PIX/ASA 7.x及更高版本：带重叠网络的LAN到LAN IPsec VPN配置示例

目录

简介
先决条件
要求
使用的组件
相关产品
规则
配置
网络图
配置
验证
显示从 ASA-1 发出的命令
显示从 ASA-2 发出的命令
故障排除
清除安全关联
故障排除命令
相关信息

简介

本文档介绍了对通过两个安全设备间的 LAN 到 LAN (L2L) IPsec 隧道进行传输的 VPN 数据流进行转换 (NAT) 的步骤以及对 Internet 数据流进行 PAT 的步骤。每个安全设备身后都有一个受保护的专用网络。在本示例中，具有相同和重叠的内部网络的两台 Cisco 自适应安全设备 (ASA) 通过 VPN 隧道连接。通常情况下，不会出现通过 VPN 进行通信的情况，因为用户对同一子网的 IP 地址进行 ping 操作导致 ping 数据包从不会离开本地子网。为使这两个专用内部网络能够互相通信，在两台 ASA 上使用了策略 NAT 以转换本地子网，以便按预期进行通信。

先决条件

要求

在继续本配置示例之前，请确保您已在接口上对 Cisco 自适应安全设备进行了 IP 地址配置并具备基本的连接。

使用的组件

本文档中的信息基于以下软件版本：

- Cisco 自适应安全设备软件版本 7.x 及更高版本。

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。

相关产品

此配置也可用于 Cisco PIX 安全设备版本 7.x 及更高版本。

规则

有关文档约定的更多信息，请参考 Cisco 技术提示约定。

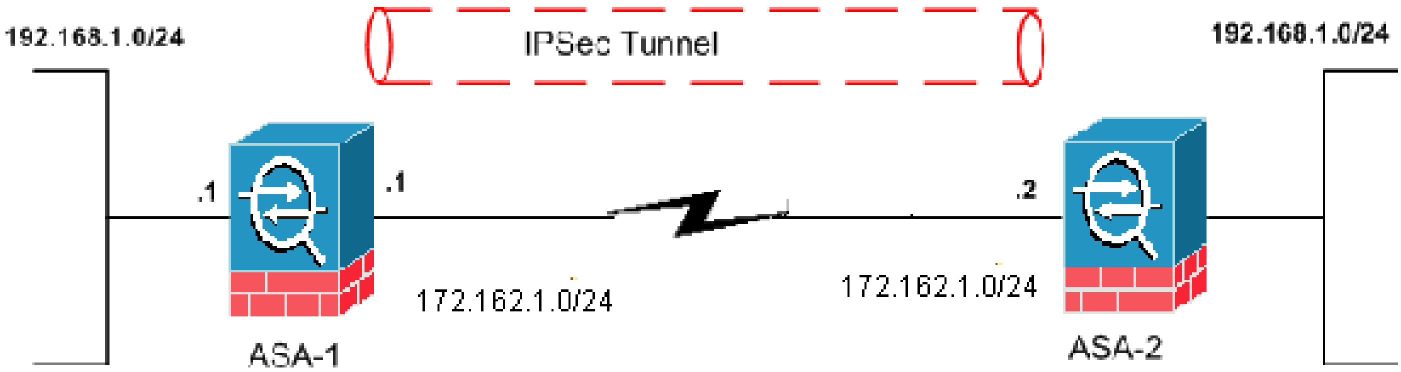
配置

本部分提供有关如何配置本文档所述功能的信息。

注意：要获取有关本部分中所使用命令的更多信息，可使用命令查找工具（仅限已注册客户）。

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：

- ASA-1 配置
- ASA-2 配置

ASA-1

```
ASA-1#show running-config
: Saved
:
ASA Version 8.0(3)
!
hostname ciscoasa
enable password 8Ry2YjIyt7RRXU24 encrypted
names
!
```

```
interface Ethernet0
 nameif outside
 security-level 0
 ip address 172.162.1.1 255.255.255.0
!--- Configure the outside interface. ! interface
Ethernet1 nameif inside security-level 100 ip address
192.168.1.1 255.255.255.0 !--- Configure the inside
interface. passwd 2KFQnbNIdI.2KYOU encrypted ftp mode
passive access-list new extended permit ip 192.168.2.0
255.255.255.0 192.168.3.0 255.255.255.0 !--- This access
list (new) is used with the crypto map (outside_map) !--
- in order to determine which traffic should be
encrypted !--- and sent across the tunnel.
access-list policy-nat extended permit ip 192.168.1.0
255.255.255.0 192.168.3.0 255.255.255.0

!--- The policy-nat ACL is used with the static !---
command in order to match the VPN traffic for
translation.

pager lines 24
mtu outside 1500
mtu inside 1500
no failover
asdm image flash:/asdm-615.bin
no asdm history enable
arp timeout 14400


static (inside,outside) 192.168.2.0  access-list policy-
nat
!--- It is a Policy NAT statement. !--- The static
command with the access list (policy-nat), !--- which
matches the VPN traffic and translates the source
(192.168.1.0) to !--- 192.168.2.0 for outbound VPN
traffic.


global (outside) 1 interface
nat (inside) 1 0.0.0.0 0.0.0.0 0 0
!--- The previous statements PAT the Internet traffic !-
-- except for the VPN traffic that uses the IP address
172.17.1.1. route outside 0.0.0.0 0.0.0.0 172.162.1.2 1
!--- Output is suppressed. !--- PHASE 2 CONFIGURATION --
-! !--- The encryption types for Phase 2 are defined
here. crypto ipsec transform-set CISCO esp-des esp-md5-
hmac !--- Define the transform set for Phase 2. crypto
map outside_map 20 match address new !--- Define which
traffic should be sent to the IPsec peer with the !---
access list (new). crypto map outside_map 20 set peer
172.162.1.2 !--- Sets the IPsec peer (remote end point)
crypto map outside_map 20 set transform-set CISCO !---
Sets the IPsec transform set "CISCO" !--- to be used
with the crypto map entry "outside_map" crypto map
outside_map interface outside !--- Specifies the
interface to be used with !--- the settings defined in
this configuration !--- PHASE 1 CONFIGURATION ---! !---
This configuration uses isakmp policy 65535. !--- Policy
65535 is included in the configuration by default. !---
These configuration commands define the !--- Phase 1
policy parameters that are used. crypto isakmp identity
address crypto isakmp enable outside crypto isakmp
policy 65535 authentication pre-share encryption des
hash md5 group 2 lifetime 86400 tunnel-group 172.162.1.2
```

```
type ipsec-l2l !--- In order to create and manage the
database of connection-specific records !--- for IPsec-
L2L—IPsec (LAN-to-LAN) tunnels, use the tunnel-group !--
- command in global configuration mode. !--- For L2L
connections, the name of the tunnel group must be !---
the IP address of the IPsec peer (remote peer end).

tunnel-group 172.162.1.2 ipsec-attributes
 pre-shared-key *
!--- Enter the pre-shared key in order to configure the
authentication method. telnet timeout 5 ssh timeout 5
console timeout 0 ! class-map inspection_default match
default-inspection-traffic ! ! policy-map global_policy
class inspection_default inspect dns maximum-length 512
inspect ftp inspect h323 h225 inspect h323 ras inspect
netbios inspect rsh inspect rtsp inspect skinny inspect
esmtp inspect sqlnet inspect sunrpc inspect tftp inspect
sip inspect xdmcp ! service-policy global_policy global
Cryptochecksum:33e1e37cd1280d908210dac0cc26e706 : end
```

ASA-2

```

ASA-2#show running-config
: Saved
:
ASA Version 8.0(3)
!
hostname ASA-2
enable password 8Ry2YjIyt7RRXU24 encrypted
names
!
interface Ethernet0
 nameif outside
 security-level 0
 ip address 172.162.1.2 255.255.255.0
!
interface Ethernet1
 nameif inside
 security-level 100
 ip address 192.168.1.1 255.255.255.0
!
!--- Output is suppressed. access-list new extended
permit ip 192.168.3.0 255.255.255.0 192.168.2.0
255.255.255.0 !--- This access list (new) is used with
the crypto map (outside_map) !--- in order to determine
which traffic needs to be encrypted !--- and sent across
the tunnel.
access-list policy-nat extended permit ip 192.168.1.0
255.255.255.0 192.168.2.0 255.255.255.0

!--- The policy-nat ACL is used with the static !---
command in order to match the VPN traffic for
translation.

pager lines 24
mtu outside 1500
mtu inside 1500
no failover
asdm image flash:/asdm-615.bin
no asdm history enable
arp timeout 14400
```

```
static (inside,outside) 192.168.3.0  access-list policy-
nat
!--- This is a Policy NAT statement. !--- The static
command with the access list (policy-nat), !--- which
matches the VPN traffic and translates the source
(192.168.1.0) to !--- 192.168.3.0 for outbound VPN
traffic.

global (outside) 1 interface
nat (inside) 1 0.0.0.0 0.0.0.0 0 0
!--- The previous statements PAT the Internet traffic !-
-- except the VPN traffic that uses the outside
interface IP address. route outside 0.0.0.0 0.0.0.0
172.162.1.2 1 !--- PHASE 2 CONFIGURATION ---! !--- The
encryption types for Phase 2 are defined here. crypto
ipsec transform-set CISCO esp-des esp-md5-hmac !---
Define the transform set for Phase 2. crypto map
outside_map 20 match address new !--- Define which
traffic needs to be sent to the IPsec peer. crypto map
outside_map 20 set peer 172.162.1.1 !--- Sets the IPsec
peer. crypto map outside_map 20 set transform-set CISCO
!--- Sets the IPsec transform set "CISCO" !--- to be
used with the crypto map entry "outside_map". crypto map
outside_map interface outside !--- Specifies the
interface to be used with !--- the settings defined in
this configuration. !--- PHASE 1 CONFIGURATION ---! !---
This configuration uses isakmp policy 65535 !--- which
is included in the configuration by default. !--- The
configuration commands here define the !--- Phase 1
policy parameters that are used. crypto isakmp identity
address crypto isakmp enable outside crypto isakmp
policy 65535 authentication pre-share encryption des
hash md5 group 2 lifetime 86400 !--- Output is
suppressed. !--- In order to create and manage the
database of connection-specific !--- records for IPsec-
L2L—IPsec (LAN-to-LAN) tunnels, use the !--- tunnel-
group  command in global configuration mode. !--- For
L2L connections, the name of the tunnel group must be !-
-- the IP address of the IPsec peer.


tunnel-group 172.162.1.1 type ipsec-l2l
tunnel-group 172.162.1.1 ipsec-attributes
 pre-shared-key *
!--- Enter the pre-shared key in order to configure the
authentication method. prompt hostname context
Cryptochecksum:6b505b4a05c1aee96a71e67c23e71865 : 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 查看对 show 命令输出的分析：

- **show crypto isakmp sa - 显示对等体上的所有当前 IKE 安全关联 (SA)。**
- **show crypto ipsec sa - 显示当前 SA 使用的设置。**

显示从 ASA-1 发出的命令

```
ASA-1#show crypto isakmp sa



Active SA: 1
    Rekey SA: 0 (A tunnel will report 1 Active and 1 Rekey SA during rekey)
Total IKE SA: 1

1   IKE Peer: 172.162.1.2
    Type    : L2L             Role    : initiator
    Rekey   : no              State   : MM_ACTIVE

ASA-1#show crypto ipsec sa
interface: outside
    Crypto map tag: outside_map, seq num: 20, local addr: 172.162.1.1

      access-list new permit ip 192.168.2.0 255.255.255.0 192.168.3.0

255.255.2
5.0
      local ident (addr/mask/prot/port): (192.168.2.0/255.255.255.0/0/0)
      remote ident (addr/mask/prot/port): (192.168.3.0/255.255.255.0/0/0)
      current_peer: 172.162.1.2

      #pkts encaps: 9, #pkts encrypt: 9, #pkts digest: 9
      #pkts decaps: 9, #pkts decrypt: 9, #pkts verify: 9
      #pkts compressed: 0, #pkts decompressed: 0
      #pkts not compressed: 9, #pkts comp failed: 0, #pkts decomp failed: 0
      #pre-frag successes: 0, #pre-frag failures: 0, #fragments created: 0
      #PMTUs sent: 0, #PMTUs rcvd: 0, #decapsulated frgs needing reassembly: 0
      #send errors: 0, #recv errors: 0

      local crypto endpt.: 172.162.1.1, remote crypto endpt.: 172.162.1.2

      path mtu 1500, ipsec overhead 58, media mtu 1500
      current outbound spi: 0BA6CD7E

    inbound esp sas:
      spi: 0xFB4BD01A (4216049690)
         transform: esp-des esp-md5-hmac none
         in use settings ={L2L, Tunnel, }
         slot: 0, conn_id: 8192, crypto-map: outside_map
         sa timing: remaining key lifetime (kB/sec): (3824999/27738)
         IV size: 8 bytes
         replay detection support: Y
    outbound esp sas:
      spi: 0x0BA6CD7E (195480958)
         transform: esp-des esp-md5-hmac none
         in use settings ={L2L, Tunnel, }
         slot: 0, conn_id: 8192, crypto-map: outside_map
         sa timing: remaining key lifetime (kB/sec): (3824999/27738)
         IV size: 8 bytes
         replay detection support: Y

ASA-1#show nat


NAT policies on Interface inside:
  match ip inside 192.168.1.0 255.255.255.0 outside 192.168.3.0 255.255.255.0
```

```
    static translation to 192.168.2.0
    translate_hits = 12, untranslate_hits = 5
  match ip inside any outside any
    dynamic translation to pool 1 (172.162.1.1 [Interface PAT])
    translate_hits = 0, untranslate_hits = 0
  match ip inside any inside any
    dynamic translation to pool 1 (No matching global)
    translate_hits = 0, untranslate_hits = 0
  match ip inside any dmz any
    dynamic translation to pool 1 (No matching global)
    translate_hits = 0, untranslate_hits = 0

ASA-1#show xlate

1 in use, 1 most used
Global 192.168.2.0 Local 192.168.1.0
```

显示从 ASA-2 发出的命令

```
ASA-2#show crypto ipsec sa

interface: outside
    Crypto map tag: outside_map, seq num: 20, local addr: 172.162.1.2

      access-list new permit ip 192.168.3.0 255.255.255.0 192.168.2.0

255.255.25
5.0
      local ident (addr/mask/prot/port): (192.168.3.0/255.255.255.0/0/0)
      remote ident (addr/mask/prot/port): (192.168.2.0/255.255.255.0/0/0)
      current_peer: 172.162.1.1

      #pkts encaps: 9, #pkts encrypt: 9, #pkts digest: 9
      #pkts decaps: 9, #pkts decrypt: 9, #pkts verify: 9
      #pkts compressed: 0, #pkts decompressed: 0
      #pkts not compressed: 9, #pkts comp failed: 0, #pkts decomp failed: 0
      #pre-frag successes: 0, #pre-frag failures: 0, #fragments created: 0
      #PMTUs sent: 0, #PMTUs rcvd: 0, #decapsulated frgs needing reassembly: 0
      #send errors: 0, #recv errors: 0

      local crypto endpt.: 172.162.1.2, remote crypto endpt.: 172.162.1.1

      path mtu 1500, ipsec overhead 58, media mtu 1500
      current outbound spi: FB4BD01A

    inbound esp sas:
      spi: 0x0BA6CD7E (195480958)
         transform: esp-des esp-md5-hmac none
         in use settings ={L2L, Tunnel, }
         slot: 0, conn_id: 8192, crypto-map: outside_map
         sa timing: remaining key lifetime (kB/sec): (4274999/26902)
         IV size: 8 bytes
         replay detection support: Y
    outbound esp sas:
      spi: 0xFB4BD01A (4216049690)
         transform: esp-des esp-md5-hmac none
         in use settings ={L2L, Tunnel, }
         slot: 0, conn_id: 8192, crypto-map: outside_map
         sa timing: remaining key lifetime (kB/sec): (4274999/26902)
         IV size: 8 bytes
         replay detection support: Y
```

```
ASA-2#show crypto isakmp sa

Active SA: 1
    Rekey SA: 0 (A tunnel will report 1 Active and 1 Rekey SA during rekey)
Total IKE SA: 1

1   IKE Peer: 172.162.1.1
    Type    : L2L              Role    : responder
    Rekey   : no               State   : MM_ACTIVE
```

故障排除

清除安全关联

排除故障时，请务必在进行更改后清除现有的 SA。在 PIX 的特权模式下，使用以下命令：

- **clear crypto ipsec sa - 删除活动的 IPsec SA。**
- **clear crypto isakmp sa - 删除活动的 IKE SA。**

故障排除命令

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

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

- **debug crypto ipsec - 显示第 2 阶段的 IPsec 协商。**
- **debug crypto isakmp - 显示第 1 阶段的 ISAKMP 协商。**

相关信息

- **最常用的 L2L 和远程访问 IPSec VPN 故障排除解决方案**
- **PIX 7.0 和使用 nat、global、static、conduit 和 access-list 命令进行自适应安全设备端口重定向（转发）**
- **PIX/ASA 7.x和FWSM ：NAT和PAT语句**
- **Cisco ASA 5500 系列安全设备**
- **Cisco PIX 500 系列安全设备**
- **IPsec 协商/IKE 协议**
- **技术支持和文档 - Cisco Systems**