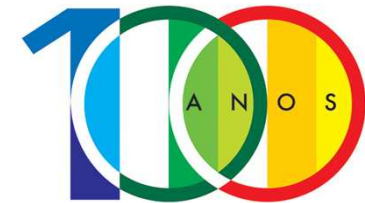


**INSTITUTO FEDERAL DE  
EDUCAÇÃO, CIÊNCIA E TECNOLOGIA**  
RIO GRANDE DO NORTE

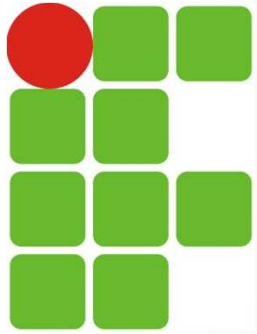


**REDE FEDERAL  
DE EDUCAÇÃO  
PROFISSIONAL  
E TECNOLÓGICA**  
1909-2009

# Curso Superior em Redes de Computadores

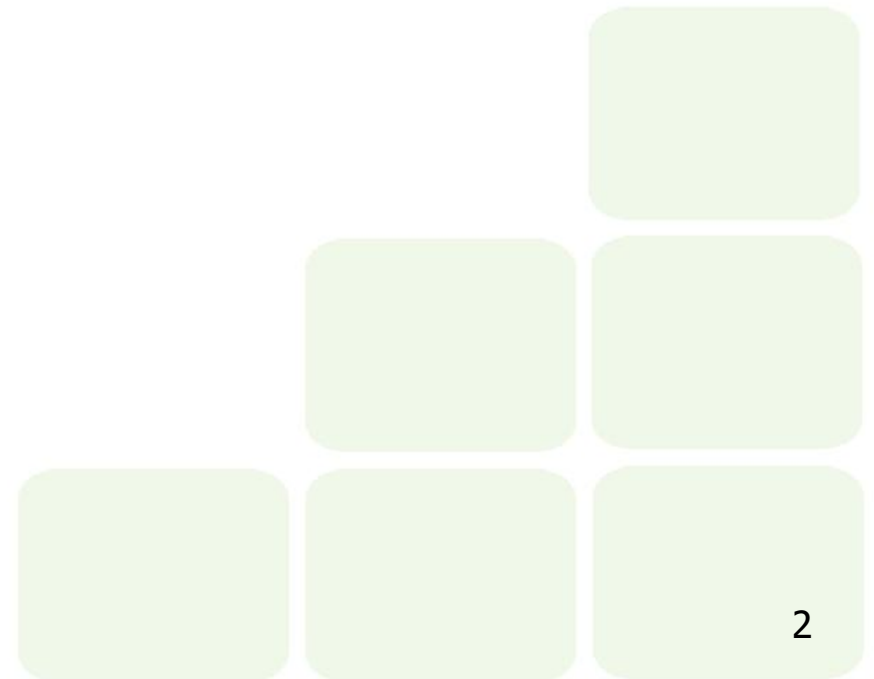
## Roteamento IP UNICAST

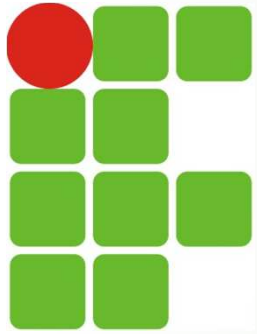
Prof. Sales Filho <salesfilho@cefetrn.br>



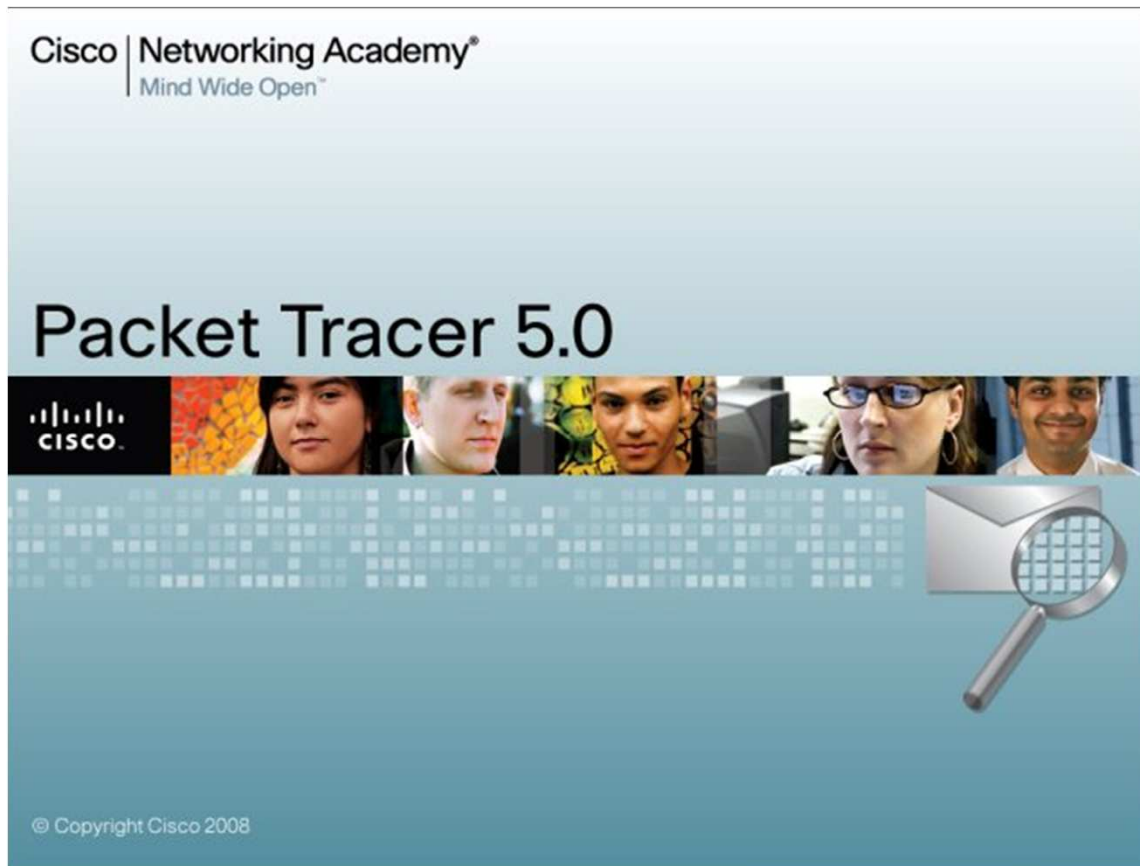
# Objetivo

- Apresentar o simulador *Packet Tracer 5*
- Implementar uma topologia utilizando o protocolo de roteamento RIPv2

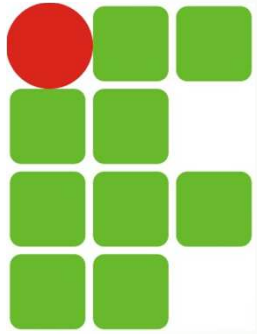




# Simulador Packet Tracer



Cisco Networking Academy is a comprehensive e-learning initiative that enables students to develop valuable information and communication technology skills for increased access to opportunities in the global economy. To learn more about the program, how to get involved, career resources for students, how we are addressing the digital divide, and more, visit [www.cisco.com/go/netacad](http://www.cisco.com/go/netacad).



# Simulador Packet Tracer

**Seleção de categoria de dispositivos**

**Seleção do dispositivo**

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_red\_e\_rotamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Time: 00:10:28 Power Cycle Devices Realtime

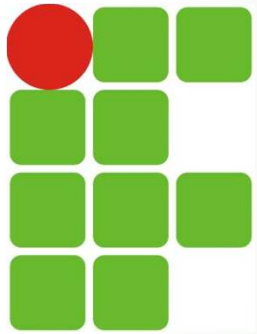
Scenario 0

| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|------|-------------|--------|-------------|------|-------|

New Delete

Toggle PDU List Window

Automatically Choose Connection Type



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc.

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

2620XM Router0 2620XM Router1 2620XM Router2

Time: 00:04:57 Power Cycle Devices Realtime

Routers: 1841, 2620XM, 2621XM, 2811, Generic, Generic

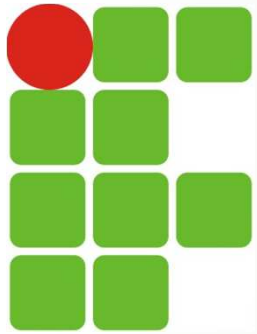
Automatically Choose Connection Type

Scenario 0: Fire, Last Status, Source, Destination, Type, Color

New Delete

Toggle PDU List Window

**Clicar e arrastar o dispositivo Para a área de desenho**

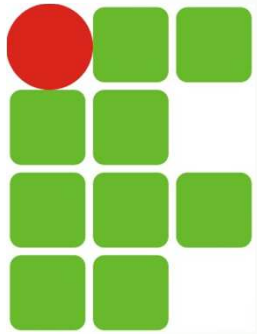


# Simulador Packet Tracer

The screenshot displays the Packet Tracer 5.0 interface. The title bar reads "Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotteamento\_rip.pkt". The menu bar includes "File", "Edit", "Options", "View", "Tools", "Extensions", and "Help". The toolbar contains various icons for file operations and simulation control. The main workspace is titled "Logical [Root]" and contains a network diagram with the following components:

- Three 2620XM Routers: Router0, Router1, and Router2.
- Three 2950-24 Switches: Switch0, Switch1, and Switch2.
- Three PC-PT PCs: PC0, PC1, and PC2.

The interface also features a "Realtime" panel at the bottom right, showing a clock and "Power Cycle Devices" options. A "Connections" panel at the bottom left includes a "Connections" button and a "Toggle PDU List Window" button. A table with columns "Fire", "Last Status", "Source", "Destination", "Type", and "Color" is visible in the bottom right corner.



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotacionamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

2620XM Router0  
2620XM Router1  
2620XM Router2

2950-24 Switch0  
2950-24 Switch1  
2950T-24 Switch2

PC-PT PC0  
PC-PT PC1  
PC-PT PC2

Time: 00:10:28 Power Cycle Devices Realtime

Connections

Automatically Choose Connection Type

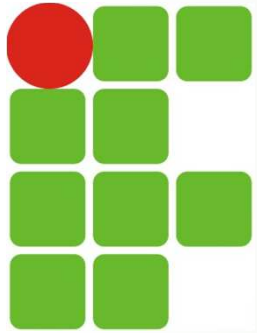
Scenario 0

| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|      |             |        |             |      |       |

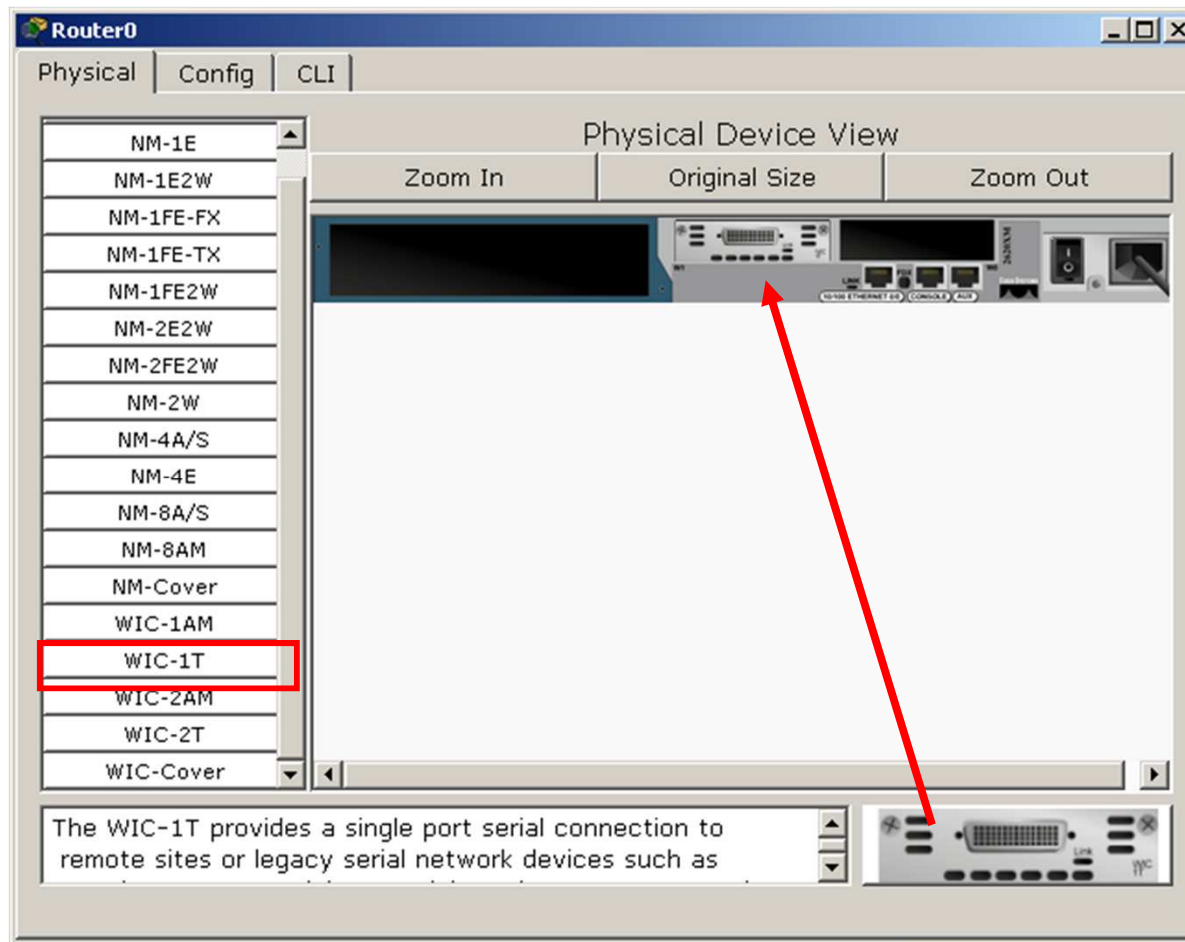
New Delete

Toggle PDU List Window

**Esta barra de ferramenta apresenta os vários tipos de ligações possíveis**

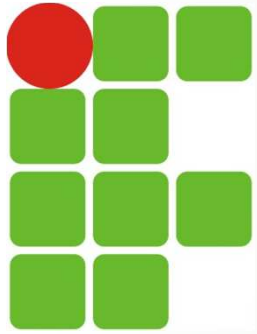


# Simulador Packet Tracer

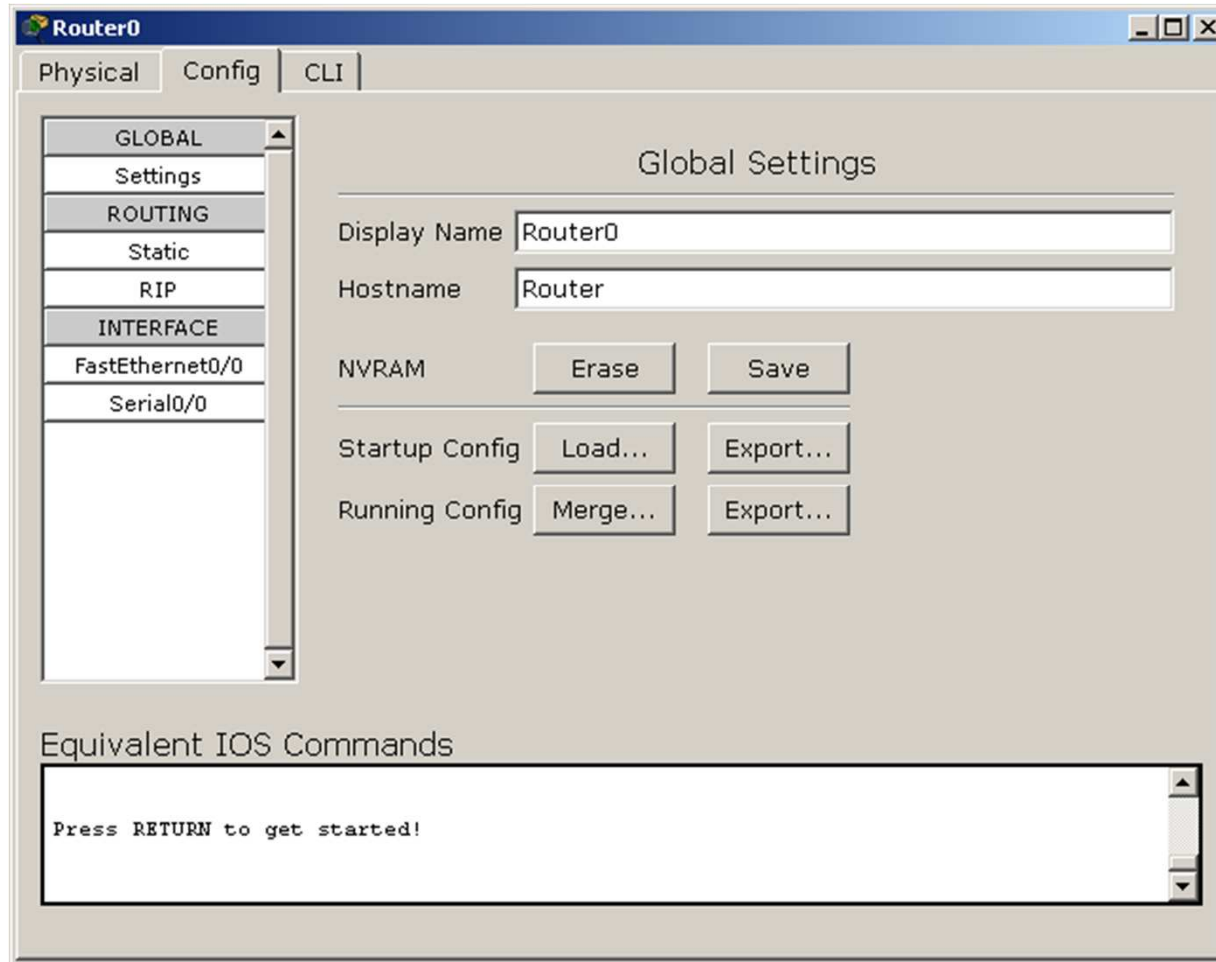


- Clicando duas vezes no dispositivo abre-se a tela de configuração
- No caso dos roteadores, é possível fazer as configurações físicas das interfaces
- É preciso desligar o roteador para configurá-lo fisicamente
- Seleciona-se o tipo de interface no painel, arrasta-se e coloca no encaixe do roteador
- Depois liga-se novamente o dispositivo

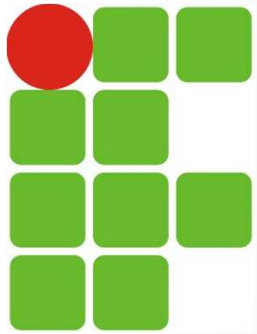




# Simulador Packet Tracer



- Pode-se fazer as configurações básicas através da aba Config
- Configurações avançadas devem ser feitas no CLI – Command Line Interface



# Simulador Packet Tracer

Router0

Physical Config CLI

GLOBAL

- Settings
- ROUTING
  - Static
  - RIP
- INTERFACE
  - FastEthernet0/0**
  - Serial0/0

FastEthernet0/0

Port Status  On

Bandwidth  Auto

10 Mbps  100 Mbps

Duplex  Auto

Full Duplex  Half Duplex

MAC Address 0060.3E97.0EB7

IP Address 172.16.10.1

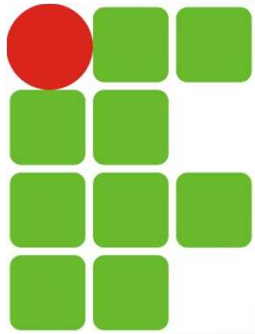
Subnet Mask 255.255.255.0

Equivalent IOS Commands

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 172.16.10.1 255.255.255.0
Router(config-if)#
```

- Configuração da Interface Fast Ethernet

- Perceba o painel inferior apresenta os comandos que são executados no S.O. do roteador



# Simulador Packet Tracer

```
Router0
Physical Config CLI
IOS Command Line Interface
m800 processor, part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
1 FastEthernet/IEEE 802.3 interface(s)
1 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

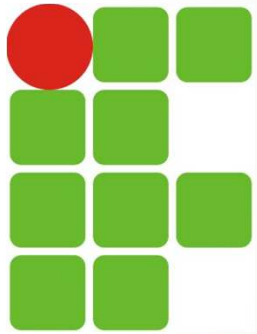
--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 172.16.10.1 255.255.255.0
Router(config-if)#
```

- A console de comandos pode ser acessada para configuração dos parâmetros do roteador



# Simulador Packet Tracer

Router0

Physical Config CLI

Serial0/0

Port Status  On

Clock Rate 2000000

Duplex  Full Duplex

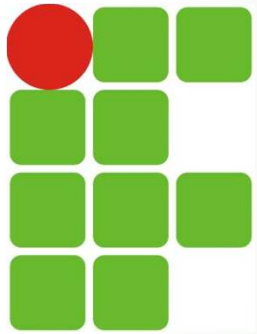
IP Address 200.200.100.1

Subnet Mask 255.255.255.252

Equivalent IOS Commands

```
Router(config-if)#no shutdown
Router(config-if)#clock rate 2000000
Router(config-if)#ip address 200.200.100.1 255.255.255.0
Router(config-if)#ip address 200.200.100.1 255.255.255.252
Router(config-if)#
```

- Configuração da interface serial0/0 do Roteador0



# Simulador Packet Tracer

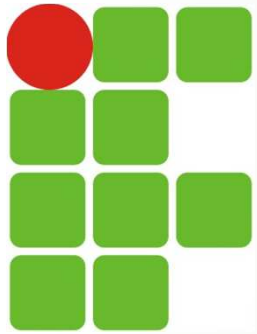
The screenshot shows the configuration window for Router1, specifically the FastEthernet0/0 interface. The interface is highlighted in the left-hand menu. The configuration details are as follows:

- Port Status:  On
- Bandwidth:  Auto
- Speed:  10 Mbps,  100 Mbps
- Duplex:  Auto
- Mode:  Full Duplex,  Half Duplex
- MAC Address: 00D0.5820.4867
- IP Address: 172.16.30.1
- Subnet Mask: 255.255.0.0

Equivalent IOS Commands:

```
Router(config)#interface Serial0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

- Configuração da interface Fast Ethernet do Roteador1



# Simulador Packet Tracer

Router1

Physical Config CLI

Serial0/0

Port Status  On

Clock Rate Not Set

Duplex  Full Duplex

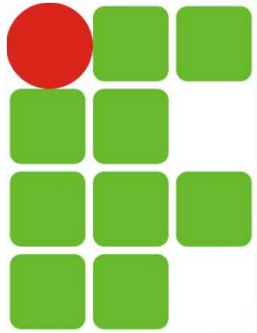
IP Address 200.200.100.2

Subnet Mask 255.255.255.252

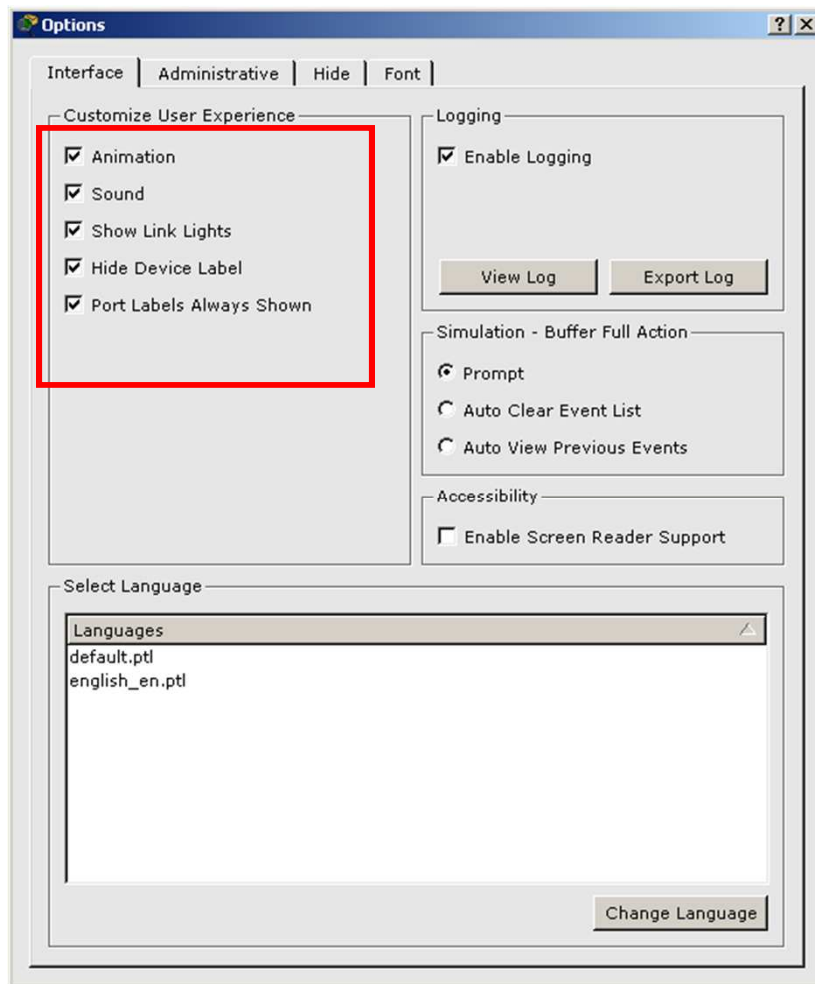
Equivalent IOS Commands

```
Router(config)#interface Serial0/0
Router(config-if)#no shutdown
Router(config-if)#ip address 200.200.100.2 255.255.255.0
Router(config-if)#ip address 200.200.100.2 255.255.255.252
Router(config-if)#
```

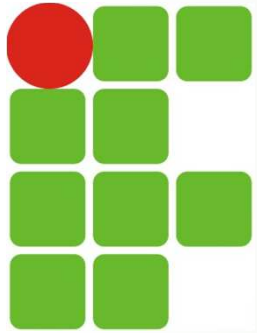
- Configuração da interface serial0/0 do Roteador1



# Simulador Packet Tracer



- Pode-se realizar algumas configurações no programa acessando o menu Options->Preferences



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotacao\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Time: 00:28:01 Power Cycle Devices Realtime

Scenario 0

| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|------|-------------|--------|-------------|------|-------|

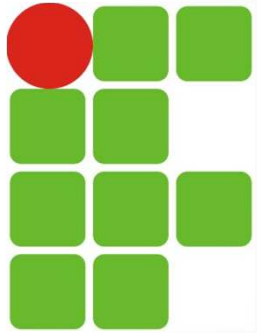
Connections

Automatically Choose Connection Type

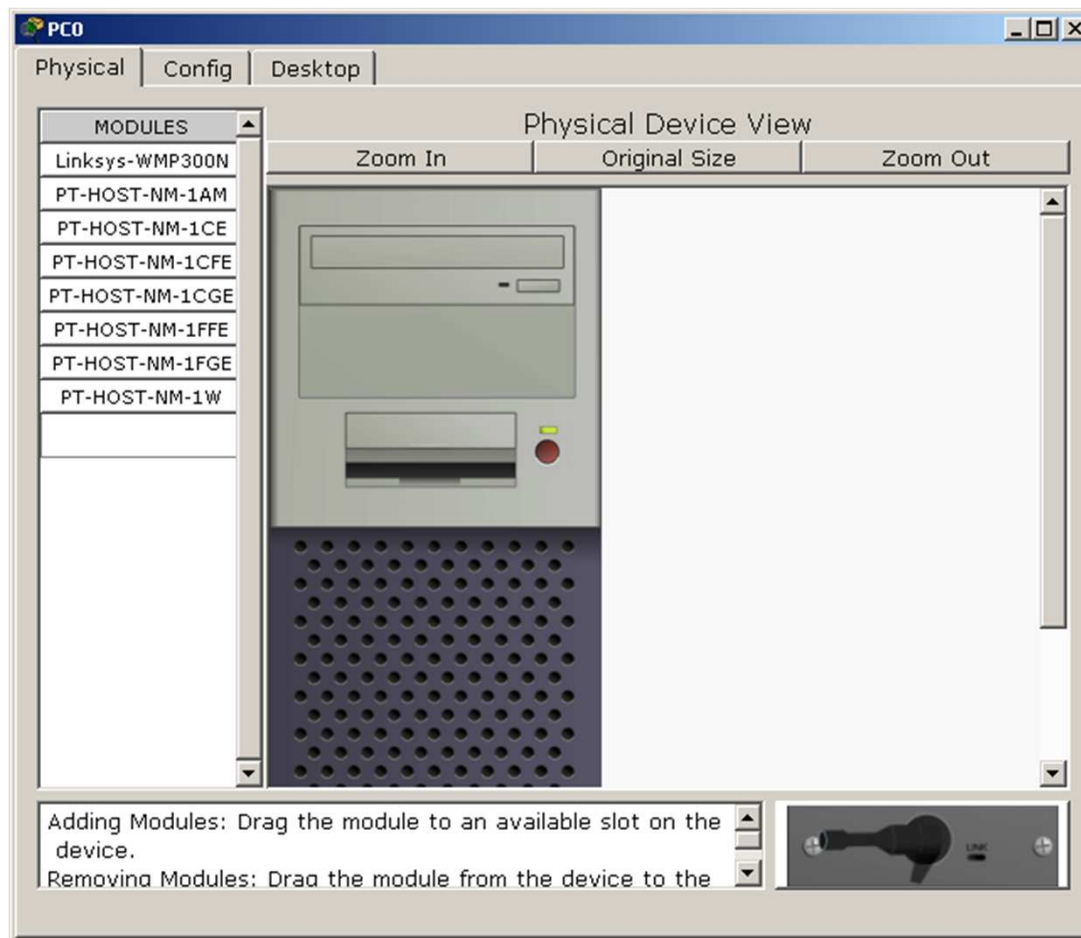
Toggle PDU List Window

Interligação dos dispositivos

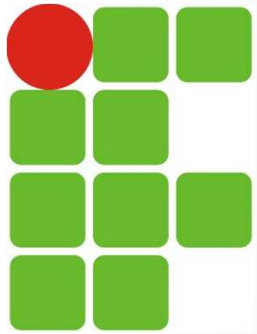




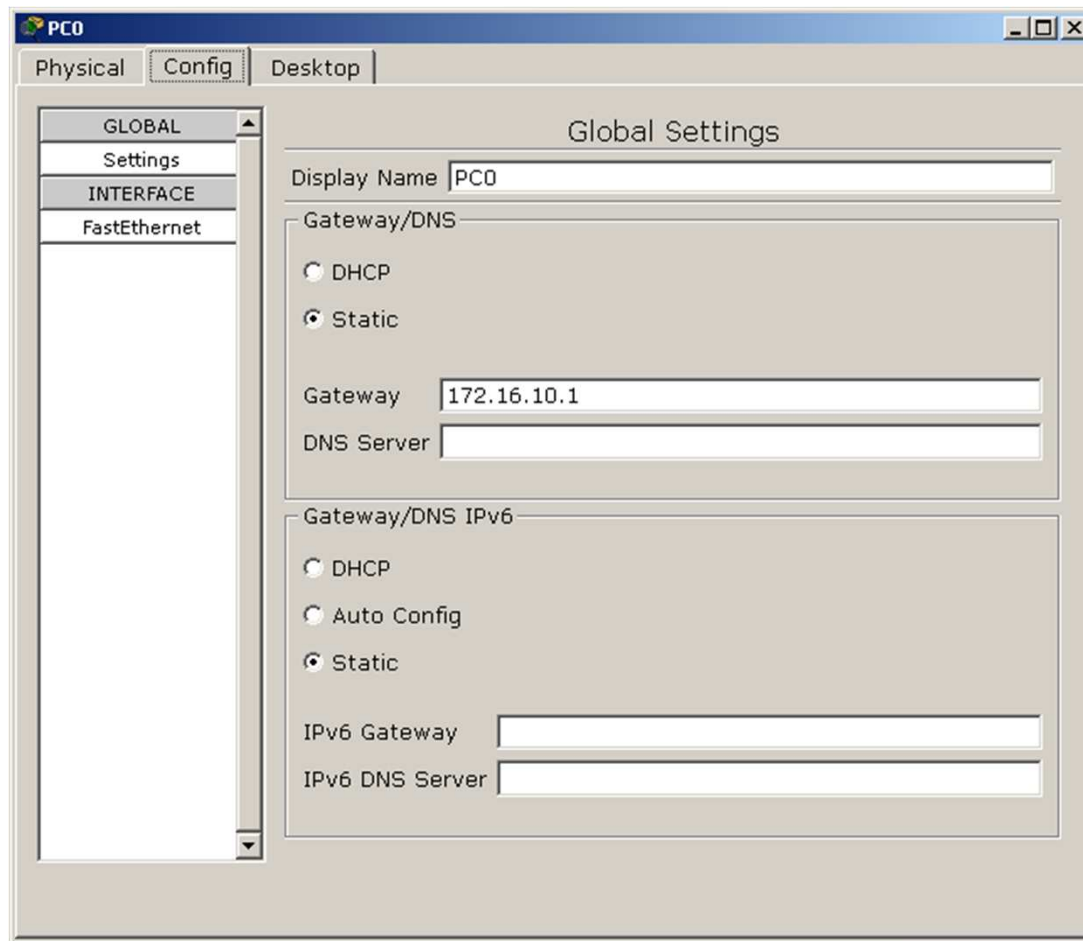
# Simulador Packet Tracer



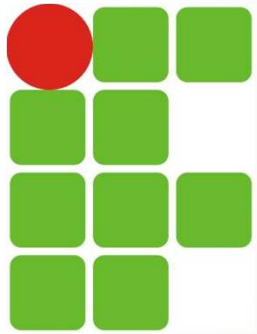
- Pode-se realizar configurações nos hosts (computadores) através das abas Physical, Config e Desktop



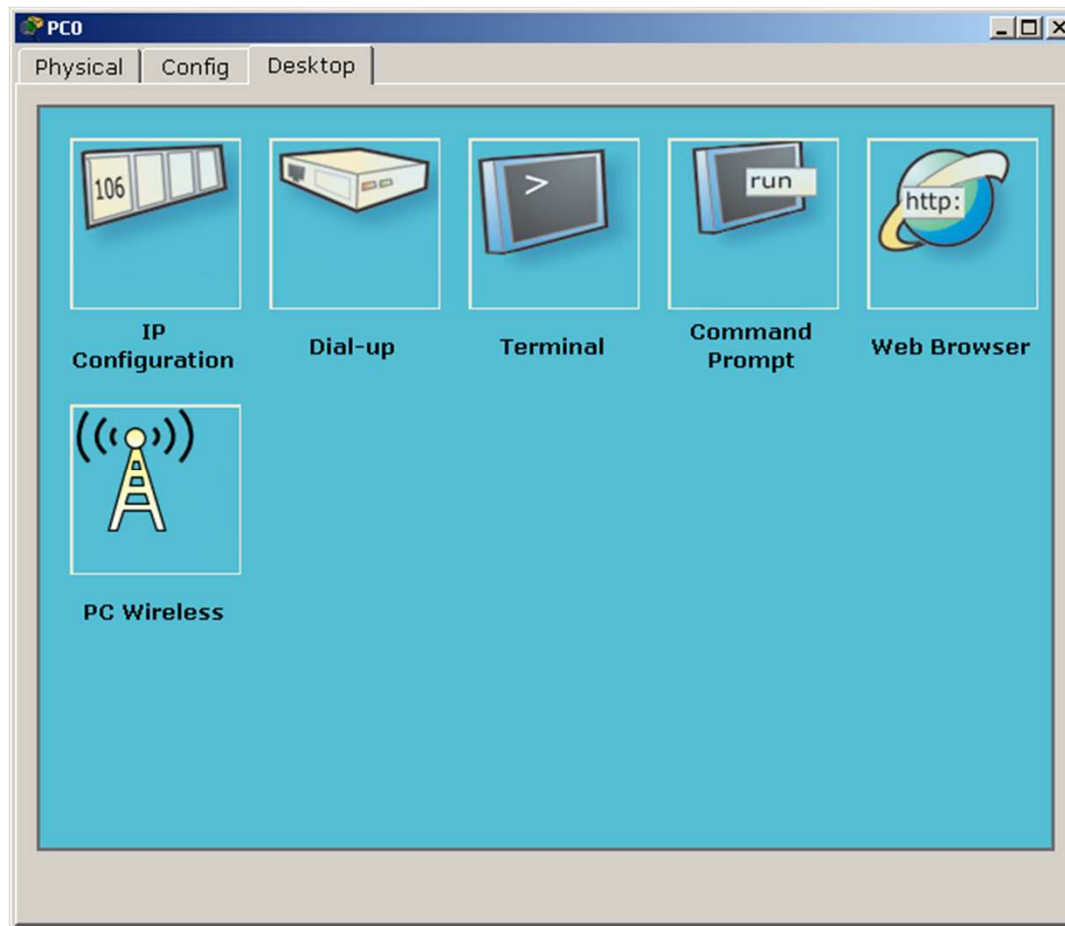
# Simulador Packet Tracer



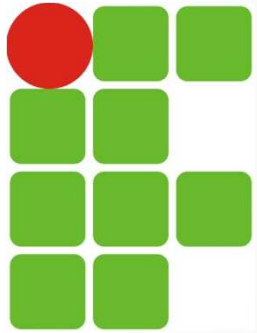
- Pode-se realizar configurações de endereçamento



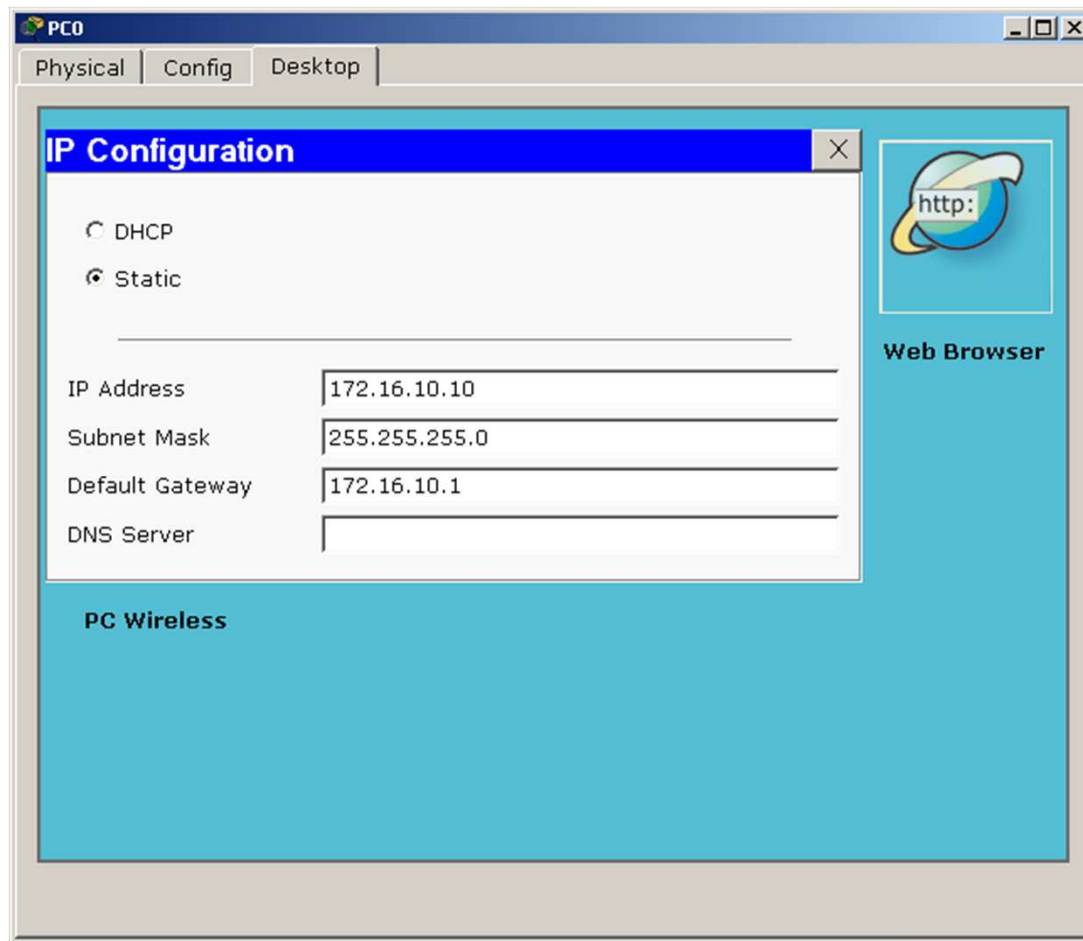
# Simulador Packet Tracer



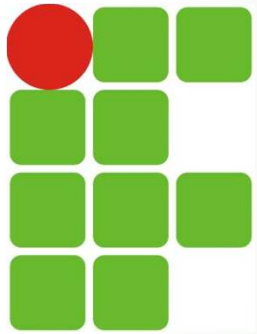
- Opções de configuração da aba Desktop



# Simulador Packet Tracer



- Acesso a opção IP CONFIGURATION



# Simulador Packet Tracer

```
PCO
Physical Config Desktop
Command Prompt
PC>
PC>ping 172.16.10.1

Pinging 172.16.10.1 with 32 bytes of data:

Reply from 172.16.10.1: bytes=32 time=157ms TTL=255
Reply from 172.16.10.1: bytes=32 time=62ms TTL=255
Reply from 172.16.10.1: bytes=32 time=62ms TTL=255
Reply from 172.16.10.1: bytes=32 time=62ms TTL=255

Ping statistics for 172.16.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 62ms, Maximum = 157ms, Average = 85ms

PC>ping 172.16.30.1

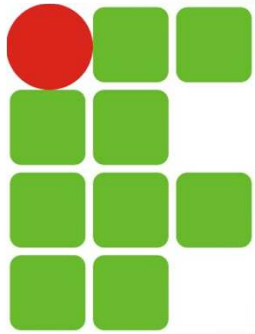
Pinging 172.16.30.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.16.30.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>
```

- Acesso a opção COMMAND PROMPT



# Simulador Packet Tracer

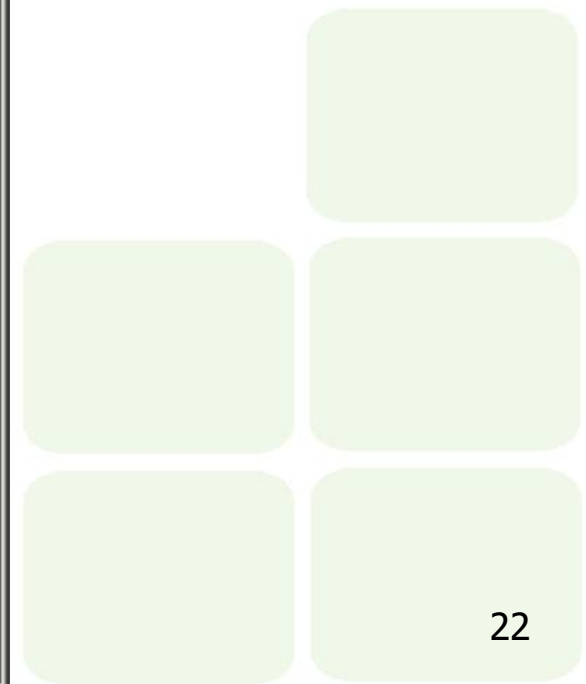
```
Router0
Physical | Config | CLI
IOS Command Line Interface

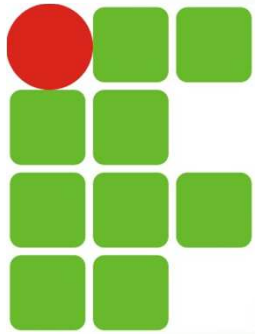
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#rou
Router(config)#router rip
Router(config-router)#ver
Router(config-router)#version 2
Router(config-router)#ne
Router(config-router)#network 200.200.100.0
Router(config-router)#network 172.16.10.0
Router(config-router)#exit
Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
Router#show ip rou
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      172.16.0.0/24 is subnetted, 1 subnets
C       172.16.10.0 is directly connected, FastEthernet0/0
      200.200.100.0/30 is subnetted, 1 subnets
C       200.200.100.0 is directly connected, Serial0/0
Router#
```

- Realizando a configuração do protocolo de roteamento dinâmico RIP no **Roteador0** através da COMMAND LINE INTERFACE





# Simulador Packet Tracer

```
Router1
Physical Config CLI
IOS Command Line Interface

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#ver
Router(config-router)#version 2
Router(config-router)#netw
Router(config-router)#network 200.200.100.0 255.255.255.252
^
% Invalid input detected at '^' marker.

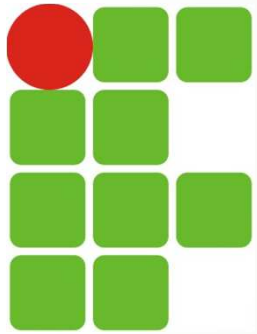
Router(config-router)#network 200.200.100.0
Router(config-router)#network 172.16.30.0
Router(config-router)#exit
Router(config)#exit
%SYS-5-CONFIG_I: Configured from console by console
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
R       172.16.0.0/16 [120/1] via 200.200.100.1, 00:00:23, Serial0/0
C       172.16.30.0/24 is directly connected, FastEthernet0/0
        200.200.100.0/30 is subnetted, 1 subnets
C       200.200.100.0 is directly connected, Serial0/0
Router#
```

- Realizando a configuração do protocolo de roteamento dinâmico RIP no **Roteador1** através da COMMAND LINE INTERFACE





# Simulador Packet Tracer

```
PCO
Physical Config Desktop
Command Prompt
PC>ping 172.16.30.1

Pinging 172.16.30.1 with 32 bytes of data:

Reply from 172.16.30.1: bytes=32 time=93ms TTL=254
Reply from 172.16.30.1: bytes=32 time=109ms TTL=254
Reply from 172.16.30.1: bytes=32 time=78ms TTL=254
Reply from 172.16.30.1: bytes=32 time=94ms TTL=254

Ping statistics for 172.16.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 78ms, Maximum = 109ms, Average = 93ms

PC>ping 172.16.30.30

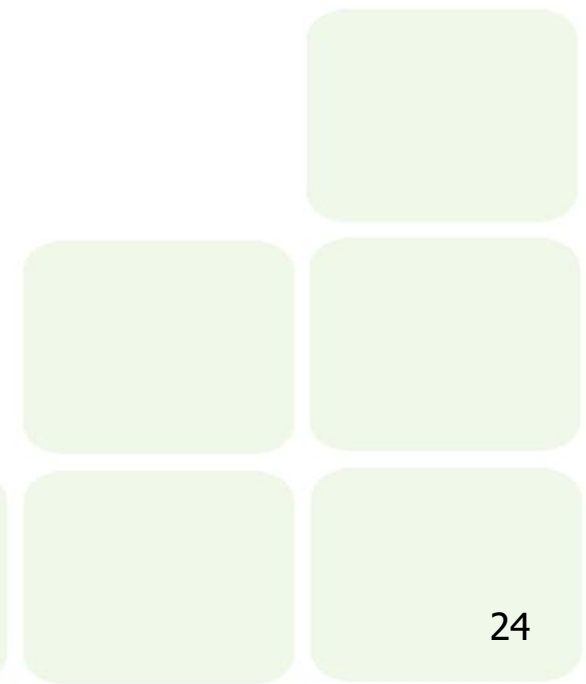
Pinging 172.16.30.30 with 32 bytes of data:

Reply from 172.16.30.30: bytes=32 time=158ms TTL=126
Reply from 172.16.30.30: bytes=32 time=125ms TTL=126
Reply from 172.16.30.30: bytes=32 time=141ms TTL=126
Reply from 172.16.30.30: bytes=32 time=157ms TTL=126

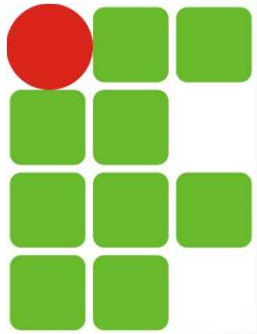
Ping statistics for 172.16.30.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 125ms, Maximum = 158ms, Average = 145ms

PC>
```

- Testando a configuração das rotas



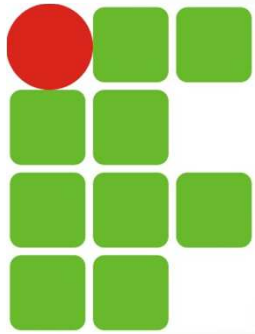




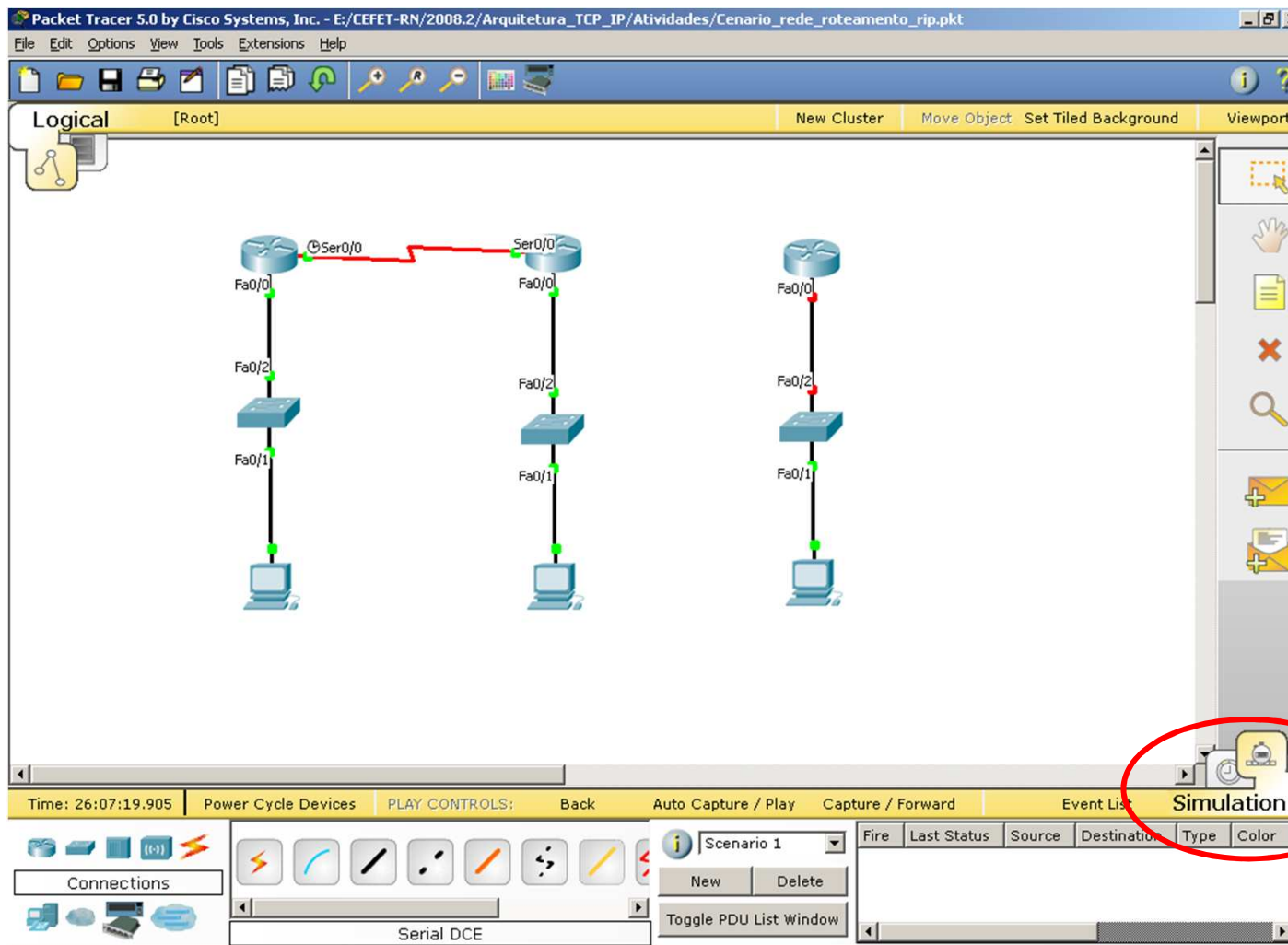
# Simulador Packet Tracer

```
Router0
Physical Config CLI
IOS Command Line Interface
Router#copy running-config sta
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
```

- Salvando as configurações do roteador no arquivo de inicialização (Gravar na flash)

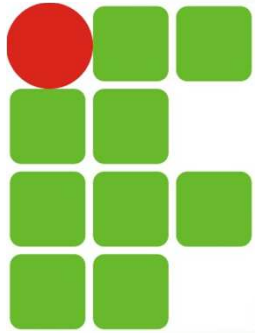


# Simulador Packet Tracer



• Utilizando o modo de simulação

Alterna entre o modo de simulação E o de tempo real



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotacionamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Time: 26:07:39.118 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation

Scenario 1

| Time | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|------|-------------|--------|-------------|------|-------|

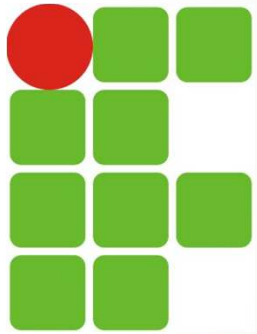
Serial DCE

Toggle PDU List Window

- Utilizando o modo de simulação

- Clicando na lupa E depois no pacote é possível verificar o conteúdo da PDU

Passo-a-passo da simulação



# Simulador Packet Tracer

**PDU Information at Device: Router0**

OSI Model | Outbound PDU Details

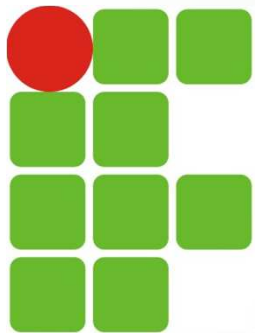
At Device: Router0  
Source: Router0  
Destination: 224.0.0.9

| In Layers | Out Layers   |
|-----------|--|
| Layer7    | Layer 7: RIP Version: 2, Command: 2                            |
| Layer6    | Layer6   |
| Layer5    | Layer5   |
| Layer4    | Layer 4: UDP Src Port: 520, Dst Port: 520                      |
| Layer3    | Layer 3: IP Header Src. IP: 200.200.100.1, Dest. IP: 224.0.0.9 |
| Layer2    | Layer 2: HDLC Frame HDLC                                       |
| Layer1    | Layer 1: Port(s): Serial0/0                                    |

1. Serial0/0 sends out the frame.

Challenge Me    << Previous Layer    Next Layer >>

- Nesta tela é possível verificar cada camada do modelo OSI



# Simulador Packet Tracer

PDU Information at Device: Router0

OSI Model    Inbound PDU Details

PDU Formats

HDLCL

|              |      |          |                         |      |              |      |      |
|--------------|------|----------|-------------------------|------|--------------|------|------|
| 0            | 8    | 16       | 32                      | 32+x | 48+x         | 56+x | Bits |
| FLG:         | ADR: | CONTROL: | DATA: (VARIABLE LENGTH) | FCS: | FLG:         |      |      |
| 0111<br>1110 | 0x8f | 0x0      |                         | 0x0  | 0111<br>1110 |      |      |

IP

|                        |     |           |     |                  |    |      |
|------------------------|-----|-----------|-----|------------------|----|------|
| 0                      | 4   | 8         | 16  | 19               | 31 | Bits |
| 4                      | IHL | DSCP: 0x0 | TL  |                  |    |      |
| ID: 0x0                |     | 0x0       |     | FRAG OFFSET: 0x0 |    |      |
| TTL: 255               |     | PRO: 0x11 |     | CHKSUM           |    |      |
| SRC IP: 200.200.100.2  |     |           |     |                  |    |      |
| DST IP: 224.0.0.9      |     |           |     |                  |    |      |
| OPT: 0x0               |     |           | 0x0 |                  |    |      |
| DATA (VARIABLE LENGTH) |     |           |     |                  |    |      |

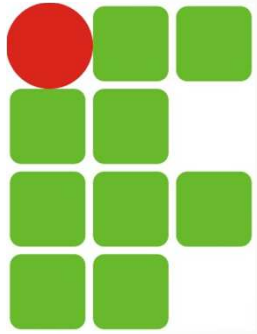
UDP

|                 |    |                |      |
|-----------------|----|----------------|------|
| 0               | 16 | 31             | Bits |
| SRC PORT: 520   |    | DEST PORT: 520 |      |
| LENGTH: 0x26    |    | CHECKSUM: 0x0  |      |
| DATA (VARIABLE) |    |                |      |

RIP v.2

|                         |   |                |    |                     |    |      |
|-------------------------|---|----------------|----|---------------------|----|------|
| 0                       | 4 | 8              | 16 | 19                  | 31 | Bits |
| CMD: 0x2                |   | VER: 0x2       |    | 0000 0000 0000 0000 |    |      |
| ADDR FAMILY: 0x2        |   | ROUTE TAG: 0x0 |    |                     |    |      |
| NETWORK: 172.16.0.0     |   |                |    |                     |    |      |
| SUBNET: 255.255.0.0     |   |                |    |                     |    |      |
| NEXT HOP: 200.200.100.2 |   |                |    |                     |    |      |
| METRIC: 0x1             |   |                |    |                     |    |      |

- Nesta tela é possível verificar todas as PDU's transmitidas



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotacionamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

From: Router0  
Type: RIPv2  
Status: Accepted

Time: 26:07:39.119 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation

Connections

Serial DCE

Scenario 1

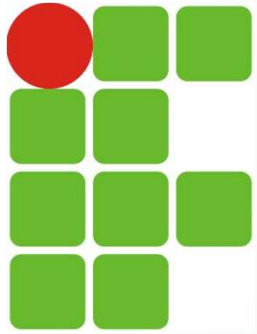
| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|------|-------------|--------|-------------|------|-------|

New Delete

Toggle PDU List Window

00:48

- Continuando a simulação, o pacote é entregue ao destino



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_rotacionamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Type: RIPv2

Time: 26:07:42.635 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation

| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|------|-------------|--------|-------------|------|-------|

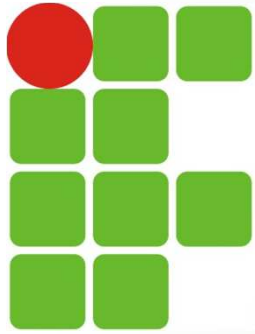
Connections

Serial DCE

Toggle PDU List Window

Windows: Iniciar, sonet - Pesquisa G..., Programa da Cisco ..., Packet Tracer 5..., Imagens, imagem - Paint, Router0, 00:49

- Continuando a simulação, o pacote é entregue ao destino



# Simulador Packet Tracer

Packet Tracer 5.0 by Cisco Systems, Inc. - E:/CEFET-RN/2008.2/Arquitetura\_TCP\_IP/Atividades/Cenario\_rede\_roteamento\_rip.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

From: Router1  
Type: RIPv2  
Status: Accepted

Time: 26:07:42.636 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation

| Fire | Last Status | Source | Destination | Type | Color |
|------|-------------|--------|-------------|------|-------|
|      |             |        |             |      |       |
|      |             |        |             |      |       |
|      |             |        |             |      |       |
|      |             |        |             |      |       |
|      |             |        |             |      |       |

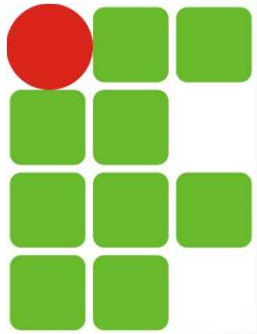
Connections Serial DCE

Scenario 1 New Delete Toggle PDU List Window

Iniciar sonet - Pesquisa G... Programa da Cisco ... Packet Tracer 5... Imagens imagem - Paint Router0 00:50

- Continuando a simulação, o pacote é entregue ao destino





# Simulador Packet Tracer

**PDU Information at Device: Router0**

OSI Model | Inbound PDU Details

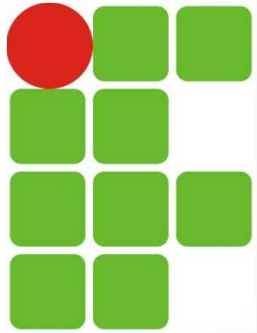
At Device: Router0  
Source: Router1  
Destination: 224.0.0.9

| In Layers  | Out Layers |
|--|------------|
| Layer 7: RIP Version: 2, Command: 2                            | Layer7     |
| Layer6   | Layer6     |
| Layer5   | Layer5     |
| Layer 4: UDP Src Port: 520, Dst Port: 520                      | Layer4     |
| Layer 3: IP Header Src. IP: 200.200.100.2, Dest. IP: 224.0.0.9 | Layer3     |
| Layer 2: HDLC Frame HDLC                                       | Layer2     |
| Layer 1: Port Serial0/0  | Layer1     |

1. Serial0/0 receives the frame.

Challenge Me | << Previous Layer | Next Layer >>

- Examinando o pacote em **Router0**



# Simulador Packet Tracer

**PDU Information at Device: Router0**

OSI Model | Inbound PDU Details

PDU Formats

**HDLC**

| 0            | 8    | 16       | 32                      | 32+x | 48+x         | 56+x | Bits |
|--------------|------|----------|-------------------------|------|--------------|------|------|
| FLG:         | ADR: | CONTROL: | DATA: (VARIABLE LENGTH) | FCS: | FLG:         |      |      |
| 0111<br>1110 | 0x8f | 0x0      |                         | 0x0  | 0111<br>1110 |      |      |

**IP**

| 0                      | 4   | 8         | 16  | 19               | 31 | Bits |
|------------------------|-----|-----------|-----|------------------|----|------|
| 4                      | IHL | DSCP: 0x0 | TL  |                  |    |      |
| ID: 0x0                |     | 0x0       |     | FRAG OFFSET: 0x0 |    |      |
| TTL: 255               |     | PRO: 0x11 |     | CHKSUM           |    |      |
| SRC IP: 200.200.100.2  |     |           |     |                  |    |      |
| DST IP: 224.0.0.9      |     |           |     |                  |    |      |
| OPT: 0x0               |     |           | 0x0 |                  |    |      |
| DATA (VARIABLE LENGTH) |     |           |     |                  |    |      |

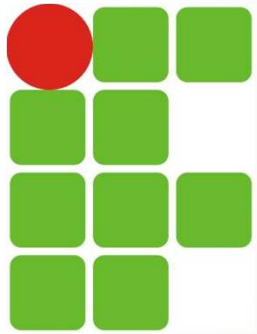
**UDP**

| 0               | 16 | 31             | Bits |
|-----------------|----|----------------|------|
| SRC PORT: 520   |    | DEST PORT: 520 |      |
| LENGTH: 0x26    |    | CHECKSUM: 0x0  |      |
| DATA (VARIABLE) |    |                |      |

**RIP v.2**

| 0                       | 4 | 8              | 16 | 19                  | 31 | Bits |
|-------------------------|---|----------------|----|---------------------|----|------|
| CMD: 0x2                |   | VER: 0x2       |    | 0000 0000 0000 0000 |    |      |
| ADDR FAMILY: 0x2        |   | ROUTE TAG: 0x0 |    |                     |    |      |
| NETWORK: 172.16.0.0     |   |                |    |                     |    |      |
| SUBNET: 255.255.0.0     |   |                |    |                     |    |      |
| NEXT HOP: 200.200.100.2 |   |                |    |                     |    |      |
| METRIC: 0x1             |   |                |    |                     |    |      |

- PDU's em **Router0**

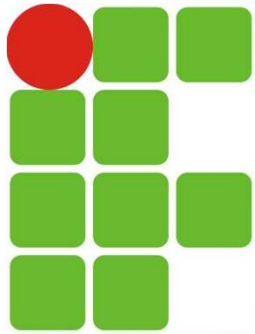


# Simulador Packet Tracer

```
Router1
Physical Config CLI
IOS Command Line Interface
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#
Router#deb
Router#debug ip
Router#debug ip rou
Router#debug ip ?
  icmp    ICMP transactions
  nat     NAT events
  ospf    OSPF information
  packet  Packet information
  rip     RIP protocol transactions
  routing Routing table events
Router#debug ip rou
Router#debug ip routing
IP routing debugging is on
Router#debug ip rip
RIP protocol debugging is on
Router#
```

Copy

Paste

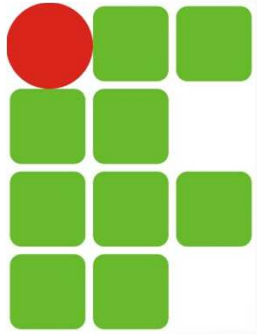


# Simulador Packet Tracer

```
Router1
Physical | Config | CLI
IOS Command Line Interface
Router#debug ip rou
Router#debug ip routing
IP routing debugging is on
Router#debug ip rip
RIP protocol debugging is on
Router#RIP: received v2 update from 200.200.100.1 on Serial0/0
    172.16.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via FastEthernet0/0 (172.16.30.1)
RIP: build update entries
    172.16.0.0/16 via 0.0.0.0, metric 2, tag 0
    200.200.100.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0 (200.200.100.2)
RIP: build update entries
    172.16.0.0/16 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 200.200.100.1 on Serial0/0
    172.16.0.0/16 via 0.0.0.0 in 1 hops
RIP: sending v2 update to 224.0.0.9 via FastEthernet0/0 (172.16.30.1)
RIP: build update entries
    172.16.0.0/16 via 0.0.0.0, metric 2, tag 0
    200.200.100.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/0 (200.200.100.2)
RIP: build update entries
    172.16.0.0/16 via 0.0.0.0, metric 1, tag 0
```

Copy

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# Referências

- Comer, Douglas E., Interligação de Redes Com Tcp/ip
- James F. Kurose, Redes de Computadores e a Internet
- Escola Superior de Redes, Arquitetura e Protocolos de Redes TCP/IP
- Escola Superior de Redes, Roteamento avançado