Esercitazione di Reti di Calcolatori

Installazione Del Software

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

Sign in > Resources > Download Packet Tracer

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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*.

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.



		Nap	oli			×
Physical Config	CLI	Attributes				
GLOBAL Settings			Global Sett	tings		
Algorithm Settings ROUTING		Display Name	Napoli			
Static RIP		Hostname NVRAM	Napoli	Save		
SWITCHING VLAN Database		Startup Config	Load	Export		
INTERFACE		Running Config	Export	Merge		
GigabitEthernet0/0/1						
	-					
Equivalent IOS Comman Router>enable Router#configure te Enter configuration Router(config)#host Napoli(config)#	nds ermina comr name	al mands, one per 1 Napoli	line. End wi	th CNTL/Z.		•

Тор

Physical Config CLI Attributes GLOBAL GigabitEthernet0/0/0 Settings Port Status Algorithm Settings Bandwidth			Napol	i –	0 🔇
GLOBAL GigabitEthernet0/0/0 Settings On Algorithm Settings Bandwidth 1000 Mbps 100 Mbps 100 SwirtCHING IP Configuration IP Address 192.168.0.1 VLAN Database IP Address 192.168.0.1 Subnet Mask Subnet Mask 255.255.255.0 Tx Ring Limit Interface Equivalent IOS Commands Tx Ring Limit 10 Interface Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Interface Interface Router(config)# Napoli(config)# Napoli(config)# 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)#	Physical Config	CLI Attrit	outes		
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Static NAC Address 0004.9A90.E101 RIP IP Configuration IP Address 192.168.0.1 SWITCHING VLAN Database IP Address 192.168.0.1 VLAN Database Subnet Mask 255.255.255.0 INTERFACE GigabitEthernet0/0/0 Tx Ring Limit 10 GigabitEthernet0/0/1 V Tx Ring Limit 10 Equivalent IOS Commands Tx Ring Limit 10 Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Image: Config)# Napoli(config)# Napoli(config)# Napoli(config)# Napoli(config)# Napoli(config)#interface GigabitEthernet0/0/0 Napoli(config)#interface GigabitEthernet0/0/0 Napoli(config)if)#interface SigabitEthernet0/0/0 wapoli(config)#interface GigabitEthernet0/0/0	ROUTING	Duplex		Half Duplex O Full Duplex	/ Auto
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GigabitEthernet0/0/1 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)f)#ip address 192.168.0.1 255.255.255.0 Napoli(config-if)#	GigabitEthernet0/0/0	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)#	GigabitEthernet0/0/1				
Equivalent IOS Commands Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname Napoli Napoli(config)# Napoli(config)#interface GigabitEthernet0/0/0 Napoli(config-if)#ip address 192.168.0.1 255.255.255.0 Napoli(config-if)#		*			

Тор

- 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 Deskt	op Programming	Attributes	
	⊚ St	atic	•
IP Address	192.1	168.0.2	
Subnet Mask	255.2	255.255.0	П
Default Gateway	0.0.0	.0	
DNS Server	0.0.0	.0	
IPv6 Configuration			
O 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			-
Тор			



Apriamo PC0 > Desktop > Command Prompt

Ping 192.168.0.2

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.

GLODAL	
Settings	Port Status 🔽 O
Algorithm Settings	Bandwidth C 1000 Mbps 💿 100 Mbps C 10 Mbps 🔽 Aut
ROUTING	Duplex C Half Duplex 🕑 Full Duplex 🔽 Aut
Static	MAC Address 0000 BAE9 BB01
RIP	
SWITCHING	
VLAN Database	IP Address 192.168.0.1
INTERFACE	Subnet Mask 255.255.255.0
GigabitEthernet0/0	
GigabitEthernet0/1	Tx Ring Limit 10
Equivalent IOS Comman up %LINEPROTO-5-UPDC GigabitEthernetO/ Router(config-if) Router(config)#	ds DWN: Line protocol on Interface (1, changed state to up #exit
quivalent IOS Comman up %LINEPROTO-5-UPDC GigabitEthernetO/ Router(config-if) Router(config)# Router(config)#	ds JWN: Line protocol on Interface /1, changed state to up #exit

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

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	_ 0 😣
Physical Config CLI	Attributes	
GLOBAL	Static Bou	tes
Settings		
Algorithm Settings	Network	
ROUTING	Mask	
Static	Next Hop	
RIP		
SWITCHING		Add
VLAN Database		
INTERFACE	Network Address	
GigabitEthernet0/0/0	192.168.0.0/24 via 172.16.0.2	
GigabitEthernet0/0/1		
		Remove
•		
Equivalent IOS Commands Router(contig-it)#		
Router(config-if)#exit		_
Router(config)# Router(config)#		_
Router(config)#		
Router(config)#		v

Тор

GLOBAL	Static Rout	es
Settings	Network	
Algorithm Settings		
ROUTING	Mask	
Static	Next Hop	
RIP		644
SWITCHING		Add
VLAN Database		
INTERFACE	Network Address	
GigabitEthernet0/0/0	10.0.0.0/8 via 172.16.0.1	
GigabitEthernet0/0/1		
,	7	Remove
quivalent IOS Command Router(config-if)# Router(config-if)#ex	s	-

Тор

Topologia Estesa con Routing Statico



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Topologia Estesa con Routing RIP



	PTP Pouting
Settings	Network
Algorithm Settings	Notwork Add
ROUTING	Add
Static	Network Address
RIP	192.168.0.0
SWITCHING	102 102 1
VLAN Database	192.165.1.0
INTERFACE	
GigabitEthernet0/0	
GigabitEthernet0/1	
	Contra L
~	Renove
quivalent IOS Commands	
Router(config-1f)#e Router(config)#rout	Ar rip
Roucer(config-rouce	r) #necwork 192.168.2.0
Roucer(config-rouce	z) #
Router(config-route Routertconfigure te	z) #end
Encer configuration	commands, one per line. End with CNTL/2.
Router (config) frout	er rip
	z) #
Router(config-route	

]	RTP Routing	1		
Settings	Network			_	
Algorithm Settings			Add		
ROUTING	Antonio Address		100		
Static	Network Address	_			
RIP	192.168.1.0				
SWITCHING	192 168 2 0				
VLAN Database	1. Serverere				
INTERFACE					
GigabitEthernet0/0					
GigabitEthernet0/1					
uivalent IOS Commands]				
				A	
oucer>emable					
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oucer,courigure ce	commands, one p	er line. End	wich CNTL/2.		
ncer configuration					
ncer configuration outer(config) #rout	er rip				

hysical Config CLI	Attributes	
GLOBAL 📥	RIP Routing	
Settings	Network	
Algorithm Settings	Add	1
ROUTING	Naturali Addmos	_
Static	HELWOIK Address	
RIP	192.168.2.0	
SWITCHING		
VLAN Database	192.168.3.0	
INTERFACE		
GigabitEthernet0/0		
GigabitEthernet0/1		
	Berr	~~~
¥		
quivalent IOS Commands		
\$SYS-S-CONFIG_I: Co	nfigured from console by console	<u> </u>
necwork 192.168.3.0		
Router (config-route	er) # and	
Rouger (config-rouge	rainal	
Router(config-route Router#configure te		
Router(config-route Router#configure te Enter configuration	commands, one per line. End with CNTL/2.	
Router (config-route Router‡configure te Enter configuration Router (config) ‡rout Router (config) ‡rout	a commands, one per line. End with CNTL/2. Her rip with	
Router (config-route Router‡configure te Enter configuration Router (config)‡rout Router (config-route \$SYS-S-CONFIG_I: Co	a commands, one per line. End with CNIL/2. ser rip rt) \$ nfigured from console by console	
Router (config-route Router#configure te Enter configuration Router (config)#route Router (config-route %SYS-S-CONFIG_I: Co	<pre>commands, one per line. End wich CNTL/2. er rip sr); snfigured from console by console</pre>	-
Roucer(config-rouce Roucerrconfigure ce Encer configuration Roucer(config)frouc Roucer(config)frouce %SYS-S-CONFIG_I: Co	<pre>commands, one per line. End wich CNTL/2. er rip x1 = mfigured from console by console</pre>	Ţ

From Routing Table to Network





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



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 I interface FastEthernet0/1 ip address 192.168.24.25 255.255.255.252 duplex auto speed auto T 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 L interface FastEthernet0/1 ip address 192.168.24.26 255.255.255.252 duplex auto speed auto I 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 L 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 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

Packet Tracer Cisco

Stefania Zinno

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 Stefania Zinno 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 1/13 bgp.html