Esercitazione di Reti di Calcolatori

Installazione Del Software

https://www.netacad.com/courses/packet-tracer

Sign in > Resources > Download Packet Tracer

Windows Desktop Version 7.2 English
64 Bit Download 32 Bit Download

Linux Desktop Version 7.2 English
64 Bit Download

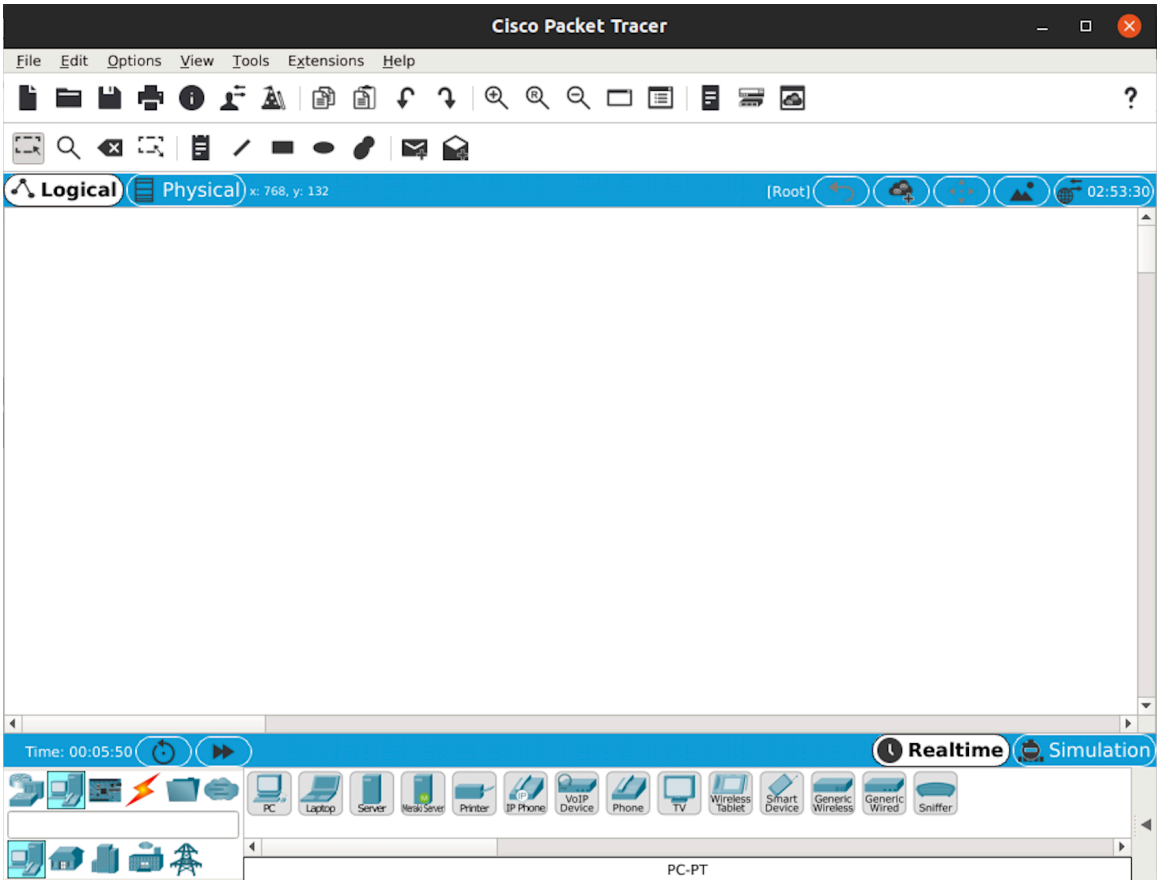
Mobile

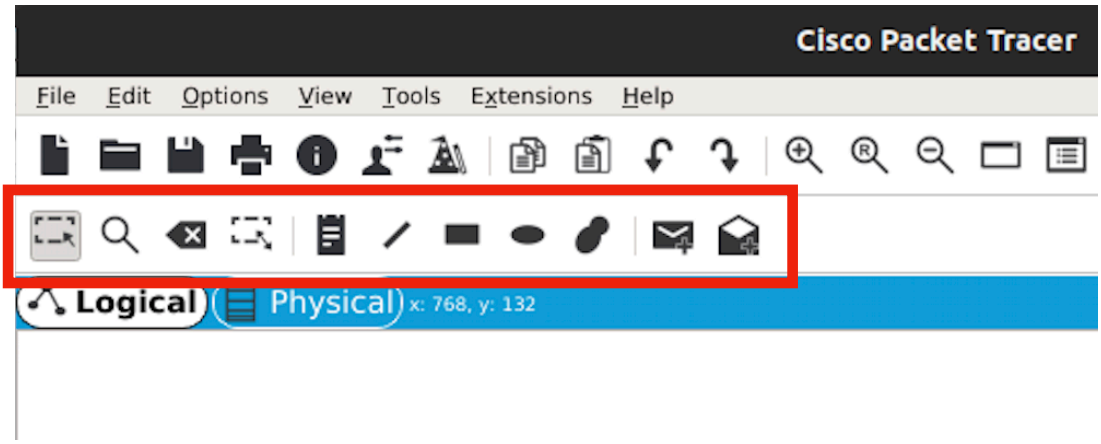
iOS Version 3.0 English

Android Version 3.0 English

Packet Tracer Interface

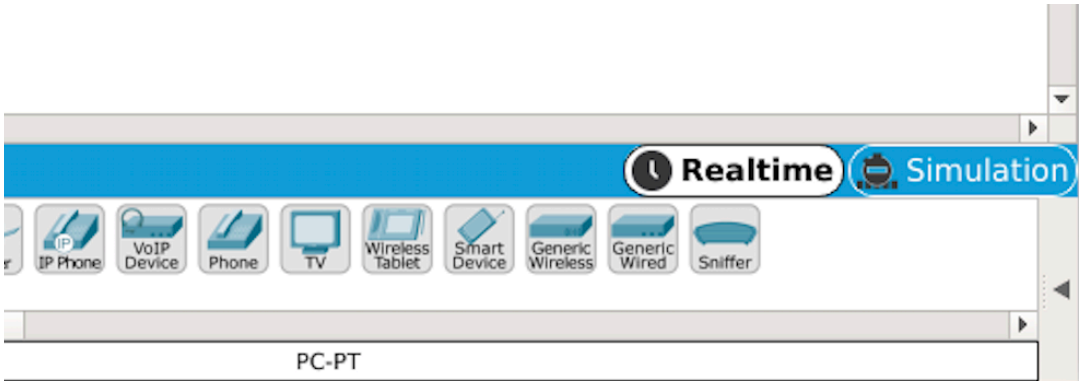
Ecco l'interfaccia principale di packet tracer.





In alto a sinistra sono posizionati tutti i tool utili per selezionare/cancellare elementi della rete, inserire note o forme, simulare l'invio di un pacchetto.

In basso a sinistra, si trovano gli elementi disponibili tra Router Switch, PC, cavi etc.



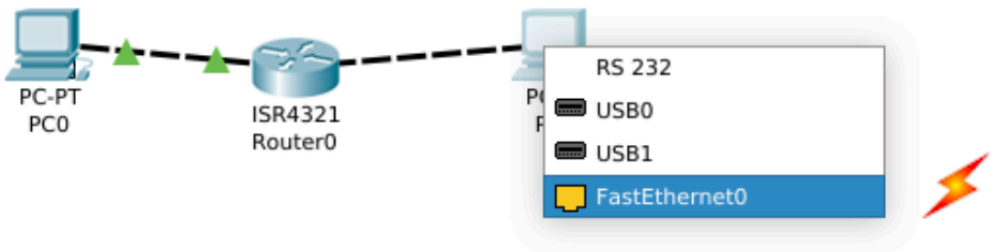
Importante notare la presenza del tab *Realtime* selezionato accanto al tab *Simulation*.

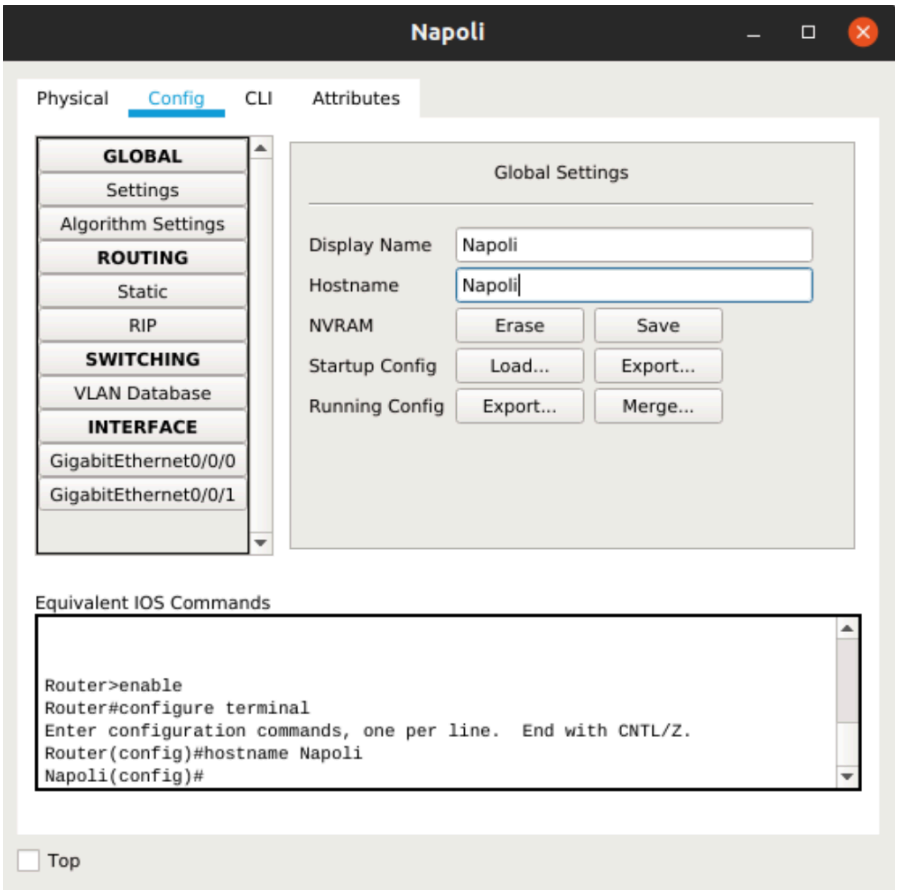
Problem Statement 1

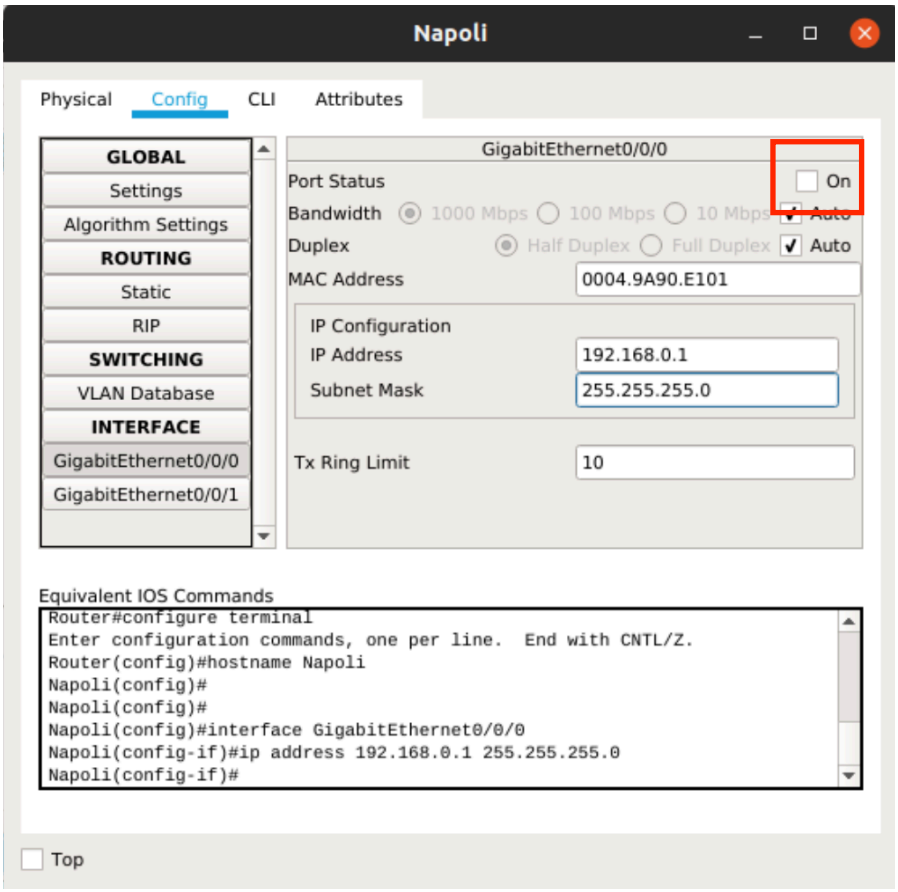
Connettere due PC tramite un Router ed effettuare un ping.

1) Selezionare dalle palette degli elementi due PC e un Router.

2) Connettere gli elementi con il cavo corretto/usare la connessione automatica sulle interfacce fast ethernet.




Napoli
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Global Settings
Display Name
Napoli
Hostname
Napoli
NVRAM
Erase
Save
Startup Config
Load...
Export...
Running Config
Export...
Merge...
Equivalent IOS Commands
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Napoli
Napoli(config)#
Top


Napoli
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0004.9A90.E101
IP Configuration
IP Address
192.168.0.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Napoli
Napoli(config)#
Napoli(config)#
Napoli(config)#interface GigabitEthernet0/0/0
Napoli(config-if)#ip address 192.168.0.1 255.255.255.0
Napoli(config-if)#
Top

3) Configurazione del Router:

1) Apro il pannello del Router (doppio click sul Router) e accedo al tab *config*, controllo che sia acceso.
2) Nel tab *config* cambio il nome del Router.
3) Qui si possono inserire i comandi per configurare il Router, gli stessi si possono inserire sia da console che da interfaccia grafica. Alcuni comandi tipici sono *enable, hostname e no shutdown*
4) Configuro le interfacce del Router da CLI o da interfaccia grafica

Da CLI ho per l' interfaccia fastEthernet 0/0 :

Interface fastEthernet 0/0

IP Address 192.168.0.1

Subnet Mask 255.255.255.0

no shutdown

Per fastEthernet 0/1 nel pannello config e seleziono fastEthernet 0/1:

Inseriamo come IP address:

IP Address 10.0.0.1

Subnet Mask 255.0.0.0

no shutdown

Per controllare apro la console e digito *ip interface brief*

3) Configurazione dei computer:

A. Passiamo al PC0 con doppio click il *Desktop* configuro

IP Address 192.168.0.2

Subnet Mask 255.255.255.0

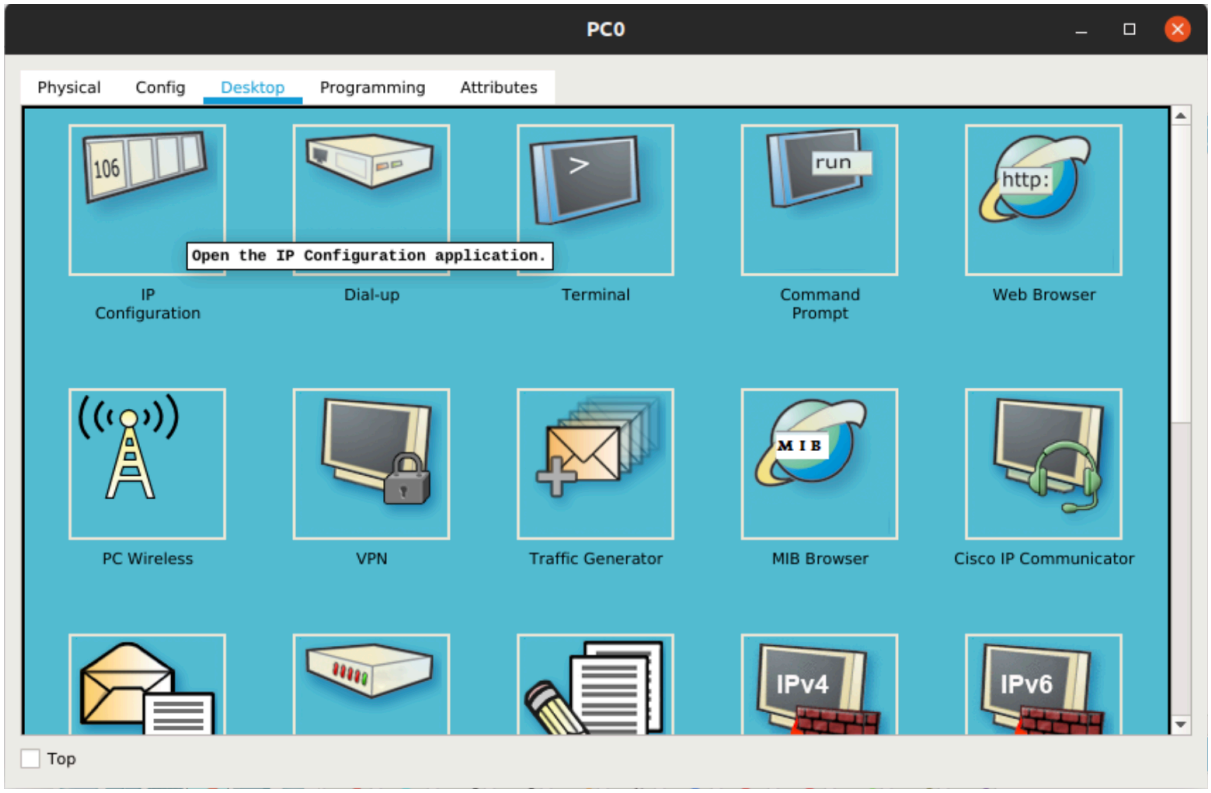
Default Gateway 192.168.0.2

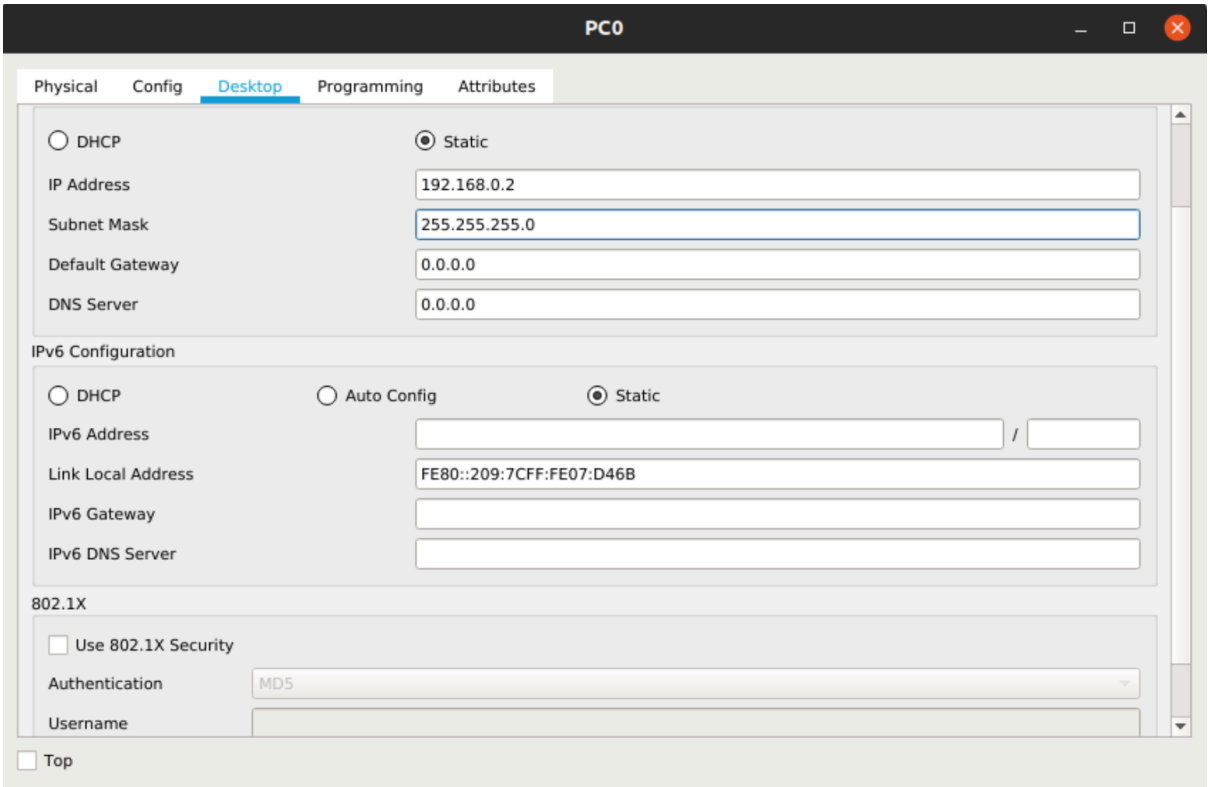
B. Passiamo al PC1 con doppio click il *Desktop* configuro

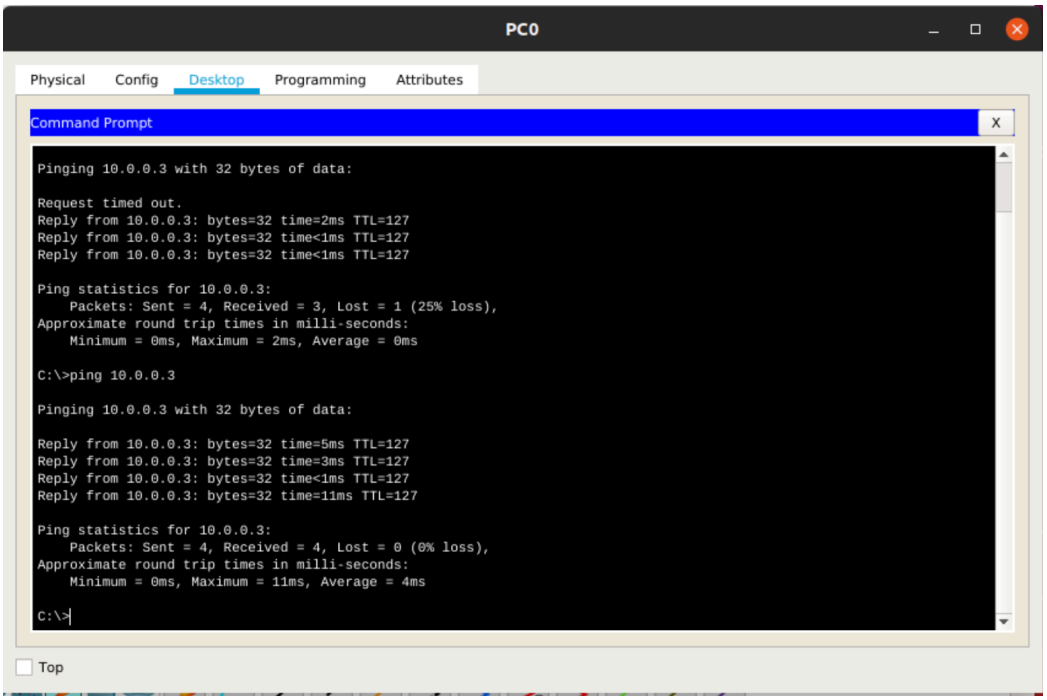
IP Address 10.0.0.2

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.1


PC0
Physical
Config
Desktop
Programming
Attributes
Open the IP Configuration application.
IP Configuration
Dial-up
Terminal
Command Prompt
Web Browser
PC Wireless
VPN
Traffic Generator
MIB Browser
Cisco IP Communicator
IPv4
IPv6
Top


PC0
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
IP Address
192.168.0.2
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::209:7CFF:FE07:D46B
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Top

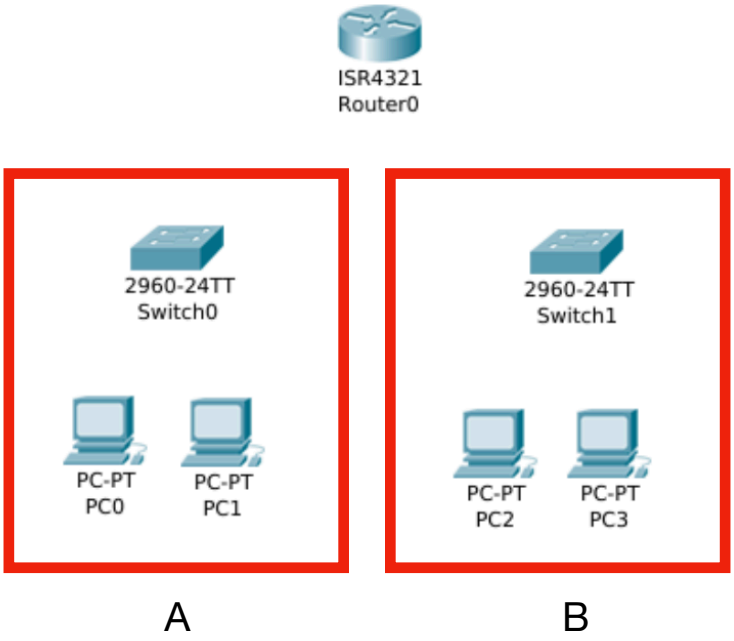


Apriamo PC0 > *Desktop* > *Command Prompt*

Ping 192.168.0.2

Problem Statement 2

Connettere PC appartenenti a subnet diverse utilizzando uno Switch e un Router ed effettuare un ping di prova



La sottorete A è caratterizzata da:

A) PC0:

Indirizzi IP 192.168.0.2

Subnet Mask 255.255.255.0

B) PC1 :

Indirizzi IP 192.168.0.3

Subnet Mask 255.255.255.0

La sottorete B è caratterizzata da:

A) PC2:

Indirizzi IP 10.0.0.2

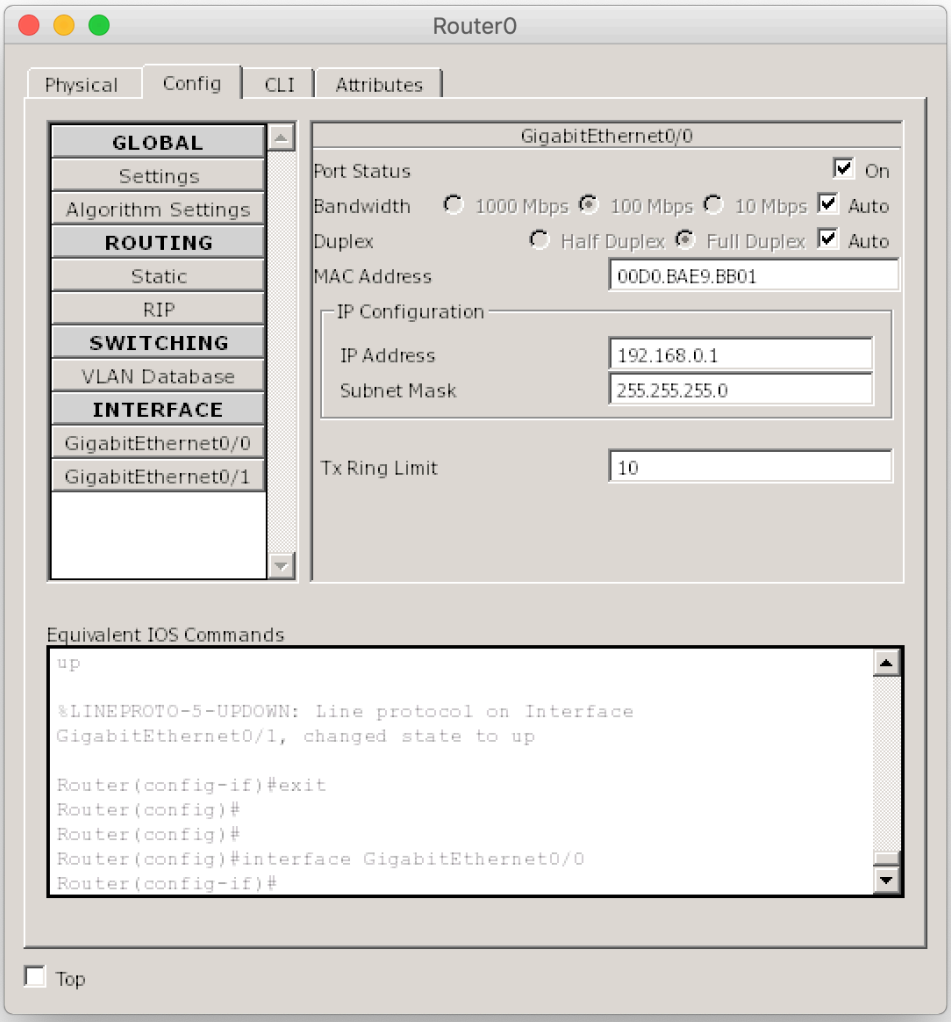
Subnet Mask 255.0.0.0

A) PC3:

Indirizzi IP 10.0.0.3

Subnet Mask 255.0.0.0

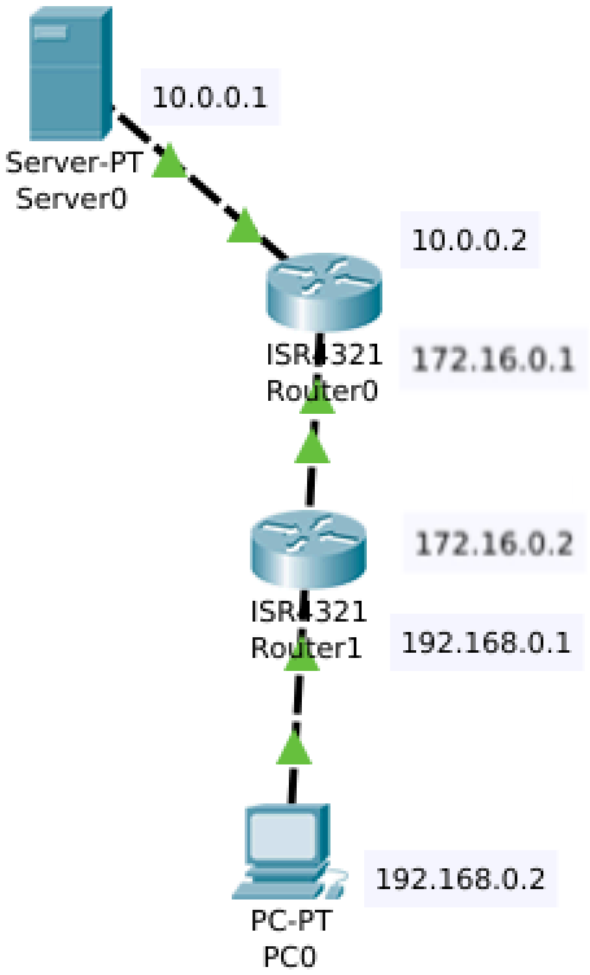
E’ necessario collegare i dispositivi innanzitutto e procedere al set-up dei personal computer con relativi indirizzi IP e subnet mask come visto in precedenza.



Successivamente si passa alla configurazione del Router0 e si impostano le relative interfacce.

Problem Statement 3

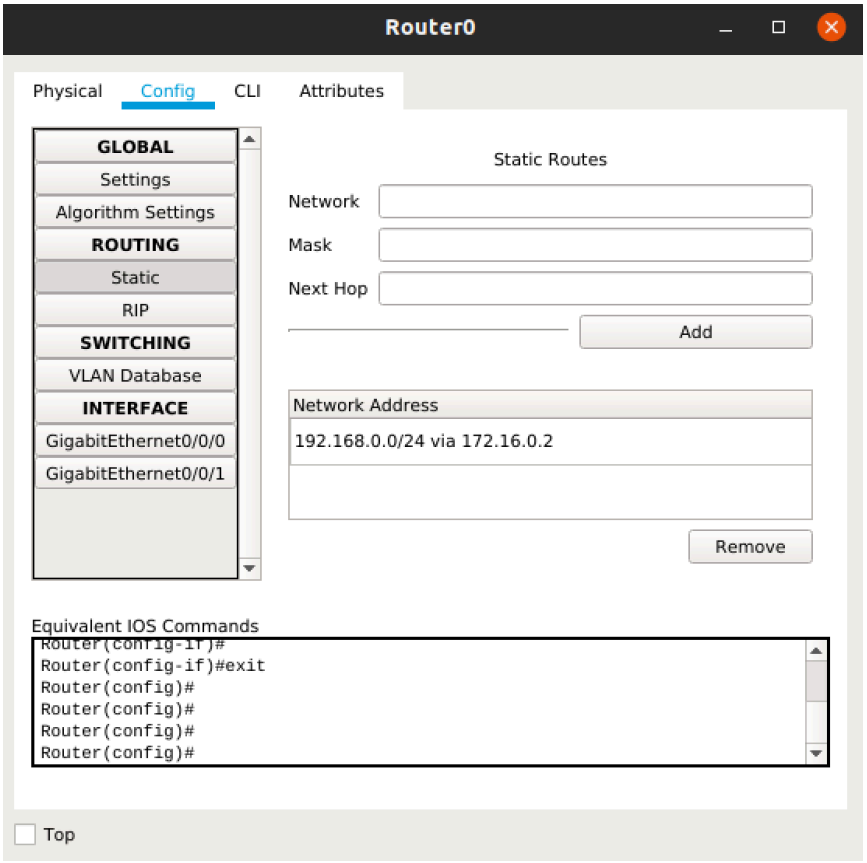
Set up topologia client server e ping di prova

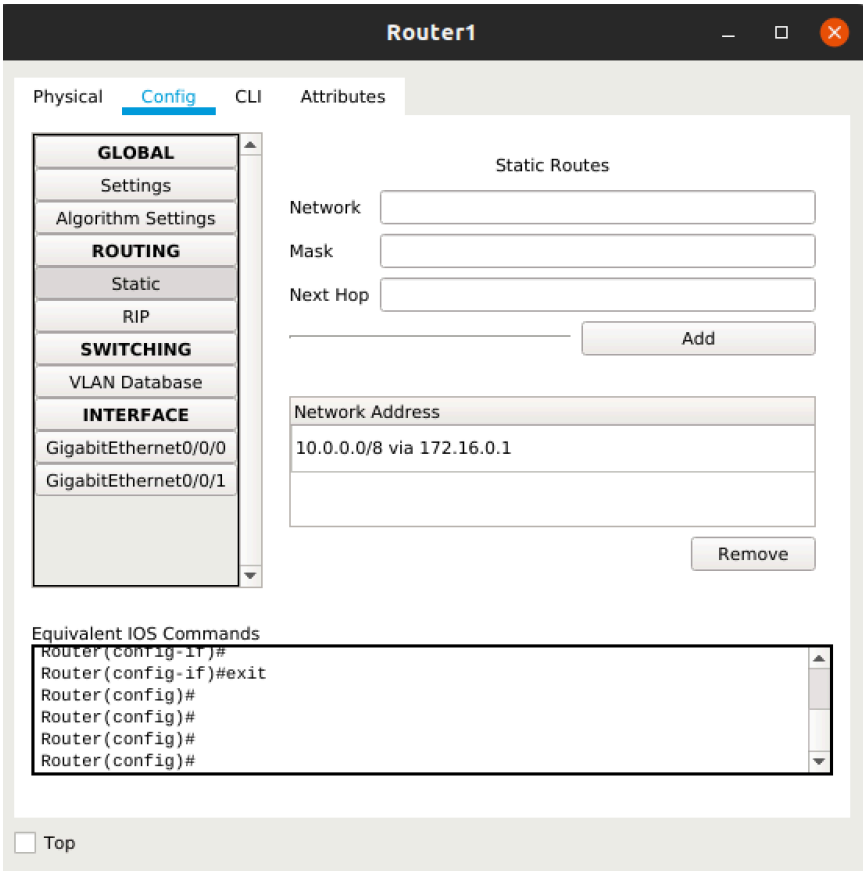


Si configurano i Router come in figura, con rispettivi gateway e maschere di rete.

Successivamente è richiesta la configurazione delle tabelle di routing del Router0 e del Router1. Accedendo alle console dei rispettivi si accede al tab Static Routing dove si possono configurare le rotte.

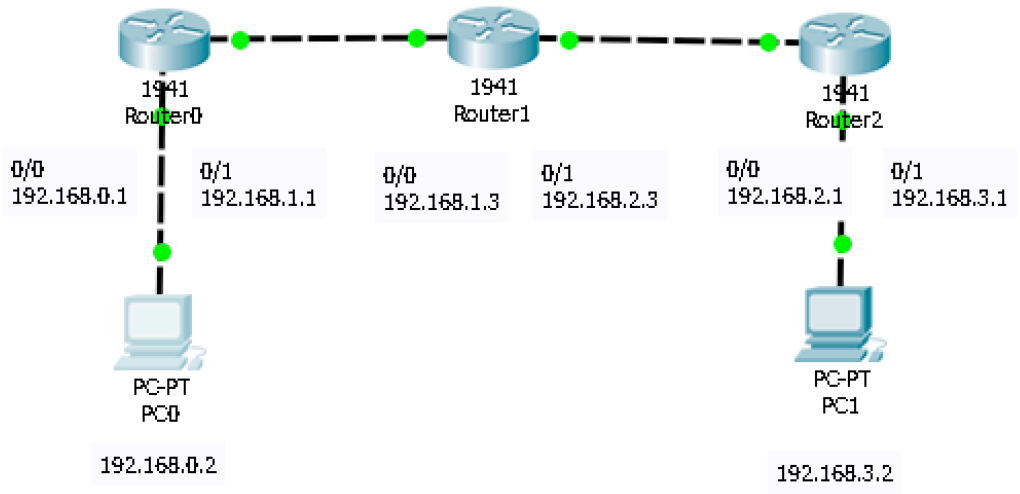
Il PC0 può ora provare ad effettuare un ping verso la macchina10.0.01 con successo.

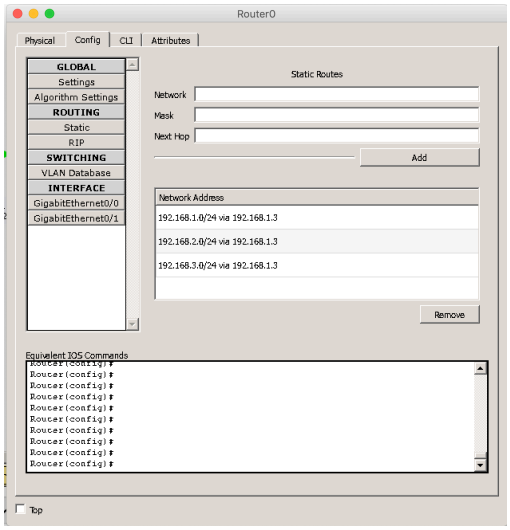

Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Static Routes
Network
Mask
Next Hop
Add
Network Address
192.168.0.0/24 via 172.16.0.2
Remove
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Top

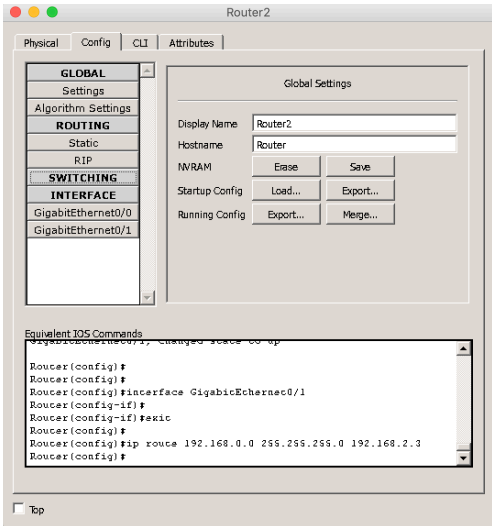

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Static Routes
Network
Mask
Next Hop
Add
Network Address
10.0.0.0/8 via 172.16.0.1
Remove
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Top

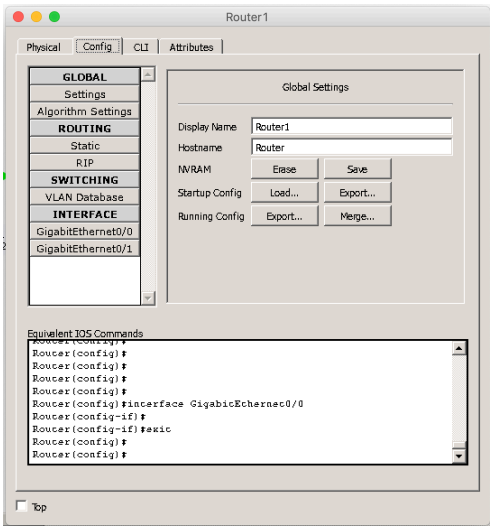
Problem Statement 4

Topologia Estesa con Routing Statico



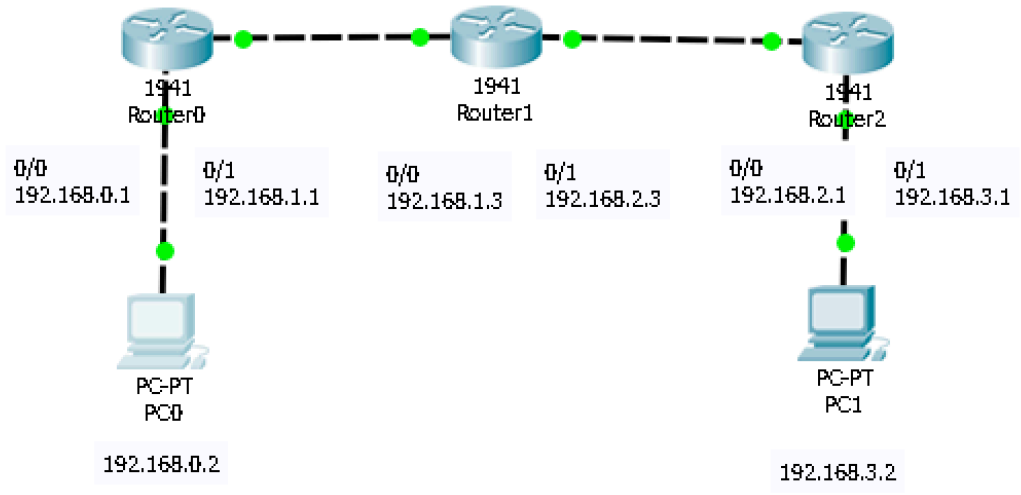


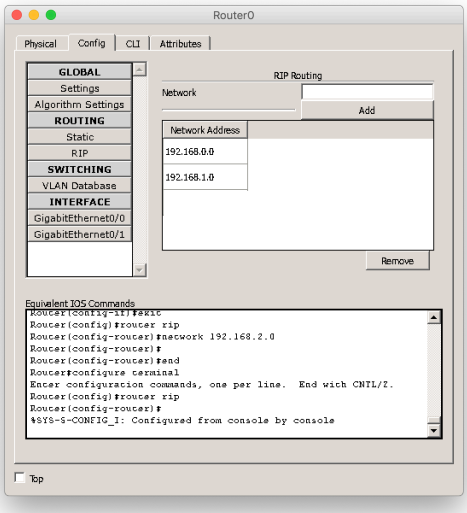


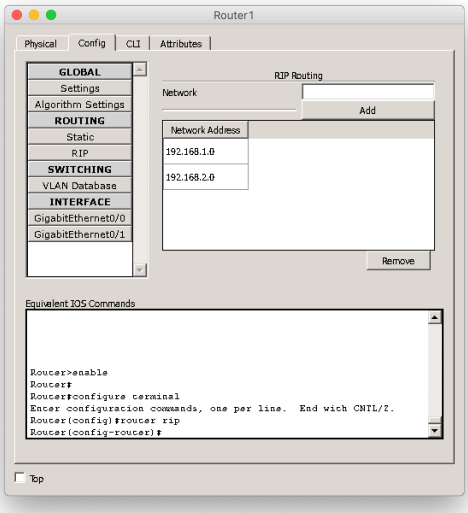


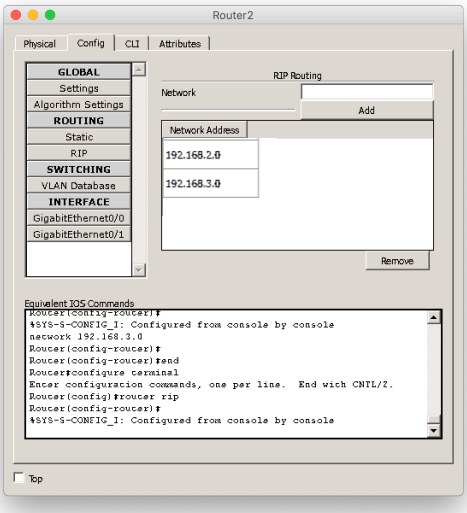
Problem Statement 5

Topologia Estesa con Routing RIP





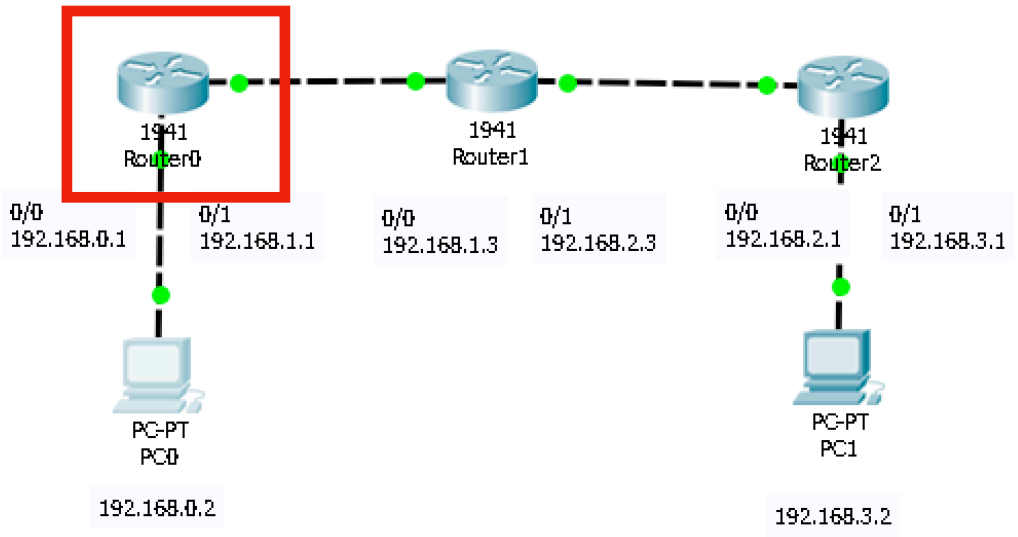




Problem Statement 6

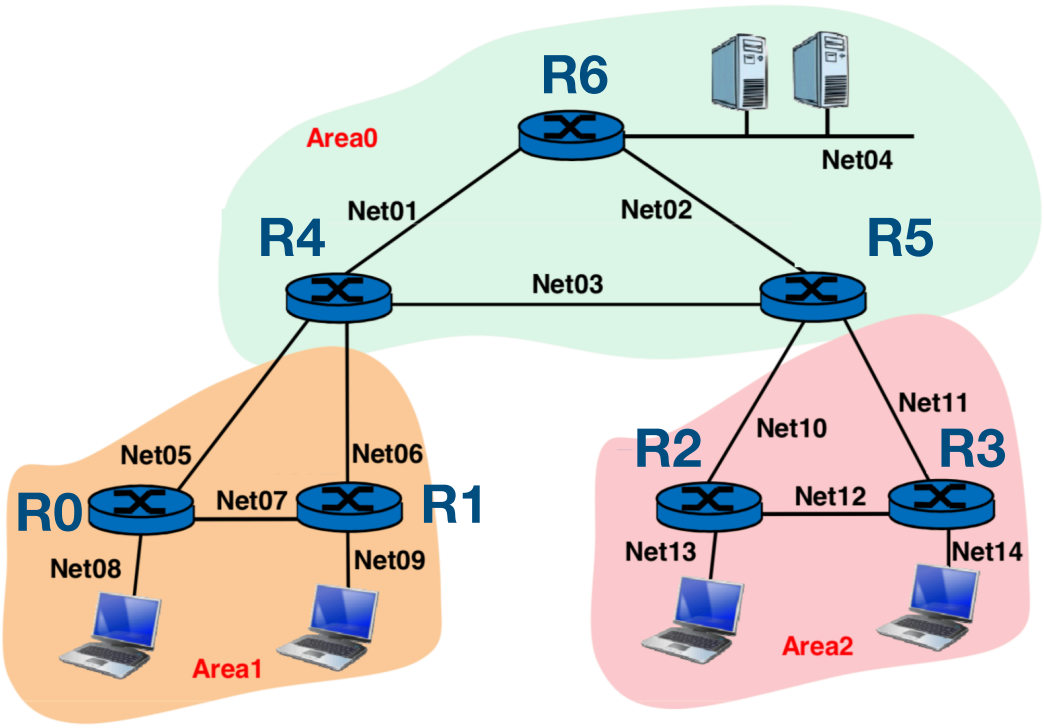
From Routing Table to Network

Type	Network	Port	Next Hop IP	Metric
C	192.168.0.0/24	GigabitEthernet0/0	—	0/0
L	192.168.0.1/32	GigabitEthernet0/0	—	0/0
C	192.168.1.0/24	GigabitEthernet0/1	—	0/0
L	192.168.1.1/32	GigabitEthernet0/1	—	0/0
S	192.168.2.0/24	—	192.168.1.3	1/0
S	192.168.3.0/24	—	192.168.1.3	1/0



Problem Statement 7

OSPF Network



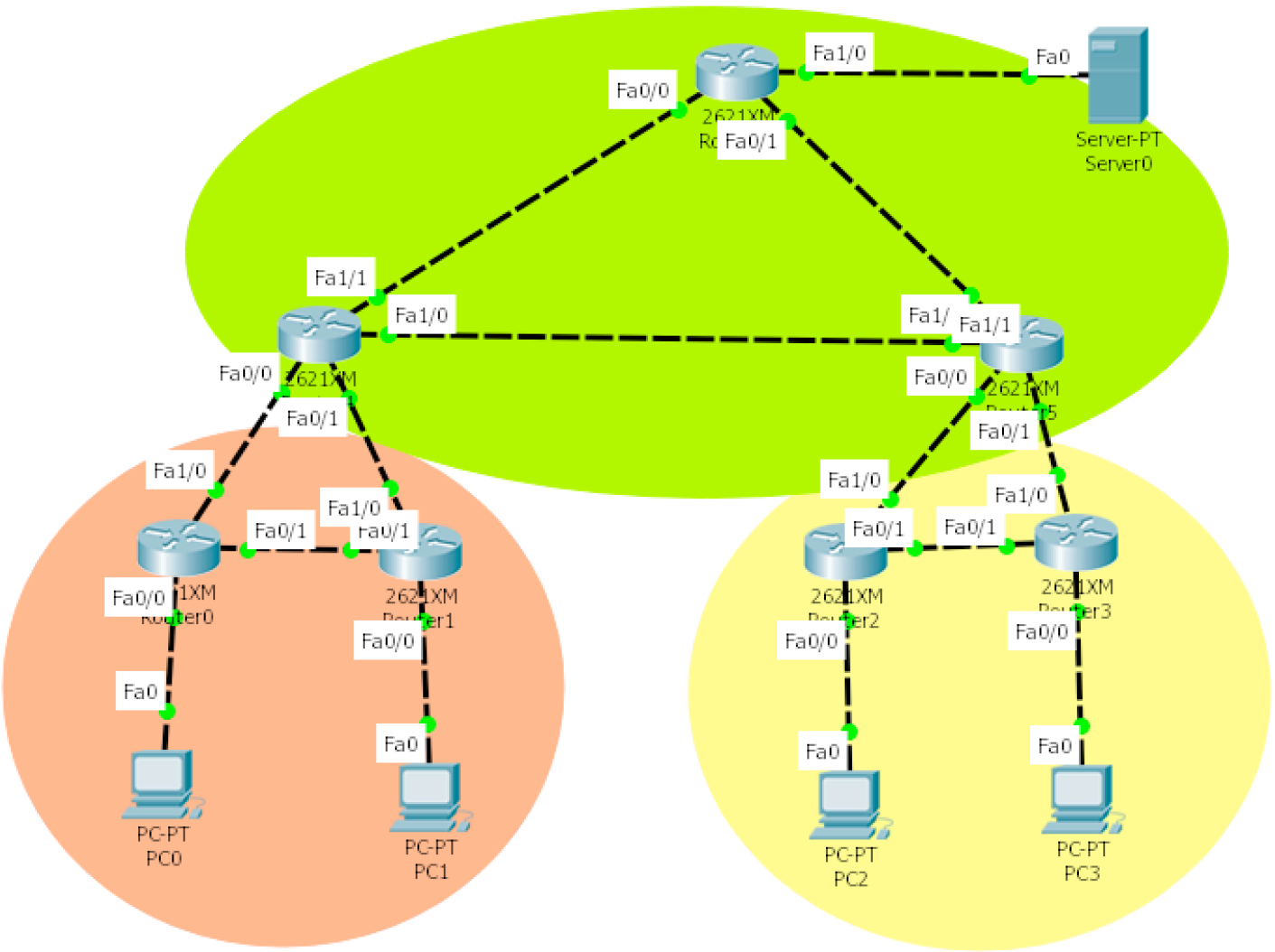
Si descrive una rete caratterizzata da 7 router e 5 end-systems.

La topologia di rete richiede 14 subnet e per l'indirizzamento si ha a disposizione il blocco di 128 indirizzi 192.168.24.0/25

Si effettua un subnetting con maschera a lunghezza variabile con Netmask /30 per i 9 collegamenti punto punto fra router e /28 per le reti LAN che ospitano gli endpoint.

End Point	Indirizzo/subnet
S01	192.168.24.50/28
C11	192.168.24.66/28
C12	192.168.24.82/28
C21	192.168.24.98/28
C22	192.168.24.114/2

Network	Indirizzo/subnet
Net 01	192.168.24.0/30
Net 02	192.168.24.4/30
Net 03	192.168.24.8/30
	192.168.24.12/30
Net 05	192.168.24.16/30
Net 06	192.168.24.20/30
Net 07	192.168.24.24/30
	192.168.24.28/30
Net 10	192.168.24.32/30
Net 11	192.168.24.36/30
Net 12	192.168.24.40/30
Net 04	192.168.24.48/28
Net 08	192.168.24.64/28
Net 09	192.168.24.80/28
Net 13	192.168.24.96/28
Net 14	192.168.24.112/28


Fa1/0
Fa0
Fa0/0
Fa0/1
Server-PT
Server0
Fa1/1
Fa1/0
Fa0/0
Fa0/1
Fa1/1
Fa0/0
Fa0/1
Fa1/0
Fa0/1
Fa1/0
Fa0/1
Fa0/0
Fa0
Fa0
PC-PT
PC0
PC-PT
PC1
Fa1/0
Fa0/1
Fa1/0
Fa0/1
Fa0/0
Fa0/0
Fa0
Fa0
PC-PT
PC2
PC-PT
PC3

Comandi utili
(Cheat Sheet)

```
enable
configure
Show running-config
copy running-config startup-config
```

```
interface FastEthernet0
ip address 192.168.24.5 255.255.255.252
duplex auto
speed auto
```

https://www.cisco.com/c/en/us/td/docs/security/asa/asa72/configuration/guide/conf_gd/intparam.html

---

```
router ospf 1
network 192.168.24.0 0.0.0.3 area 1
passive-interface FastEthernet 0/1

show ip ospf database
show ip ospf neighbor
show ip ospf
```

https://www.cisco.com/c/en/us/td/docs/security/asa/asa72/configuration/guide/conf_gd/ip.html#wp1094564

Configurazioni dei router

R0

```
interface FastEthernet0/0
!
ip address 192.168.24.65 255.255.255.240
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.25 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.18 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.24 0.0.0.3 area 1
network 192.168.24.64 0.0.0.15 area 1
network 192.168.24.16 0.0.0.3 area 1
```

R1

```
interface FastEthernet0/0
!
ip address 192.168.24.81 255.255.255.240
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.26 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.22 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
```

```
network 192.168.24.24 0.0.0.3 area 1
network 192.168.24.80 0.0.0.15 area 1
network 192.168.24.20 0.0.0.3 area 1
```

R4

```
interface FastEthernet0/0
ip address 192.168.24.17 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.21 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.9 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/1
ip address 192.168.24.2 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.16 0.0.0.3 area 1
network 192.168.24.20 0.0.0.3 area 1
network 192.168.24.8 0.0.0.3 area 0
network 192.168.24.0 0.0.0.3 area 0
```

R5

```
interface FastEthernet0/0

ip address 192.168.24.33 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.37 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.6 255.255.255.252
duplex auto
```

```
speed auto
!
interface FastEthernet1/1
ip address 192.168.24.10 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.32 0.0.0.3 area 2
network 192.168.24.36 0.0.0.3 area 2
network 192.168.24.8 0.0.0.3 area 0
network 192.168.24.4 0.0.0.3 area 0
```

R2

```
interface FastEthernet0/0

ip address 192.168.24.97 255.255.255.240
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.41 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.34 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.40 0.0.0.3 area 2
network 192.168.24.96 0.0.0.15 area 2
network 192.168.24.32 0.0.0.3 area 2
```

R3

```
interface FastEthernet0/0

ip address 192.168.24.113 255.255.255.240
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.42 255.255.255.252
duplex auto
```

```
speed auto
!
interface FastEthernet1/0
ip address 192.168.24.38 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.40 0.0.0.3 area 2
network 192.168.24.112 0.0.0.15 area 2
network 192.168.24.36 0.0.0.3 area 2
!
```

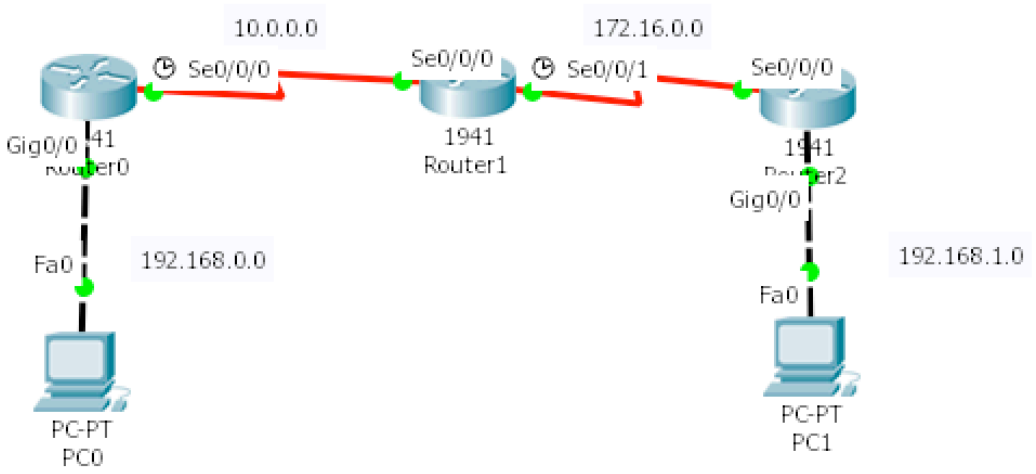
R6

```
interface FastEthernet0/0

ip address 192.168.24.1 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet0/1
ip address 192.168.24.5 255.255.255.252
duplex auto
speed auto
!
router ospf 1
log-adjacency-changes
network 192.168.24.0 0.0.0.3 area 0
network 192.168.24.4 0.0.0.3 area 0
```

Statement 8

Configurazione Routing BGP



Configurazioni dei router

R0

se0/0/0 - 10.0.0.1

router bgp 10
neighbor 10.0.0.2 remote-as 20
network 192.168.0.0 mask 255.255.255.0

R1

se0/0/0 - 10.0.0.2
se0/0/1 - 172.16.0.1

router bgp 20
neighbor 10.0.0.1 remote-as 10

neighbor 172.16.0.2 remote-as 30

R2

se0/0/0 - 172.16.0.2
router bgp 30
neighbor 172.16.0.1 remote-as 20
network 192.168.1.0 mask 255.255.255.0

Comandi utili
(Cheat Sheet)

```
router bgp 10
neighbor 172.16.0.1 remote-as 20
network 192.168.1.0 mask 255.255.255.0
```

https://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus6000/sw/unicast/6_x/cisco_n6k_layer3_ucast_cfg_rel_602_N2_1/l3_bgp.html