

网络管理与设计课程实验报告

实验 3：access_list 许可访问列表的配置

姓名	郭一航	院系	计算学部	学号	2021112342
任课教师	余翔湛	指导教师	余翔湛		
实验地点	正心楼 704	实验时间	2023 年 10 月 31 日		
实验课表现	出勤、表现得分 10%	实验报告得分 40%		实验总分	
	操作结果得分 50%				

实验内容：

1、 以你的理解，阐述 Access_list 访问控制列表的功能、作用；以及标准访问控制列表和扩展访问控制列表的区别。

得分：

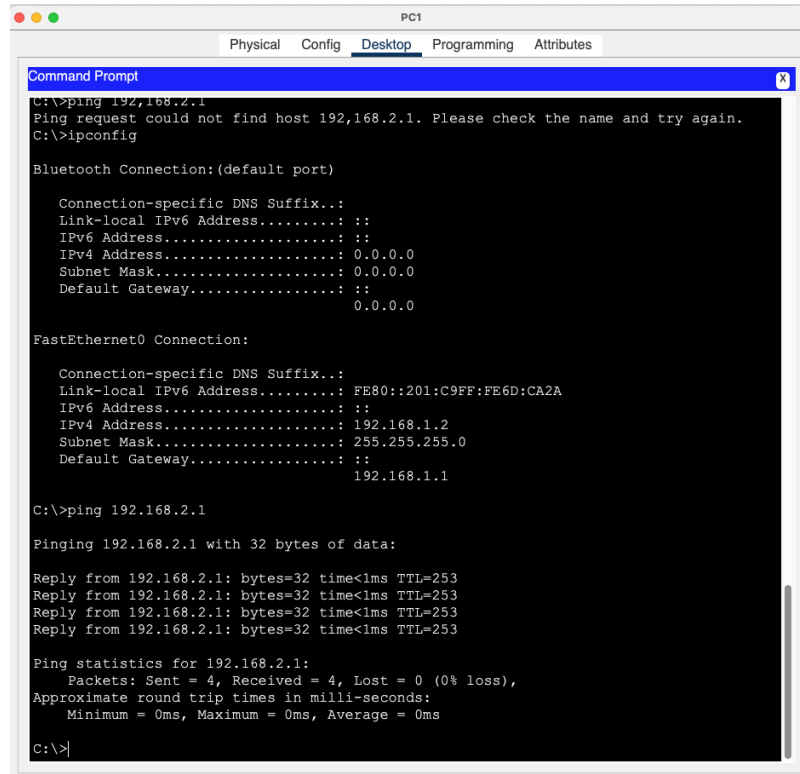
Access_list (访问控制列表) 是网络设备（如路由器和交换机）上的一种功能，用于控制通过网络设备的数据流，访问控制列表基于特定的条件允许或者拒绝数据包的传输能实现以下功能：流量过滤、增加安全性、带宽管理、策略路由、网络调试等等。

标准访问控制表和拓展访问控制列表的区别是：标准访问列表主要是基于源IP地址进行过滤，不考虑目标IP、端口和协议类型，通常放在接近目的地的位置；拓展访问控制列表出了源IP地址之外，还可以基于目标IP地址、协议类型和源目标端口进行过滤，提供了更为灵活的流量控制选项，通常放置在接近数据流来源的位置。

2、 实验第一部分，使用标准访问控制列表，在 R1 上，配置 192.168.1.3 不能访问网络；而其他 ip 可以访问网络；

得分：

PC1 的 IP 地址是 192.168.1.2，ping 192.168.2.1 是能访问的



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 192.168.2.1
Ping request could not find host 192.168.2.1. Please check the name and try again.
C:\>ipconfig

Bluetooth Connection: (default port)

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0

FastEthernet0 Connection:

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....: FE80::201:C9FF:FE6D:CA2A
IPv6 Address.....: ::
IPv4 Address.....: 192.168.1.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
192.168.1.1

C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=253
Reply from 192.168.2.1: bytes=32 time<1ms TTL=253
Reply from 192.168.2.1: bytes=32 time<1ms TTL=253
Reply from 192.168.2.1: bytes=32 time<1ms TTL=253

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```



在 R1 上配置经典 ALC 列表:

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip access-list standard test1
R1(config-std-nacl)#deny host 192.168.1.3
R1(config-std-nacl)#permit any
R1(config-std-nacl)#exit
R1(config)#int fas0/0
R1(config-if)#ip access-group test1 in
R1(config-if)#
```

Copy

Paste

禁止 192.168.1.3 的网络访问, 修改 PC1 的 IP 地址为 192.168.1.3

在 PC1 上 ping 192.168.2.1, 结果不可访问:

PC1

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Ping statistics for 192.168.2.1:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ipconfig

Bluetooth Connection:(default port)

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0

FastEthernet0 Connection:

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....: FE80::201:C9FF:FE6D:CA2A
IPv6 Address.....: ::
IPv4 Address.....: 192.168.1.3
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
192.168.1.1

C:\>ping 192.168.2.1

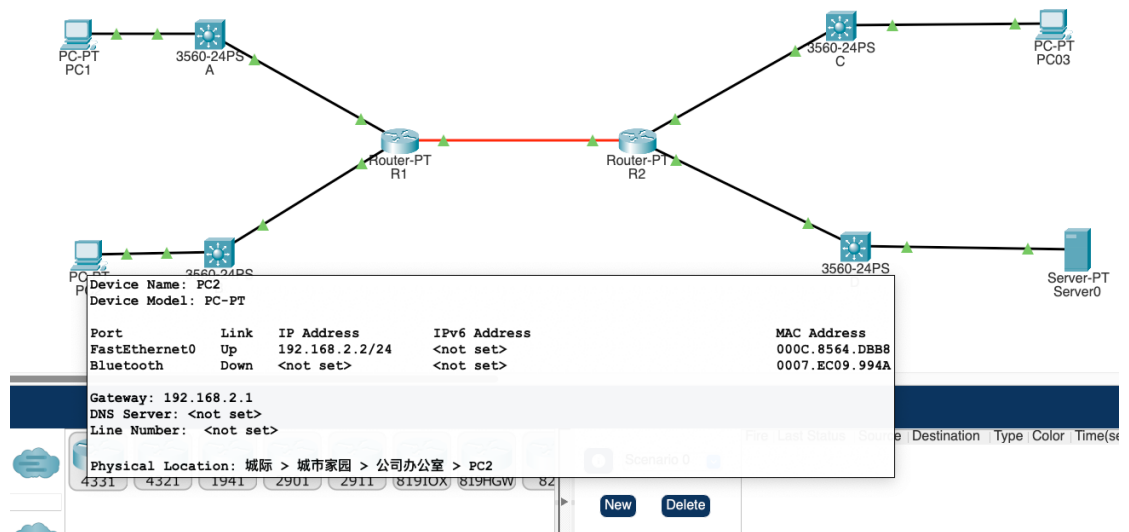
Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.10.2: Destination host unreachable.
Reply from 192.168.10.2: Destination host unreachable.
Reply from 192.168.10.2: Destination host unreachable.
Reply from 192.168.10.2: Destination host unreachable.

Ping statistics for 192.168.2.1:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

PC2 的 IP 地址为 192.168.2.2



在 pc2 上 ping 192.168.3.1，是可达的：

```
PC2
Physical Config Desktop Programming Attributes
Command Prompt
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ipconfig

Bluetooth Connection:(default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0

FastEthernet0 Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::20C:85FF:FE64:DBB8
IPv6 Address.....: ::
IPv4 Address.....: 192.168.2.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
192.168.2.1

C:\>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time<1ms TTL=252
Reply from 192.168.3.1: bytes=32 time<1ms TTL=252
Reply from 192.168.3.1: bytes=32 time=1ms TTL=252
Reply from 192.168.3.1: bytes=32 time<1ms TTL=252

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

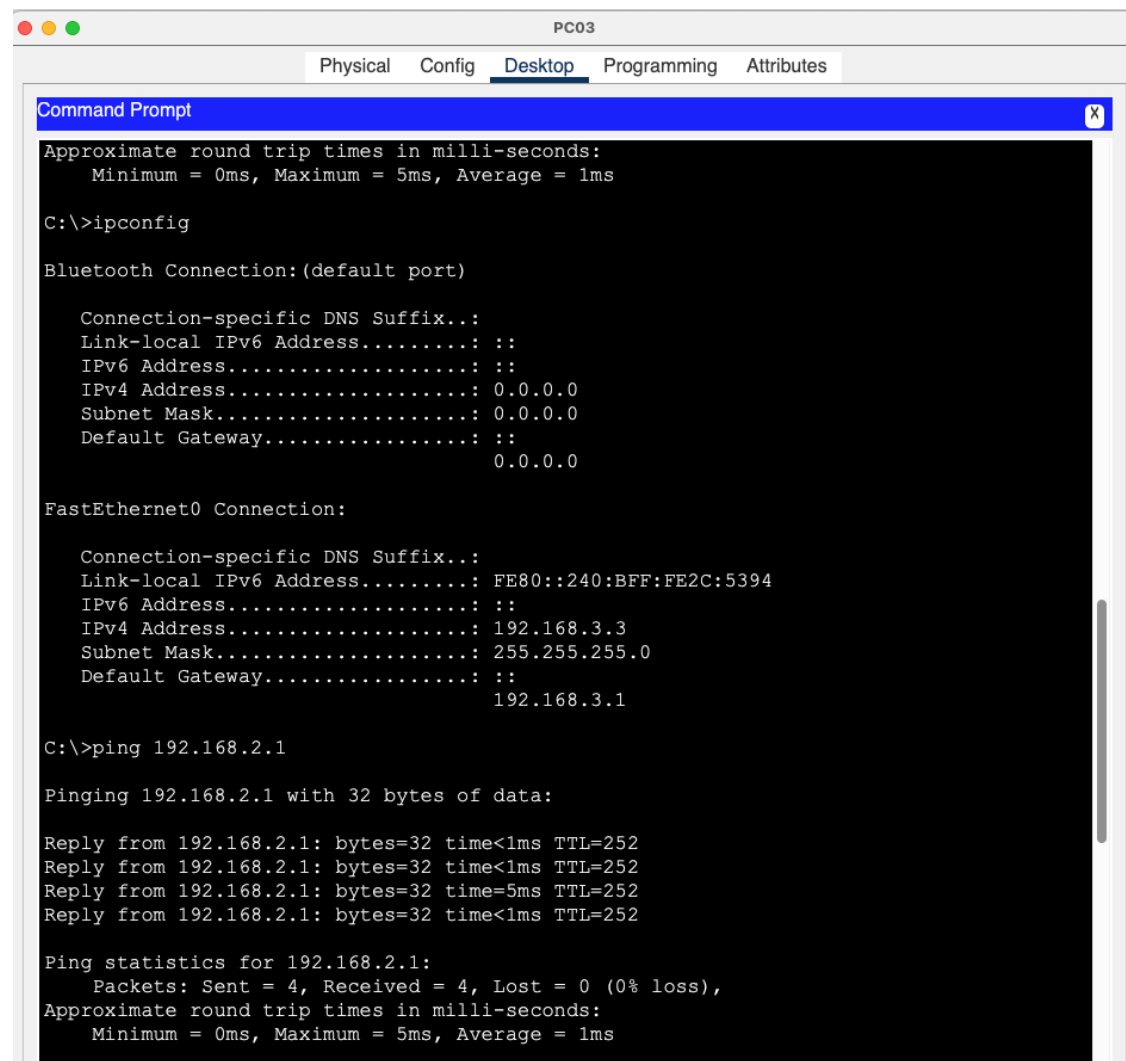
3、使用扩展访问控制列表，在 R2 上，配置 192.168.3.3 能够使用 ping 操作，而其他子网 3 的机器不能使用 ping 操作，除 ping 之外的网络访问没有限制。

得分：

R2 上配置拓展访问控制列表：

```
R2>enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip access-list extended test2
R2(config-ext-nacl)#deny icmp any any
R2(config-ext-nacl)#permit ip any any
R2(config-ext-nacl)#no permit ip any any
R2(config-ext-nacl)#no deny icmp any any
R2(config-ext-nacl)#permit icmp host 192.168.3.3 any
R2(config-ext-nacl)#deny icmp any any
R2(config-ext-nacl)#permit ip any any
R2(config-ext-nacl)#exit
R2(config)#int fas0/0
R2(config-if)#ip access-group test2
% Incomplete command.
R2(config-if)#ip access-group test2 in
R2(config-if)#
```

PC3 的 IP 地址为 192.168.3.3，ping 192.168.2.1 可达：



```
PC03
Physical Config Desktop Programming Attributes
Command Prompt
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>ipconfig

Bluetooth Connection:(default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                        0.0.0.0

FastEthernet0 Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::240:BFF:FE2C:5394
IPv6 Address.....: ::
IPv4 Address.....: 192.168.3.3
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
                        192.168.3.1

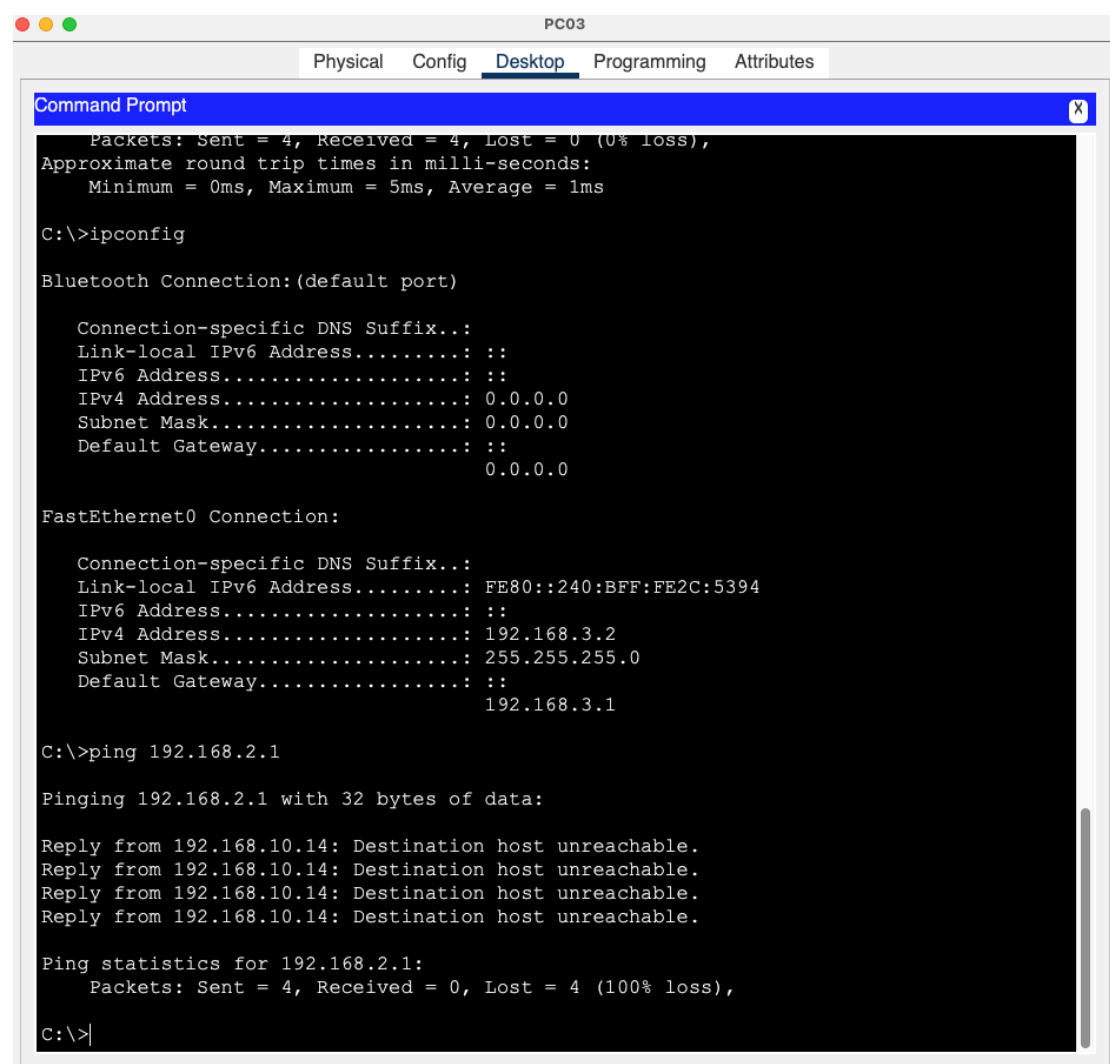
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=252
Reply from 192.168.2.1: bytes=32 time<1ms TTL=252
Reply from 192.168.2.1: bytes=32 time=5ms TTL=252
Reply from 192.168.2.1: bytes=32 time<1ms TTL=252

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 1ms
```

PC3 的地址配置为 192.168.3.2, ping 192.168.2.1 不可达



The screenshot shows a PC window titled 'PC03' with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the output of the 'ipconfig' command, indicating that the FastEthernet0 interface is configured with IP address 192.168.3.2 and subnet mask 255.255.255.0. Below this, the output of the 'ping 192.168.2.1' command is shown, indicating that the destination host is unreachable (100% loss).

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 5ms, Average = 1ms

C:\>ipconfig

Bluetooth Connection:(default port)

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....::
IPv6 Address.....::
IPv4 Address.....0.0.0.0
Subnet Mask.....0.0.0.0
Default Gateway.....::
                                0.0.0.0

FastEthernet0 Connection:

Connection-specific DNS Suffix.:
Link-local IPv6 Address.....FE80::240:BFF:FE2C:5394
IPv6 Address.....::
IPv4 Address.....192.168.3.2
Subnet Mask.....255.255.255.0
Default Gateway.....::
                                192.168.3.1

C:\>ping 192.168.2.1

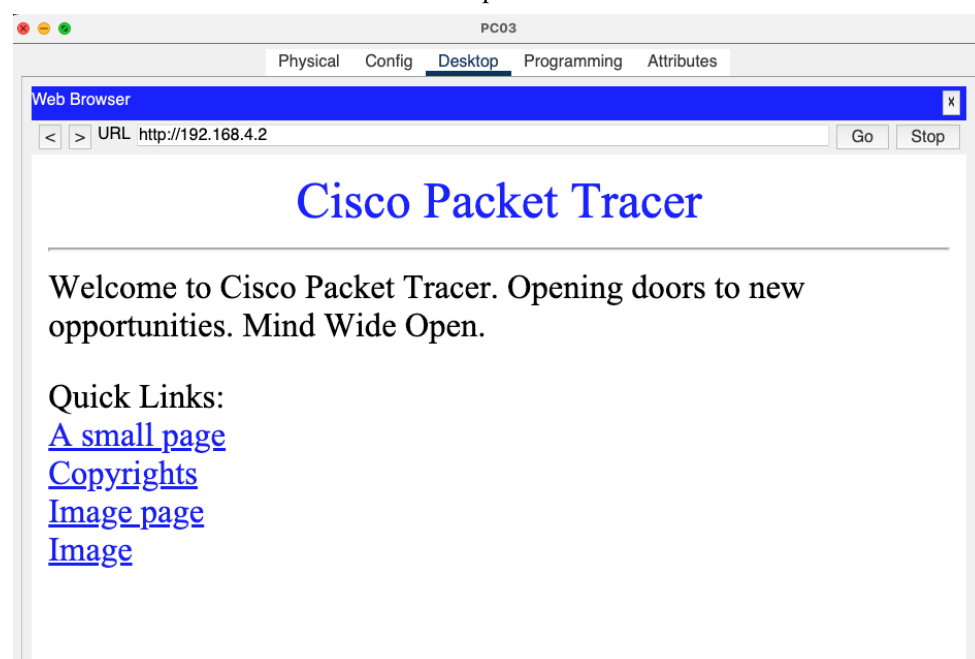
Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.10.14: Destination host unreachable.
Reply from 192.168.10.14: Destination host unreachable.
Reply from 192.168.10.14: Destination host unreachable.
Reply from 192.168.10.14: Destination host unreachable.

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>|
```

但是 PC3 上其他的协议能访问，比如 ip 地址为 192.168.4.2 的服务器



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日期：