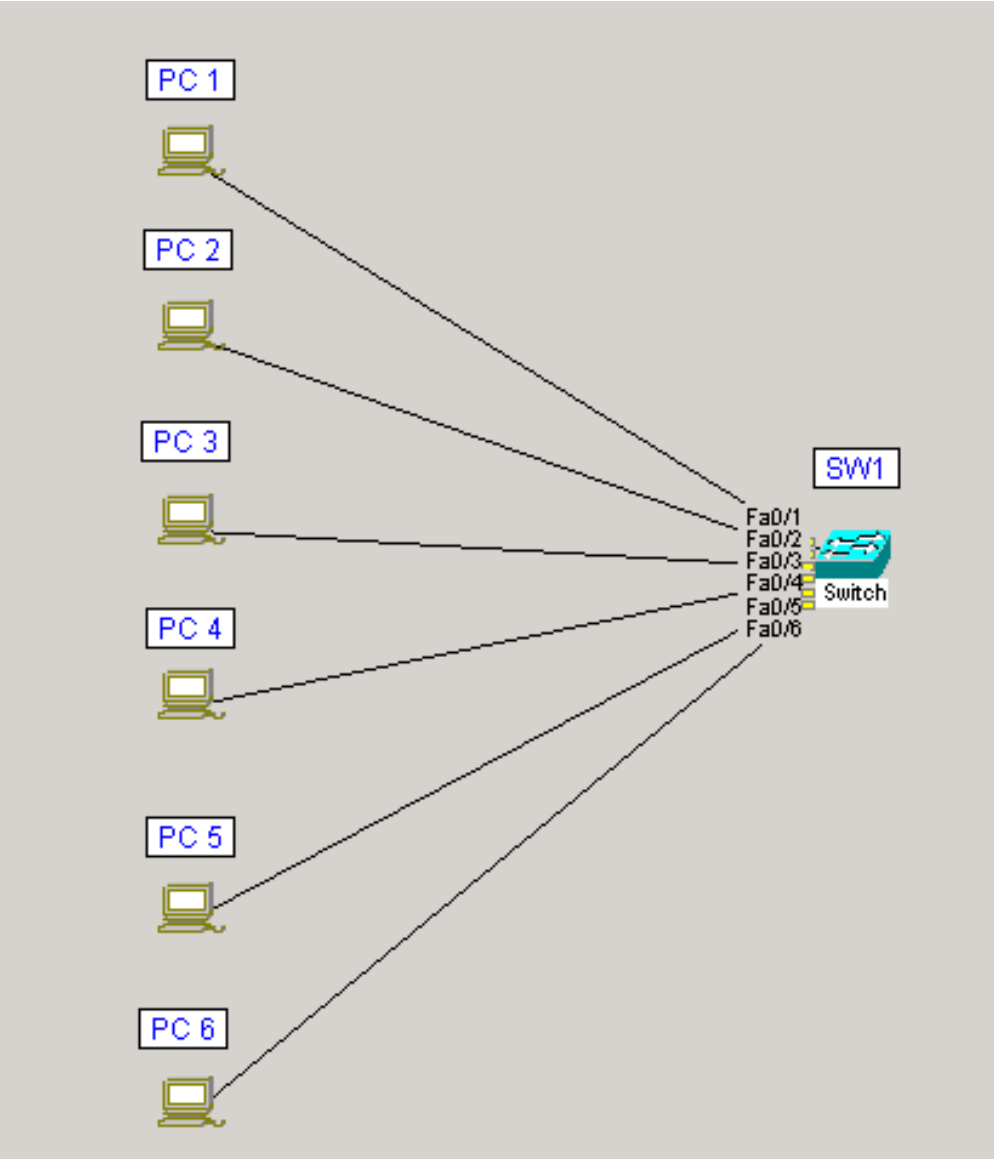
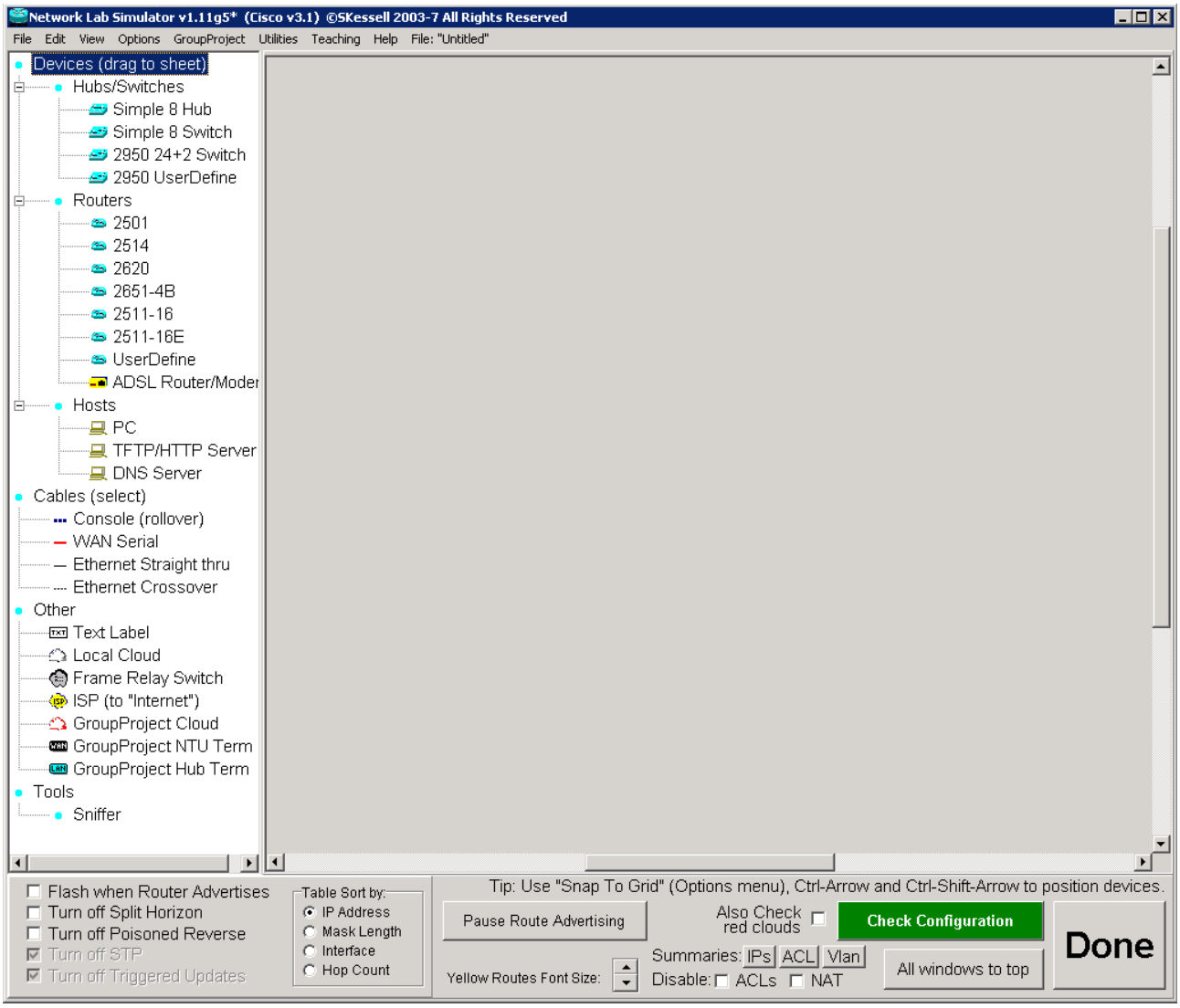
# LEZIONE 1 – SWITCHING e VLAN

# ESERCIZIO N. 1.1 – SWITCH BASE



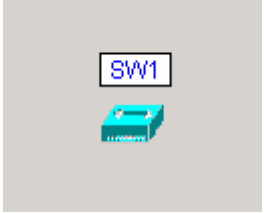

Per le esercitazioni di questo corso utilizzeremo un simulatore chiamato NetSimk
Che potete scaricare liberamente all'indirizzo **http://www.netsimk.com/**

Aprite il simulatore




Dalla lista delle Device trascinate lo switch modello 2950 24+2 nella finestra di lavoro

Mettete come nome SW1, per far ciò trascinate sulla mappa un oggetto denominato TextLabel, fate doppio click sulla label e scrivete SW1



Ora dal gruppo Host, trascinate un oggetto PC nella finestra di lavoro

Mettete come nome PC1

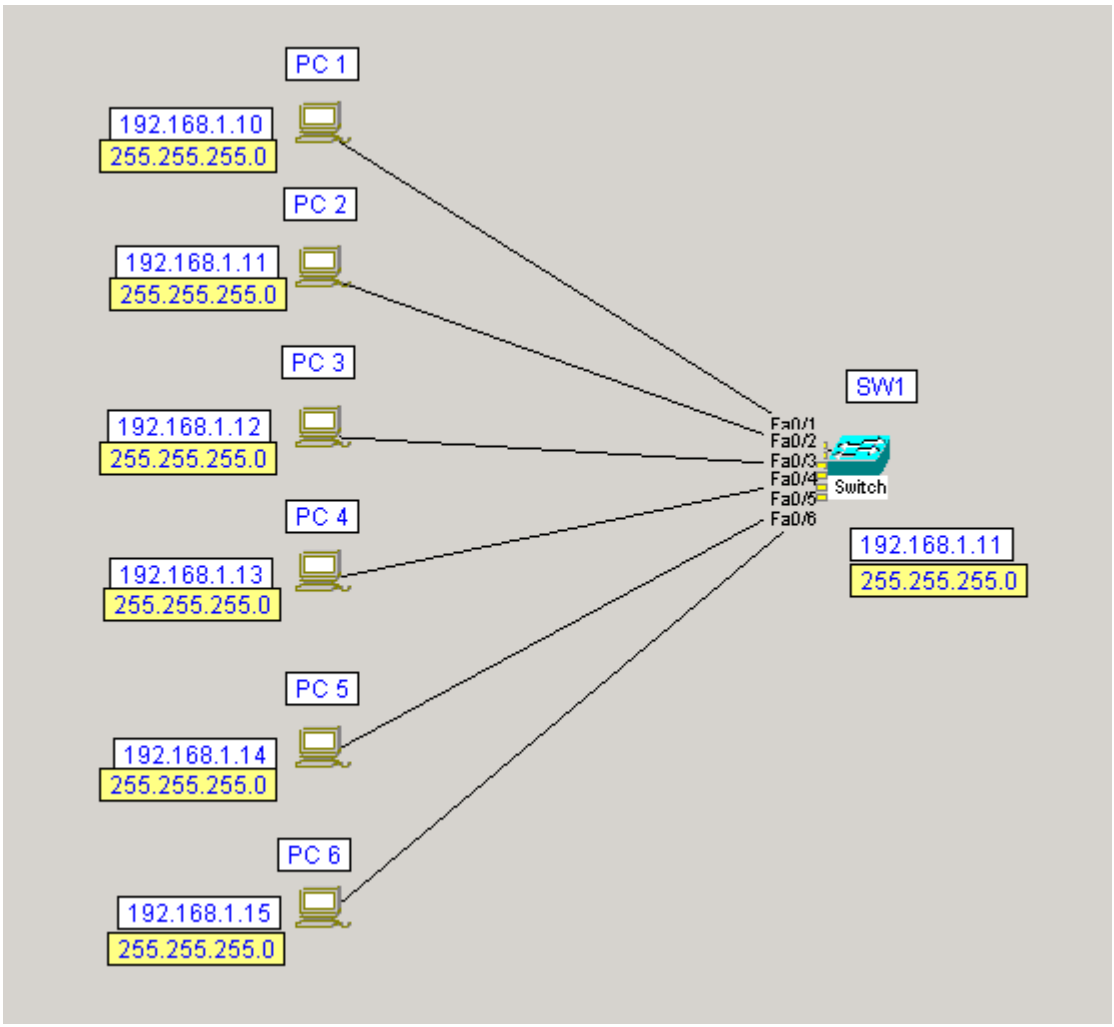

Ripetete il punto sopra inserendo altri 5 PC, chiamati PC2, PC3, PC4, PC5, PC6

Colleghiamo ora il PC1 allo Switch SW1 con un cavo Ethernet Straight thru (Il classico cavo di rete UTP )

Per fare ciò, selezionate dal menu Cables il cavo Ethernet Straight thru, cliccate sul PC1 e poi sullo SW1

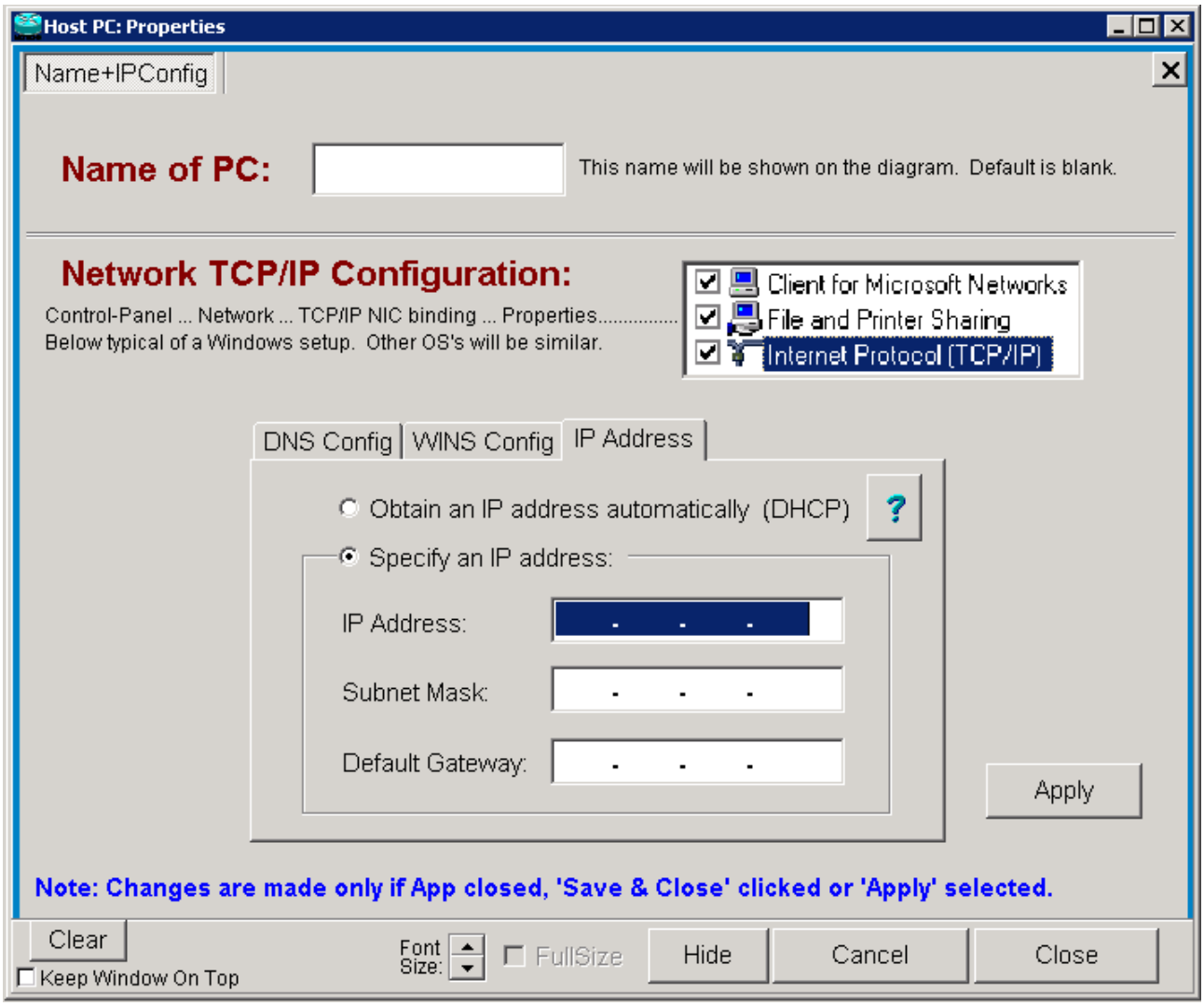
Ripetere lo stesso procedimento per gli altri pc

Iniziamo ora con dare gli ip ai 6 PC e allo switch in modo da ottenere la rete qui sotto

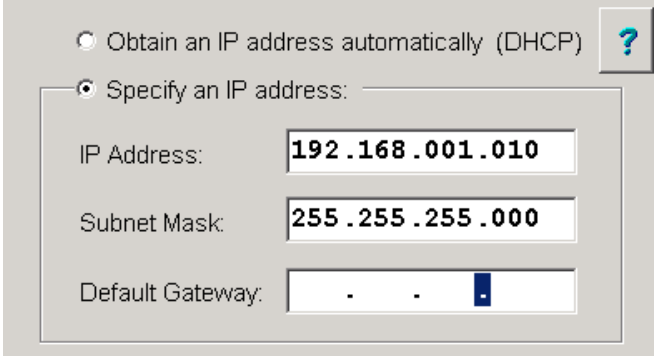


Sulla mappa fate click col tasto destro sul PC1 e scegliete la voce PC Network Properties

Si aprirà la seguente finestra



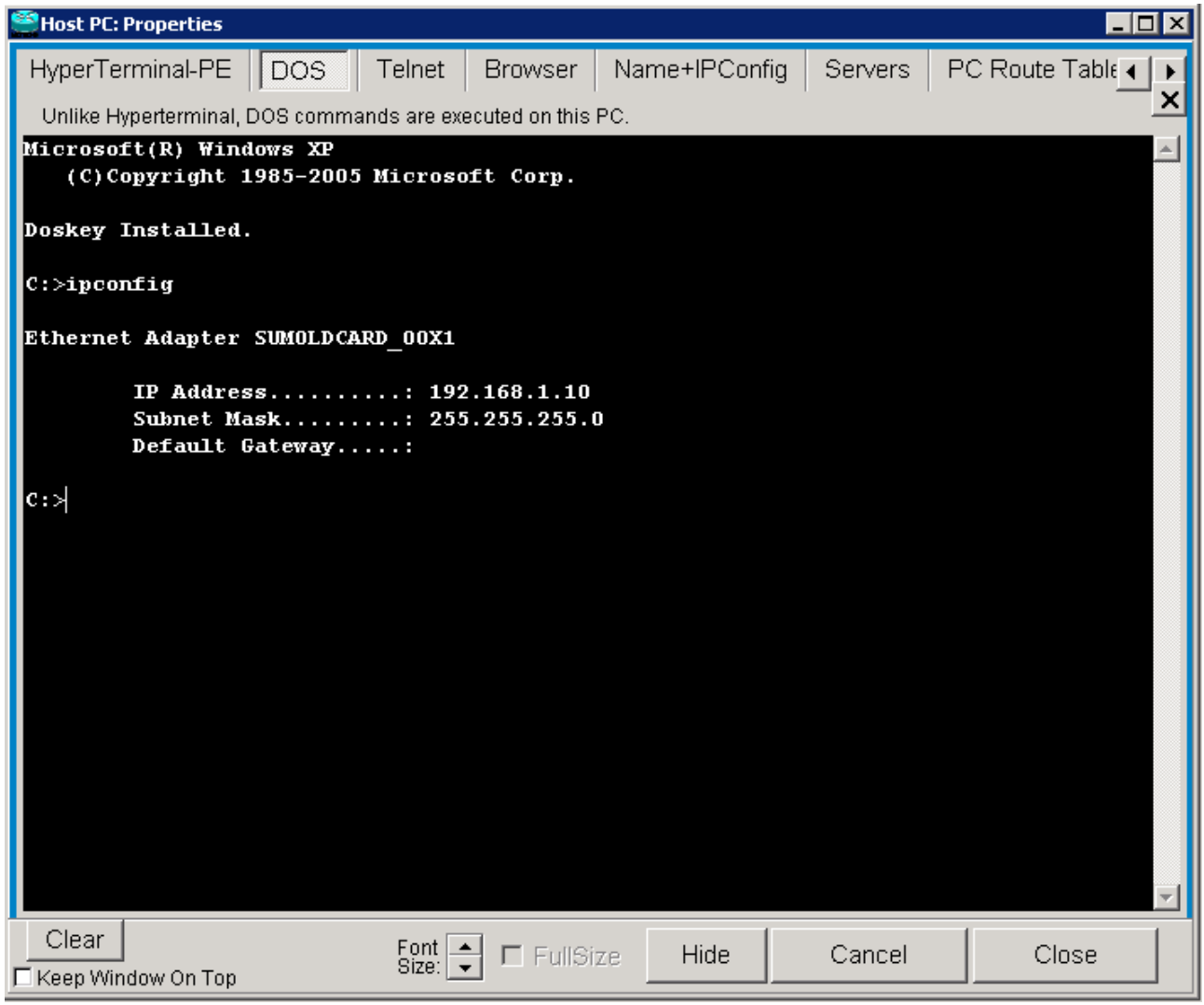

**Inserite l'indirizzo IP: 192.168.1.10**
**e la Subnet Mask: 255.255.255.0**



**e cliccate sul bottone Apply poi su Close**

per verificare che tutto sia andato a buon fine fate doppio click sul PC1 e nella finestra dos che si aprirà digitate ipconfig per vedere la configurazione

**ipconfig**

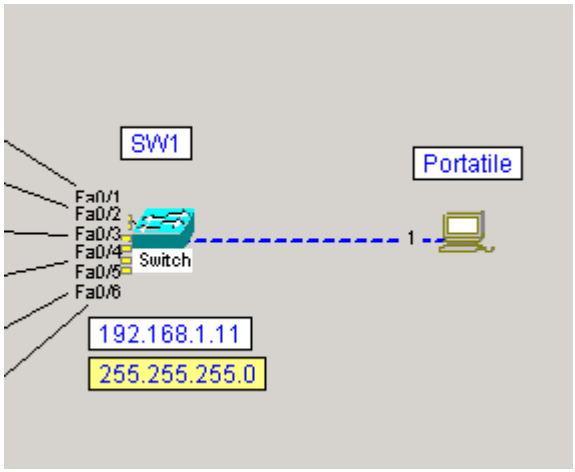



Ripetiamo ora lo stesso procedimento su gli altri 5 PC

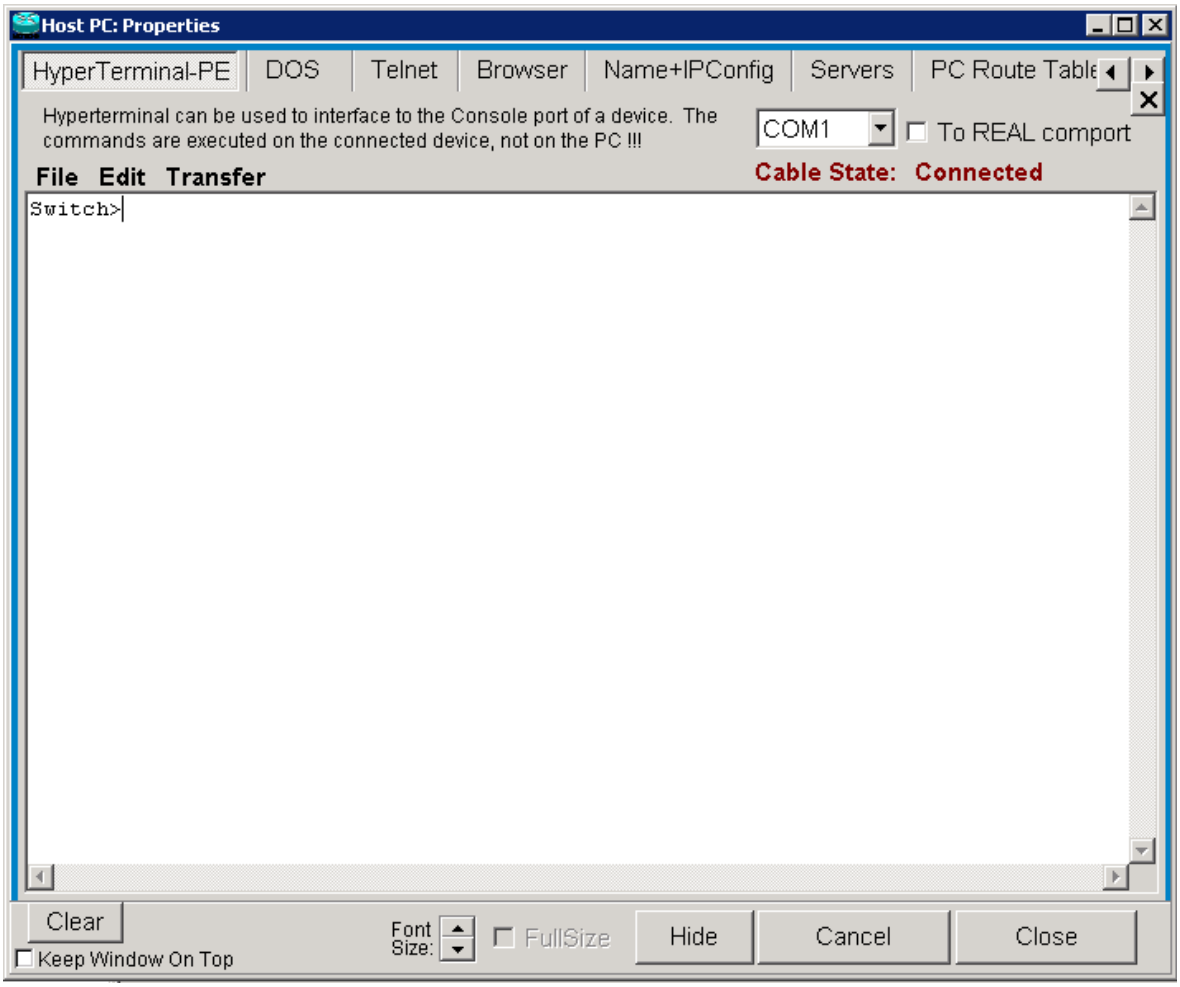
Configuriamo infine lo switch

Per far ciò dobbiamo collegarci allo switch sulla porta seriale con un cavo console tramite un pc (normalmente si usa un portatile)

Trasciniamo quindi sulla mappa un PC e lo colleghiamo allo switch con un cavo console.




Ora fate doppio click sul PC Portatile e battete invio nella finestra che si aprirà



In tal modo avete fatto una connessione via terminale allo switch.

## COMANDI IMPORTANTI:

- **show version**
  (per ricevere informazioni sul modello dell'apparecchio, la versione del firmware, ecc…)

```
  Switch>show version
  Cisco Internetwork Operating System Software
  IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA1, RELEASE
SOFTWARE (fc1)
  Copyright (c) 1986-2008 by cisco Systems, Inc.
  >>LITTLE OF THE FOLLOWING IS RELEVANT - JUST FOR LOOKS<<
  Compiled Mon 12-Jul-8 08:18 by Someone
  Image text-base: 0x80010000, data-base: 0x8055C000

  ROM: Bootstrap program is C2950 boot loader

  Switch uptime is 4 minutes
  System returned to ROM by power-on
  System image file is "flash:/c2950-i6q4l2-mz.121-22.EA1.bin"

  cisco WS-C2950T-24 (RC32300) processor (revision Q0) with 20873K bytes of
memory.
  Processor board ID FOC0846Y1K9
  Last reset from system-reset
  Running Enhanced Image

  24 FastEthernet/IEEE 802.3 interface(s)
  2 Gigabit Ethernet/IEEE 802.3 interface(s)

  32K bytes of flash-simulated non-volatile configuration memory.
  Base ethernet MAC Address: 2FA8C0001001
  Motherboard assembly number: 73-6114-10
  Power supply part number: 34-0965-01
  Motherboard serial number: FOC08460SF2
  Power supply serial number: PHI08380BCZ
  Model revision number: Q0
  Motherboard revision number: A0
  Model number: WS-C2950T-24
  System serial number: FOC0846Y1K9
  Configuration register is 0xF
```

- **show interface**
  (per vedere lo stato delle interfacce dello switch)

```
Switch>show interface
  FastEthernet0/1 is up, line protocol is up (connected)
    Hardware is Fast Ethernet, address is 2FA8.C000.1002 (bia 2FA8.C000.1002)
    MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
```

```
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/2 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 2FA8.C000.1003 (bia 2FA8.C000.1003)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/3 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 2FA8.C000.1004 (bia 2FA8.C000.1004)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/4 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 2FA8.C000.1005 (bia 2FA8.C000.1005)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/5 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 2FA8.C000.1006 (bia 2FA8.C000.1006)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/6 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 2FA8.C000.1007 (bia 2FA8.C000.1007)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...
```

```
FastEthernet0/7 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1008 (bia 2FA8.C000.1008)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/8 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1009 (bia 2FA8.C000.1009)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/9 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100A (bia 2FA8.C000.100A)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/10 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100B (bia 2FA8.C000.100B)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/11 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100C (bia 2FA8.C000.100C)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/12 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100D (bia 2FA8.C000.100D)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
```

```
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/13 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100E (bia 2FA8.C000.100E)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/14 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.100F (bia 2FA8.C000.100F)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/15 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1010 (bia 2FA8.C000.1010)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/16 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1011 (bia 2FA8.C000.1011)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/17 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1012 (bia 2FA8.C000.1012)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
     broadcast packet count, late collision count,
     runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/18 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1013 (bia 2FA8.C000.1013)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
```

```
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/19 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1014 (bia 2FA8.C000.1014)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/20 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1015 (bia 2FA8.C000.1015)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/21 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1016 (bia 2FA8.C000.1016)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/22 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1017 (bia 2FA8.C000.1017)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/23 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1018 (bia 2FA8.C000.1018)
  MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is 100BaseTX
  ARP type: ARPA, ARP timeout 00.05.00
  ..blah blah blah - look at a real device...
  -- all sorts of stats such as packet rate, bad packets,
    broadcast packet count, late collision count,
    runts (pkt too small), giants (pkt too big) etc...

FastEthernet0/24 is down, line protocol is down (notconnect)
  Hardware is Fast Ethernet, address is 2FA8.C000.1019 (bia 2FA8.C000.1019)
```

```
    MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
    Encapsulation ARPA, loopback not set, keepalive set (10 sec)
    Full-duplex, 100Mb/s, media type is 100BaseTX
    ARP type: ARPA, ARP timeout 00.05.00
    ..blah blah blah - look at a real device...
    -- all sorts of stats such as packet rate, bad packets,
      broadcast packet count, late collision count,
      runts (pkt too small), giants (pkt too big) etc...

  GigabitEthernet0/1 is down, line protocol is down (notconnect)
    Hardware is Fast Ethernet, address is 2FA8.C000.101A (bia 2FA8.C000.101A)
    MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
    Encapsulation ARPA, loopback not set, keepalive set (10 sec)
    Full-duplex, 1000Mb/s, media type is 1000BaseTX
    ARP type: ARPA, ARP timeout 00.05.00
    ..blah blah blah - look at a real device...
    -- all sorts of stats such as packet rate, bad packets,
      broadcast packet count, late collision count,
      runts (pkt too small), giants (pkt too big) etc...

  GigabitEthernet0/2 is down, line protocol is down (notconnect)
    Hardware is Fast Ethernet, address is 2FA8.C000.101B (bia 2FA8.C000.101B)
    MTU 1500 bytes, BW 0 Kbit, DLY 2000 usec, rely 255/255, load 1/255
    Encapsulation ARPA, loopback not set, keepalive set (10 sec)
    Full-duplex, 1000Mb/s, media type is 1000BaseTX
    ARP type: ARPA, ARP timeout 00.05.00
    ..blah blah blah - look at a real device...
    -- all sorts of stats such as packet rate, bad packets,
      broadcast packet count, late collision count,
      runts (pkt too small), giants (pkt too big) etc...
```

- **?** (Per far uscire la lista dei comandi disponibili)

```
Switch>?
   connect                    Telnet to another host
   disable                    Turn off privileged commands
   enable                     Turn on privileged commands
   exit                       Exit from the EXEC
   help                       Description of the interactive help system
   ping                       Send echo messages
   show                       show... commands
   telnet                     Open a telnet connection
   terminal                   Lines before MORE.  0=never.
   traceroute                 Trace route to destination

Switch>show ?
   show clock                    Display the system clock
   show flash:                   display information about flash: file system
   show history                  Display the session command history
   show hosts                    IP domain-name, nameservers, and host table
   show interface [intf]         Interface status and configuration
   show ip dhcp bindings <ip>    DHCP address bindings
   show sessions*                Information about Telnet connections
   show spanning-tree            show spanning-tree commands
   show users                    Display information about terminal lines
   show version                  System hardware and software status
   show vlan                     show vlan commands
```

- **<TAB>** (Per completare i vari comandi digitati)

Scrivete per esempio sh

```
SW1>sh
```

e premete il tasto <TAB>, automaticamente il comando verrà cosi completato:

```
SW1>show
```

- **enable**

(Entra in modalità privilegiata, il prompt si trasforma da > a #)

## COMANDI IMPORTANTI IN MODALITA' PRIVILEGIATA:

- **exit**
  (Per tornare alla modalità precedente)

- **show running-config**

(Per vedere la configurazione che sta girando sullo switch)

```
Switch#    show running-config
Building Configuration...

Current Configuration : 1108 bytes
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch
!
spanning-tree mode pvst
no spanning-tree optimize bpdu transmission
spanning-tree extend system-id
!
!
!
!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
```

```
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 no ip address
 no ip route-cache
 shutdown
!
ip http server
!
line con 0
line vty 0 4
!
end
```

- **copy running-config startup-config**

(Per salvare la configurazione corrente nella flashrom delelo switch)

- **configure terminal**

(Entra in modalità configurazione terminale, il prompt si trasforma da # a (config)# )

## COMANDI IMPORTANTI IN MODALITA' CONFIGURAZIONE TERMINALE:

- **exit**
  (Per tornare alla modalità precedente)

- **enable secret**

(Per impostare una password per entrare in modalità privilegiata)

Digitate per esempio: **enable secret corso**

**(Nota: in NetSimk non vi chiede la password comunque, ma negli apparati reali si.)**

- **hostname**

(Per cambiare il nome dell'apparecchio)

Per esempio diamo il nome SW1 al nostro switch

Switch(config)# **hostname SW1**

Dato invio vedremo cambiare il prompt comandi in

SW1(config)#

- **interface** nomeinterfaccia

(Entra in modalità configurazione interfaccia, il prompt si trasforma (config)# a (config-if)# )

Vogliamo ora dare un ip al nostro switch, **l'indirizzo che assegneremo allo switch serve solo per management,** per fare ciò occorre configurare la vlan di default (vlan 1)

Diamo il comando: **interface vlan1**

## COMANDI IMPORTANTI IN MODALITA'
## CONFIGURAZIONE INTERFACCIA:

- **ip address** <indirizzo IP> <netmask>
  (assegna l'indirizzo IP (e netmask) all'interfaccia)

  diamo per esempio l'indirizzo 192.168.1.1 255.255.255.0

```
ip address 192.168.1.1 255.255.255.0
```

- **no shutdown**
  (Per abilitare l'interfaccia)

```
SW1(config-if)#no shutdown
SW1(config-if)#
%LDXX - Interface vlan 1, changed state to up
```

- **exit**
  (Per tornare alla modalità precedente)

Usciamo dalla modalità configurazione interfaccia, dando **exit,** dalla modalità configurazione dando di nuovo **exit,** e dalla modalità privilegiata digitando di nuovo **exit**

Andiamo ora sul PC1
Apriamo una finestra DOS e proviamo a pingare lo switch

Digitiamo:

**ping 192.168.1.1**

```
C:>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
```

Digitiamo poi:

```
C:>ipconfig /all

Windows IP configuration

        Host Name . . . . . . . . . . . :
        Primary DNS Suffix. . . . . . . :
        Node Type . . . . . . . . . . . : Broadcast
```

```
        NetBIOS Scope ID. . . . . :
        IP Routing enabled. . . . . : No
        WINS Proxy enabled. . . . . : No
        NetBIOS Resolution uses DNS : No

Ethernet Adapter SUMOLDCARD_00X1:

        Description . . . . . . . . : SumJunk Fast Ethernet Adapter
        Physical Address. . . . . . : 53-1E-A2-00-10-03
        DHCP enabled. . . . . . . . : No
        IP Address. . . . . . . . . : 192.168.1.10
        Subnet Mask . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . : 0.0.0.0
        DNS Servers . . . . . . . . :
```

Torniamo sullo switch

Digitiamo in modalità privilegiata:

**SW1#show mac-address-table**

```
SW1#show mac-address-table

          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 All    2FA8.C000.1001    STATIC      CPU
 All    0100.0ccc.cccc    STATIC      CPU
 All    0100.0ccc.cccd    STATIC      CPU
 All    0100.0cdd.dddd    STATIC      CPU
   1    531E.A200.1003    DYNAMIC     Fa0/1

Total Mac Addresses for this criterion: 5
```

Notiamo che lo switch ha imparato il mac-address del primo pc che ha effettuato un collegamento

Andiamo ora sul PC6

Proviamo a pingare lo switch

Digitiamo:

**ping 192.168.1.1**

C:>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

```
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
Reply from 192.168.1.1 on Eth, time<10ms TTL=128
```

Torniamo sullo switch

Digitiamo in modalità privilegiata:

**SW1#show mac-address-table**

```
SW1#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 All    2FA8.C000.1001    STATIC      CPU
 All    0100.0ccc.cccc    STATIC      CPU
 All    0100.0ccc.cccd    STATIC      CPU
 All    0100.0cdd.dddd    STATIC      CPU
   1    531E.A200.1003    DYNAMIC     Fa0/1
   1    E85D.F700.1003    DYNAMIC     Fa0/6
Total Mac Addresses for this criterion: 6
```

Come potete vedere si è aggiunta una nuova riga nella MAC ADDRESS TABLE riferita al PC6

Questo perché lo switch al primo accesso da parte del PC6 ha aggiornato la MAC ADDRESS TABLE

Ora proviamo a pingare lo switch dagli altri PC e rivisualizziamo la MAC ADDRESS TABLE

```
SW1#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 All    2FA8.C000.1001    STATIC      CPU
 All    0100.0ccc.cccc    STATIC      CPU
 All    0100.0ccc.cccd    STATIC      CPU
 All    0100.0cdd.dddd    STATIC      CPU
   1    531E.A200.1003    DYNAMIC     Fa0/1
   1    C02B.8400.1003    DYNAMIC     Fa0/2
   1    6CFF.5100.1003    DYNAMIC     Fa0/3
   1    578B.3300.1003    DYNAMIC     Fa0/4
   1    37BA.1500.1003    DYNAMIC     Fa0/5
   1    E85D.F700.1003    DYNAMIC     Fa0/6
Total Mac Addresses for this criterion: 10
```

Vediamo ora una configurazione errata:

Mettiamo il pc2 su una rete diversa, diamogli l'indirizzo 192.168.2.10

Proviamo a pingare il pc1

ping 192.168.1.10

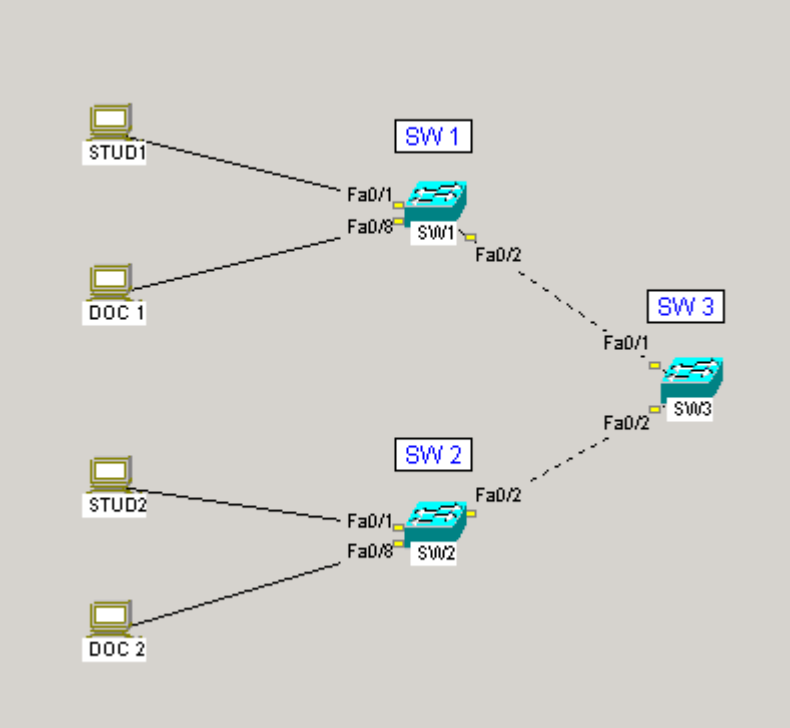
```
C:>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:

Destination unreachable at 192.168.1.10
```

Come previsto non riusciamo a raggiungere un pc su un altra rete in quanto lo switch non ruota i pacchetti ip.

# ESERCIZIO N. 1.2 – VLAN BASE




**DESCRIZIONE:**

Si vuole costruire una rete, nella quale abbiamo uno switch centro stella al quale sono collegati due switch; ad ognuno di questi si collegano un pc. I PC STUD 1 e STUD 2 appartengono alla VLAN studenti, mentre i PC DOC 1 e DOC 2 appartengono alla VLAN docenti .

Costruire la rete e verificare che i pc riescano a pingarsi

**PC STUD1:** ip 192.168.1.10 255.255.255.0
**PC STUD2:** ip 192.168.1.11 255.255.255.0
**PC DOC 1:** ip 192.168.2.10 255.255.255.0
**PC DOC 2:** ip 192.168.2.11 255.255.255.0

**Attenzione: Gli Switch vanno collegati tra loro con il cavo incrociato (Crossover)**

## SOLUZIONE:

### PC STUD1: Configurazione

Sulla mappa fate click col tasto destro sul PC STUD1 e scegliete la voce PC Network Properties, specificate il seguente indirizzo: 192.168.1.10 255.255.255.0

### PC STUD2: Configurazione

Sulla mappa fate click col tasto destro sul PC2 e scegliete la voce PC Network Properties, specificate il seguente indirizzo: 192.168.1.11 255.255.255.0

### PC DOC 1: Configurazione

Sulla mappa fate click col tasto destro sul PC DOC 1 e scegliete la voce PC Network Properties, specificate il seguente indirizzo: 192.168.2.10 255.255.255.0

### PC DOC 2: Configurazione

Sulla mappa fate click col tasto destro sul DOC 2 e scegliete la voce PC Network Properties, specificate il seguente indirizzo: 192.168.2.11 255.255.255.0

### Configurazione degli switch

collegate un terminale allo switch **SW 1** e nella console scrivete:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Diamo il nome allo switch

```
Switch(config)#hostname SW1
```

Configuriamo la VLAN studenti

```
SW1(config)#vlan 10
SW1(config-vlan)#name studenti
SW1(config-vlan)#exit
SW1(config)#exit
```

## Guardiamo se è stata creata la VLAN

```
SW1>#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gi0/1, Gi0/2
10   studenti                         active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

## Configuriamo la VLAN docenti

```
SW1#conf terminal
SW1(config)#vlan 20
SW1(config-vlan)#name docenti
SW1(config-vlan)#exit
SW1(config)#exit
```

Ora andiamo ad assegnare alla VLAN studenti, le porte dello switch a cui sono collegati i PC

```
SW1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Andiamo a configurare l'interfaccia a cui è collegato il PC

```
SW1(config)#interface F0/1
```

Per assegnare una vlan ad una interfaccia si utilizza il comando: switchport access

```
SW1(config-if)#switchport access vlan 10
SW1(config-if)#exit
SW1(config)#exit
```

Vediamo se l'interfaccia è stata assegnata la vlan tramite il commando show vlan

```
SW1#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                                                 Fa0/6, Fa0/7, Fa0/8, Fa0/9
                                                 Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23, Fa0/24, Gi0/1
                                                 Gi0/2
10   studenti                          active    Fa0/1
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup
```

Come potete vedere ora l'interfaccia Fa0/1 fa parte della VLAN studenti

Facciamo ora la stessa cosa per la VLAN docenti

```
SW1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Andiamo a configurare l'interfaccia a cui è collegato il PC

```
SW1(config)#interface F0/8
```

Per assegnare una vlan ad una interfaccia si utilizza il comando: switchport access

```
SW1(config-if)#switchport access vlan 20
SW1(config-if)#exit
SW1(config)#exit
```

Vediamo se l'interfaccia è stata associata correttamente alla vlan tramite il commando: **show vlan**

```
SW1#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/9, Fa0/10, Fa0/11
                                                 Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                 Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                 Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                 Fa0/24, Gi0/1, Gi0/2
10   studenti                          active    Fa0/1
20   docenti                           active    Fa0/8
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup
```

Come potete vedere ora l'interfaccia Fa0/8 fa parte della VLAN docenti

Ora collegate un terminale allo switch **SW 2** e nella console scrivete:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Diamo il nome allo switch

```
Switch(config)#hostname SW2
```

Configuriamo la VLAN studenti e quella docenti

```
SW2(config)#vlan 10
SW2(config-vlan)#name studenti
SW2(config-vlan)#exit
SW2(config)#vlan 20
SW2(config-vlan)#name docenti
SW2(config-vlan)#exit
SW2(config)#exit
```

## Guardiamo se sono state create le due VLAN

```
SW1>#show vlan


VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gi0/1, Gi0/2

10   studenti                          active    Fa0/1
20   docenti                           active
1002 fddi-default                      ac
```

```
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
--More--1    enet  100001     1500  -      -      -        -    -        0
0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
```

Ora andiamo ad assegnare alla VLAN studenti, le porte dello switch a cui sono collegati i PC

```
SW2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Andiamo a configurare l'interfaccia a cui è collegato il PC

```
SW2(config)#interface F0/1
```

Per assegnare una vlan ad una interfaccia si utilizza il comando: switchport access

```
SW2(config-if)#switchport access vlan 10
SW2(config-if)#exit
SW2(config)#exit
```

Vediamo se l'interfaccia è stata associata correttamente alla vlan tramite il commando: **show vlan**

```
SW2#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                                                 Fa0/6, Fa0/7, Fa0/8, Fa0/9
                                                 Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23, Fa0/24, Gi0/1
                                                 Gi0/2
10   studenti                          active    Fa0/1
1002 fddi-default                      act/unsup
1003 token-ring-default                act/unsup
1004 fddinet-default                   act/unsup
1005 trnet-default                     act/unsup
```

Come potete vedere ora l'interfaccia Fa0/1 fa parte della VLAN studenti

Facciamo ora la stessa cosa per la VLAN docenti

```
SW2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Andiamo a configurare l'interfaccia a cui è collegato il PC

```
SW2(config)#interface F0/8
```

Per assegnare una vlan ad una interfaccia si utilizza il comando: switchport access

```
SW2(config)#interface F0/8
SW2(config-if)#switchport access vlan 20
SW2(config-if)#exit
```

Vediamo se l'interfaccia è stata associata correttamente alla vlan tramite il commando: **show vlan**

```
SW2#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                Fa0/24, Gi0/1, Gi0/2
10   studenti                         active    Fa0/1
20   docenti                          active    Fa0/8
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
```

Ora abbiamo assegnato i due PC Studenti alla stessa VLAN, però essendo su due switch diversi, sicuramente non possono fino ad ora pingarsi.

Per risolvere il problema si usano le porte di trunk, che sono tipicamente utilizzate per collegare fra loro due switch in modo che una o più VLAN possano estendersi sui diversi switch.

Su ogni switch è possibile configurare una o più porte come "**trunk port**" in cui possono essere convogliate diverse VLAN.

Impostiamo quindi la porta che fa da up-link allo switch di livello superiore come **trunk port**

```
SW2>enable
SW2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#interface F0/2
SW2(config-if)#switchport mode trunk
SW2(config-if)#exit
SW2(config)#exit
SW2#
```

Facciamo la medesima cosa per lo switch SW1

```
SW1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)#interface F0/2
SW1(config-if)#switchport mode trunk
SW1(config-if)#exit
SW1(config)#exit
SW1#
```

Infine bisogna impostare le porte in trunk mode anche per lo switch SW3, che è lo switch di livello superiore

collegate un terminale allo switch **SW 3** e nella console scrivete:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
```

Diamo il nome allo switch

```
Switch(config)#hostname SW3
```

Impostiamo quindi le porta che si collegano ai due switch di livello inferiore come **trunk port**

```
SW3(config)#interface F0/1
SW3(config-if)#switchport mode trunk
SW3(config-if)#interface F0/2
SW3(config-if)#switchport mode trunk
SW3(config-if)#exit
```

Configuriamo la VLAN studenti e docenti

```
SW3(config)#vlan 10
SW3(config-vlan)#name studenti
SW3(config-vlan)#exit
SW3(config)#vlan 20
SW3(config-vlan)#name docenti
SW3(config-vlan)#exit
SW3(config)#exit
SW3#
```

## TEST PC STUD1

```
C:>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11 on Eth, time<10ms TTL=128
Reply from 192.168.1.11 on Eth, time<10ms TTL=128
Reply from 192.168.1.11 on Eth, time<10ms TTL=128
Reply from 192.168.1.11 on Eth, time<10ms TTL=128
```

## TEST PC STUD2

```
C:>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:

Reply from 192.168.1.10 on Eth, time<10ms TTL=128
Reply from 192.168.1.10 on Eth, time<10ms TTL=128
Reply from 192.168.1.10 on Eth, time<10ms TTL=128
Reply from 192.168.1.10 on Eth, time<10ms TTL=128
```

## TEST PC DOC 1

```
C:>ping 192.168.2.11

Pinging 192.168.2.11 with 32 bytes of data:

Reply from 192.168.2.11 on Eth, time<10ms TTL=128
Reply from 192.168.2.11 on Eth, time<10ms TTL=128
Reply from 192.168.2.11 on Eth, time<10ms TTL=128
Reply from 192.168.2.11 on Eth, time<10ms TTL=128
```

## TEST PC DOC 2

```
C:>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10 on Eth, time<10ms TTL=128
Reply from 192.168.2.10 on Eth, time<10ms TTL=128
Reply from 192.168.2.10 on Eth, time<10ms TTL=128
Reply from 192.168.2.10 on Eth, time<10ms TTL=128
```