配置三个 PIX 之间的 IPSec 星形连接

目录

[简介](#)
[先决条件](#)
[要求](#)
[使用的组件](#)
[规则](#)
[配置](#)
[网络图](#)
[配置](#)
[验证](#)
[故障排除](#)
[故障排除命令](#)
[清除安全关联](#)
[相关信息](#)

简介

此配置允许一个中央Cisco 安全 PIX 防火墙使用IPSec，通过Internet或任何公共网络上的VPN通道，与另外两个PIX防火墙后的网络通讯。二个边远网络无需彼此通信，但是可以连接到中央网络。两个边远网络不能通过中央PIX彼此通信，因为PIX不能将在一个接口上接收的流量路由出同一个接口。如果有需要对于边远网络彼此间的通信，您需要一个充分地网状连接的配置，而不是在本文中显示的星型网配置。PIX**上可能已经有 nat 1, global, static 和** conduit语句。此示例仅演示如何添加加密。

先决条件

要求

为了使IPsec工作，在开始此配置之前，您必须在隧道终点间建立连接。

使用的组件

本文档中的信息基于PIX防火墙版本5.1.x、5.2.x和6.3.3。

注意：show **version命**令必须显示加密已启用。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文档约定的更多信息，请参考 Cisco 技术提示约定。

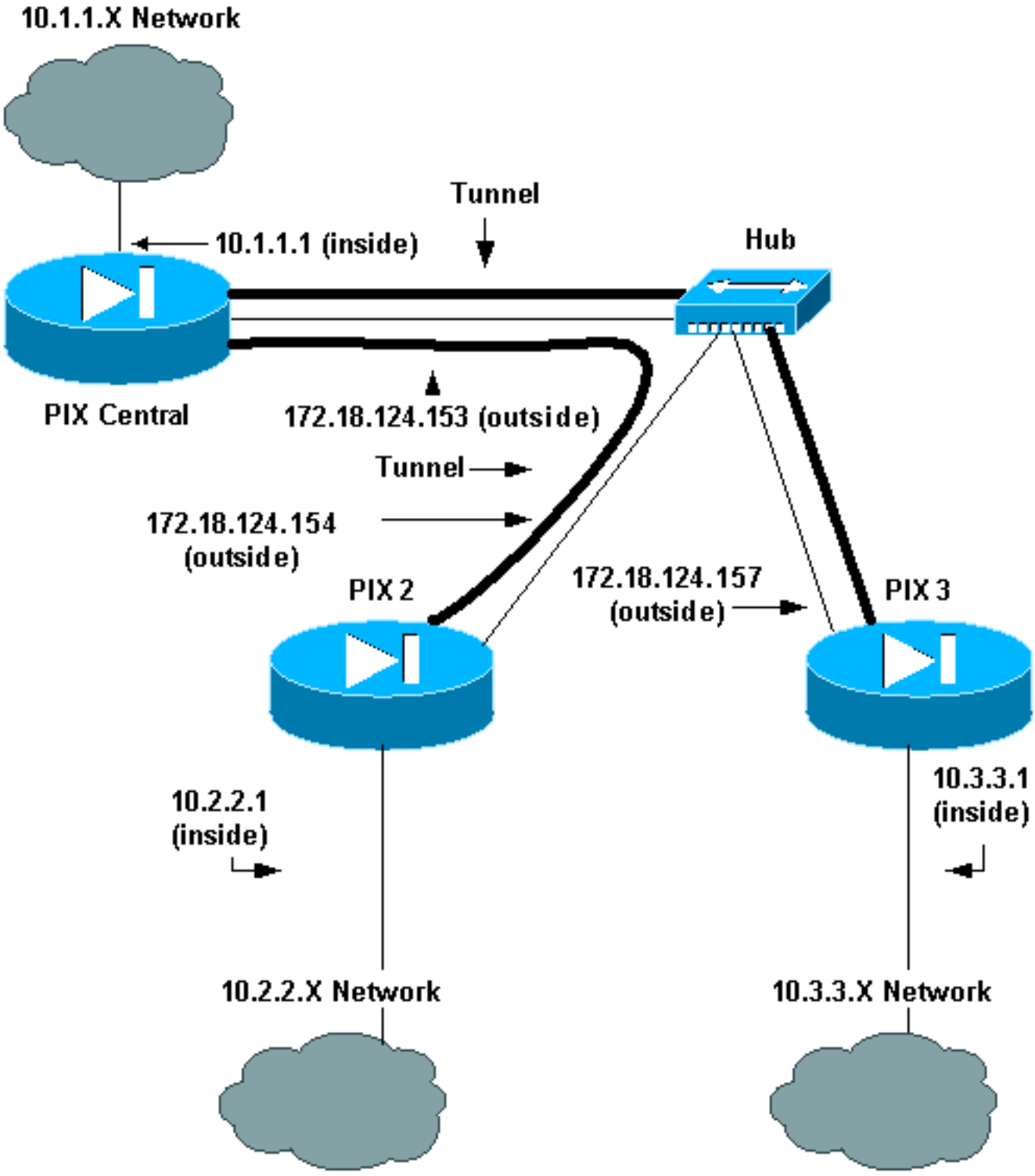
配置

本部分提供有关如何配置本文档所述功能的信息。

注意：使用命令查找工具(仅限注册客户)可获取有关本节中使用的命令的详细信息。

网络图

本文档使用以下网络设置：



配置

本文档使用以下配置：

- PIX中心
- PIX 2
- PIX 3

PIX中心

```
Building configuration...
: Saved
:
PIX Version 6.3(3)
interface ethernet0 auto
interface ethernet1 auto
nameif ethernet0 outside security0
nameif ethernet1 inside security100
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname pix-central
fixup protocol dns maximum-length 512
fixup protocol ftp 21
fixup protocol h323 h225 1720
fixup protocol h323 ras 1718-1719
fixup protocol http 80
fixup protocol rsh 514
fixup protocol rtsp 554
fixup protocol sip 5060
fixup protocol sip udp 5060
fixup protocol skinny 2000
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol tftp 69
names
!--- This is traffic to PIX 2. access-list 120 permit ip
10.1.1.0 255.255.255.0 10.2.2.0 255.255.255.0
!--- This is traffic to PIX 3. access-list 130 permit ip
10.1.1.0 255.255.255.0 10.3.3.0 255.255.255.0
!--- Do not do Network Address Translation (NAT) on
traffic to other PIXes. access-list 100 permit ip
10.1.1.0 255.255.255.0 10.2.2.0 255.255.255.0
access-list 100 permit ip 10.1.1.0 255.255.255.0
10.3.3.0 255.255.255.0
pager lines 24
logging on
mtu outside 1500
mtu inside 1500
ip address outside 172.18.124.153 255.255.255.0
ip address inside 10.1.1.1 255.255.255.0
ip audit info action alarm
ip audit attack action alarm
pdm history enable
arp timeout 14400
!--- Do not do NAT on traffic to other PIXes. nat
(inside) 0 access-list 100
route outside 0.0.0.0 0.0.0.0 172.18.124.1 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc
0:10:00 h225 1:00:00
```

```
timeout h323 0:05:00 mgcp 0:05:00 sip 0:30:00 sip_media
0:02:00
timeout uauth 0:05:00 absolute
aaa-server TACACS+ protocol tacacs+
aaa-server RADIUS protocol radius
aaa-server LOCAL protocol local
no snmp-server location
no snmp-server contact
snmp-server community public
snmp-server enable traps
floodguard enable
sysopt connection permit-ipsec
crypto ipsec transform-set myset esp-des esp-md5-hmac
!--- This is traffic to PIX 2. crypto map newmap 20
ipsec-isakmp
crypto map newmap 20 match address 120
crypto map newmap 20 set peer 172.18.124.154
crypto map newmap 20 set transform-set myset
!--- This is traffic to PIX 3. crypto map newmap 30
ipsec-isakmp
crypto map newmap 30 match address 130
crypto map newmap 30 set peer 172.18.124.157
crypto map newmap 30 set transform-set myset
crypto map newmap interface outside
isakmp enable outside
isakmp key ******** address 172.18.124.154 netmask
255.255.255.255
   no-xauth no-config-mode
isakmp key ******** address 172.18.124.157 netmask
255.255.255.255
   no-xauth no-config-mode
isakmp identity address
isakmp policy 10 authentication pre-share
isakmp policy 10 encryption des
isakmp policy 10 hash md5
isakmp policy 10 group 1
isakmp policy 10 lifetime 1000
telnet timeout 5
ssh timeout 5
console timeout 0
terminal width 80
Cryptochecksum:d41d8cd98f00b204e9800998ecf8427e
: end
```

PIX 2

```
Building configuration...
: Saved
:
PIX Version 6.3(3)
interface ethernet0 auto
interface ethernet1 auto
nameif ethernet0 outside security0
nameif ethernet1 inside security100
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname pix2
fixup protocol dns maximum-length 512
fixup protocol ftp 21
fixup protocol h323 h225 1720
fixup protocol h323 ras 1718-1719
fixup protocol http 80
fixup protocol rsh 514
```

```
fixup protocol rtsp 554
fixup protocol sip 5060
fixup protocol sip udp 5060
fixup protocol skinny 2000
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol tftp 69
names
!--- This is traffic to PIX Central. access-list 110
permit ip 10.2.2.0 255.255.255.0 10.1.1.0 255.255.255.0
!--- Do not do NAT on traffic to PIX Central. access-
list 100 permit ip 10.2.2.0 255.255.255.0 10.1.1.0
255.255.255.0
pager lines 24
logging on
mtu outside 1500
mtu inside 1500
ip address outside 172.18.124.154 255.255.255.0
ip address inside 10.2.2.1 255.255.255.0
ip audit info action alarm
ip audit attack action alarm
no failover
failover timeout 0:00:00
failover poll 15
no failover ip address outside
no failover ip address inside
pdm history enable
arp timeout 14400
!--- Do not do NAT on traffic to PIX Central. nat
(inside) 0 access-list 100
route outside 0.0.0.0 0.0.0.0 172.18.124.1 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc
0:10:00 h225 1:00:00
timeout h323 0:05:00 mgcp 0:05:00 sip 0:30:00 sip_media
0:02:00
timeout uauth 0:05:00 absolute
aaa-server TACACS+ protocol tacacs+
aaa-server RADIUS protocol radius
aaa-server LOCAL protocol local
no snmp-server location
no snmp-server contact
snmp-server community public
no snmp-server enable traps
floodguard enable
sysopt connection permit-ipsec
crypto ipsec transform-set myset esp-des esp-md5-hmac
!--- This is traffic to PIX Central. crypto map newmap
10 ipsec-isakmp
crypto map newmap 10 match address 110
crypto map newmap 10 set peer 172.18.124.153
crypto map newmap 10 set transform-set myset
crypto map newmap interface outside
isakmp enable outside
isakmp key ******** address 172.18.124.153 netmask
255.255.255.255
   no-xauth no-config-mode
isakmp identity address
isakmp policy 10 authentication pre-share
isakmp policy 10 encryption des
isakmp policy 10 hash md5
isakmp policy 10 group 1
isakmp policy 10 lifetime 1000
telnet timeout 5
```

```
ssh timeout 5
console timeout 0
terminal width 80
Cryptochecksum:d41d8cd98f00b204e9800998ecf8427e
: end
```

PIX 3

```
Building configuration...
: Saved
:
PIX Version 6.3(3)
interface ethernet0 auto
interface ethernet1 auto
nameif ethernet0 outside security0
nameif ethernet1 inside security100
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname pix3
fixup protocol dns maximum-length 512
fixup protocol ftp 21
fixup protocol h323 h225 1720
fixup protocol h323 ras 1718-1719
fixup protocol http 80
fixup protocol rsh 514
fixup protocol rtsp 554
fixup protocol sip 5060
fixup protocol sip udp 5060
fixup protocol skinny 2000
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol tftp 69
names
!--- This is traffic to PIX Central. access-list 110
permit ip 10.3.3.0 255.255.255.0 10.1.1.0 255.255.255.0
!--- Do not do NAT on traffic to PIX Central. access-
list 100 permit ip 10.3.3.0 255.255.255.0 10.1.1.0
255.255.255.0
pager lines 24
logging on
mtu outside 1500
mtu inside 1500
ip address outside 172.18.124.157 255.255.255.0
ip address inside 10.3.3.1 255.255.255.0
ip audit info action alarm
ip audit attack action alarm
no failover
failover timeout 0:00:00
failover poll 15
no failover ip address outside
no failover ip address inside
pdm history enable
arp timeout 14400
!--- Do not do NAT on traffic to PIX Central. nat
(inside) 0 access-list 100
route outside 0.0.0.0 0.0.0.0 172.18.124.1 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc
0:10:00 h225 1:00:00
timeout h323 0:05:00 mgcp 0:05:00 sip 0:30:00 sip_media
0:02:00
timeout uauth 0:05:00 absolute
aaa-server TACACS+ protocol tacacs+
```

```
aaa-server RADIUS protocol radius
aaa-server LOCAL protocol local
no snmp-server location
no snmp-server contact
snmp-server community public
no snmp-server enable traps
floodguard enable
sysopt connection permit-ipsec
crypto ipsec transform-set myset esp-des esp-md5-hmac
!--- This is traffic to PIX Central. crypto map newmap
10 ipsec-isakmp
crypto map newmap 10 match address 110
crypto map newmap 10 set peer 172.18.124.153
crypto map newmap 10 set transform-set myset
crypto map newmap interface outside
isakmp enable outside
isakmp key ******** address 172.18.124.153 netmask
255.255.255.255
   no-xauth no-config-mode
isakmp identity address
isakmp policy 10 authentication pre-share
isakmp policy 10 encryption des
isakmp policy 10 hash md5
isakmp policy 10 group 1
isakmp policy 10 lifetime 1000
telnet timeout 5
ssh timeout 5
console timeout 0
terminal width 80
Cryptochecksum:aa3bbd8c6275d214b153e1e0bc0173e4
: end
```

验证

使用本部分可确认配置能否正常运行。

命令输出解释程序（仅限注册用户）(OIT) 支持某些 show 命令。使用 OIT 可查看对 show 命令输出的分析。

- **show crypto ipsec sa** — 显示IPsec安全关联(SA)的当前状态，在确定流量是否加密时非常有用。

```
pix-central#show crypto ipsec sa

interface: outside
    Crypto map tag: newmap, local addr. 172.18.124.153

   local  ident (addr/mask/prot/port): (10.1.1.0/255.255.255.0/0/0)
   remote ident (addr/mask/prot/port): (10.3.3.0/255.255.255.0/0/0)
   current_peer: 172.18.124.157:500
     PERMIT, flags={origin_is_acl,}
!--- This verifies that encrypted packets are sent !--- and received without any errors.
#pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4
     #pkts decaps: 4, #pkts decrypt: 4, #pkts verify 4
     #pkts compressed: 0, #pkts decompressed: 0
     #pkts not compressed: 0, #pkts compr. failed: 0,
     #pkts decompress failed: 0, #send errors 0, #recv errors 0

     local crypto endpt.: 172.18.124.153,
     remote crypto endpt.: 172.18.124.157
     path mtu 1500, ipsec overhead 56, media mtu 1500
```

```
     current outbound spi: 3bcb6913
!--- Shows inbound SAs that are established. inbound esp sas:
      spi: 0x3efbe540(1056695616)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 3, crypto map: newmap
        sa timing: remaining key lifetime (k/sec): (4607999/27330)
        IV size: 8 bytes
        replay detection support: Y

     inbound ah sas:
     inbound pcp sas:
!--- Shows outbound SAs that are established. outbound esp sas:
       spi: 0x3bcb6913(1003186451)
         transform: esp-des esp-md5-hmac ,
         in use settings ={Tunnel, }
         slot: 0, conn id: 4, crypto map: newmap
         sa timing: remaining key lifetime (k/sec): (4607999/27321)
         IV size: 8 bytes
         replay detection support: Y

      outbound ah sas:

      outbound pcp sas:

local  ident (addr/mask/prot/port): (10.1.1.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (10.2.2.0/255.255.255.0/0/0)
current_peer: 172.18.124.154:500
  PERMIT, flags={origin_is_acl,}
!--- This verifies that encrypted packets are sent !--- and received without any errors.
#pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4
  #pkts decaps: 4, #pkts decrypt: 4, #pkts verify 4
  #pkts compressed: 0, #pkts decompressed: 0
  #pkts not compressed: 0, #pkts compr. failed: 0,
  #pkts decompress failed: 0, #send errors 0, #recv errors 0

  local crypto endpt.: 172.18.124.153,
  remote crypto endpt.: 172.18.124.154
  path mtu 1500, ipsec overhead 56, media mtu 1500
  current outbound spi: da8d556
!--- Shows inbound SAs that are established. inbound esp sas: spi: 0x53835c96(1401117846)
transform: esp-des esp-md5-hmac ,
       in use settings ={Tunnel, }
       slot: 0, conn id: 1, crypto map: newmap
       sa timing: remaining key lifetime (k/sec): (4607999/27319)
       IV size: 8 bytes
       replay detection support: Y

    inbound ah sas:

    inbound pcp sas:
!--- Shows outbound SAs that are established. outbound esp sas: spi: 0xda8d556c(3666695532)
transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 2, crypto map: newmap
        sa timing: remaining key lifetime (k/sec): (4607999/27319)
        IV size: 8 bytes
        replay detection support: Y

     outbound ah sas:

     outbound pcp sas:
```

- **show crypto isakmp sa** — 显示Internet密钥交换(IKE)SA的当前状态。

```
pix-central#show crypto isakmp sa
Total     : 2
Embryonic : 0
        dst               src       state     pending   created

  172.18.124.153   172.18.124.154   QM_IDLE         0         0
  172.18.124.153   172.18.124.157   QM_IDLE         0         0
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除命令

注意：在使用debug命令之前，请参阅有关Debug命**令的**重要信息。

在PIX上(运行logging monitor debugging**或logging console debugging**命**令时**):

- **debug crypto ipsec — 调试 IPSec 处理。**
- **debug crypto isakmp** — 调试Internet安全关联和密钥管理协议(ISAKMP)处理。
- **debug crypto engine - 显示有关执行加密和解密的加密引擎的 debug 消息。**

清除安全关联

在PIX的配置模式下使用以下命令：

- **clear [crypto] ipsec sa - 删除活动 IPsec SA。**关键字 **crypto 是可选的。**
- **clear [crypto] isakmp sa - 删除活动 IKE SA。**关键字 **crypto 是可选的。**

相关信息

- Cisco PIX 防火墙软件
- Cisco Secure PIX 防火墙命令参考
- 安全产品 Field Notices（包括 PIX）
- 请求注解 (RFC)
- IPsec 协商/IKE 协议
- 技术支持和文档 - Cisco Systems