Konfigurieren der BGP FlowSpec-VRF-zu-VRF-Umleitung

Inhalt

Einleitung

In diesem Dokument wird die Konfiguration der VRF-zu-VRF-Umleitung für BGP Flowspec beschrieben.

Anforderungen

- Eine funktionierende MPLS-fähige IGP-Implementierung
- Eine funktionierende VPNv4-Implementierung

Verwendete Komponenten

Dies wurde auf Cisco Aggregation Services Routern der Serie ASR 9000 mit Cisco IOS XR 7.8.2 getestet.

Die Informationen in diesem Dokument beziehen sich auf Geräte in einer speziell eingerichteten Testumgebung. Alle in diesem Dokument verwendeten Geräte begannen mit einer gelöschten (Standard-)Konfiguration. Wenn Ihr Netzwerk in Betrieb ist, stellen Sie sicher, dass Sie die möglichen Auswirkungen aller Befehle kennen.

Die BGP Flow Specification (Flowspec)-Funktion ermöglicht die schnelle Bereitstellung und Weitergabe von Filter- und Richtlinienfunktionen zwischen zahlreichen BGP-Peer-Routern, um die Auswirkungen eines DDoS-Angriffs (Distributed Denial-of-Service) über Ihr Netzwerk zu minimieren.

Konfigurieren

Netzwerkdiagramm

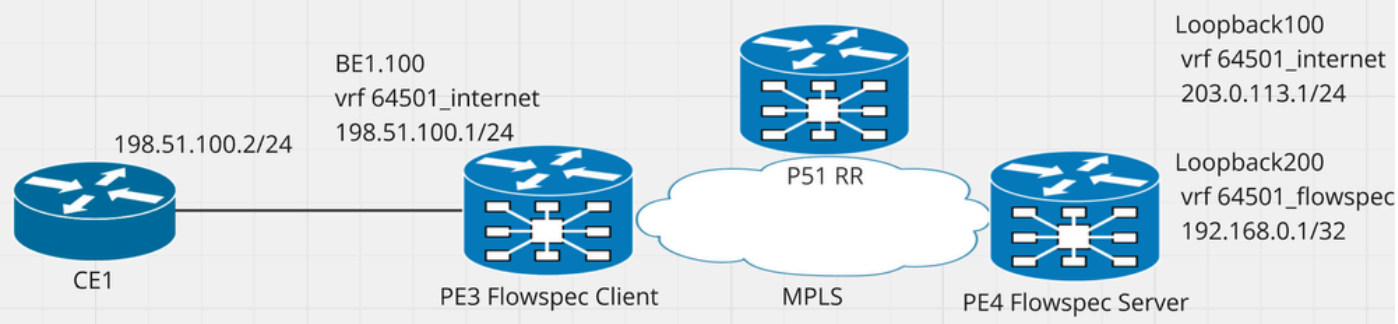

Abbildung 1: Netzwerkdiagramm mit relevanten IP-Adressen

Konfigurationen

PE3-Konfigurationen des FlowSpec-Clients

```
vrf 64501_internet
address-family ipv4 unicast
  import route-target
   64501:100
  !
  export route-target
   64501:100
  !
!
address-family ipv4 flowspec   <<<<<  Since traffic ingresses on a VRF interface we need to enable VPNV
  import route-target
   64501:100
  !
  export route-target
   64501:100
  !
!
vrf 64501_flowspec       <<<< The honeypot VRF to redirect dirty traffic to
address-family ipv4 unicast
  import route-target
   64501:200
  !
  export route-target
   64501:200
  !
!
interface Bundle-Ether1.100
vrf 64501_internet
ipv4 address 198.51.100.1 255.255.255.0
encapsulation dot1q 100
!
flowspec
vrf 64501_internet
  address-family ipv4
   local-install interface-all   <<<< To install VPNV4 flowspec policies on the vrf interface
  !
!
router bgp 64501
```

```
bgp router-id 10.3.3.3
address-family vpnv4 unicast
 !
address-family vpnv4 flowspec   <<<< Enable VPNV4 flowspec on global BGP
!
neighbor 10.51.51.51
  remote-as 64501
  update-source Loopback0
  address-family vpnv4 unicast
   soft-reconfiguration inbound always
  !
  address-family vpnv4 flowspec  <<<<
   soft-reconfiguration inbound always
  !
vrf 64501_internet
  rd 64501:103
  address-family ipv4 unicast
   redistribute connected
  !
  address-family ipv4 flowspec   <<<< Enable VPNV4 on the VRF for which we are going to receive policie
  !
!
vrf 64501_flowspec     <<<< This is just the honeypot VRF to redirect the dirty traffic to
  rd 64501:203
  address-family ipv4 unicast
  !
!
router static
vrf 64501_flowspec
  address-family ipv4 unicast
   0.0.0.0/0 192.168.0.1    <<<< We need a default route on the honeypot VRF to be able to forward the
  !
!
```

FlowSpec Server-PE4-Konfigurationen

```
vrf 64501_internet
address-family ipv4 unicast
  import route-target
   64501:100
  !
  export route-target
   64501:100
  !
!
address-family ipv4 flowspec    <<<<<< We are going to advertise VPNV4 flowspec policies for this VRF w
  import route-target
   64501:100
  !
  export route-target
   64501:100
  !
!
vrf 64501_flowspec    <<<< The honeypot VRF to redirect dirty traffic to
address-family ipv4 unicast
  import route-target
   64501:200
```

```
  !
  export route-target
   64501:200
  !
!
interface Loopback100   <<<< Traffic destination prefix for testing
vrf 64501_internet
ipv4 address 203.0.113.1 255.255.255.0
!
interface Loopback200   <<<< Just for testing purposes, this is where we are redirecting the traffic to
vrf 64501_flowspec
ipv4 address 192.168.0.1 255.255.255.255
!
class-map type traffic match-all 64501_flow
match source-address ipv4 198.51.100.2 255.255.255.255
end-class-map
!
policy-map type pbr 64501_flow
class type traffic 64501_flow
  redirect nexthop route-target 64501:200   <<<< honeypot vrf 64501_flowspec  RT
!
 class type traffic class-default
 !
 end-policy-map
!
flowspec
vrf 64501_internet
  address-family ipv4
   service-policy type pbr 64501_flow       <<<< Advertise the policy within the VRF context in the serv
  !
!
router bgp 64501
bgp router-id 10.4.4.4
address-family vpnv4 unicast
!
address-family vpnv4 flowspec    <<<< Enable VPNV4 flowspec on global BGP
!
neighbor 10.51.51.51
  address-family vpnv4 unicast
   soft-reconfiguration inbound always
  !
  address-family vpnv4 flowspec    <<<<
   soft-reconfiguration inbound always
  !
!
vrf 64501_internet
  rd 64501:104
  address-family ipv4 unicast
   redistribute connected
  !
  address-family ipv4 flowspec  <<<< Enable VPNV4 on the VRF for which we are going to advertise policie
  !
!
vrf 64501_flowspec <<<< This is just the honeypot VRF to redirect the dirty traffic to
  rd 64501:204
  address-family ipv4 unicast
   redistribute connected
  !
!
```

RR P51-Konfigurationen

```
router bgp 64501
bgp router-id 10.51.51.51
address-family vpnv4 unicast
!
address-family vpnv4 flowspec
!
neighbor 10.3.3.3
  remote-as 64501
  update-source Loopback0
  address-family vpnv4 unicast
   route-reflector-client
   soft-reconfiguration inbound always
  !
  address-family vpnv4 flowspec
   route-reflector-client
   soft-reconfiguration inbound
  !
!
neighbor 10.4.4.4
  remote-as 64501
  update-source Loopback0
  address-family vpnv4 unicast
   route-reflector-client
   soft-reconfiguration inbound always
  !
  address-family vpnv4 flowspec
   route-reflector-client
   soft-reconfiguration inbound
  !
!
```

Überprüfung

```
RP/0/RP0/CPU0:PE3#show flowspec vrf 64501_internet ipv4 detail
Tue Oct  1 16:54:51.990 CDT
VRF: 64501_internet     AFI: IPv4
  Flow           :Source:198.51.100.2/32
    Actions      :Redirect: VRF 64501_flowspec Route-target: ASN2-64501:200  (bgp.1)
    Statistics                          (packets/bytes)
      Matched             :                   5/610 <<<<<<<
      Dropped             :                   0/0

RP/0/RP0/CPU0:PE3#show bgp vpnv4 flowspec
Tue Oct  1 16:54:57.352 CDT
BGP router identifier 10.3.3.3, local AS number 64501
BGP generic scan interval 60 secs
Non-stop routing is enabled
BGP table state: Active
Table ID: 0x0
BGP main routing table version 7
BGP NSR Initial initsync version 1 (Reached)
```

```
BGP NSR/ISSU Sync-Group versions 0/0
BGP scan interval 60 secs
Status codes: s suppressed, d damped, h history, * valid, > best
              i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network            Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 64501:103 (default for vrf 64501_internet)
Route Distinguisher Version: 7
*>iSource:198.51.100.2/32/48
                      0.0.0.0                        100      0 i
Route Distinguisher: 64501:104
Route Distinguisher Version: 6
*>iSource:198.51.100.2/32/48
                      0.0.0.0                        100      0 i
Processed 2 prefixes, 2 paths

RP/0/RP0/CPU0:PE3#show bgp vpnv4 flowspec vrf 64501_internet Source:198.51.100.2/32/48
BGP routing table entry for Source:198.51.100.2/32/48, Route Distinguisher: 64501:103
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker                   7           7
Last Modified: Oct  1 16:52:12.083 for 00:02:55
Paths: (1 available, best #1)
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
  Local, (received & used
    0.0.0.0 from 10.51.51.51 (10.4.4.4)
      Origin IGP, localpref 100, valid, internal, best, group-best, import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 7
      Extended community: FLOWSPEC Redirect-RT:64501:200 RT:64501:100    <<<<<<
      Originator: 10.4.4.4, Cluster list: 0.0.253.233
      Source AFI: VPNv4 Flowspec, Source VRF: default, Source Route Distinguisher: 64501:104
```

Bei einer Paketerfassung können wir das MPLS-Label des Service beobachten, das bestätigt, dass die Pakete umgeleitet werden.

```
RP/0/RP0/CPU0:PE4#show mpls forwarding labels 24005
Tue Oct  1 16:45:21.743 CST
Local  Outgoing    Prefix             Outgoing     Next Hop        Bytes
Label  Label       or ID              Interface                    Switched
------ ----------- ------------------ ------------ --------------- ------------
24005  Aggregate   64501_flowspec: Per-VRF Aggr[V]   \
                                      64501_flowspec                1500
```

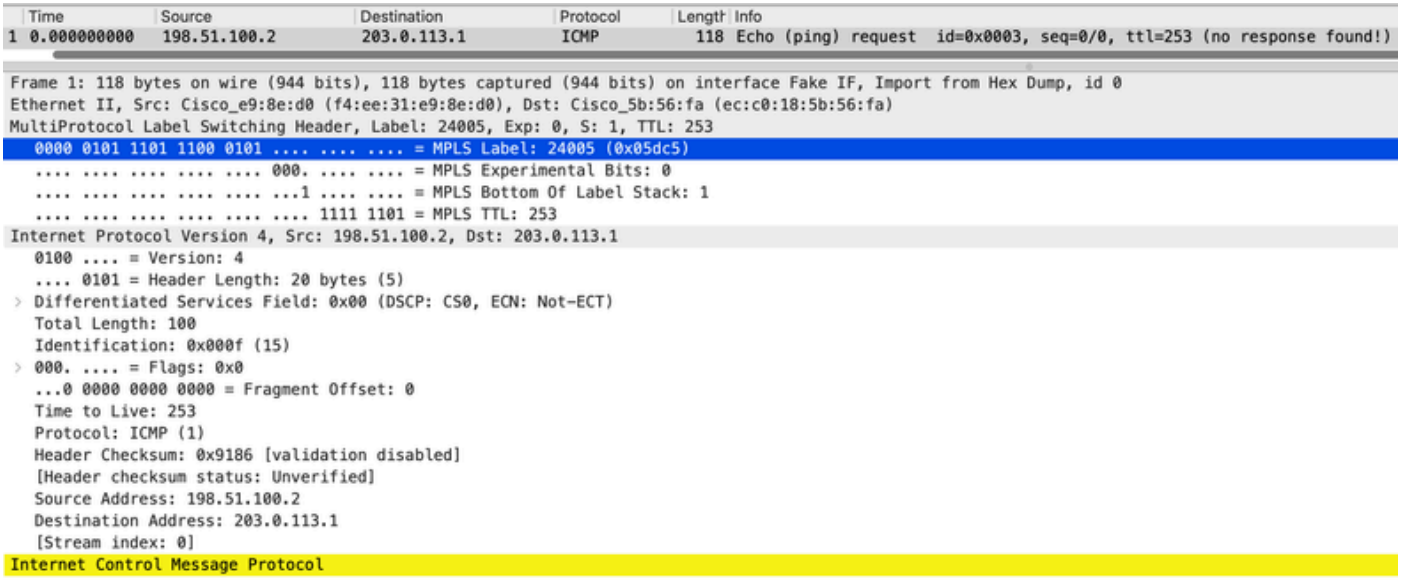

Abbildung 2: PCAP zeigt den Nachweis der Datenverkehrsumleitung. Beachten Sie das MPLS-Label 24005 des Service.

Der VRF 64501_internet-Eingangsdatenverkehr auf dem FlowSpec-Client, der der Richtlinie entspricht, wird zu 64501_flowspec VRF umgeleitet.

Zugehörige Informationen

https://www.cisco.com/c/en/us/td/docs/routers/asr9000/software/asr9k-r7-8/routing/configuration/guide/b-routing-cg-asr9000-78x/implementing-bgp-flowspec.html

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