

## 查看本机IP与MAC地址

```
sanboot@A34:~$ sudo su
[sudo] password for sanboot:
root@A34:/home/sanboot# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 8c:89:a5:7b:66:ac
          inet  addr:192.168.133.29  Bcast:192.168.133.255  Mask:255.255.255.0
          inet6 addr: fe80::8e89:a5ff:fe7b:66ac/64 Scope:Link
             UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
             RX packets:254435 errors:0 dropped:60 overruns:0 frame:0
             TX packets:48859 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:362467781 (362.4 MB)  TX bytes:22384538 (22.3 MB)
```

## 查看ARP缓存

```
root@A34:/home/sanboot# arp -n
Address           HWtype  HWaddress           Flags Mask   Iface
192.168.133.254  ether    78:58:60:7b:6c:64  C       eth0
192.168.133.250  ether    f8:bc:12:35:fa:d8  C       eth0
```

## ping临近主机

```
root@A34:/home/sanboot# ping 192.168.133.30
PING 192.168.133.30 (192.168.133.30) 56(84) bytes of data.
64 bytes from 192.168.133.30: icmp_req=1 ttl=64 time=0.389 ms
64 bytes from 192.168.133.30: icmp_req=2 ttl=64 time=0.181 ms
64 bytes from 192.168.133.30: icmp_req=3 ttl=64 time=0.172 ms
64 bytes from 192.168.133.30: icmp_req=4 ttl=64 time=0.173 ms
^C
--- 192.168.133.30 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2999ms
rtt min/avg/max/mdev = 0.172/0.228/0.389/0.094 ms
```

## 重新查看arp缓存

```
root@A34:/home/sanboot# arp -n
Address          HWtype  HWaddress          Flags Mask   Iface
192.168.133.30  ether   8c:89:a5:7b:60:b4  C      eth0
192.168.133.254 ether   78:58:60:7b:6c:64  C      eth0
192.168.133.250 ether   f8:bc:12:35:fa:d8  C      eth0
```

# 查看本机IPv4路由表与路由配置

```
root@A34:/home/sanboot# route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref  Use Iface
0.0.0.0         192.168.133.254 0.0.0.0        UG    0      0      0 eth0
192.168.133.0   0.0.0.0        255.255.255.0   U     0      0      0 eth0
```

查看/proc/sys/net/ipv4/ip\_forward文件内容

# 寻找到bbs.ustc.edu.cn的路由路径(windows)

```
Microsoft Windows XP [版本 5.1.2600]
(C) 版权所有 1985-2001 Microsoft Corp.

C:\Documents and Settings\stl>tracert bbs.ustc.edu.cn

Tracing route to bbs.ustc.edu.cn [202.38.64.3]
over a maximum of 30 hops:

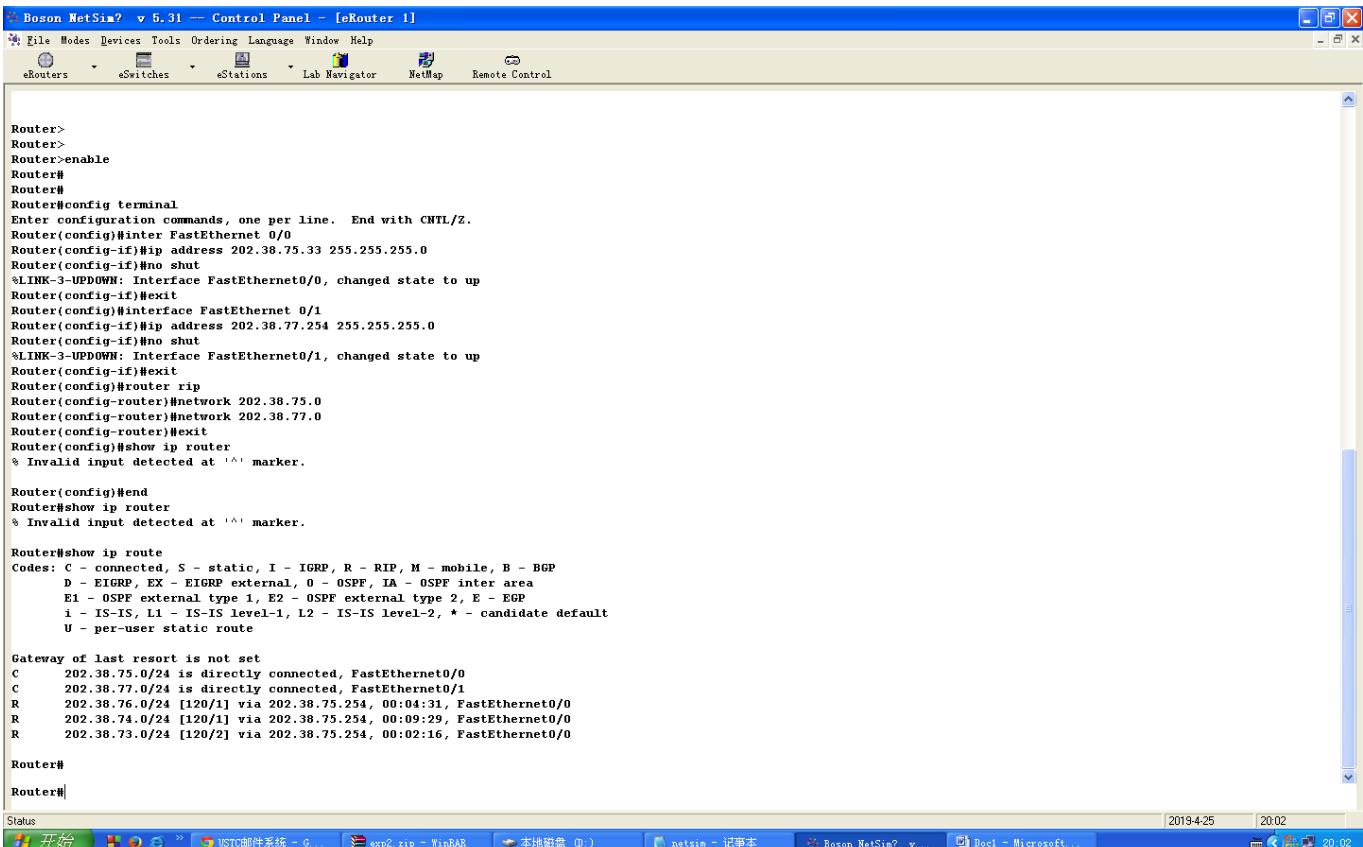
 1      1 ms      1 ms      1 ms  192.168.133.254
 2      <1 ms      <1 ms      <1 ms  172.16.0.1
 3      <1 ms      <1 ms      <1 ms  202.38.88.94
 4     263 ms      58 ms      3 ms   202.38.96.60
 5      <1 ms      <1 ms      <1 ms  bbs.ustc.edu.cn [202.38.64.3]

Trace complete.
```

## 路由器IP组网模拟

### 动态路由

#### RouterA



```
Boson NetSim? v 5.31 -- Control Panel - [eRouter_1]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Router>
Router>
Router>enable
Router#
Router#
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet 0/0
Router(config-if)#ip address 202.38.75.33 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip address 202.38.77.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 202.38.75.0
Router(config-router)#network 202.38.77.0
Router(config-router)#exit
Router(config)#show ip router
% Invalid input detected at '^' marker.

Router(config)#end
Router#show ip router
% Invalid input detected at '^' marker.

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
      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, * - candidate default
      U - per-user static route

Gateway of last resort is not set
C    202.38.75.0/24 is directly connected, FastEthernet0/0
C    202.38.77.0/24 is directly connected, FastEthernet0/1
R    202.38.76.0/24 [120/1] via 202.38.75.254, 00:04:31, FastEthernet0/1
R    202.38.74.0/24 [120/1] via 202.38.75.254, 00:09:29, FastEthernet0/0
R    202.38.73.0/24 [120/2] via 202.38.75.254, 00:02:16, FastEthernet0/0

Router#
Router#
```

## RouterB

```

Boson NetSim? v. 5.31 -- Control Panel - [eRouter 2]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Router(config)#interface FastEthernet 0/0
Router(config-if)#ip address 202.38.76.253 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip address 202.38.73.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 202.38.76
% Invalid input detected at '^' marker.
Router(config-router)#network 202.38.76.0
Router(config-router)#network 202.38.73.0
Router(config-router)#exit
Router(config)#exit
Router#show 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
      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, * - candidate default
      U - per-user static route

Gateway of last resort is not set
C 202.38.76.0/24 is directly connected, FastEthernet0/0
C 202.38.73.0/24 is directly connected, FastEthernet0/1
R 202.38.75.0/24 [120/1] via 202.38.76.254, 00:01:13, FastEthernet0/0
R 202.38.74.0/24 [120/1] via 202.38.76.254, 00:05:16, FastEthernet0/0
R 202.38.77.0/24 [120/2] via 202.38.76.254, 00:02:27, FastEthernet0/0

Router#

```

Status: 2019-4-25 19:50

## RouterC

```

Boson NetSim? v. 5.31 -- Control Panel - [eRouter 3]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Router(config)#interface Ethernet 0/1
Router(config-if)#ip address 202.38.76.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
Router(config-if)#exit
Router(config)#interface Ethernet 0/2
Router(config-if)#ip address 202.38.74.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0/2, changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 202.38.75.0
Router(config-router)#network 202.38.76.0
Router(config-router)#network 202.38.74.0
Router(config-router)#network 202.38.77.0
Router(config-router)#network 202.38.73.0
Router(config-router)#end
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
      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, * - candidate default
      U - per-user static route

Gateway of last resort is not set
C 202.38.75.0/24 is directly connected, Ethernet0/1
C 202.38.76.0/24 is directly connected, Ethernet0/2
C 202.38.74.0/24 is directly connected, Ethernet0/2
R 202.38.73.0/24 [120/1] via 202.38.76.253, 00:03:31, Ethernet0/1
R 202.38.77.0/24 [120/1] via 202.38.75.33, 00:09:20, Ethernet0/0

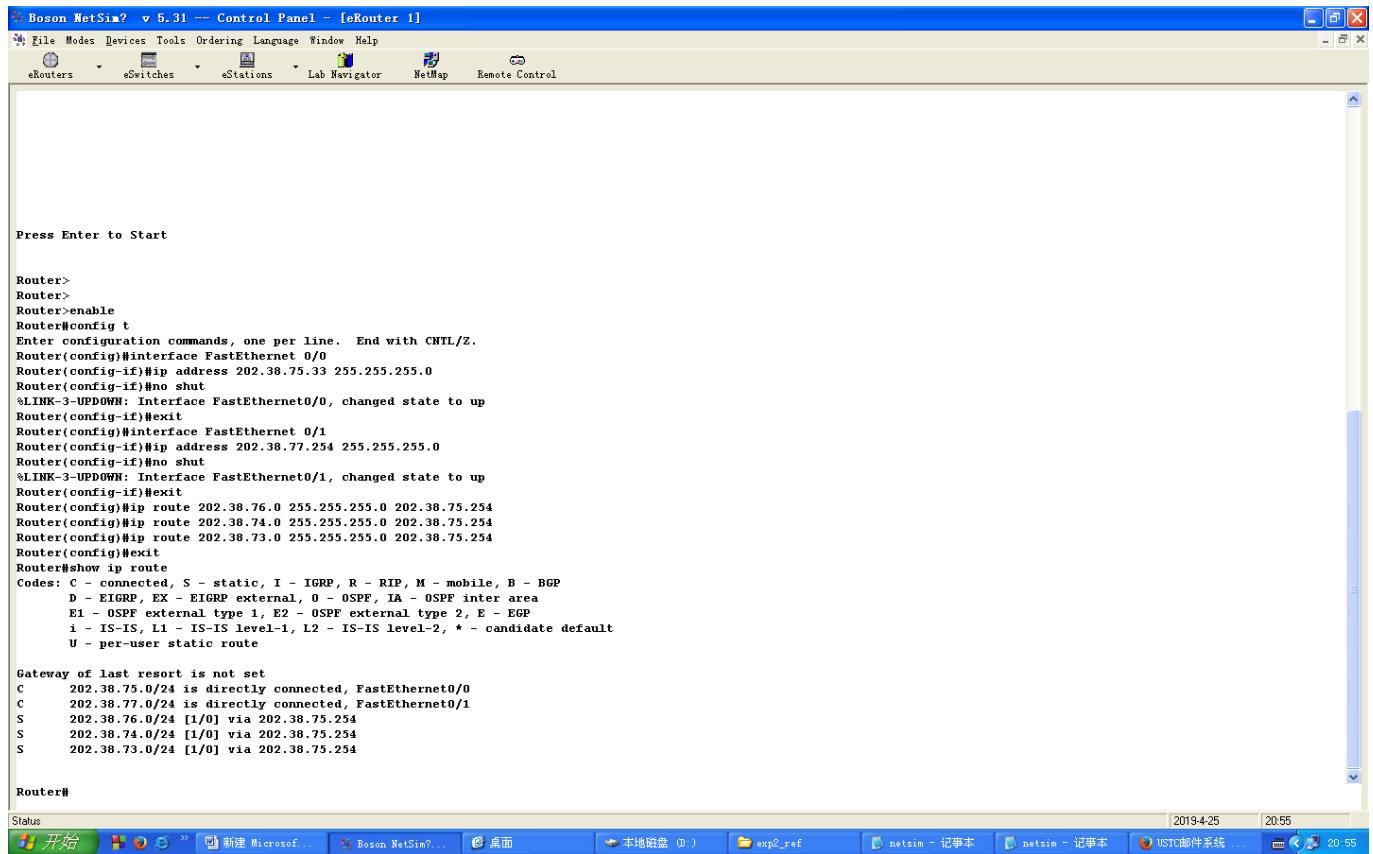
Router#

```

Status: 2019-4-25 19:50

静态路由

## Router A



```

Boson NetSim? v 5.31 -- Control Panel - [eRouter 1]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Press Enter to Start

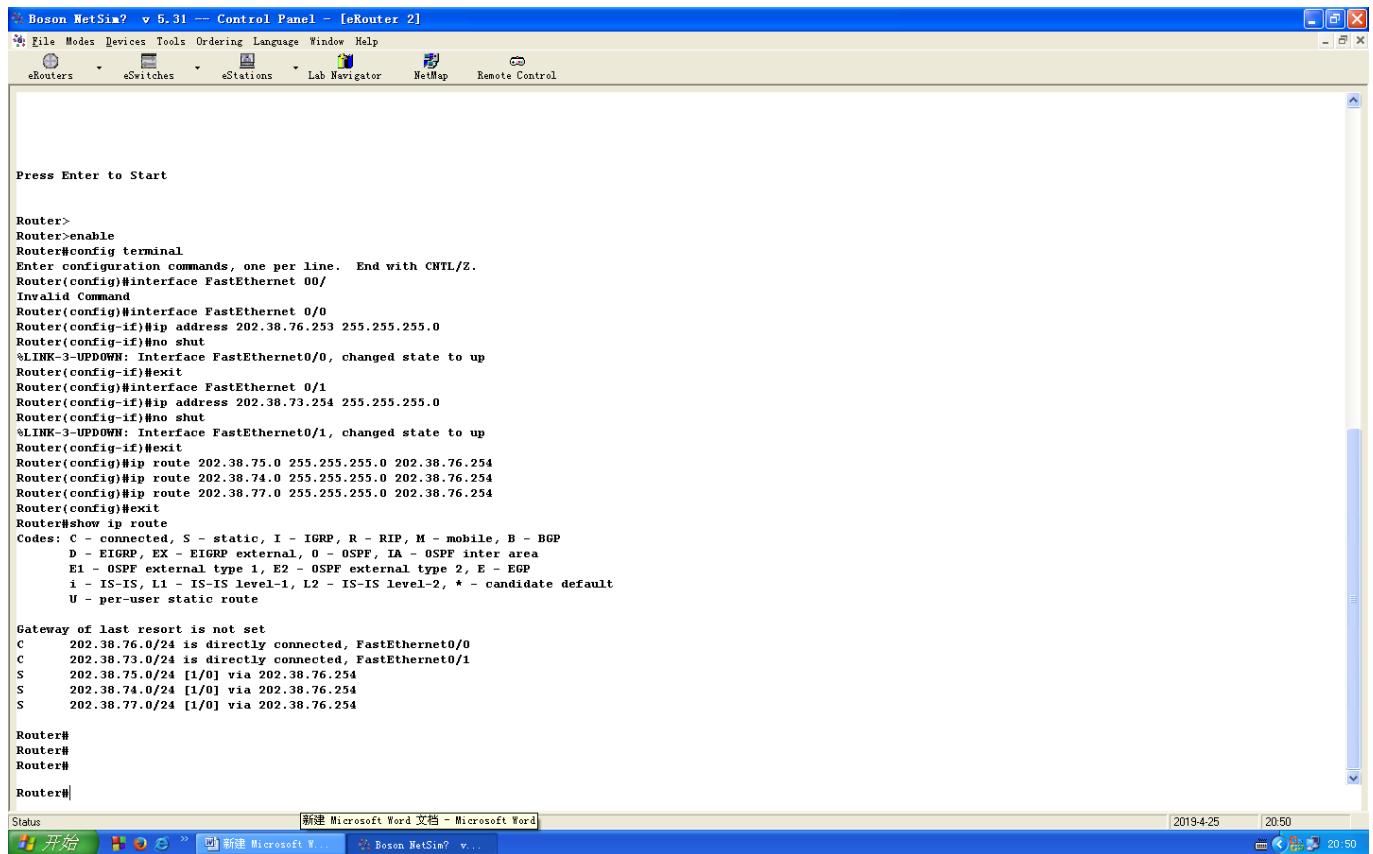
Router>
Router>
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet 0/0
Router(config-if)#ip address 202.38.75.33 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip address 202.38.77.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#ip route 202.38.76.0 255.255.255.0 202.38.75.254
Router(config)#ip route 202.38.74.0 255.255.255.0 202.38.75.254
Router(config)#ip route 202.38.73.0 255.255.255.0 202.38.75.254
Router(config)#exit
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, 0 - OSPF, IA - OSPF inter area
      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, * - candidate default
      U - per-user static route
Gateway of last resort is not set
C    202.38.75.0/24 is directly connected, FastEthernet0/0
C    202.38.77.0/24 is directly connected, FastEthernet0/1
S    202.38.76.0/24 [1/0] via 202.38.75.254
S    202.38.74.0/24 [1/0] via 202.38.75.254
S    202.38.73.0/24 [1/0] via 202.38.75.254

Router#

```

The screenshot shows the Boson NetSim Control Panel interface for Router A. The title bar reads "Boson NetSim? v 5.31 -- Control Panel - [eRouter 1]". The menu bar includes File, Modes, Devices, Tools, Ordering, Language, Window, and Help. The toolbar has icons for eRouters, eSwitches, eStations, Lab Navigator, NetMap, and Remote Control. The main window displays the configuration command history and the resulting routing table. The taskbar at the bottom shows the Windows Start button, Microsoft Word, Boson NetSim, and other system icons.

## Router B



```

Boson NetSim? v 5.31 -- Control Panel - [eRouter 2]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Press Enter to Start

Router>
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet 0/0
Invalid Command
Router(config)#interface FastEthernet 0/0
Router(config-if)#ip address 202.38.76.253 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet 0/1
Router(config-if)#ip address 202.38.73.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
Router(config-if)#exit
Router(config)#ip route 202.38.75.0 255.255.255.0 202.38.76.254
Router(config)#ip route 202.38.74.0 255.255.255.0 202.38.76.254
Router(config)#ip route 202.38.77.0 255.255.255.0 202.38.76.254
Router(config)#exit
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, 0 - OSPF, IA - OSPF inter area
      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, * - candidate default
      U - per-user static route
Gateway of last resort is not set
C    202.38.76.0/24 is directly connected, FastEthernet0/0
C    202.38.73.0/24 is directly connected, FastEthernet0/1
S    202.38.75.0/24 [1/0] via 202.38.76.254
S    202.38.74.0/24 [1/0] via 202.38.76.254
S    202.38.77.0/24 [1/0] via 202.38.76.254

Router#
Router#
Router#

```

The screenshot shows the Boson NetSim Control Panel interface for Router B. The title bar reads "Boson NetSim? v 5.31 -- Control Panel - [eRouter 2]". The menu bar and toolbar are identical to Router A. The main window shows an invalid command for interface 0/0, followed by successful configuration of interfaces 0/0 and 0/1 with their respective IP addresses and subnet masks. The taskbar at the bottom shows the Windows Start button, Microsoft Word, Boson NetSim, and other system icons.

## Router C

```

Boson NetSim? v 5.31 -- Control Panel - [eRouter 3]
File Modes Devices Tools Ordering Language Window Help
eRouters eSwitches eStations Lab Navigator NetMap Remote Control

Press Enter to Start

Router>
Router>enable
Router>config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Ethernet 0/0
Router(config-if)#ip address 202.38.75.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
Router(config-if)#exit
Router(config)#interface Ethernet 0/1
Router(config-if)#ip address 202.38.76.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
Router(config-if)#exit
Router(config)#interface Ethernet 0/2
Router(config-if)#ip address 202.38.74.254 255.255.255.0
Router(config-if)#no shut
%LINK-3-UPDOWN: Interface Ethernet0/2, changed state to up
Router(config-if)#exit
Router(config)#ip route 202.38.73.0 255.255.255.0 202.38.76.253
Router(config)#ip route 202.38.77.0 255.255.255.0 202.38.75.33
Router(config)#exit
% Invalid input detected at '^' marker.

Router(config)#exit
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
      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, * - candidate default
      U - per-user static route

Gateway of last resort is not set
C    202.38.75.0/24 is directly connected, Ethernet0/0
C    202.38.76.0/24 is directly connected, Ethernet0/1
C    202.38.74.0/24 is directly connected, Ethernet0/2
S    202.38.73.0/24 [1/0] via 202.38.76.253
S    202.38.77.0/24 [1/0] via 202.38.75.33

Router#

```

Status 2019-4-25 21:05

## ping结果

### A1主机

```

Boson BOSS 5.0
Copyright 1998-2003 Boson Software, Inc.
Use the command help to get started

Press Enter to begin
C:>
C:>ipconfig /ip 202.38.77.1 255.255.255.0
C:>ipconfig /dg 202.38.77.254
C:>ping 202.38.74.2
% Invalid input detected at '^' marker.

C:>ping 202.38.74.2
Pinging 202.38.74.2 with 32 bytes of data:

Reply from 202.38.74.2: bytes=32 time=60ms TTL=241

Ping statistics for 202.38.74.2:  Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 50ms, Maximum = 60ms, Average = 55ms

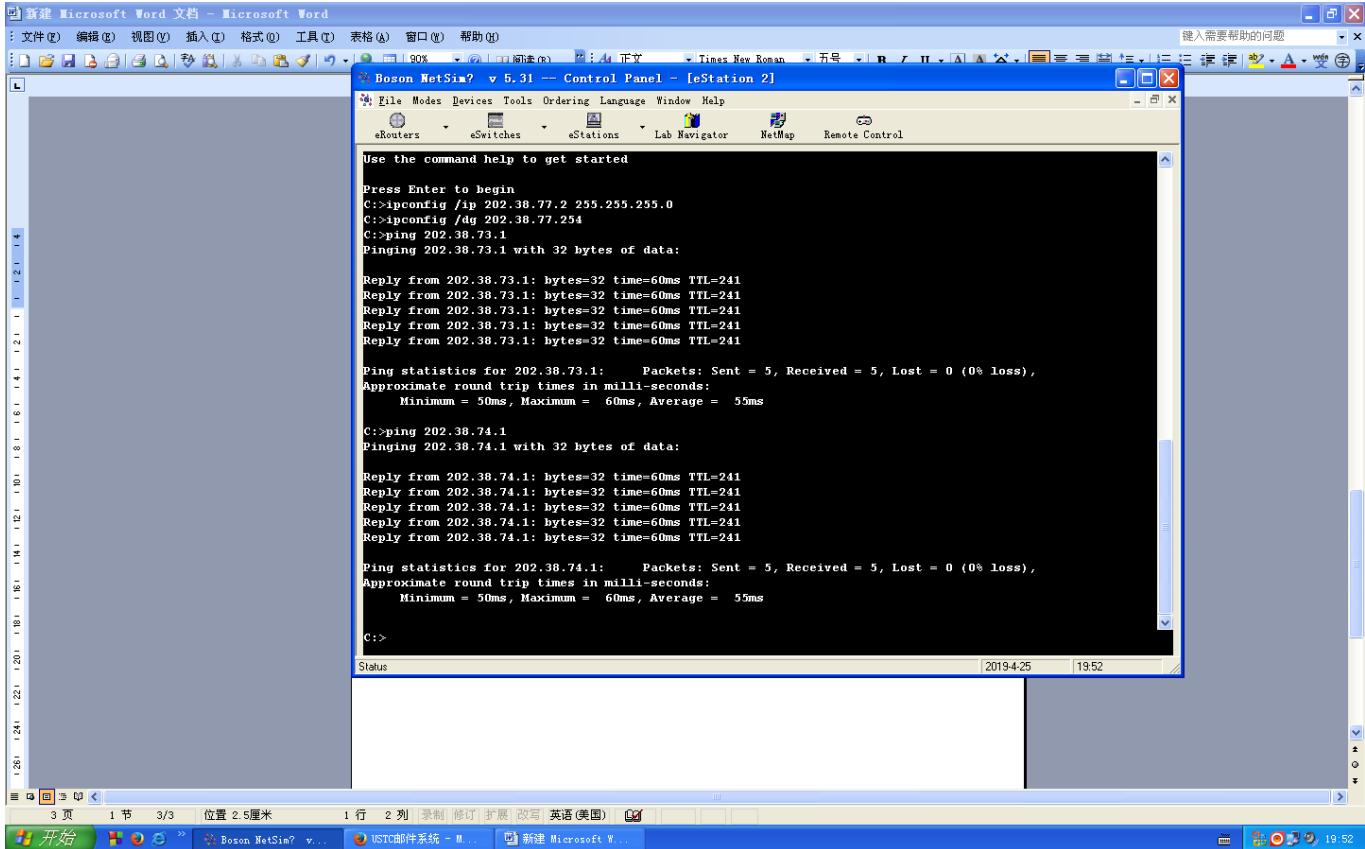
C:>

```

Status 2019-4-25 19:51

开始 2019-4-25 19:51

### A2主机



## C1主机

