

Университет ИТМО

Факультет программной инженерии и компьютерной техники

Лабораторная работа №4
по Администрированию систем и сетей
«Настройка ACL»

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Желаемая оценка: 3

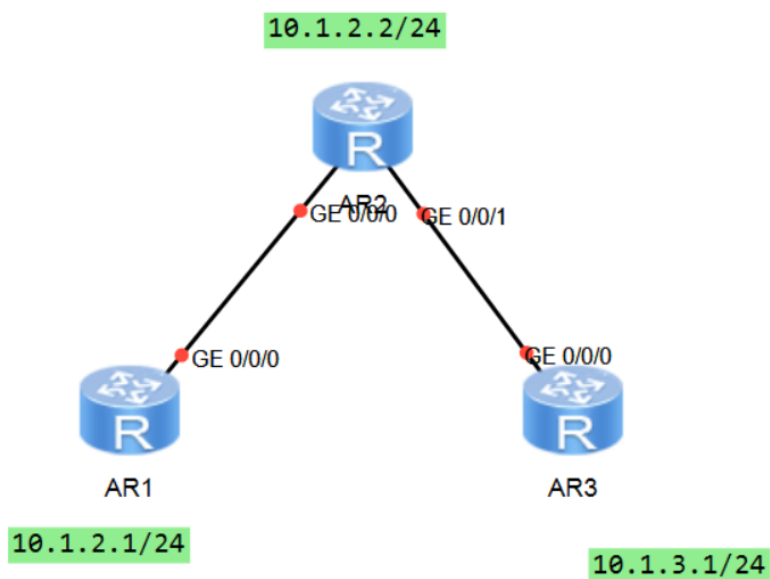
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Топология



Шаг 1: Настройте IP-адреса.

Настройте IP-адреса для маршрутизаторов R1, R2, R3.

```
system-view
sysname R1
system-view
sysname R2
system-view
sysname R3
```

```
[R1]interface GigabitEthernet0/0/0
[R1-GigabitEthernet0/0/0]ip address 10.1.2.1 24
Oct 20 2021 21:52:51-08:00 R1 %%01IFNET/4/LINK_STATE(1)[1]:The line
protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[R1-GigabitEthernet0/0/0]quit
[R1]interface LoopBack 0
[R1-LoopBack0]ip address 10.1.1.1 24
[R1-LoopBack0]quit
[R1]interface LoopBack 1
[R1-LoopBack1]ip address 10.1.4.1 24
[R1-LoopBack1]quit
```

```
[R2]interface GigabitEthernet 0/0/0
[R2-GigabitEthernet0/0/0]ip address 10.1.2.2 24
Oct 20 2021 21:55:25-08:00 R2 %%01IFNET/4/LINK_STATE(1)[2]:The line
protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[R2-GigabitEthernet0/0/0]quit
[R2]interface GigabitEthernet 0/0/1
```

```
[R2-GigabitEthernet0/0/1]ip address 10.1.3.2 24
Oct 20 2021 21:55:59-08:00 R2 %%01IFNET/4/LINK_STATE(1)[3]:The line
protocol IP
on the interface GigabitEthernet0/0/1 has entered the UP state.
[R2-GigabitEthernet0/0/1]quit
```

```
[R3]interface GigabitEthernet 0/0/0
[R3-GigabitEthernet0/0/0]ip address 10.1.3.1 24
Oct 20 2021 21:57:14-08:00 R3 %%01IFNET/4/LINK_STATE(1)[0]:The line
protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[R3-GigabitEthernet0/0/0]quit
```

Шаг 2: Настройте OSPF для обеспечения возможности сетевого подключения.

Настройте OSPF на маршрутизаторах R1, R2 и R3 и назначьте их область 0, чтобы обеспечить возможность подключения.

```
[R1]ospf
[R1-ospf-1]area 0
[R1-ospf-1-area-0.0.0.0]network 10.1.1.1 0.0.0.0
[R1-ospf-1-area-0.0.0.0]network 10.1.2.1 0.0.0.0
[R1-ospf-1-area-0.0.0.0]network 10.1.4.1 0.0.0.0
[R1-ospf-1-area-0.0.0.0]return
```

```
[R2]ospf
[R2-ospf-1]area 0
[R2-ospf-1-area-0.0.0.0]network 10.1.2.2 0.0.0.0
[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[4]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborEvent=HelloReceived,
NeighborPreviousState=Down, NeighborCurrentState=Init)
[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[5]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborE
vent=2WayReceived, NeighborPreviousState=Init,
NeighborCurrentState=2Way)
[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[6]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborE
vent=AdjOk?, NeighborPreviousState=2Way, NeighborCurrentState=ExStart)
[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[7]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborE
vent=NegotiationDone, NeighborPreviousState=ExStart,
NeighborCurrentState=Exchange)
```

```

[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[8]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborE
vent=ExchangeDone, NeighborPreviousState=Exchange,
NeighborCurrentState>Loading)

[R2-ospf-1-area-0.0.0.0]network
Oct 20 2021 21:59:34-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(1)[9]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=1.2.1.10, NeighborE
vent>LoadingDone, NeighborPreviousState>Loading,
NeighborCurrentState=Full)
[R2-ospf-1-area-0.0.0.0]network 10.1.3.2 0.0.0.0
[R2-ospf-1-area-0.0.0.0]return

[R3]ospf
[R3-ospf-1]area 0
[R3-ospf-1-area-0.0.0.0]network 10.1.3.1 0.0.0.0
[R3-ospf-1-area-0.0.0.0]return
<R3>
Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[1]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=2.3.1.10, NeighborE
vent=HelloReceived, NeighborPreviousState=Down,
NeighborCurrentState=Init)
<R3>
Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[2]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=2.3.1.10, NeighborE
vent=2WayReceived, NeighborPreviousState=Init,
NeighborCurrentState=2Way)
<R3>
Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[3]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=2.3.1.10, NeighborE
vent=AdjOk?, NeighborPreviousState=2Way, NeighborCurrentState=ExStart)
<R3>
Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[4]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=2.3.1.10, NeighborE
vent=NegotiationDone, NeighborPreviousState=ExStart,
NeighborCurrentState=Exchange)
<R3>
Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[5]:Neighbor
changes event: neighbor status changed. (ProcessId=256,
NeighborAddress=2.3.1.10, NeighborEvent=ExchangeDone,
NeighborPreviousState=Exchange, NeighborCurrentState>Loading)

<R3>

```

Oct 20 2021 22:01:09-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(1)[6]:Neighbor changes event: neighbor status changed. (ProcessId=256, NeighborAddress=2.3.1.10, NeighborEvent=LoadingDone, NeighborPreviousState=Loading, NeighborCurrentState=Full)

Выполните команду ping на маршрутизаторе R3 чтобы проверить возможность подключения к сети.

```
<R3>ping 10.1.1.1
PING 10.1.1.1: 56 data bytes, press CTRL_C to break
  Reply from 10.1.1.1: bytes=56 Sequence=1 ttl=254 time=50 ms
  Reply from 10.1.1.1: bytes=56 Sequence=2 ttl=254 time=40 ms
  Reply from 10.1.1.1: bytes=56 Sequence=3 ttl=254 time=30 ms
  Reply from 10.1.1.1: bytes=56 Sequence=4 ttl=254 time=30 ms
  Reply from 10.1.1.1: bytes=56 Sequence=5 ttl=254 time=30 ms

--- 10.1.1.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 30/36/50 ms
```

```
<R3>ping 10.1.2.1
PING 10.1.2.1: 56 data bytes, press CTRL_C to break
  Reply from 10.1.2.1: bytes=56 Sequence=1 ttl=254 time=40 ms
  Reply from 10.1.2.1: bytes=56 Sequence=2 ttl=254 time=30 ms
  Reply from 10.1.2.1: bytes=56 Sequence=3 ttl=254 time=30 ms
  Reply from 10.1.2.1: bytes=56 Sequence=4 ttl=254 time=30 ms
  Reply from 10.1.2.1: bytes=56 Sequence=5 ttl=254 time=20 ms

--- 10.1.2.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 20/30/40 ms
```

```
<R3>ping 10.1.4.1
PING 10.1.4.1: 56 data bytes, press CTRL_C to break
  Reply from 10.1.4.1: bytes=56 Sequence=1 ttl=254 time=20 ms
  Reply from 10.1.4.1: bytes=56 Sequence=2 ttl=254 time=30 ms
  Reply from 10.1.4.1: bytes=56 Sequence=3 ttl=254 time=30 ms
  Reply from 10.1.4.1: bytes=56 Sequence=4 ttl=254 time=40 ms
  Reply from 10.1.4.1: bytes=56 Sequence=5 ttl=254 time=30 ms

--- 10.1.4.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 20/30/40 ms
```

Шаг 3: Сконфигурируйте R3 в качестве сервера.

Включите функцию Telnet на R3, установите для уровня пользователя значение 3 и задайте для входа пароль - Huawei@123.

```
[R3]telnet server enable
Error: TELNET server has been enabled

[R3]user-interface vty 0 4
[R3-ui-vty0-4]user privilege level 3
[R3-ui-vty0-4]set authentication password cipher Huawei@123
[R3-ui-vty0-4]quit
```

Шаг 4: Настройте ACL на основе необходимого трафика.

Настройте ACL на R3.

```
[R3]acl 3000
[R3-acl-adv-3000]rule 5 permit tcp source 10.1.4.1 0.0.0.0 destination
10.1.3.1
0.0.0.0 destination-port eq 23
[R3-acl-adv-3000]rule 10 deny tcp source any
[R3-acl-adv-3000]quit
```

Выполните фильтрацию трафика на интерфейсе VTY маршрутизатора R3.

```
[R3]user-interface vty 0 4
[R3-ui-vty0-4]acl 3000 inb
[R3-ui-vty0-4]acl 3000 inbound
[R3-ui-vty0-4]quit
```

Выведите на экран конфигурацию ACL на R3.

```
[R3]display acl 3000
Advanced ACL 3000, 2 rules
Acl's step is 5
 rule 5 permit tcp source 10.1.4.1 0 destination 10.1.3.1 0
destination-port eq
telnet
 rule 10 deny tcp
```

Настройте ACL на R2.

```
[R2]acl 3001
[R2-acl-adv-3001]rule 5 permit tcp source 10.1.4.1 0.0.0.0
destination-port eq 23
[R2-acl-adv-3001]rule 10 deny tcp source any
[R2-acl-adv-3001]quit
```

Выполните фильтрацию трафика на интерфейсе GE0/0/0/3 маршрутизатора R3.

```
[R2]interface GigabitEthernet 0/0/0
[R2-GigabitEthernet0/0/0]traffic-filter inbound acl 3001
[R2-GigabitEthernet0/0/0]quit
```

Выведите на экран конфигурацию ACL на R2.

```
[R2]display acl 3001
Advanced ACL 3001, 2 rules
Acl's step is 5
 rule 5 permit tcp source 10.1.4.1 0 destination-port eq telnet
 rule 10 deny tcp
```

Проверка: протестируйте доступ через Telnet и проверьте конфигурацию ACL.

На маршрутизаторе R1 подключитесь через Telnet к серверу, используя указанный IP-адрес источника 10.1.1.1.

```
<R1>telnet -a 10.1.1.1 10.1.3.1
Press CTRL_] to quit telnet mode
Trying 10.1.3.1 ...
Error: Can't connect to the remote host
```

На маршрутизаторе R1 подключитесь через Telnet к серверу, используя указанный IP-адрес источника 10.1.4.1.

```
<R1>telnet -a 10.1.1.1 10.1.3.1
Press CTRL_] to quit telnet mode
Trying 10.1.3.1 ...
Error: Can't connect to the remote host
<R1>telnet -a 10.1.4.1 10.1.3.1
Press CTRL_] to quit telnet mode
Trying 10.1.3.1 ...
Connected to 10.1.3.1 ...
```

Login authentication

```
Password:
<R3>quit
```


Configuration console exit, please retry to log on

The connection was closed by the remote host
<R1>

Вывод

Лабораторная работа познакомила нас с ACL - механизмом, позволяющим настраивать политики фильтрации пакетов по разным признакам. На практике заблокировали пакеты от одного маршрутизатора к другому и проверили блокировку с использованием утилиты `telnet`.