Configurazione di FTD BGP su VPN IPSec

Sommario

Introduzione

In questo documento viene descritto come configurare il protocollo Border Gateway Protocol (BGP) su un tunnel VPN da sito a sito IPsec tra due Cisco FirePower Threat Defense (FTD).

Prerequisiti

Requisiti

Cisco raccomanda la conoscenza dei seguenti argomenti:

- Configurazioni BGP su FTD
- Configurazioni tunnel VPN da sito a sito IPsec su FTD

Componenti usati

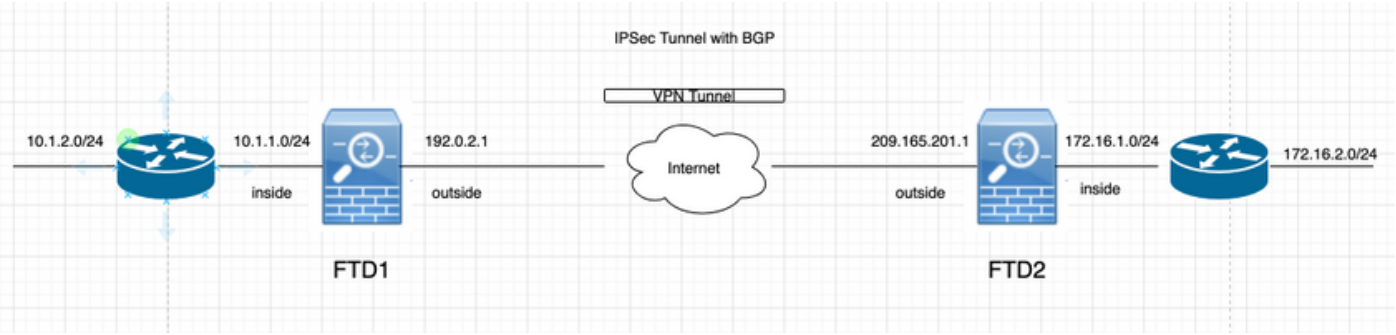
Per la stesura del documento, è stato usato un Cisco FTDv con versione 6.4.0.7 e 6.4.0.9.

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.

Configurazione

In questa sezione viene descritta la configurazione necessaria sui FTD per configurare il protocollo BGP adiacente tramite un tunnel IPSec.

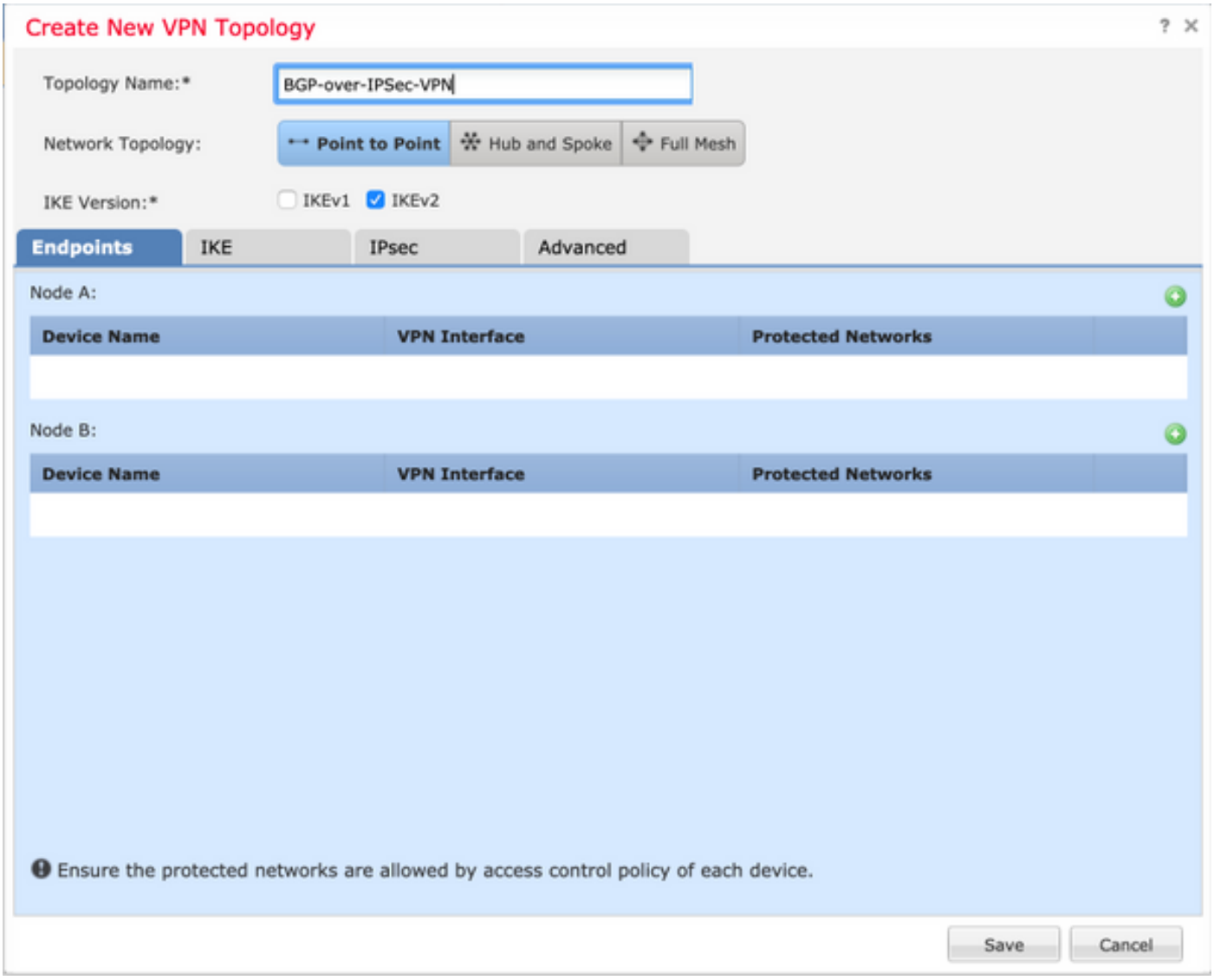
Esempio di rete



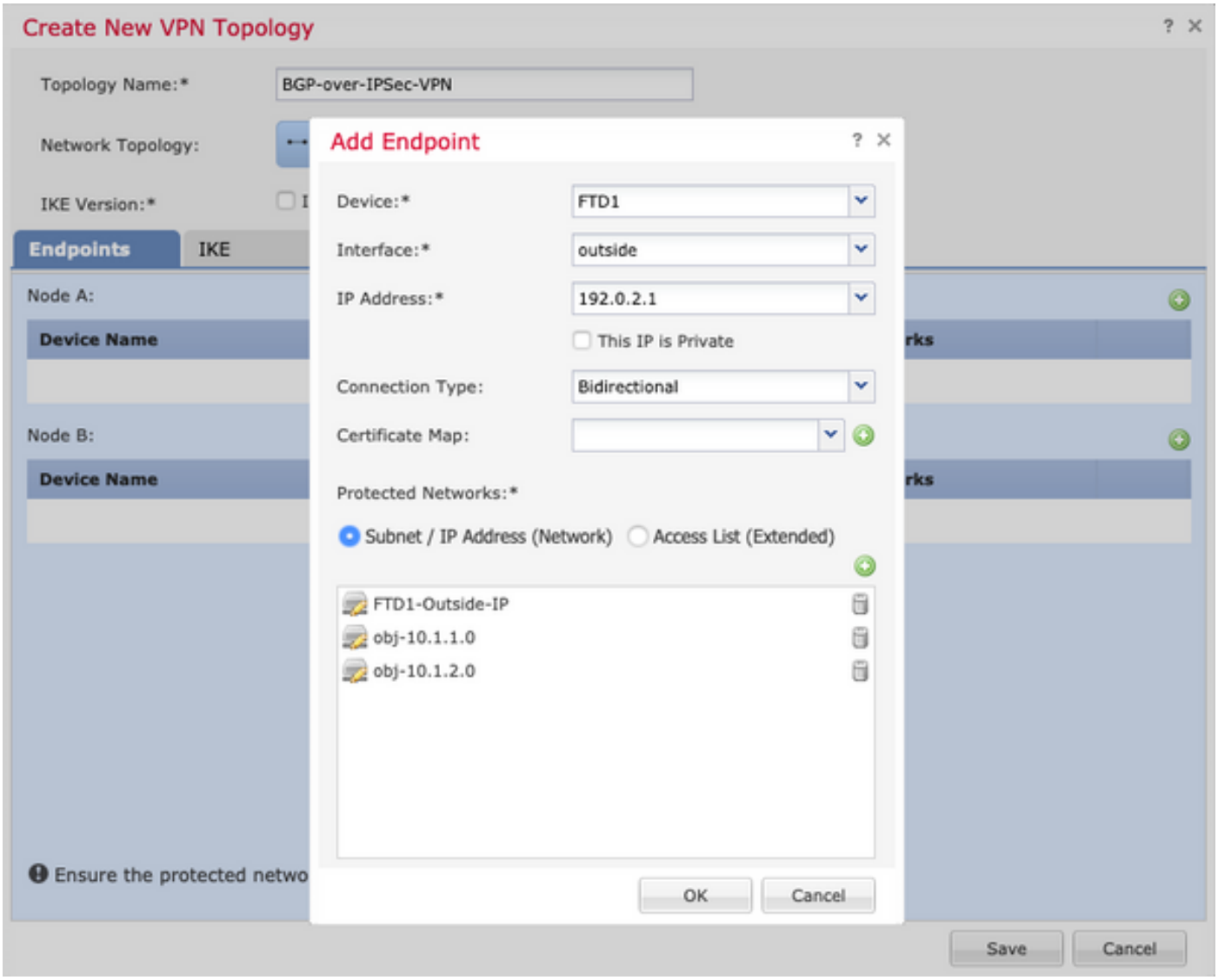
Configurazione VPN IPSec

Passaggio 1. Creare una nuova topologia VPN point-to-point.

Selezionare **Dispositivi > VPN > Da sito a sito** e aggiungere una nuova VPN per dispositivo FirePower Threat Defense.

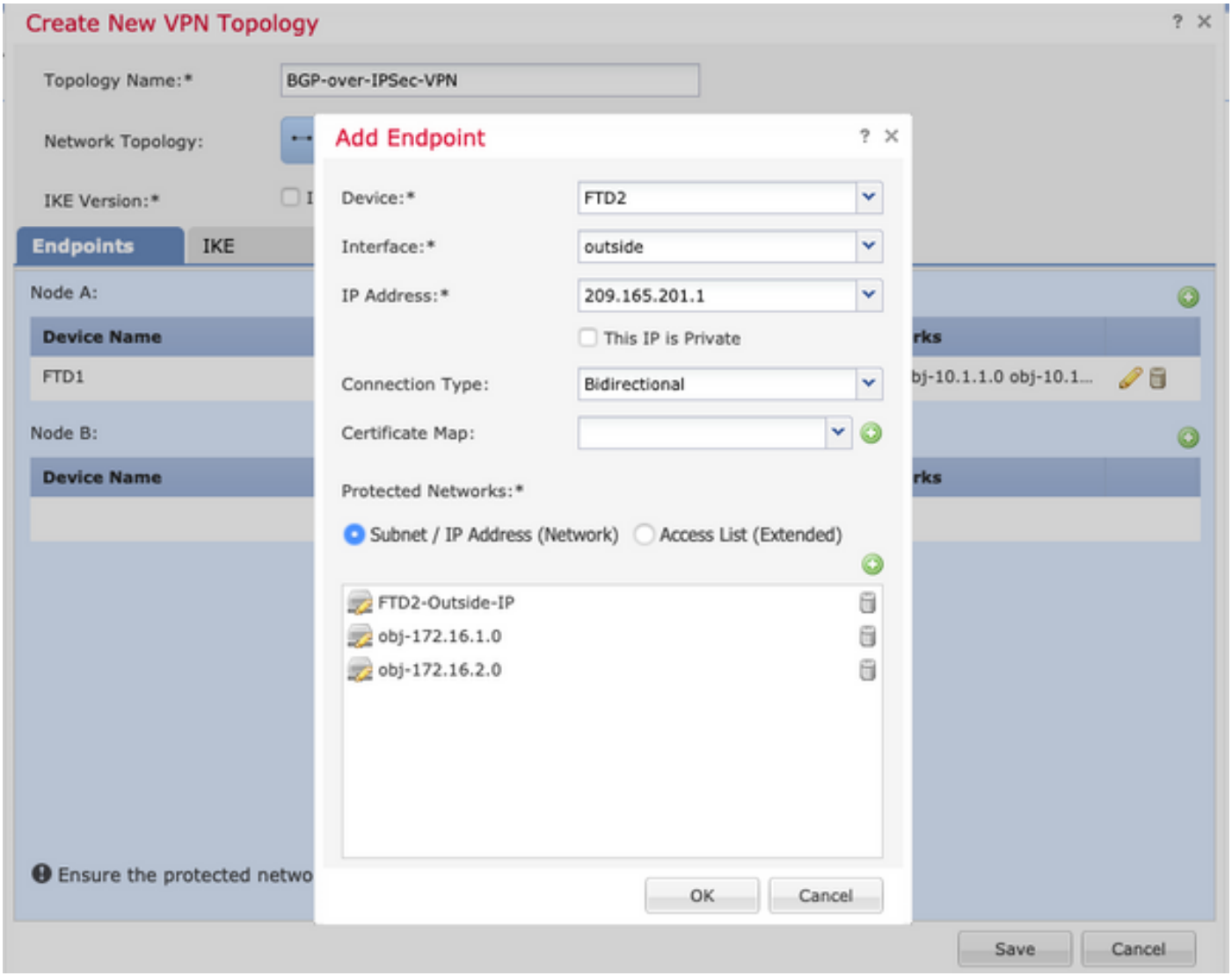


Passaggio 2. Configurare FTD1 come uno degli endpoint.



- La rete di oggetti FTD1-Outside-IP contiene l'indirizzo IP dell'interfaccia esterna dell'FTD1.
- Gli oggetti obj-10.1.1.0 e obj-10.1.2.0 contengono rispettivamente la subnet 10.1.1.0/24 e 10.1.2.0/24. Il traffico VPN viene generato da queste subnet. Nella sezione di configurazione BGP, BGP è configurato per annunciare queste subnet ai router adiacenti.

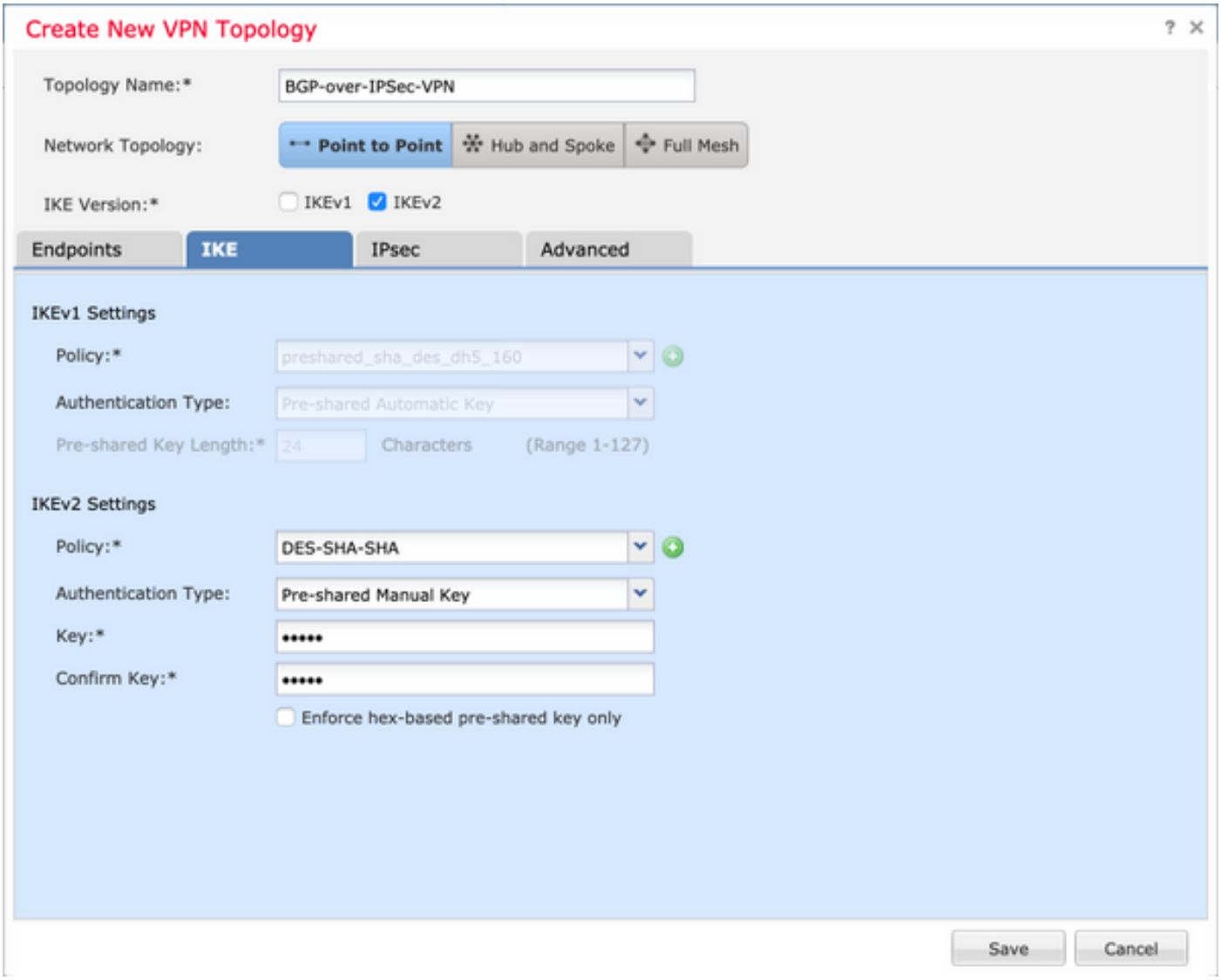
Passaggio 3. Configurare FTD2 come secondo endpoint.



- La rete di oggetti FTD2-Outside-IP contiene l'indirizzo IP dell'interfaccia esterna dell'FTD2.
- Gli oggetti obj-172.16.1.0 e obj-172.16.2.0 contengono rispettivamente la subnet 172.16.1.0/24 e 172.16.2.0/24. Il traffico VPN viene generato da queste subnet. Nella sezione di configurazione BGP, BGP è configurato per annunciare queste subnet ai router adiacenti.

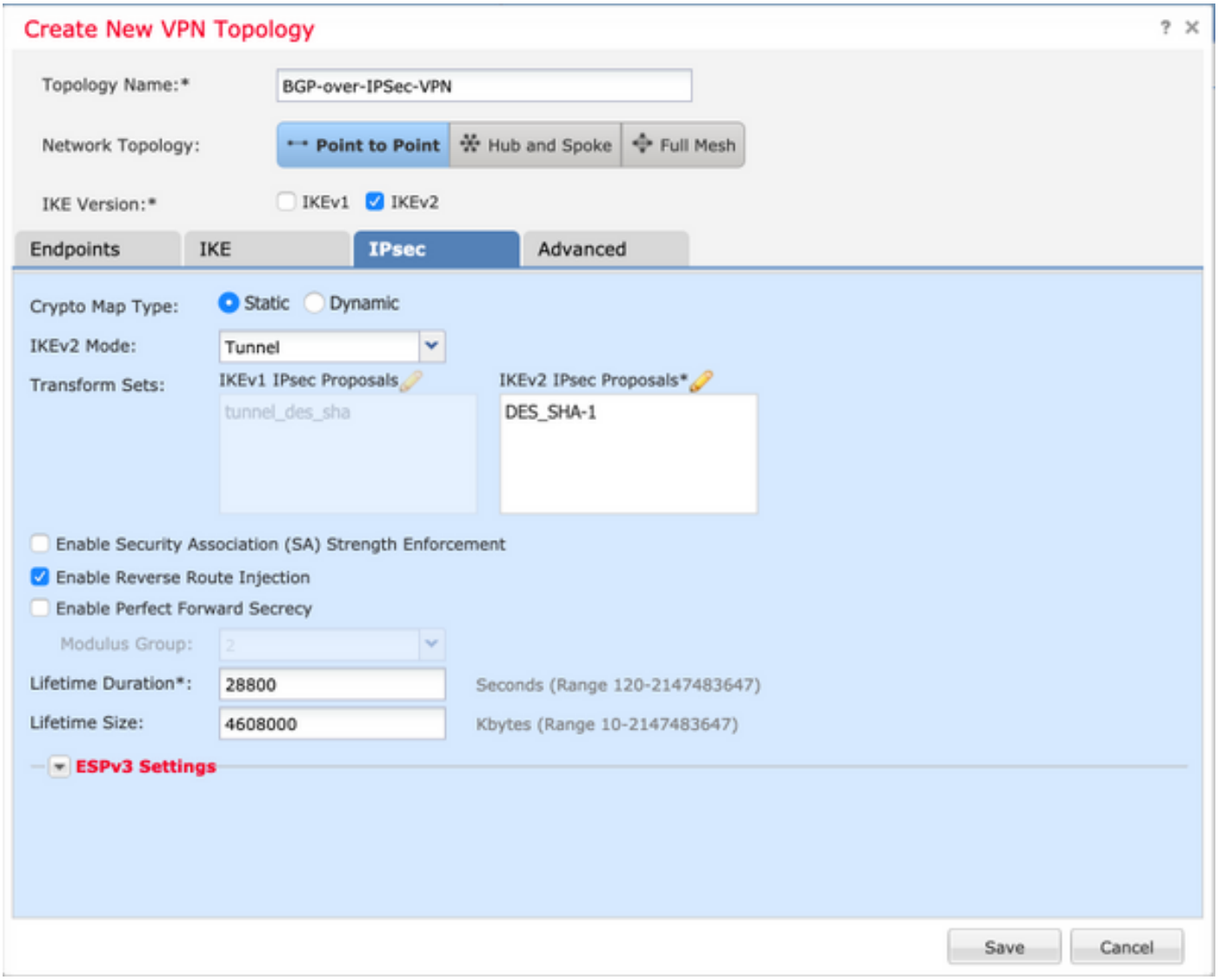
Passaggio 4. Configurare i parametri IKE.

1. Configurare il criterio IKEv2.
2. Configurare il metodo di autenticazione (PSK/Certificato).

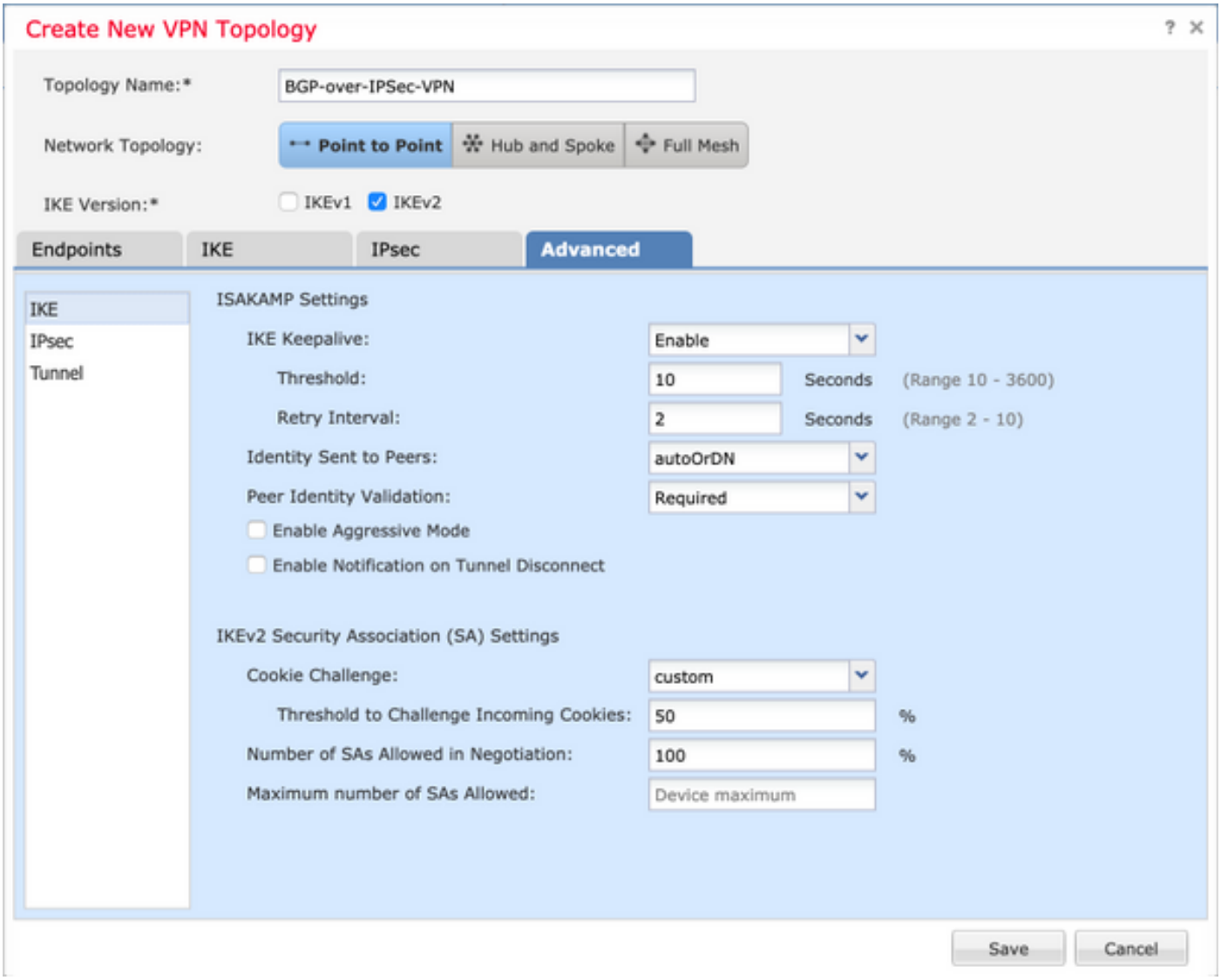


Passaggio 5. Configurare i parametri IPSec necessari.

1. Configura tipo di mappa crittografica (statica o dinamica)
2. Configura modalità IKEv2 (tunnel o trasporto)
3. Configurazione delle proposte IPSec
4. Abilita Perfect Forward Secrecy (facoltativo)
5. Abilita Reverse Route Injection (Facoltativo)



Passaggio 6. Configurare le impostazioni avanzate in base alle esigenze.

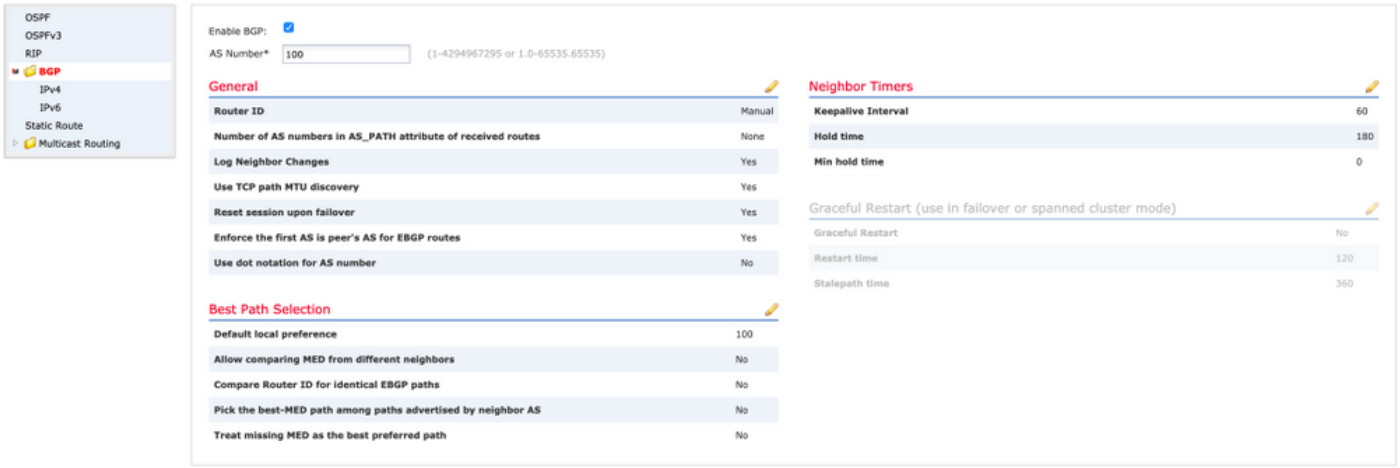


Configurazione BGP

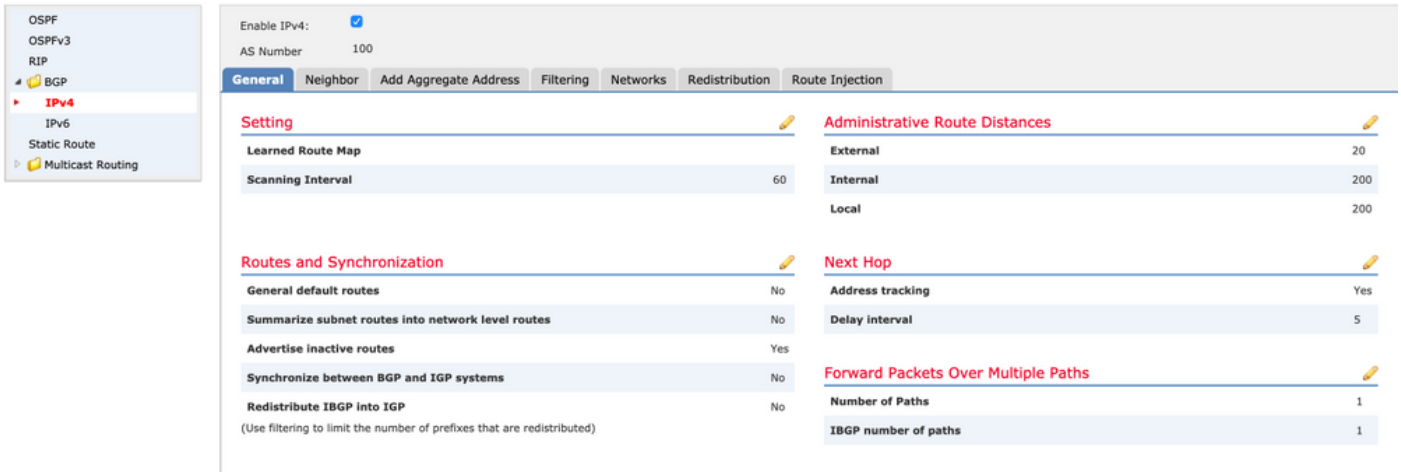
Questa è la procedura per configurare FTD1 e FTD2.

In **Gestione dispositivi** selezionare il dispositivo, quindi selezionare **Routing > BGP**.

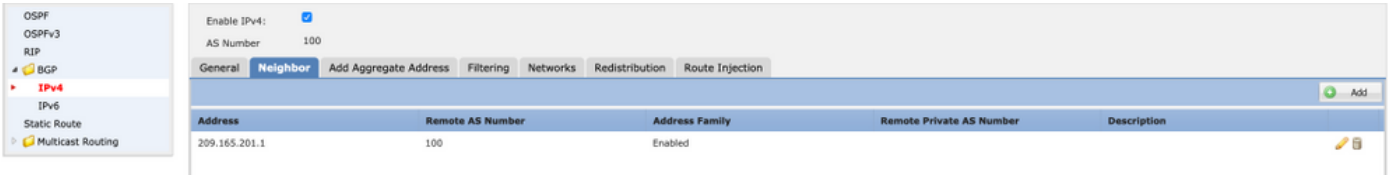
1. Abilitare BGP e configurare il numero AS (Autonomous System), come mostrato nell'immagine.



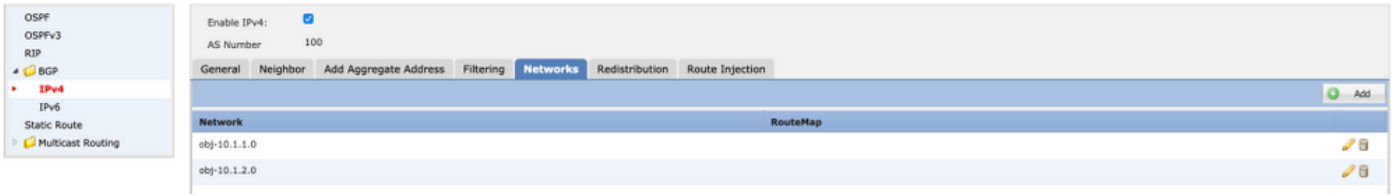
2. Passare a **BGP > IPv4** e abilitare BGP IPv4 sull'FTD, come mostrato in questa immagine.



3. Sotto la scheda **Adiacente**, aggiungere l'altro FTD come vicino e abilitare il vicino, come mostrato in questa immagine.



4. Sotto la scheda **Reti**, aggiungere le reti che si desidera pubblicizzare tramite BGP.



5. Tutte le altre impostazioni BGP sono facoltative e possono essere configurate in base all'ambiente.

Configurazione finale su entrambi i dispositivi

FTD1

```
!--- FTD Version ---! ftd1# show version ----------------------[ ftd1 ]----------------------
Model : Cisco Firepower Threat Defense for VMWare (75) Version 6.4.0.7 (Build 53) UUID :
cbd4966c-daf4-11ea-8637-c8977622bc2d Rules update version : 2018-10-10-001-vrt VDB version : 309
------------------------------------------------- Cisco Adaptive Security Appliance Software
Version 9.12(2)151 !--- Configure the Inside and outside interface ---! interface
GigabitEthernet0/0 nameif outside cts manual propagate sgt preserve-untag policy static sgt
disabled trusted security-level 0 ip address 192.0.2.1 255.255.255.0 ! interface
GigabitEthernet0/1 nameif inside cts manual propagate sgt preserve-untag policy static sgt
disabled trusted security-level 0 ip address 10.1.1.1 255.255.255.0 !--- Configure VPN ---! !---
Configure IPSec Policy ---! crypto ipsec ikev2 ipsec-proposal CSM_IP_1 protocol esp encryption
des protocol esp integrity sha-1 !--- Configure Crypto Map ---! crypto map CSM_outside_map 1
match address CSM_IPSEC_ACL_2 crypto map CSM_outside_map 1 set peer 209.165.201.1 crypto map
CSM_outside_map 1 set ikev2 ipsec-proposal CSM_IP_1 crypto map CSM_outside_map 1 set reverse-
route !--- Apply the Crypto Map to the outside interface ---! crypto map CSM_outside_map
interface outside !--- Configure IKEv2 policy ---! crypto ikev2 policy 80 encryption des
integrity sha group 5 prf sha lifetime seconds 86400 !--- Enable IKEv2 on the outside interface
---! crypto ikev2 enable outside !--- Configure BGP Router Process ---! router bgp 100 bgp log-
```

neighbor-changes bgp router-id 10.127.248.35 address-family ipv4 unicast neighbor 209.165.201.1 remote-as 100 neighbor 209.165.201.1 transport path-mtu-discovery disable neighbor 209.165.201.1 activate network 10.1.1.0 mask 255.255.255.0 network 10.1.2.0 mask 255.255.255.0 no auto-summary no synchronization exit-address-family ! !--- Configure the necessary routes ---! route outside 0.0.0.0 0.0.0.0 192.0.2.100 1 route inside 10.1.2.0 255.255.255.0 10.1.1.100 1

FTD2

```
!--- FTD Version ---! ftd2# show version ----------------------[ ftd2 ]----------------------
Model : Cisco Firepower Threat Defense for VMWare (75) Version 6.4.0.9 (Build 62) UUID :
4ebe8e3a-dd8d-11ea-a599-a348a450d5ff Rules update version : 2018-10-10-001-vrt VDB version : 309
------------------------------------------------ Cisco Adaptive Security Appliance Software
Version 9.12(2)33 !--- Configure the Inside and outside interface ---! interface
GigabitEthernet0/0 nameif outside cts manual propagate sgt preserve-untag policy static sgt
disabled trusted security-level 0 ip address 209.165.201.1 255.255.255.0 ! interface
GigabitEthernet0/1 nameif inside cts manual propagate sgt preserve-untag policy static sgt
disabled trusted security-level 0 ip address 172.16.1.1 255.255.255.0 !--- Configure VPN ---! !-
-- Configure IPSec Policy ---! crypto ipsec ikev2 ipsec-proposal CSM_IP_1 protocol esp
encryption des protocol esp integrity sha-1 !--- Configure Crypto Map ---! crypto map
CSM_outside_map 2 match address CSM_IPSEC_ACL_2 crypto map CSM_outside_map 2 set peer 192.0.2.1
crypto map CSM_outside_map 2 set ikev2 ipsec-proposal CSM_IP_1 crypto map CSM_outside_map 2 set
reverse-route !--- Apply the Crypto Map to the outside interface ---! crypto map CSM_outside_map
interface outside !--- Configure IKEv2 policy ---! crypto ikev2 policy 80 encryption des
integrity sha group 5 prf sha lifetime seconds 86400 !--- Enable IKEv2 on the outside interface
---! crypto ikev2 enable outside !--- Configure BGP Router Process ---! router bgp 100 bgp log-
neighbor-changes bgp router-id 10.127.248.36 address-family ipv4 unicast neighbor 192.0.2.1
remote-as 100 neighbor 192.0.2.1 transport path-mtu-discovery disable neighbor 192.0.2.1
activate network 172.16.1.0 mask 255.255.255.0 network 172.16.2.0 mask 255.255.255.0 no auto-
summary no synchronization exit-address-family !--- Configure the necessary routes ---! route
outside 0.0.0.0 0.0.0.0 209.165.201.100 1 route inside 172.16.2.0 255.255.255.0 172.16.1.100 1
```

Verifica

FTD1

```
!--- Check the IKEv2 sa with remote peer ---! ftd1# show crypto ikev2 sa IKEv2 SAs: Session-
id:34, Status:UP-ACTIVE, IKE count:1, CHILD count:1 Tunnel-id Local Remote Status Role 315310279
192.0.2.1/500 209.165.201.1/500 READY INITIATOR Encr: DES, Hash: SHA96, DH Grp:5, Auth sign:
PSK, Auth verify: PSK Life/Active Time: 86400/32514 sec Child sa: local selector 192.0.2.1/0 -
192.0.2.1/65535 remote selector 209.165.201.1/0 - 209.165.201.1/65535 ESP spi in/out:
0xd8ba0545/0x4b6beb6c !--- Check the IPSec sa with remote peer and check the number of encrypts
and decrypts---! ftd1# show crypto ipsec sa interface: outside Crypto map tag: CSM_outside_map,
seq num: 1, local addr: 192.0.2.1 access-list CSM_IPSEC_ACL_2 extended permit ip host 192.0.2.1
host 209.165.201.1 local ident (addr/mask/prot/port): (192.0.2.1/255.255.255.255/0/0) remote
ident (addr/mask/prot/port): (209.165.201.1/255.255.255.255/0/0) current_peer: 209.165.201.1
#pkts encaps: 1110, #pkts encrypt: 1110, #pkts digest: 1110 #pkts decaps: 1111, #pkts decrypt:
1111, #pkts verify: 1111 #pkts compressed: 0, #pkts decompressed: 0 #pkts not compressed: 1110,
#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
#TFC rcvd: 0, #TFC sent: 0 #Valid ICMP Errors rcvd: 0, #Invalid ICMP Errors rcvd: 0 #send
errors: 0, #recv errors: 0 local crypto endpt.: 192.0.2.1/500, remote crypto endpt.:
209.165.201.1/500 path mtu 1500, ipsec overhead 58(36), media mtu 1500 PMTU time remaining
(sec): 0, DF policy: copy-df ICMP error validation: disabled, TFC packets: disabled current
outbound spi: 4B6BEB6C current inbound spi : D8BA0545 inbound esp sas: spi: 0xD8BA0545
(3636069701) SA State: active transform: esp-des esp-sha-hmac no compression in use settings
={L2L, Tunnel, IKEv2, } slot: 0, conn_id: 1515, crypto-map: CSM_outside_map sa timing: remaining
key lifetime (kB/sec): (4101105/21619) IV size: 8 bytes replay detection support: Y Anti replay
bitmap: 0xFFFFFFFF 0xFFFFFFFF outbound esp sas: spi: 0x4B6BEB6C (1265363820) SA State: active
transform: esp-des esp-sha-hmac no compression in use settings ={L2L, Tunnel, IKEv2, } slot: 0,
conn_id: 1515, crypto-map: CSM_outside_map sa timing: remaining key lifetime (kB/sec):
```

(4239345/21619) IV size: 8 bytes replay detection support: Y Anti replay bitmap: 0x00000000 0x00000001 !--- Check the BGP router summary ---! ftd1# show bgp summary BGP router identifier 10.127.248.35, local AS number 100 BGP table version is 43, main routing table version 43 4 network entries using 800 bytes of memory 4 path entries using 320 bytes of memory 2/2 BGP path/bestpath attribute entries using 416 bytes of memory 0 BGP route-map cache entries using 0 bytes of memory 0 BGP filter-list cache entries using 0 bytes of memory BGP using 1536 total bytes of memory BGP activity 20/16 prefixes, 26/22 paths, scan interval 60 secs Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 209.165.201.1 4 100 494 488 43 0 0 09:01:15 2 !--- Check the BGP neighborship ---! ftd1# show bgp neighbors BGP neighbor is 209.165.201.1, context single_vf, remote AS 100, internal link BGP version 4, remote router ID 10.127.248.36 BGP state = Established, up for 09:01:18 Last read 00:00:52, last write 00:00:12, hold time is 180, keepalive interval is 60 seconds Neighbor sessions: 1 active, is not multisession capable (disabled) Neighbor capabilities: Route refresh: advertised and received(new) Four-octets ASN Capability: advertised and received Address family IPv4 Unicast: advertised and received Multisession Capability: Message statistics: InQ depth is 0 OutQ depth is 0 Sent Rcvd Opens: 1 1 Notifications: 0 0 Updates: 3 3 Keepalives: 484 490 Route Refresh: 0 0 Total: 488 494 Default minimum time between advertisement runs is 0 seconds For address family: IPv4 Unicast Session: 209.165.201.1 BGP table version 43, neighbor version 43/0 Output queue size : 0 Index 19 19 update-group member Sent Rcvd Prefix activity: ---- ---- Prefixes Current: 2 2 (Consumes 160 bytes) Prefixes Total: 2 2 Implicit Withdraw: 0 0 Explicit Withdraw: 0 0 Used as bestpath: n/a 2 Used as multipath: n/a 0 Outbound Inbound Local Policy Denied Prefixes: -------- ------- Bestpath from this peer: 2 n/a Invalid Path: 1 n/a Total: 3 0 Number of NLRIs in the update sent: max 1, min 0 Address tracking is enabled, the RIB does have a route to 209.165.201.1 Connections established 2; dropped 1 Last reset 09:01:34, due to Peer closed the session of session 1 Transport(tcp) path-mtu-discovery is disabled Graceful-Restart is disabled !--- Check the routes learned from BGP ---! ftd1# sh route bgp Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, V - VPN i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, + - replicated route Gateway of last resort is 192.0.2.100 to network 0.0.0.0 B 172.16.1.0 255.255.255.0 [200/0] via 209.165.201.1, 00:00:57 B 172.16.2.0 255.255.255.0 [200/0] via 172.16.1.100, 09:01:23

FTD2

!--- Check the IKEv2 sa with remote peer ---! ftd2# show crypto ikev2 sa IKEv2 SAs: Session-id:34, Status:UP-ACTIVE, IKE count:1, CHILD count:1 Tunnel-id Local Remote Status Role 862624945 209.165.201.1/500 192.0.2.1/500 READY RESPONDER Encr: DES, Hash: SHA96, DH Grp:5, Auth sign: PSK, Auth verify: PSK Life/Active Time: 86400/32429 sec Child sa: local selector 209.165.201.1/0 - 209.165.201.1/65535 remote selector 192.0.2.1/0 - 192.0.2.1/65535 ESP spi in/out: 0x4b6beb6c/0xd8ba0545 !--- Check the IPSec sa with remote peer and check the number of encrypts and decrypts---! ftd2# show crypto ipsec sa interface: outside Crypto map tag: CSM_outside_map, seq num: 2, local addr: 209.165.201.1 access-list CSM_IPSEC_ACL_2 extended permit ip host 209.165.201.1 host 192.0.2.1 local ident (addr/mask/prot/port): (209.165.201.1/255.255.255.255/0/0) remote ident (addr/mask/prot/port): (192.0.2.1/255.255.255.255/0/0) current_peer: 192.0.2.1 #pkts encaps: 1107, #pkts encrypt: 1107, #pkts digest: 1107 #pkts decaps: 1106, #pkts decrypt: 1106, #pkts verify: 1106 #pkts compressed: 0, #pkts decompressed: 0 #pkts not compressed: 1107, #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 #TFC rcvd: 0, #TFC sent: 0 #Valid ICMP Errors rcvd: 0, #Invalid ICMP Errors rcvd: 0 #send errors: 0, #recv errors: 0 local crypto endpt.: 209.165.201.1/500, remote crypto endpt.: 192.0.2.1/500 path mtu 1500, ipsec overhead 58(36), media mtu 1500 PMTU time remaining (sec): 0, DF policy: copy-df ICMP error validation: disabled, TFC packets: disabled current outbound spi: D8BA0545 current inbound spi : 4B6BEB6C inbound esp sas: spi: 0x4B6BEB6C (1265363820) SA State: active transform: esp-des esp-sha-hmac no compression in use settings ={L2L, Tunnel, IKEv2, } slot: 0, conn_id: 1516, crypto-map: CSM_outside_map sa timing: remaining key lifetime (kB/sec): (4008945/21713) IV size: 8 bytes replay detection support: Y Anti replay bitmap: 0xFFFFFFFF 0xFFFFFFFF outbound esp sas: spi: 0xD8BA0545 (3636069701) SA State: active transform: esp-des esp-sha-hmac no compression in use settings ={L2L, Tunnel, IKEv2, } slot: 0, conn_id: 1516, crypto-map: CSM_outside_map sa timing: remaining key lifetime (kB/sec): (4239345/21713) IV size: 8 bytes replay detection support: Y

```
Anti replay bitmap: 0x00000000 0x00000001 !--- Check the BGP router summary ---! ftd2# show bgp summary BGP router identifier 10.127.248.36, local AS number 100 BGP table version is 44, main routing table version 44 3 network entries using 600 bytes of memory 3 path entries using 240 bytes of memory 2/2 BGP path/bestpath attribute entries using 416 bytes of memory 0 BGP route-map cache entries using 0 bytes of memory 0 BGP filter-list cache entries using 0 bytes of memory BGP using 1256 total bytes of memory BGP activity 20/17 prefixes, 26/23 paths, scan interval 60 secs Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd 192.0.2.1 4 100 486 492 44 0 0 08:59:40 2 !--- Check the BGP neighborship ---! ftd2# show bgp neighbors BGP neighbor is 192.0.2.1, context single_vf, remote AS 100, internal link BGP version 4, remote router ID 10.127.248.35 BGP state = Established, up for 08:59:42 Last read 00:00:53, last write 00:00:38, hold time is 180, keepalive interval is 60 seconds Neighbor sessions: 1 active, is not multisession capable (disabled) Neighbor capabilities: Route refresh: advertised and received(new) Four-octets ASN Capability: advertised and received Address family IPv4 Unicast: advertised and received Multisession Capability: Message statistics: InQ depth is 0 OutQ depth is 0 Sent Rcvd Opens: 1 1 Notifications: 0 0 Updates: 2 3 Keepalives: 489 482 Route Refresh: 0 0 Total: 492 486 Default minimum time between advertisement runs is 0 seconds For address family: IPv4 Unicast Session: 192.0.2.1 BGP table version 44, neighbor version 44/0 Output queue size : 0 Index 19 19 update-group member Sent Rcvd Prefix activity: ---- ---- Prefixes Current: 1 2 (Consumes 160 bytes) Prefixes Total: 1 2 Implicit Withdraw: 0 0 Explicit Withdraw: 0 0 Used as bestpath: n/a 2 Used as multipath: n/a 0 Outbound Inbound Local Policy Denied Prefixes: ---------- ------- Bestpath from this peer: 2 n/a Invalid Path: 2 n/a Total: 4 0 Number of NLRIs in the update sent: max 1, min 0 Address tracking is enabled, the RIB does have a route to 192.0.2.1 Connections established 2; dropped 1 Last reset 08:59:57, due to Peer closed the session of session 1 Transport(tcp) path-mtu-discovery is disabled Graceful-Restart is disabled !--- Check the routes learned from BGP ---! ftd2# show route bgp Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, V - VPN i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2 ia - IS-IS inter area, * - candidate default, U - per-user static route o - ODR, P - periodic downloaded static route, + - replicated route Gateway of last resort is 209.165.201.100 to network 0.0.0.0 B 10.1.1.0 255.255.255.0 [200/0] via 192.0.2.1, 08:59:46 B 10.1.2.0 255.255.255.0 [200/0] via 10.1.1.100, 08:59:46
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Risoluzione dei problemi

Al momento non sono disponibili informazioni specifiche per la risoluzione dei problemi di questa configurazione.