# PIX/ASA 7.x e versioni successive: Esempio di configurazione della VPN IPsec da LAN a LAN con reti sovrapposte

## Sommario

## Introduzione

In questo documento viene descritta la procedura utilizzata per tradurre (NAT) il traffico VPN che attraversa un tunnel IPsec da LAN a LAN (L2L) tra due appliance di sicurezza e il traffico Internet. Ogni appliance di sicurezza dispone di una rete privata protetta. Nell'esempio, due appliance Cisco Adaptive Security (ASA) con reti interne identiche e sovrapposte sono collegate sul tunnel VPN. In uno scenario normale, la comunicazione sulla VPN non avviene mai perché i pacchetti ping non lasciano mai la subnet locale poiché l'utente esegue il ping dell'indirizzo IP della stessa subnet. Affinché le due reti interne private comunichino tra loro, la policy NAT viene utilizzata su entrambe le appliance ASA per la traduzione della subnet locale in modo che la comunicazione avvenga come previsto.

## Prerequisiti

### Requisiti

Prima di procedere con questo esempio di configurazione, verificare di aver configurato Cisco Adaptive Security Appliance con gli indirizzi IP sulle interfacce e di disporre della connettività di base.

## Componenti usati

Le informazioni di questo documento si basano sulla seguente versione del software:

- Software Cisco Adaptive Security Appliance versione 7.x e successive.

Le informazioni discusse in questo documento fanno riferimento a dispositivi usati in uno specifico ambiente di emulazione. Su tutti i dispositivi menzionati nel documento la configurazione è stata ripristinata ai valori predefiniti. Se la rete è operativa, valutare attentamente eventuali conseguenze derivanti dall'uso dei comandi.

## Prodotti correlati

Questa configurazione può essere utilizzata anche con Cisco PIX Security Appliance versione 7.x e successive.

## Convenzioni

Fare riferimento a Cisco Technical Tips Conventions per ulteriori informazioni sulle convenzioni dei documenti.

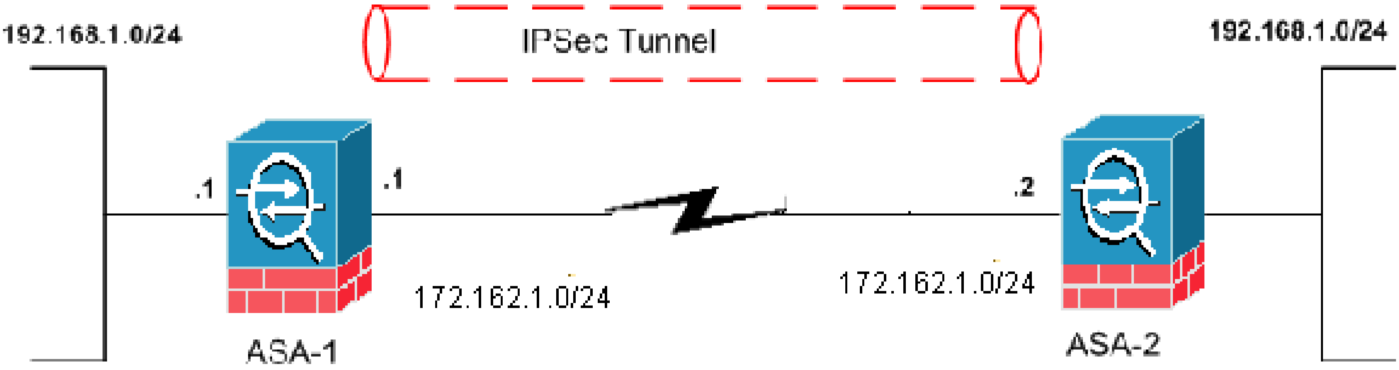
# Configurazione

In questa sezione vengono presentate le informazioni necessarie per configurare le funzionalità descritte più avanti nel documento.

**Nota: per** ulteriori informazioni sui comandi menzionati in questa sezione, usare lo strumento di ricerca dei comandi (solo utenti registrati).

## Esempio di rete

Nel documento viene usata questa impostazione di rete:



## Configurazioni

Nel documento vengono usate queste configurazioni:

- Configurazione ASA-1

- Configurazione ASA-2

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
```

## Verifica

Fare riferimento a questa sezione per verificare che la configurazione funzioni correttamente.

Lo strumento Output Interpreter (solo utenti registrati) (OIT) supporta alcuni comandi **show**. Usare l'OIT per visualizzare un'analisi dell'output del comando **show**:

- **show crypto isakmp sa**: visualizza tutte le associazioni di sicurezza IKE correnti in un peer.
- **show crypto ipsec sa**: visualizza le impostazioni utilizzate dalle associazioni di protezione correnti.

### show Commands da ASA-1

```
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
```

## show Commands da ASA-2

```
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
```

# Risoluzione dei problemi

## Cancella associazioni di protezione

Quando si esegue la risoluzione dei problemi, assicurarsi di cancellare le associazioni di protezione esistenti dopo aver apportato una modifica. In modalità privilegiata di PIX, utilizzare i seguenti comandi:

- **clear crypto ipsec sa**: elimina le SA IPsec attive.
- **clear crypto isakmp sa**: elimina le associazioni di protezione IKE attive.

## Comandi per la risoluzione dei problemi

Lo strumento Output Interpreter (solo utenti registrati) supporta alcuni comandi show. Usare l'OIT per visualizzare un'analisi dell'output del comando **show**.

**Nota:** consultare le informazioni importanti sui comandi di debug prima di usare i comandi di **debug**.

- **debug crypto ipsec**: visualizza le negoziazioni IPsec della fase 2.
- **debug crypto isakmp**: visualizza le negoziazioni ISAKMP della fase 1.

# Informazioni correlate

- Soluzioni per la risoluzione dei problemi più comuni di VPN IPsec L2L e ad accesso remoto
- PIX 7.0 e Adaptive Security Appliance Port Redirection(Forwarding) con comandi nat, global, static, conduit e access-list
- PIX/ASA 7.x e FWSM: Dichiarazioni NAT e PAT

- Cisco ASA serie 5500 Security Appliance
- Cisco PIX serie 500 Security Appliance
- Negoziazione IPSec/protocolli IKE
- Documentazione e supporto tecnico – Cisco Systems