為FMC管理的FTD配置雙ISP故障切換

目錄

簡介

本檔案介紹如何在FMC管理的FTD上使用PBR和IP SLA設定雙ISP容錯移轉。

必要條件

需求

思科建議您瞭解以下主題：

- 原則型路由(PBR)
- 網際網路通訊協定服務等級協定(IP SLA)
- Firepower Management Center (FMC)
- Firepower Threat Defense (FTD)

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- FMCv 7.3.0
- FTDv 7.3.0

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

背景資訊

靜態路由跟蹤功能概述

靜態路由跟蹤功能允許FTD在主租用線路不可用時使用與輔助ISP的連線。為了達到此備援，FTD將靜態路由與您定義的監控目標相關聯。SSLA操作使用定期的ICMP回應請求監控目標。

如果沒有收到回應應答，則會將該對象視為關閉，並從路由表中刪除關聯的路由。使用先前配置的備份路由來代替已移除的路由。使用備份路由時，SLA監控操作將繼續嘗試訪問監控目標。

目標再次可用後，第一個路由將替換在路由表中，備份路由將被刪除。

現在，您可以同時配置多個下一跳和基於策略的路由轉發操作。當流量與路由的條件匹配時，系統將嘗試按照您指定的順序將流量轉發到IP地址，直到成功。

此功能在運行7.1版及更高版本、由FMC 7.3版及更高版本管理的FTD裝置上可用。

設定

網路圖表

此圖提供網路圖示範例。

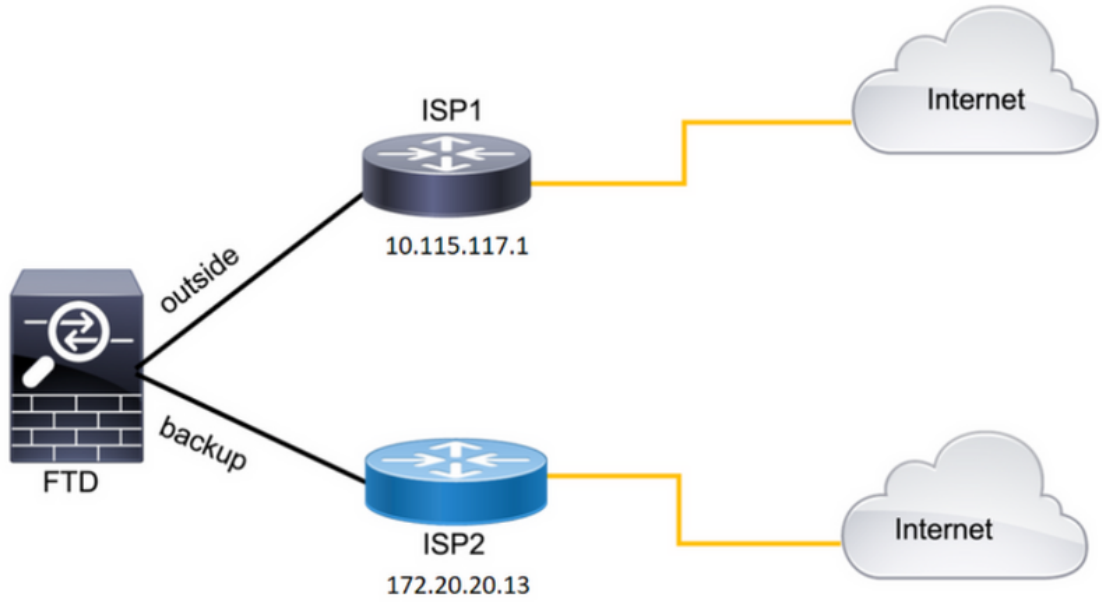


圖1.圖示示例。

ISP1 = 10.115.117.1

ISP2 = 172.20.20.13

組態

步驟 1.配置SLA監控器對象。

在FMC上，導航至 Object > Object Management > SLA Monitor > Add SLA Monitor 並為ISP IP地址新增SLA

Monitor對象。

主預設網關(ISP1)的SLA監控。

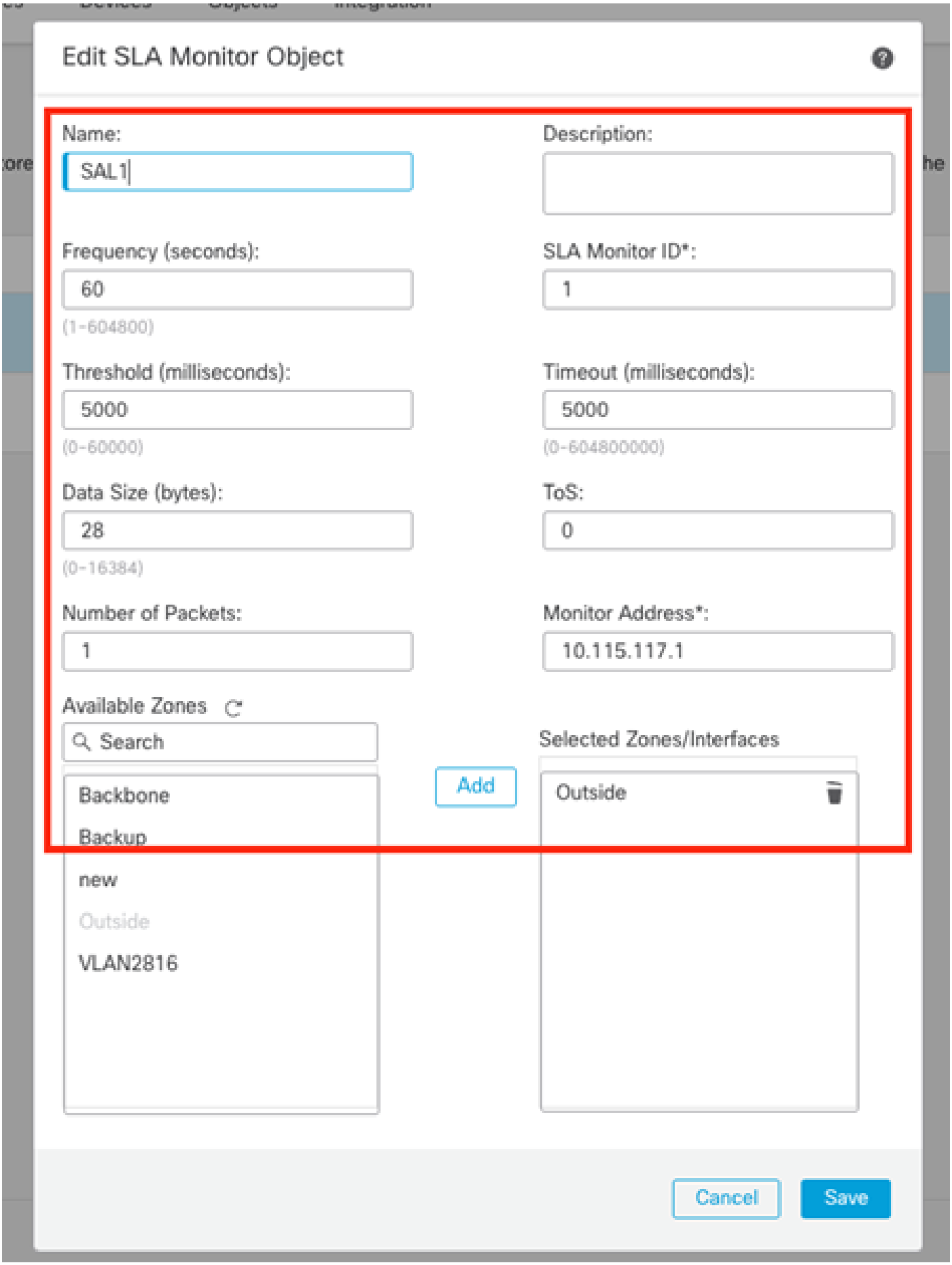


圖2.SLA1監控器配置視窗。

輔助預設網關(ISP2)的SLA監控。

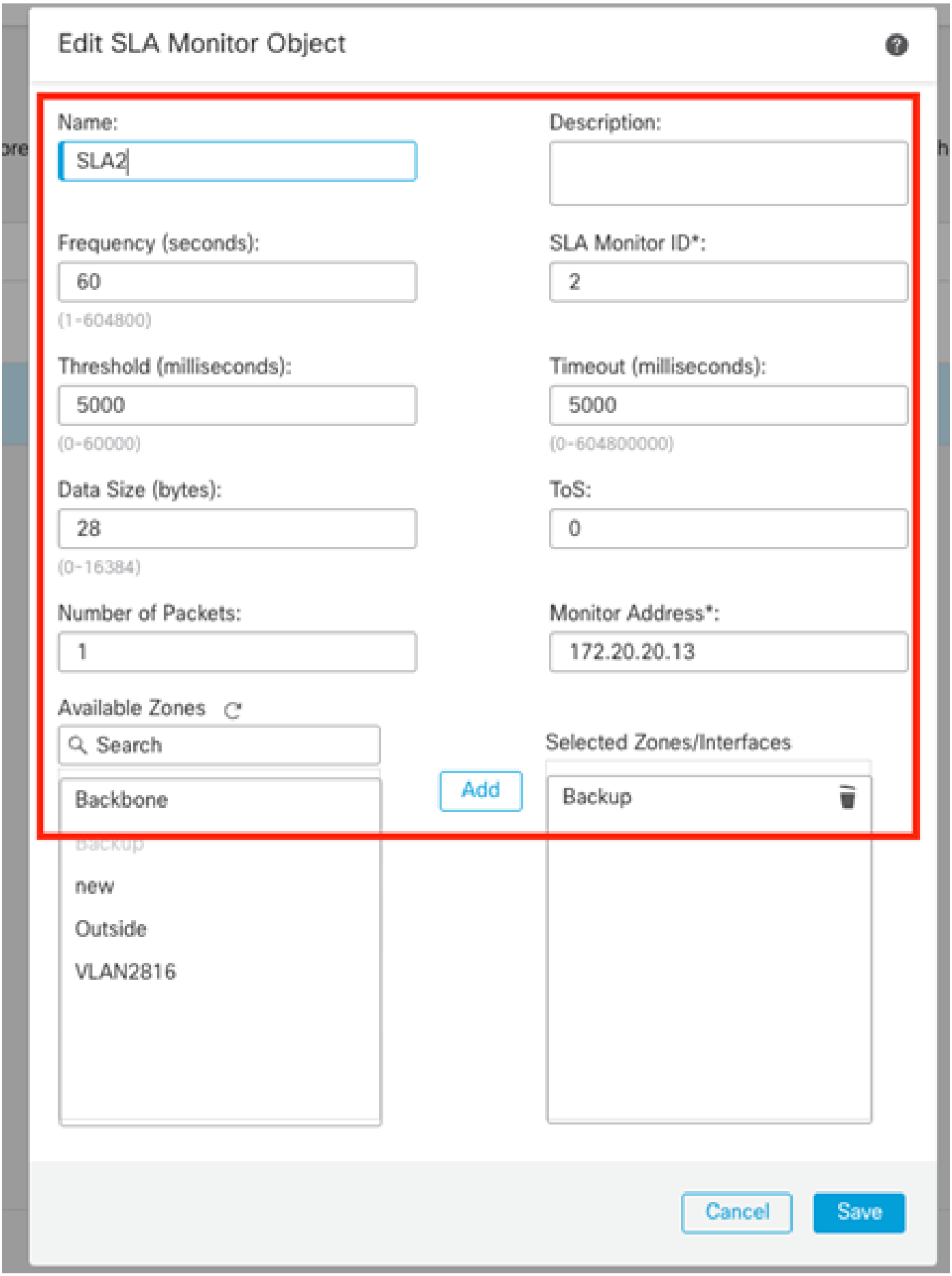


圖3.SLA2監控器配置視窗。

步驟 2.使用路由跟蹤配置靜態路由。

在FMC上，導航至 Device > Device Management > Edit the desired FTD > Routing > Static Routes並使用正確的SLA監控器新增靜態路由。

SLA監控器必須是監控預設網關的監控器。

主預設網關的靜態路由：

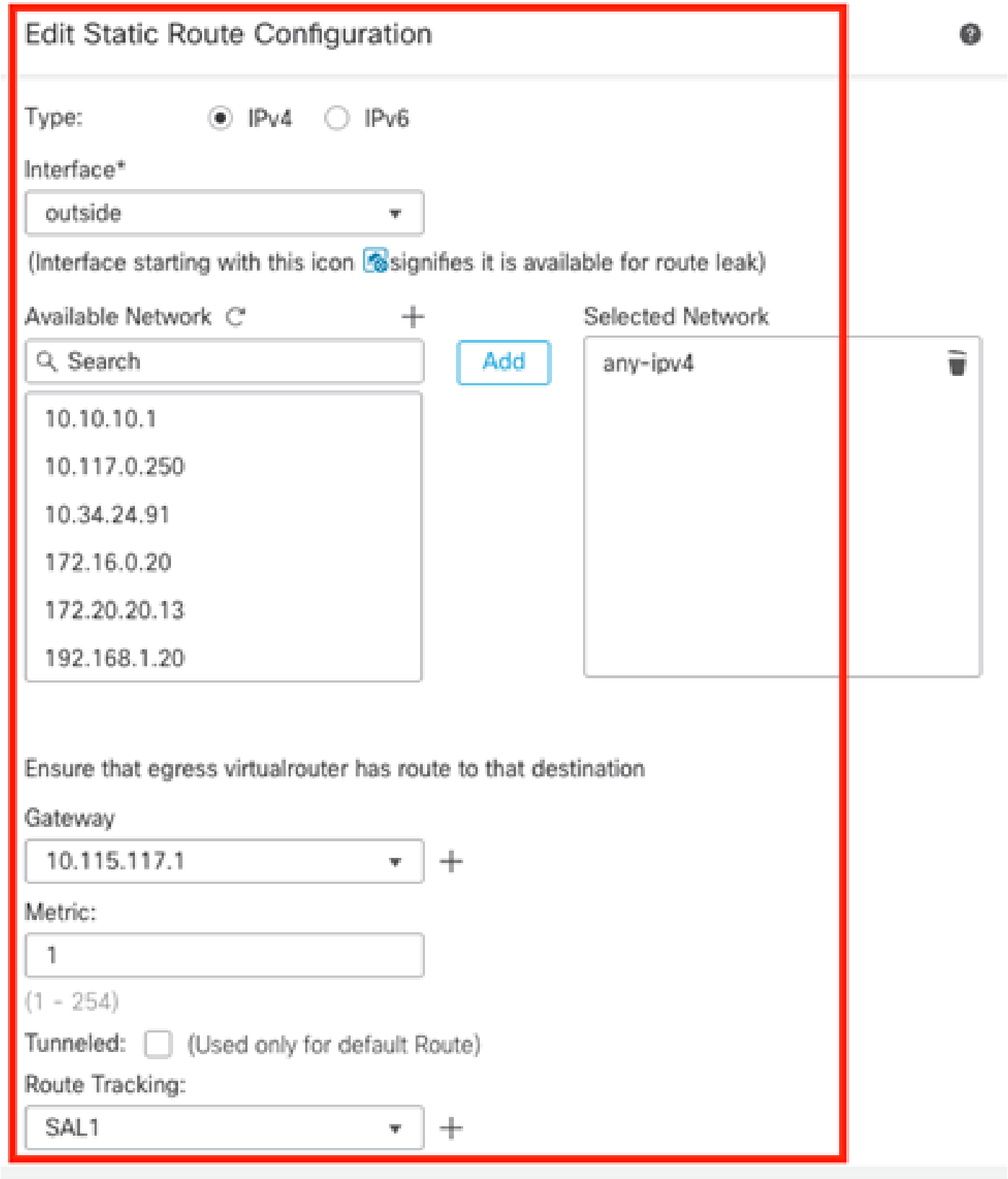


圖4.外部介面的靜態路由配置視窗。

輔助預設網關的靜態路由。

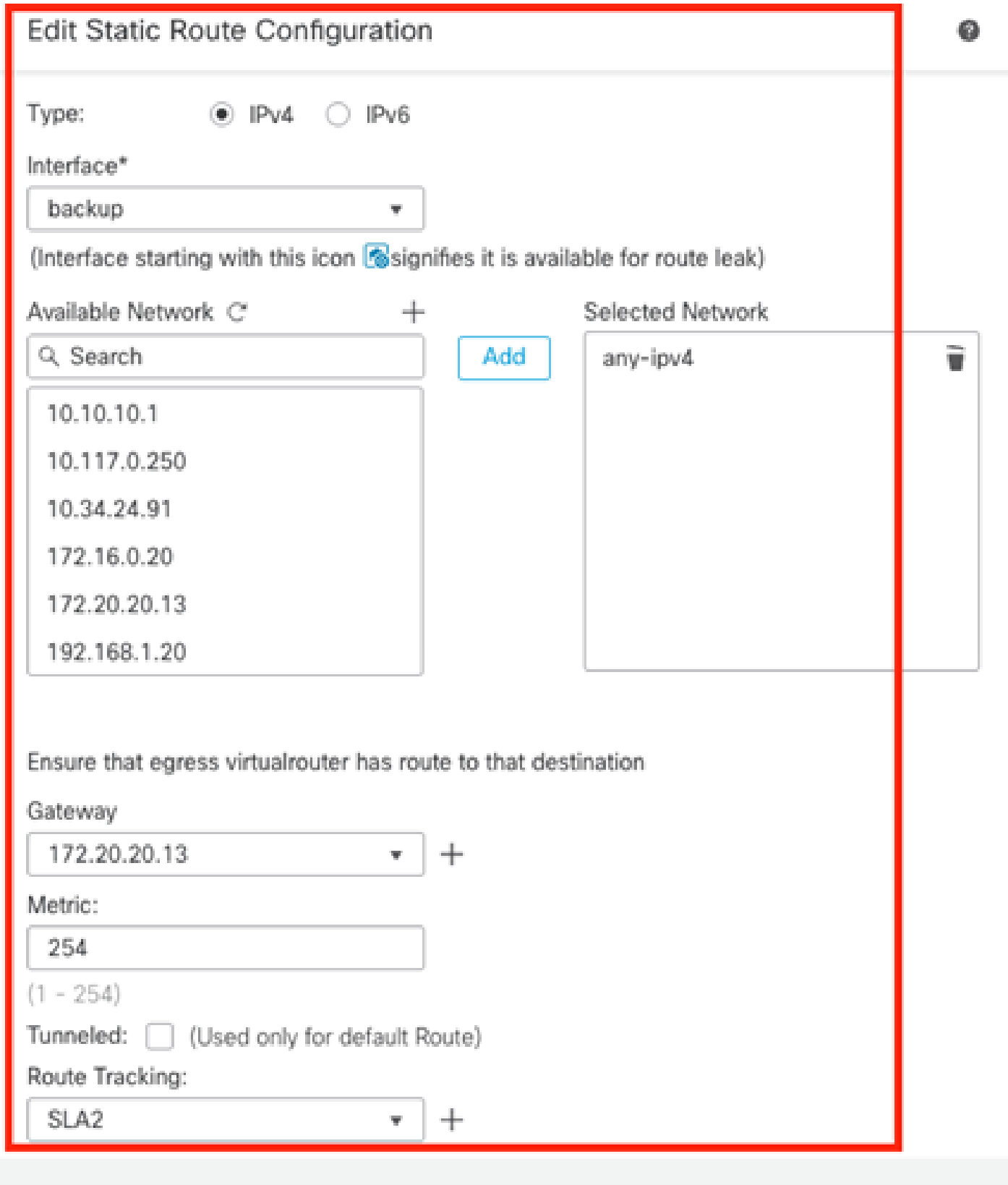


圖5.備用介面的靜態路由配置視窗。

步驟 3.配置策略基本路由。

導航至 Device > Device Management > Edit the desired FTD > Routing > Policy Based Routing, 新增PBR，並選擇輸入介面。

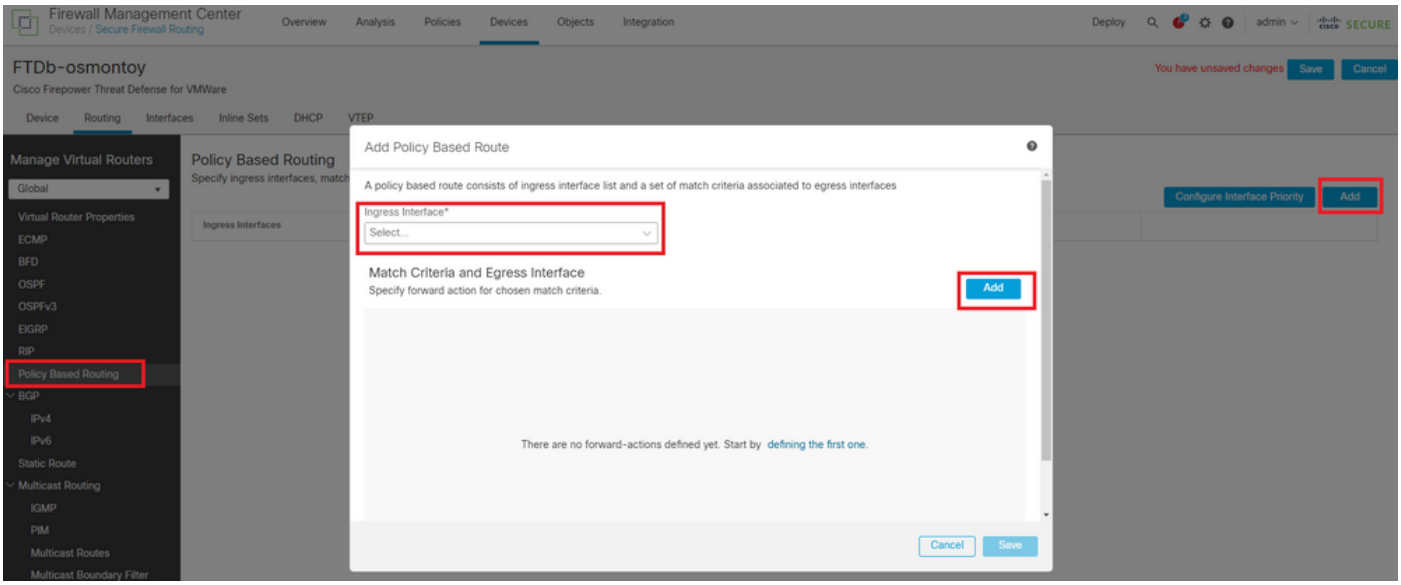


圖6.PBR配置視窗。

配置轉發操作。

- 選擇或新增要匹配的新訪問控制清單。
- 選擇IP Address 從 Send to 選項。
- 在本範例中，10.115.117.234是FTD內部IP位址。

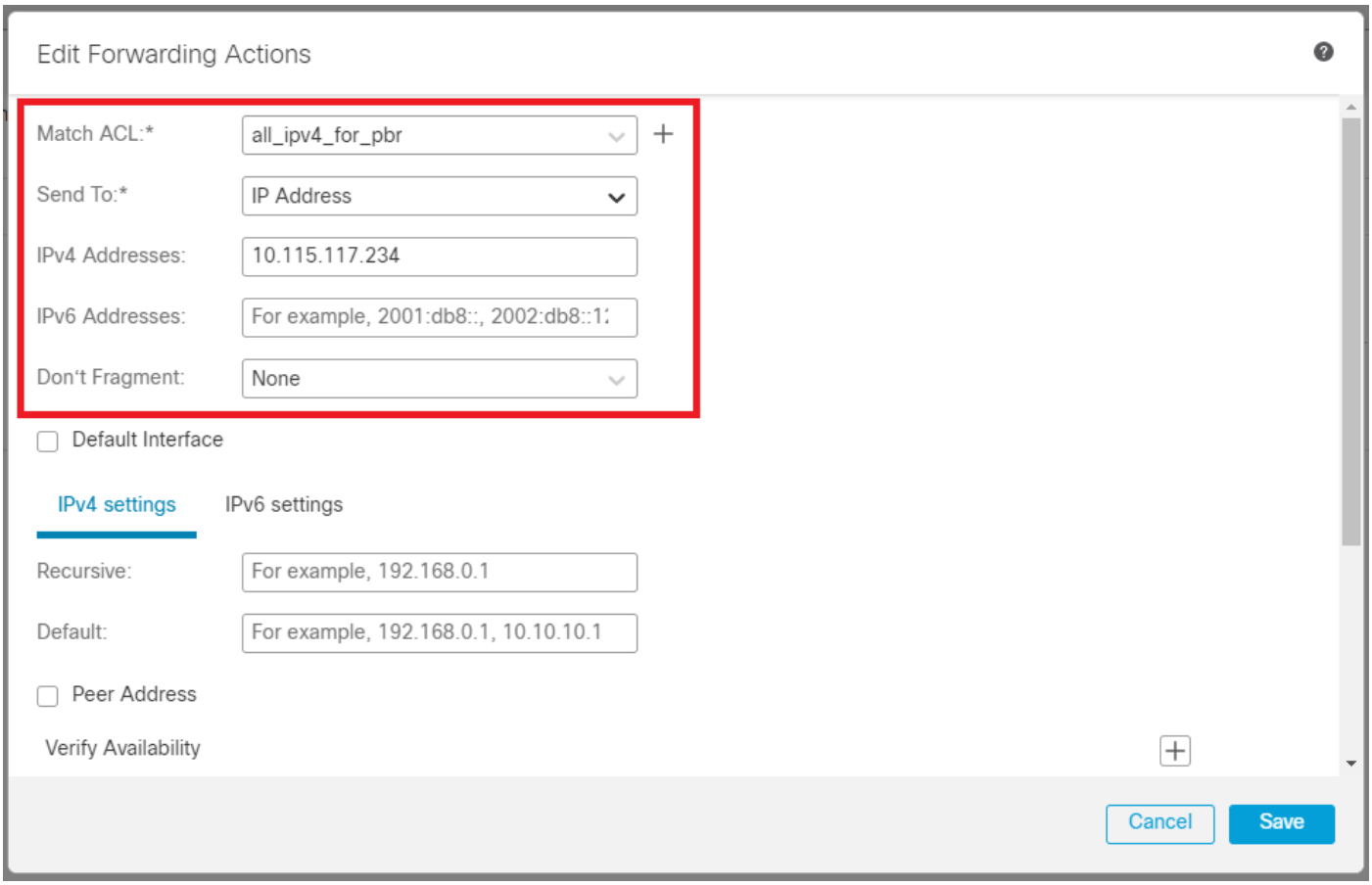


圖7.Forwarding Actions配置視窗。

向下滾動並新增 **Verify Availability** ISP1的值

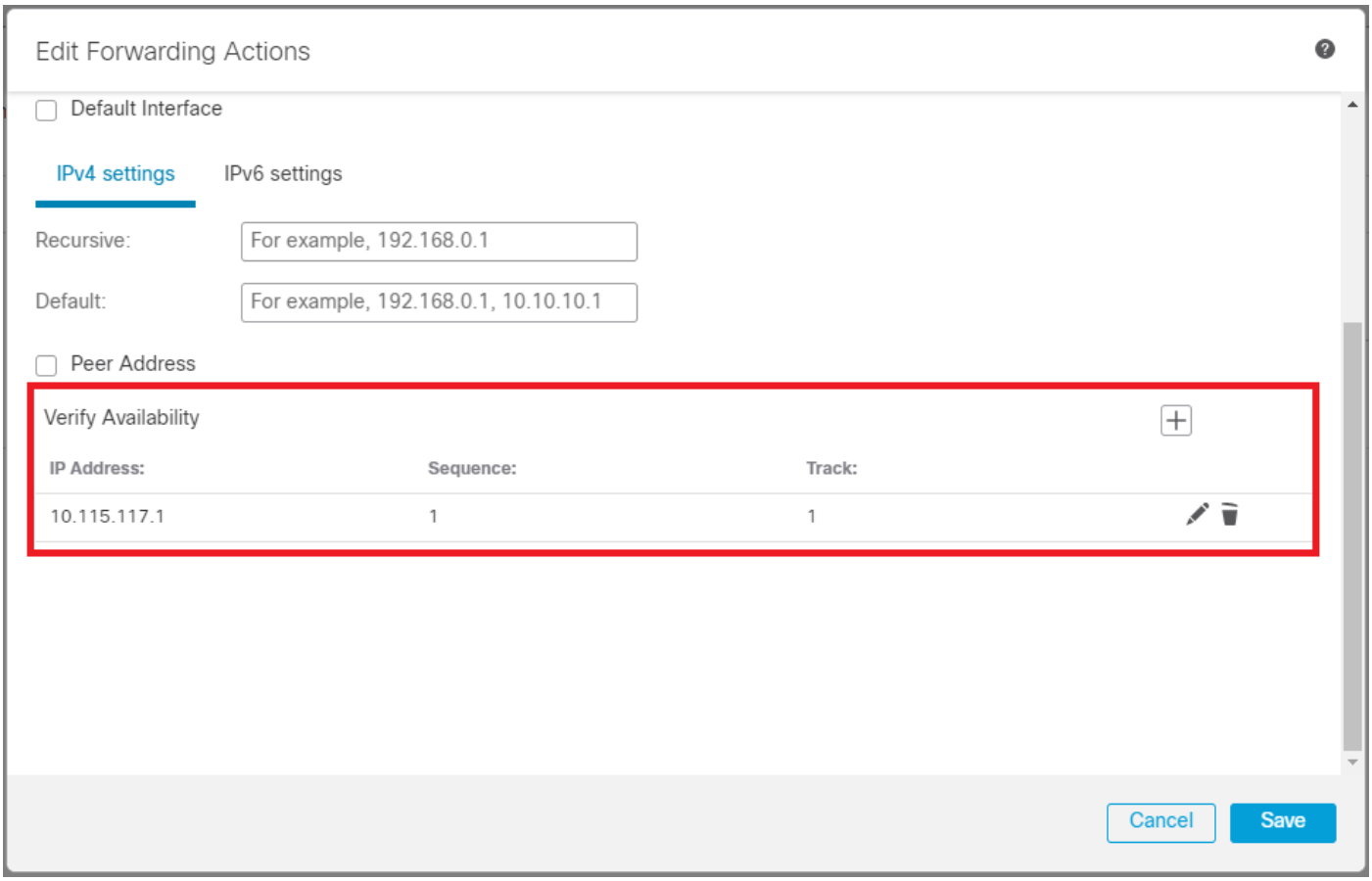


圖8.Forwarding Actions配置視窗。

對備份介面重複相同的過程。但是，請確保使用不同的訪問控制清單對象。

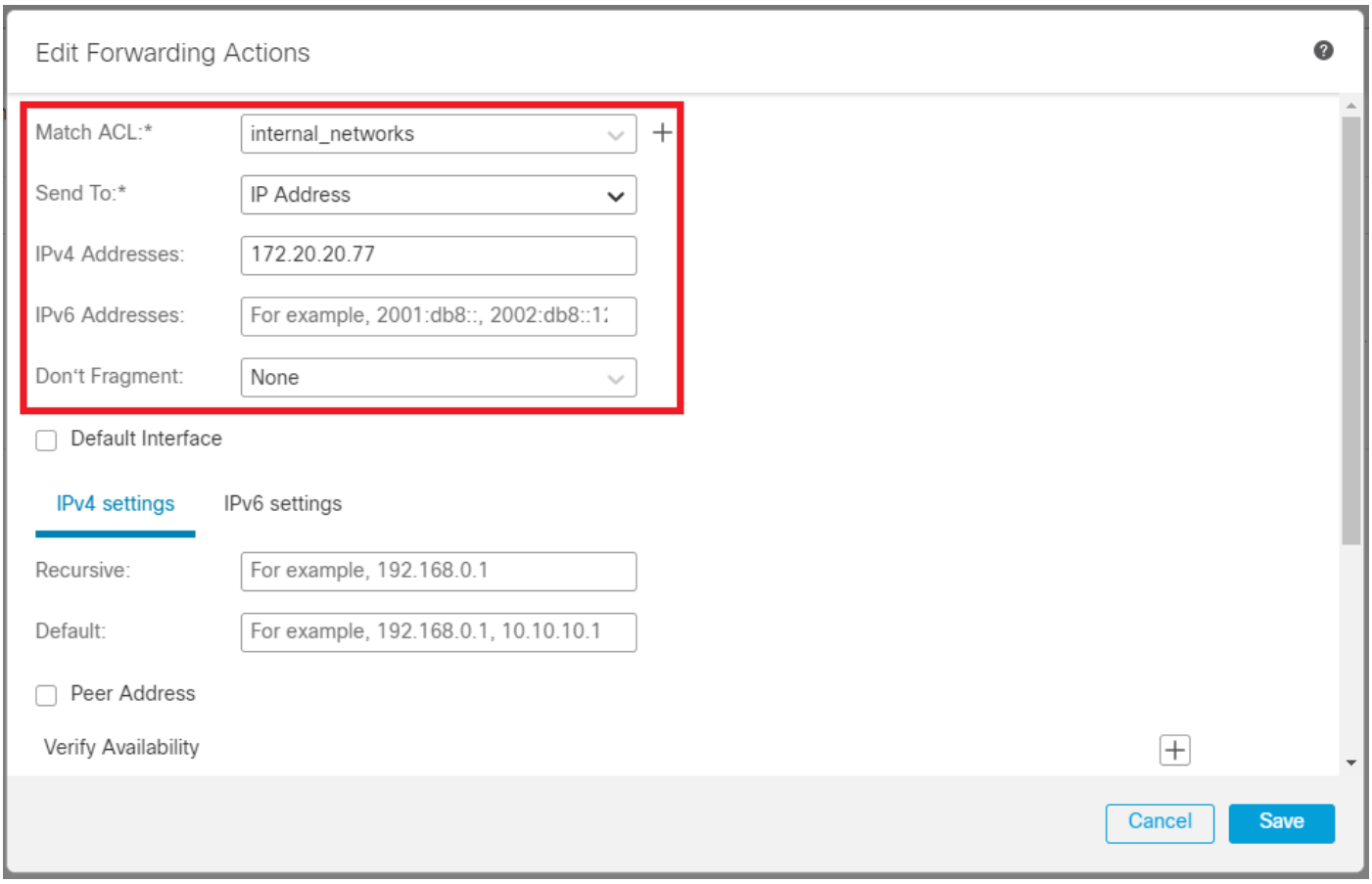
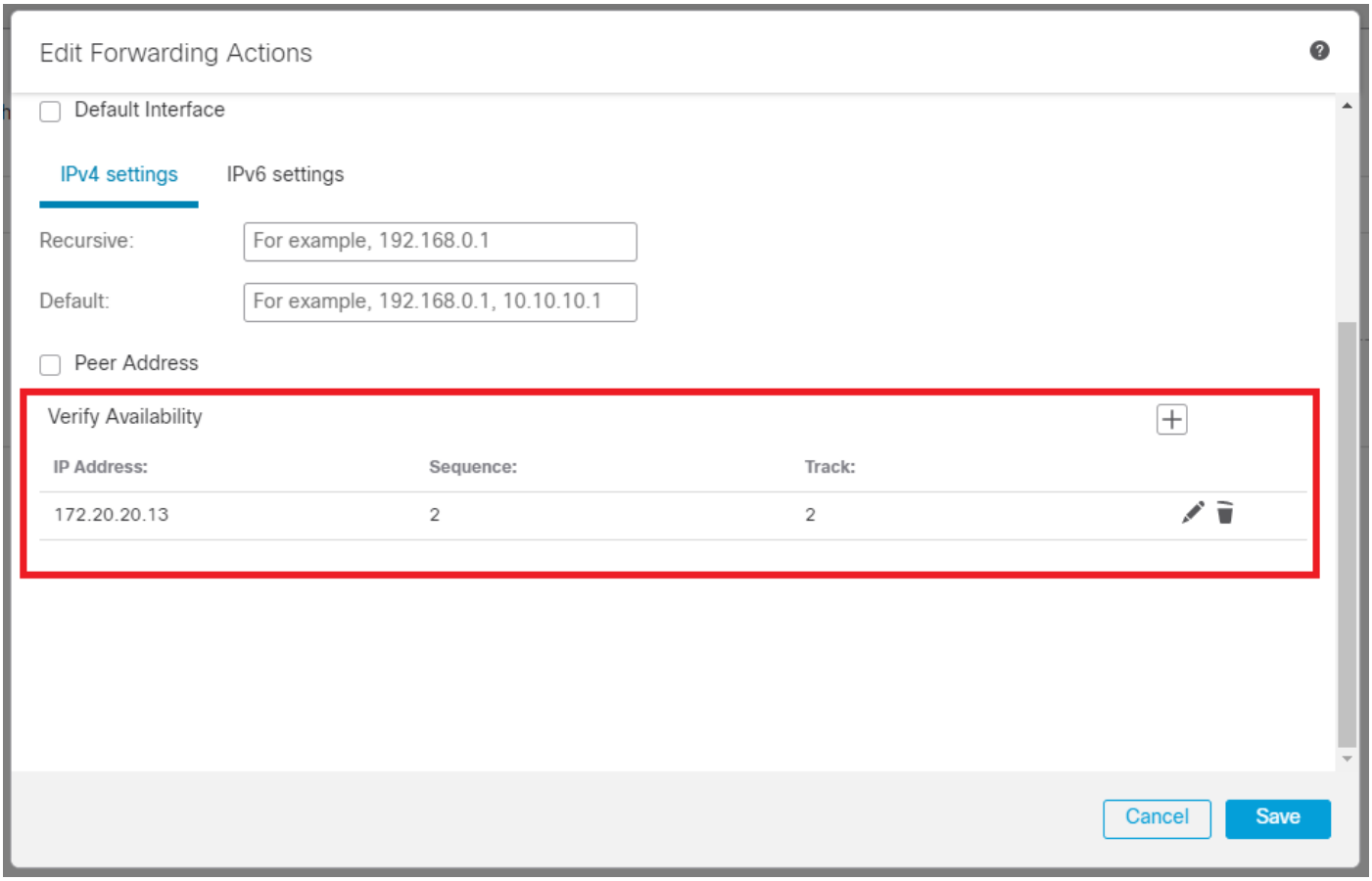


圖9.Forwarding Actions配置視窗

對重複相同的過程Verify Availability配置，但現在用於ISP2。



映像10.驗證可用性配置。

驗證您的配置。

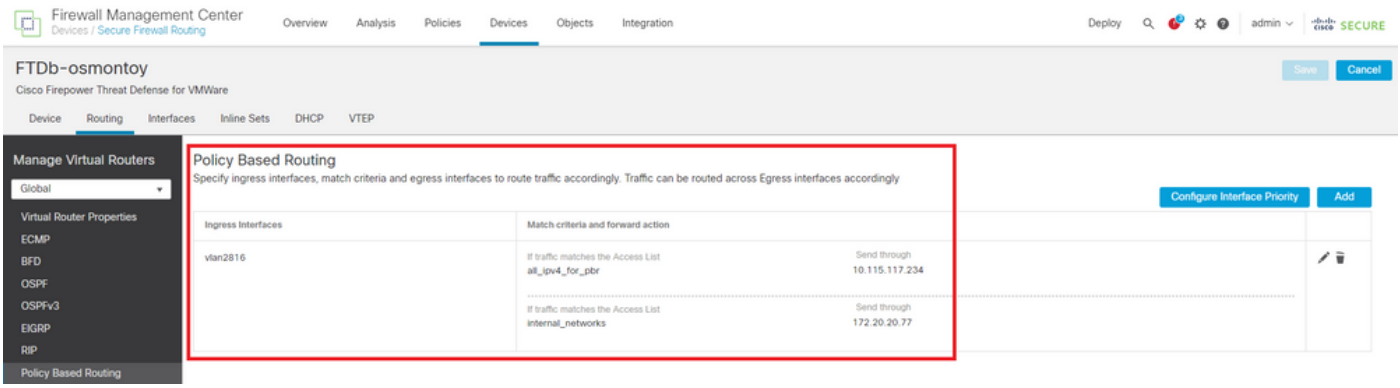


圖11.PBR配置。

驗證

透過安全殼層(SSH)存取FTD，並使用命令 system support disagnotsic-cli 並運行以下命令：

- show route-map：此命令顯示路由對映配置。

<#root>

```
firepower#

show route-map



route-map FMC_GENERATED_PBR_1679065711925

, permit, sequence 5
Match clauses:
ip address (access-lists): internal_networks

Set clauses:
ip next-hop verify-availability 10.115.117.1 1

track 1 [up]


ip next-hop 10.115.117.234
route-map FMC_GENERATED_PBR_1679065711925, permit, sequence 10
Match clauses:
ip address (access-lists): all_ipv4_for_pbr

Set clauses:
ip next-hop verify-availability 172.20.20.13 2

track 2 [up]


ip next-hop 172.20.20.77
firepower#
```

- show running-config sla monitor：此命令顯示SLA配置。

<#root>

```
firepower#

show running-config sla monitor



sla monitor 1


type echo protocol ipIcmpEcho 10.115.117.1 interface outside
sla monitor schedule 1 life forever start-time now

sla monitor 2


type echo protocol ipIcmpEcho 172.20.20.13 interface backup
sla monitor schedule 2 life forever start-time now
firepower#
```

- show sla monitor configuration：此命令顯示SLA配置值。

<#root>

```
firepower#

show sla monitor configuration


SA Agent, Infrastructure Engine-II
Entry number:

1


Owner:
Tag:
Type of operation to perform: echo

Target address: 10.115.117.1


Interface: outside
Number of packets: 1
Request size (ARR data portion): 28
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Verify data: No
Operation frequency (seconds): 60
Next Scheduled Start Time: Start Time already passed
Group Scheduled : FALSE
Life (seconds): Forever
Entry Ageout (seconds): never
Recurring (Starting Everyday): FALSE
Status of entry (SNMP RowStatus): Active
Enhanced History:

Entry number:

2


Owner:
Tag:
Type of operation to perform: echo

Target address: 172.20.20.13


Interface: backup
Number of packets: 1
Request size (ARR data portion): 28
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Verify data: No
Operation frequency (seconds): 60
Next Scheduled Start Time: Start Time already passed
Group Scheduled : FALSE
Life (seconds): Forever
Entry Ageout (seconds): never
Recurring (Starting Everyday): FALSE
Status of entry (SNMP RowStatus): Active
Enhanced History:
```

- show sla monitor operational-state：此命令顯示SLA操作的運行狀態。

<#root>

```
firepower#

show sla monitor operational-state


Entry number: 1


Modification time: 15:48:04.332 UTC Fri Mar 17 2023
Number of Octets Used by this Entry: 2056
Number of operations attempted: 74
Number of operations skipped: 0
Current seconds left in Life: Forever

Operational state of entry: Active


Last time this entry was reset: Never
Connection loss occurred: FALSE
Timeout occurred: FALSE
Over thresholds occurred: FALSE
Latest RTT (milliseconds): 1
Latest operation start time: 17:01:04.334 UTC Fri Mar 17 2023
Latest operation return code: OK
RTT Values:
RTTAvg: 1 RTTMin: 1 RTTMax: 1
NumOfRTT: 1 RTTSum: 1 RTTSum2: 1


Entry number: 2


Modification time: 15:48:04.335 UTC Fri Mar 17 2023
Number of Octets Used by this Entry: 2056
Number of operations attempted: 74
Number of operations skipped: 0
Current seconds left in Life: Forever

Operational state of entry: Active


Last time this entry was reset: Never
Connection loss occurred: FALSE
Timeout occurred: FALSE
Over thresholds occurred: FALSE
Latest RTT (milliseconds): 1
Latest operation start time: 17:01:04.337 UTC Fri Mar 17 2023
Latest operation return code: OK
RTT Values:
RTTAvg: 1 RTTMin: 1 RTTMax: 1
NumOfRTT: 1 RTTSum: 1 RTTSum2: 1
```

- show track：此命令顯示有關SLA跟蹤進程跟蹤的對象的資訊。

<#root>

```
firepower#
show track


Track 1


Response Time Reporter 1 reachability
Reachability is Up


4 changes, last change 00:53:42
Latest operation return code: OK
Latest RTT (millisecs) 1
Tracked by:
ROUTE-MAP 0
STATIC-IP-ROUTING 0
Track 2


Response Time Reporter 2 reachability
Reachability is Up


2 changes, last change 01:13:41
Latest operation return code: OK
Latest RTT (millisecs) 1
Tracked by:
ROUTE-MAP 0
STATIC-IP-ROUTING 0
```

- show running-config route：此命令顯示當前路由配置。

<#root>

```
firepower#
show running-config route


route
outside
 0.0.0.0 0.0.0.0 10.115.117.1 1
track 1


route
backup
 0.0.0.0 0.0.0.0 172.20.20.13 254
track 2
```

```
route vlan2816 10.42.0.37 255.255.255.255 10.43.0.1 254
firepower#
```

- show route：此命令顯示資料介面的路由表。

<#root>

```
firepower#
 show route


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
SI - Static InterVRF, BI - BGP InterVRF
Gateway of last resort is 10.115.117.1 to network 0.0.0.0

S* 0.0.0.0 0.0.0.0 [1/0] via 10.115.117.1, outside


S 10.0.0.0 255.0.0.0 [1/0] via 10.88.243.1, backbone
C 10.88.243.0 255.255.255.0 is directly connected, backbone
L 10.88.243.67 255.255.255.255 is directly connected, backbone
C 10.115.117.0 255.255.255.0 is directly connected, outside
L 10.115.117.234 255.255.255.255 is directly connected, outside
C 10.42.0.0 255.255.255.0 is directly connected, vlan2816
L 10.42.0.1 255.255.255.255 is directly connected, vlan2816
S 10.42.0.37 255.255.255.255 [254/0] via 10.43.0.1, vlan2816
C 172.20.20.0 255.255.255.0 is directly connected, backup
L 172.20.20.77 255.255.255.255 is directly connected, backup
```

當主鏈路發生故障時：

- show route-map：此命令在鏈路發生故障時顯示路由對映配置。

<#root>

```
firepower#
show route-map FMC_GENERATED_PBR_1679065711925


route-map FMC_GENERATED_PBR_1679065711925, permit, sequence 5
Match clauses:
```

```
ip address (access-lists): internal_networks

Set clauses:
ip next-hop verify-availability 10.115.117.1 1
```

track 1 [down]

```
ip next-hop 10.115.117.234
route-map FMC_GENERATED_PBR_1679065711925, permit, sequence 10
Match clauses:
ip address (access-lists): all_ipv4_for_pbr

Set clauses:
ip next-hop verify-availability 172.20.20.13 2
```

track 2 [up]

```
ip next-hop 172.20.20.77
firepower#
```

- show route：此命令顯示每個介面的新路由表。

<#root>

```
firepower#
```

show route

```
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
SI - Static InterVRF, BI - BGP InterVRF
Gateway of last resort is 10.115.117.1 to network 0.0.0.0
```

S* 0.0.0.0 0.0.0.0 [1/0] via 172.20.20.13, backup

```
S 10.0.0.0 255.0.0.0 [1/0] via 10.88.243.1, backbone
C 10.88.243.0 255.255.255.0 is directly connected, backbone
L 10.88.243.67 255.255.255.255 is directly connected, backbone
C 10.115.117.0 255.255.255.0 is directly connected, outside
L 10.115.117.234 255.255.255.255 is directly connected, outside
C 10.42.0.0 255.255.255.0 is directly connected, vlan2816
L 10.42.0.1 255.255.255.255 is directly connected, vlan2816
S 10.42.0.37 255.255.255.255 [254/0] via 10.43.0.1, vlan2816
C 172.20.20.0 255.255.255.0 is directly connected, backup
L 172.20.20.77 255.255.255.255 is directly connected, backup
```

相關資訊

- 思科安全防火牆管理中心管理指南7.3
- 技術支援與文件 - Cisco Systems