MSR20/30/50系列路由器IPSec VPN穿越NAT典型配置（V5）方法

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组网及说明

1 配置需求或说明

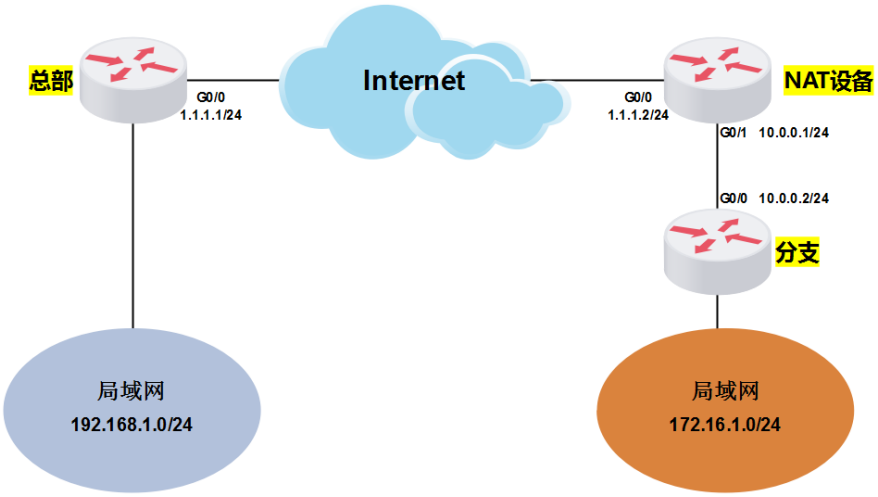
1.1 适用产品系列

本案例适用于如MSR2020、MSR2040、MSR3020、MSR3040、MSR5040、MSR5060等MSR20、MSR30、MSR50系列的路由器。

1.2 配置需求及实现的效果

总部路由器外网口为地址1.1.1.1（模拟运营商公网固定地址环境），分支路由器前面有 NAT设备，分支路由器作为二级路由外网口地址为私网地址10.0.0.2（模拟运营商非公网地址环境），要实现总部路由器的局域网网段（192.168.1.0/24）和分支路由器的局域网网段（172.16.1.0/24）互访。

2 组网图



配置步骤

3 配置步骤

3.1 配置路由器基本上网

#路由器基本上网配置省略，具体设置步骤请参考“2.1.2 路由器外网使用固定IP地址上网配置方法”章节中“MSR830[930][2600]系列路由器基本上网（静态IP）WEB配置（V5）”案例

3.2 配置总部IPSEC VPN

system-view

#配置公网口NAT要关联的ACl 3000，作用是把IPSec感兴趣流从NAT转换的数据流deny掉

[H3C]acl number 3000

[H3C-acl-adv-3000]rule 0 deny ip source 192.168.1.0 0.0.0.255 destination 172.16.1.0 0.0.0.255

[H3C-acl-adv-3000]rule 5 permit ip

#配置IPSec感兴趣流ACL 3333，匹配源地址为总部内网网段目的地址为分支内网网段的数据流

[H3C-acl-adv-3000]acl number 3333

[H3C-acl-adv-3333]rule 0 permit ip source 192.168.1.0 0.0.0.255 destination 172.16.1.0 0.0.0.255

[H3C-acl-adv-3333]quit

#配置本端安全网关的名字为zongbu

[H3C]ike local-name zongbu

#创建IKE对等体123，IKE阶段的协商模式为野蛮模式，IKE预共享密钥为123456，配置名字作为IKE协商过程中使用的ID（缺省情况下，使用IP地址作为IKE协商过程中使用的ID），配置对端网关的名字为fenzhi（要与对端的ike local-name配置对应），并开启NAT穿越功能

[H3C]ike peer 123

[H3C-ike-peer-123]exchange-mode aggressive

[H3C-ike-peer-123]pre-shared-key simple 123456

[H3C-ike-peer-123]id-type name

[H3C-ike-peer-123]remote-name fenzhi

[H3C-ike-peer-123]nat traversal

[H3C-ike-peer-123]quit

#创建IPSec安全提议123，配置ESP协议采用的认证算法为sha1，加密算法为3des

[H3C]ipsec transform-set 123
[H3C-ipsec-transform-set-123]esp authentication-algorithm sha1
[H3C-ipsec-transform-set-123]esp encryption-algorithm 3des
[H3C-ipsec-transform-set-123]quit
#创建IPSec安全策略123，引用之前创建的ACL 3333，引用之前创建的对等体123，引用之前创建的IPSec安全提议123
[H3C]ipsec policy 123 1 isakmp
[H3C-ipsec-policy-isakmp-123-1]security acl 3333
[H3C-ipsec-policy-isakmp-123-1]ike-peer 123
[H3C-ipsec-policy-isakmp-123-1]transform-set 123
[H3C-ipsec-policy-isakmp-123-1]quit
#设置外网口做NAT转换的时候关联ACL 3000 （如果之前已经在外网口配置了 nat outbound，需要先undo掉），并将IPSec安全策略123应用在外网接口
[H3C]interface GigabitEthernet0/0
[H3C-GigabitEthernet0/0]undo nat outbound
[H3C-GigabitEthernet0/0]nat outbound 3000
[H3C-GigabitEthernet0/0]ip address 1.1.1.1 255.255.255.0
[H3C-GigabitEthernet0/0]ipsec policy 123
[H3C-GigabitEthernet0/0]quit

3.3 配置分部路由器IPSEC

system-view
#配置公网口NAT要关联的ACl 3000，作用是把IPSec感兴趣流从NAT转换的数据流deny掉
[H3C]acl number 3000
[H3C-acl-adv-3000]rule 0 deny ip source 172.16.1.0 0.0.0.255 destination 192.168.1.0 0.0.0.255
[H3C-acl-adv-3000]rule 5 permit ip
#配置IPSec感兴趣流ACL 3333，匹配源地址为分支内网网段，目的地址为总部内网网段的数据流
 [H3C]acl number 3333
[H3C-acl-adv-3333]rule 0 permit ip source 172.16.1.0 0.0.0.255 destination 192.168.1.0 0.0.0.255
[H3C-acl-adv-3333]quit
#配置本端安全网关的名字为fenzhi
[H3C]ike local-name fenzhi
#创建IKE对等体123，IKE阶段的协商模式为野蛮模式，IKE预共享密钥为123456，配置名字作为IKE协商过程中使用的ID（缺省情况下，使用IP地址作为IKE协商过程中使用的ID），配置对端网关的名字为zongbu（要与对端的ike local-name配置对应），配置对端网关的地址为1.1.1.1，并开启NAT穿越功能
[H3C]ike peer 123
[H3C-ike-peer-123]exchange-mode aggressive
[H3C-ike-peer-123]pre-shared-key simple 123456
[H3C-ike-peer-123]id-type name
[H3C-ike-peer-123]remote-name zongbu
[H3C-ike-peer-123]remote-address 1.1.1.1
[H3C-ike-peer-123]nat traversal
[H3C-ike-peer-123]quit
创建IPSec安全提议123，配置ESP协议采用的认证算法为sha1，加密算法为3des
[H3C]ipsec transform-set 123
[H3C-ipsec-transform-set-123]esp authentication-algorithm sha1
[H3C-ipsec-transform-set-123]esp encryption-algorithm 3des
[H3C-ipsec-transform-set-123]quit
#创建IPSec安全策略123，引用之前创建的ACL 3333，引用之前创建的对等体123，引用创建的IPSec安全提议123
[H3C]ipsec policy 123 1 isakmp
[H3C-ipsec-policy-isakmp-123-1]security acl 3333
[H3C-ipsec-policy-isakmp-123-1]ike-peer 123
[H3C-ipsec-policy-isakmp-123-1]transform-set 123
[H3C-ipsec-policy-isakmp-123-1]quit
#设置外网口做NAT转换的时候关联ACL 3000 （如果之前已经在外网口配置了 nat outbound，需要先undo掉），并将IPSec安全策略123应用在外网接口
[H3C]interface GigabitEthernet0/0
[H3C-GigabitEthernet0/0]undo nat outbound
[H3C-GigabitEthernet0/0]nat outbound 3000
[H3C-GigabitEthernet0/0] ip address 10.0.0.2 255.255.255.0
[H3C-GigabitEthernet0/0] ipsec policy 123
[H3C-GigabitEthernet0/0]quit

3.4 验证配置结果

#在分支MSR路由器上带源ping总部MSR路由器内网网关地址

```
<H3C>ping -a 172.16.1.1 192.168.1.1
  PING 192.168.1.1: 56  data bytes, press CTRL_C to break
    Request time out
    Reply from 192.168.1.1: bytes=56 Sequence=1 ttl=255 time=1 ms
    Reply from 192.168.1.1: bytes=56 Sequence=2 ttl=255 time=2 ms
    Reply from 192.168.1.1: bytes=56 Sequence=3 ttl=255 time=1 ms
    Reply from 192.168.1.1: bytes=56 Sequence=4 ttl=255 time=1 ms

  --- 192.168.1.1 ping statistics ---
    5 packet(s) transmitted
    4 packet(s) received
    20.00% packet loss
    round-trip min/avg/max = 1/1/2 ms
```

#在分支MSR路由器上查看IKE SA和IPSec SA的状态，可以看到IKE SA和IPSec SA均已正常建立。

```
<H3C>display ike sa
    total phase-1 SAs:  1
    connection-id  peer                 flag        phase   doi
  --------------------------------------------------------------------
     29           1.1.1.1               RD|ST       1       IPSEC
     30           1.1.1.1               RD|ST       2       IPSEC

  flag meaning
  RD--READY ST--STAYALIVE RL--REPLACED FD--FADING TO--TIMEOUT RK--REKEY
```

```
<H3C>display ipse sa
================================
Interface: GigabitEthernet0/0
    path MTU: 1500
================================

  ----------------------------
  IPsec policy name: "123"
  sequence number: 1
  acl version: ACL4
  mode: isakmp
  ----------------------------
    PFS: N, DH group: none
    inside VRF:
    tunnel:
        local  address: 10.0.0.2
        remote address: 1.1.1.1
    flow:
        sour addr: 172.16.1.0/255.255.255.0  port: 0  protocol: IP
        dest addr: 192.168.1.0/255.255.255.0  port: 0  protocol: IP

    [inbound ESP SAs]
      spi: 0x70EE52C3(1894666947)
      transform: ESP-ENCRYPT-3DES ESP-AUTH-SHA1
      in use setting: Tunnel
      connection id: 51
      sa duration (kilobytes/sec): 1843200/3600
      sa remaining duration (kilobytes/sec): 1843199/1300
      anti-replay detection: Enabled
        anti-replay window size(counter based): 32
      udp encapsulation used for nat traversal: Y

    [outbound ESP SAs]
      spi: 0x5DD34B21(1574128417)
      transform: ESP-ENCRYPT-3DES ESP-AUTH-SHA1
      in use setting: Tunnel
      connection id: 52
      sa duration (kilobytes/sec): 1843200/3600
      sa remaining duration (kilobytes/sec): 1843199/1300
      anti-replay detection: Enabled
        anti-replay window size(counter based): 32
      udp encapsulation used for nat traversal: Y
```

配置关键点