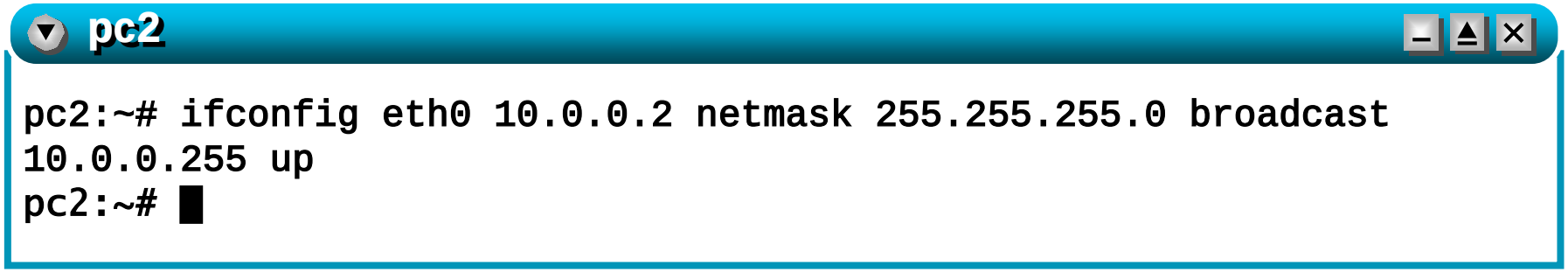
pc2 is created and a console window opens for **pc2**

Lab Scenario Personalization

- Please modify the default scenario in the following way
  - In the next slide change the IP address of the `eth0` interface of `pc1` to `10.0.0.<LAB-ID>`, where LAB-ID is your personal ID assigned by the lab instructor
- **Note well**: from now-on
  - Command-line commands should reflect the change in addressing, therefore there can be differences in the outputs shown in the manual

step 2 – configuring network interfaces





step 3 - ping

pc1

```
pc1:~# ping 10.0.0.2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=2.65 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.357 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.380 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.349 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.348 ms

--- 10.0.0.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4078ms
rtt min/avg/max/mdev = 0.348/0.818/2.656/0.919 ms
pc1:~#
```

- **pc1** and **pc2** can reach each other

step 4 – a look at the packets

- let's look at the packets exchanged on collision domain A
- we use tcpdump, a network sniffer that is widely available on linux boxes

```
TCPDUMP(8)

NAME
       tcpdump - dump traffic on a

SYNOPSIS
       tcpdump [ -AdDeflLnNO      tuUvxX ] [ -c cou
               [ -C file_s     ] [ -F file ]
               [ -i int  face ] [ -m module ] [    r file ]
               [ -s snaplen ] [ -T type ] [ -w file ]
               [ -E spi@ipaddr algo:secret,...  ]
```

number of bytes captured per packet (default is 68)

stores the packets to file

step 4 – a look at the packets

- ping from **pc1**

pc1

```
pc1:~# ping 10.0.0.2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=6.94 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.906 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.864 ms

--- 10.0.0.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2033ms
rtt min/avg/max/mdev = 0.864/2.906/6.948/2.858 ms
pc1:~#
```

step 4 – a look at the packets

- at the same time, sniff from **pc2** (ctrl+C to interrupt)

pc2

```
pc2:~# tcpdump -tenni eth0
tcpdump: verbose output suppressed, use -v or -vv for full protocol
decode
listening on eth0, link-type EN10MB (Ethernet), capture size 96
bytes
19:27:17.899782 arp who-has 10.0.0.2 tell 10.0.0.1
19:27:18.002578 arp reply 10.0.0.2 is-at fe:fd:0a:00:00:02
19:27:18.004384 IP 10.0.0.1 > 10.0.0.2: icmp 64: echo request seq 1
19:27:18.005806 IP 10.0.0.2 > 10.0.0.1: icmp 64: echo reply seq 1
19:27:18.920463 IP 10.0.0.1 > 10.0.0.2: icmp 64: echo request seq 2
19:27:18.920605 IP 10.0.0.2 > 10.0.0.1: icmp 64: echo reply seq 2

6 packets captured
6 packets received by filter
0 packets dropped by kernel
pc2:~#
```

step 4 – looking at the packets with a graphical interface

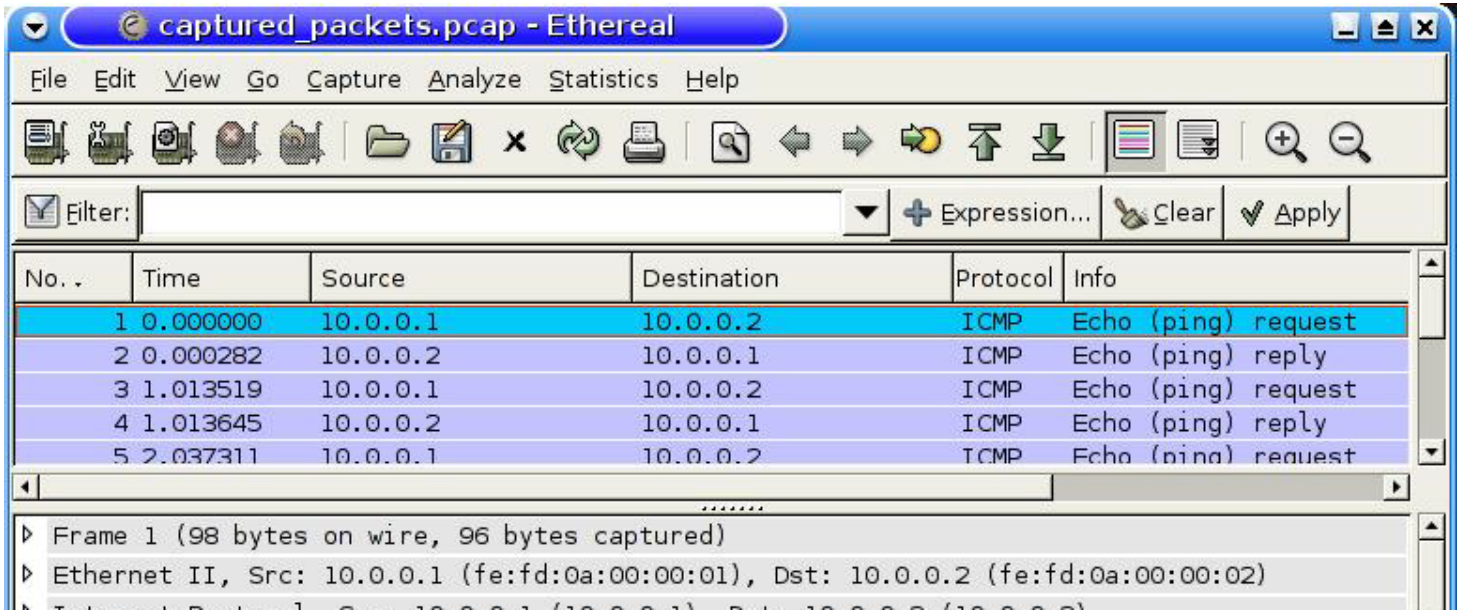
- same as before, but store sniffed packets into file **`capture.pcap`** (on the host machine)
  - the (real) home directory of the current user is made available inside the vm under **`/hosthome`**

pc2

```
pc2:~# tcpdump -tenni eth0 -w /hosthome/capture.pcap
tcpdump: listening on eth0, link-type EN10MB (Ethernet), capture
size 96 bytes
10 packets captured
10 packets received by filter
0 packets dropped by kernel
pc2:~#
```

step 4 – looking at the packets with a graphical interface

- open **`capture.pcap`** on the real host machine using a packet dissector (like, e.g., **`ethereal`**)



Reporting

- Please deliver the following items to the UPEL system using your account
  1. A photocopy or a screenshot showing the Wireshark output on the host machine