Implementación de VPN de sitio a sitio basada en ruta IKEv2 en routers Cisco que utilizan IPv6

Contenido

Introducción

Este documento describe una configuración para configurar un túnel IPv6, basado en ruta, de sitio a sitio entre dos routers Cisco que utilizan el protocolo Intercambio de claves de Internet versión 2 (IKEv2).

Prerequisites

Requirements

Cisco recomienda que tenga conocimiento sobre estos temas:

- Conocimientos fundamentales de la configuración CLI de Cisco IOS®/Cisco IOS® XE
- Conocimientos fundamentales de los protocolos IPsec y ISAKMP (Internet Security Association and Key Management Protocol)
- Comprensión del direccionamiento y el routing IPv6

Componentes Utilizados

La información que contiene este documento se basa en estas versiones de software:

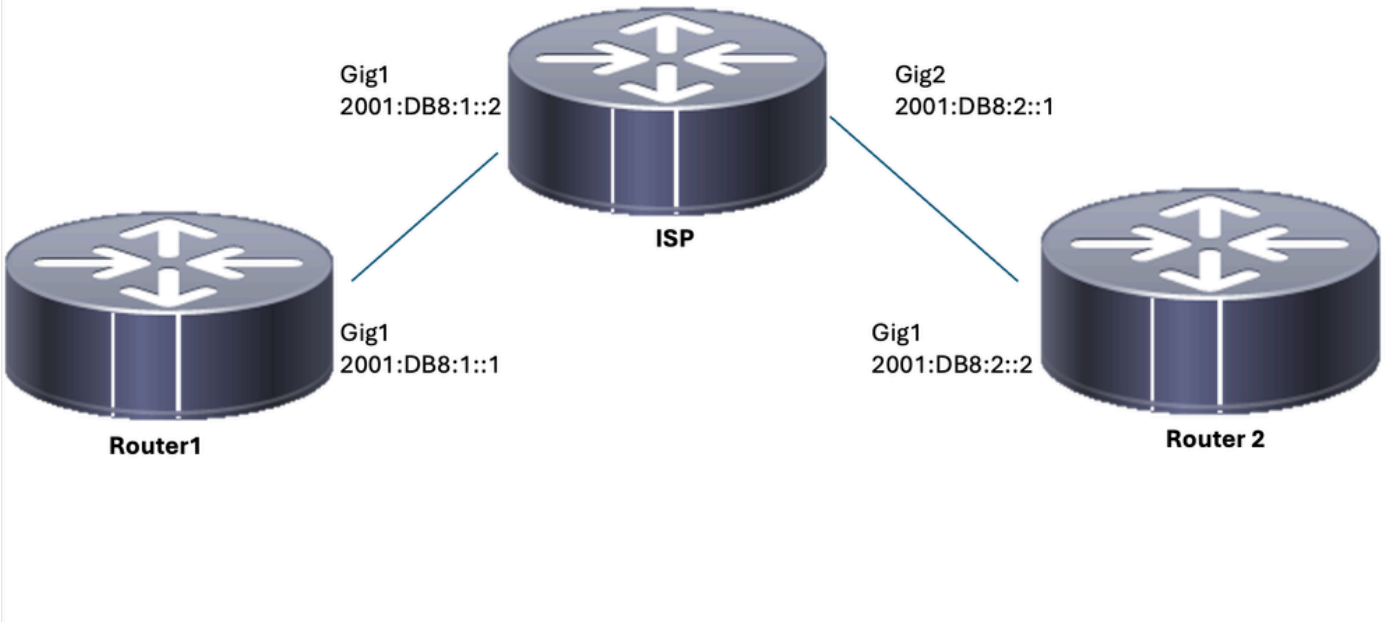
- Cisco IOS XE con 17.03.04a como router local

- Cisco IOS que ejecuta 17.03.04a como router remoto

La información que contiene este documento se creó a partir de los dispositivos en un ambiente de laboratorio específico. Todos los dispositivos que se utilizan en este documento se pusieron en funcionamiento con una configuración verificada (predeterminada). Si tiene una red en vivo, asegúrese de entender el posible impacto de cualquier comando.

Configurar

Diagrama de la red



Configuraciones de router local

Paso 1. Habilitación del routing unidifusión IPv6.

```
ipv6 unicast-routing
```

Paso 2. Configure las interfaces del router.

```
interface GigabitEthernet1
ipv6 address 2001:DB8:1::1/64
no shutdown

interface GigabitEthernet2
ipv6 address FC00::1/64
no shutdown
```

Paso 3. Establecer la ruta predeterminada de IPv6.

```
ipv6 route ::/0 GigabitEthernet1
```

Paso 4. Configuración De La Propuesta Ikev2.

```
crypto ikev2 proposal IKEv2-PROP
encryption aes-cbc-128
integrity sha1
group 14
```

Paso 5. Configuración De La Política Ikev2.

```
crypto ikev2 policy IKEv2-POLI
proposal IKEv2-PROP
```

Paso 6. Configure el llavero con una clave previamente compartida.

```
crypto ikev2 keyring IPV6_KEY
peer Remote_IPV6
 address 2001:DB8:2::2/64
 pre-shared-key cisco123
```

Paso 7. Configure el perfil Ikev2.

```
crypto ikev2 profile IKEV2-PROF
 match identity remote address 2001:DB8:2::2/64
 authentication remote pre-share
 authentication local pre-share
 keyring local IPV6_KEY
```

Paso 8. Configure la política de la Fase 2.

```
crypto ipsec transform-set ESP-AES-SHA esp-aes esp-sha-hmac
mode tunnel
```

Paso 9. Configure el perfil IPsec.

```
crypto ipsec profile IPSEC-PROF
 set transform-set ESP-AES-SHA
 set ikev2-profile IKEV2-PROF
```

Paso 10. Configure la interfaz de túnel.

```
interface Tunnel1
 ipv6 address 2001:DB8:3::1/64
 tunnel source GigabitEthernet1
 tunnel mode ipsec ipv6
 tunnel destination 2001:DB8:2::2
 tunnel protection ipsec profile IPSEC-PROF
end
```

Paso 11. Configure las rutas para el tráfico interesante.

```
ipv6 route FC00::/64 2012::1
```

Configuración final del router local

```
ipv6 unicast-routing
!
interface GigabitEthernet1
ipv6 address 2001:DB8:1::1/64
no shutdown

!

interface GigabitEthernet2
ipv6 address FC00::1/64
no shutdown

!

ipv6 route ::/0 GigabitEthernet1

!

crypto ikev2 proposal IKEv2-PROP
encryption aes-cbc-128
integrity sha1
group 14
```

```
!

crypto ikev2 policy IKEv2-POLI
proposal IKEv2-PROP

!

crypto ikev2 keyring IPV6_KEY
peer Remote_IPV6
 address 2001:DB8:2::2/64
 pre-shared-key cisco123

!

crypto ikev2 profile IKEV2-PROF
 match identity remote address 2001:DB8:2::2/64
 authentication remote pre-share
 authentication local pre-share
 keyring local IPV6_KEY

!

crypto ipsec transform-set ESP-AES-SHA esp-aes esp-sha-hmac
mode tunnel

!

crypto ipsec profile Prof1
 set transform-set ESP-AES-SHA

 !

 crypto ipsec profile IPSEC-PROF
 set transform-set ESP-AES-SHA
 set ikev2-profile IKEV2-PROF

!

interface Tunnel1
 ipv6 address 2001:DB8:3::1/64
 tunnel source GigabitEthernet1
 tunnel mode ipsec ipv6
 tunnel destination 2001:DB8:2::2
 tunnel protection ipsec profile IPSEC-PROF
end

!

ipv6 route FC00::/64 2012::1
```

Configuración ISP

```
ipv6 unicast-routing
!
!
interface GigabitEthernet1
```

```
 description Link to R1
 ipv6 address 2001:DB8:1::2/64
!
interface GigabitEthernet2
 description Link to R3
 ipv6 address 2001:DB8:2::1/64
!
!
!
ipv6 route 2001:DB8:1::/64 GigabitEthernet1
ipv6 route 2001:DB8:2::/64 GigabitEthernet2
!
```

Configuración final del router remoto

```
ipv6 unicast-routing
!
interface GigabitEthernet1
ipv6 address 2001:DB8:2::2/64
no shutdown

!

interface GigabitEthernet2
ipv6 address FC00::2/64
no shutdown

!

ipv6 route ::/0 GigabitEthernet1

!

crypto ikev2 proposal IKEv2-PROP
encryption aes-cbc-128
integrity sha1
group 14

!

crypto ikev2 policy IKEv2-POLI
proposal IKEv2-PROP

!

crypto ikev2 keyring IPV6_KEY
peer Remote_IPV6
 address 2001:DB8:1::1/64
 pre-shared-key cisco123

!

crypto ikev2 profile IKEV2-PROF
 match identity remote address 2001:DB8:1::1/64
 authentication remote pre-share
 authentication local pre-share
 keyring local IPV6_KEY
```

```
!

crypto ipsec transform-set ESP-AES-SHA esp-aes esp-sha-hmac
mode tunnel

!

crypto ipsec profile Prof1
 set transform-set ESP-AES-SHA

 !

 crypto ipsec profile IPSEC-PROF
 set transform-set ESP-AES-SHA
 set ikev2-profile IKEV2-PROF

!

interface Tunnel1
 ipv6 address 2001:DB8:3::2/64
 tunnel source GigabitEthernet1
 tunnel mode ipsec ipv6
 tunnel destination 2001:DB8:1::1
 tunnel protection ipsec profile IPSEC-PROF
end

!

ipv6 route FC00::/64 2012::1
```

Verificación

```
On Router 1

R1#show crypto ikev2 sa
 IPv4 Crypto IKEv2  SA

 IPv6 Crypto IKEv2  SA

Tunnel-id    fvrf/ivrf              Status
2          none/none             READY
Local  2001:DB8:1::1/500
Remote  2001:DB8:2::2/500
      Encr: AES-CBC, keysize: 256, PRF: SHA256, Hash: SHA256, DH Grp:14, Auth sign: PSK, Auth verify: P
      Life/Active Time: 86400/75989 sec

R1#show crypto ipsec sa

interface: Tunnel1
    Crypto map tag: Tunnel1-head-0, local addr 2001:DB8:1::1

   protected vrf: (none)
   local  ident (addr/mask/prot/port): (::/0/0/0)
   remote ident (addr/mask/prot/port): (::/0/0/0)
   current_peer 2001:DB8:2::2 port 500
     PERMIT, flags={origin_is_acl,}
```

```
    #pkts encaps: 14, #pkts encrypt: 14, #pkts digest: 14
    #pkts decaps: 14, #pkts decrypt: 14, #pkts verify: 14
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #send errors 0, #recv errors 0

     local crypto endpt.: 2001:DB8:1::1,
     remote crypto endpt.: 2001:DB8:2::2
     plaintext mtu 1422, path mtu 1500, ipv6 mtu 1500, ipv6 mtu idb GigabitEthernet1
     current outbound spi: 0x9DC2A6F6(2646779638)
     PFS (Y/N): N, DH group: none

     inbound esp sas:
      spi: 0x18569EF7(408329975)
        transform: esp-aes esp-sha-hmac ,
        in use settings ={Tunnel, }
        conn id: 2104, flow_id: CSR:104, sibling_flags FFFFFFFF80000049, crypto map: Tunnel1-head-0
         sa timing: remaining key lifetime (k/sec): (4608000/1193)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE(ACTIVE)

     inbound ah sas:

     inbound pcp sas:

     outbound esp sas:
      spi: 0x9DC2A6F6(2646779638)
        transform: esp-aes esp-sha-hmac ,
        in use settings ={Tunnel, }
        conn id: 2103, flow_id: CSR:103, sibling_flags FFFFFFFF80000049, crypto map: Tunnel1-head-0
         sa timing: remaining key lifetime (k/sec): (4608000/1193)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE(ACTIVE)

     outbound ah sas:

     outbound pcp sas:


On Router 2

R2#show crypto ikev2 sa
 IPv4 Crypto IKEv2  SA

 IPv6 Crypto IKEv2  SA

Tunnel-id    fvrf/ivrf              Status
1          none/none             READY
Local  2001:DB8:2::2/500
Remote  2001:DB8:1::1/500
      Encr: AES-CBC, keysize: 256, PRF: SHA256, Hash: SHA256, DH Grp:14, Auth sign: PSK, Auth verify: P
      Life/Active Time: 86400/19 sec

R2#show cryto ipsec sa

interface: Tunnel1
    Crypto map tag: Tunnel1-head-0, local addr 2001:DB8:2::2

   protected vrf: (none)
```

```
local  ident (addr/mask/prot/port): (::/0/0/0)
remote ident (addr/mask/prot/port): (::/0/0/0)
current_peer 2001:DB8:1::1 port 500
  PERMIT, flags={origin_is_acl,}
 #pkts encaps: 14, #pkts encrypt: 14, #pkts digest: 14
 #pkts decaps: 14, #pkts decrypt: 14, #pkts verify: 14
 #pkts compressed: 0, #pkts decompressed: 0
 #pkts not compressed: 0, #pkts compr. failed: 0
 #pkts not decompressed: 0, #pkts decompress failed: 0
 #send errors 0, #recv errors 0

  local crypto endpt.: 2001:DB8:2::2,
  remote crypto endpt.: 2001:DB8:1::1
  plaintext mtu 1422, path mtu 1500, ipv6 mtu 1500, ipv6 mtu idb GigabitEthernet1
  current outbound spi: 0xEF1D3BA2(4011670434)
  PFS (Y/N): N, DH group: none

  inbound esp sas:
   spi: 0x9829B86D(2552871021)
     transform: esp-aes esp-sha-hmac ,
     in use settings ={Tunnel, }
     conn id: 2006, flow_id: CSR:6, sibling_flags FFFFFFFF80000049, crypto map: Tunnel1-head-0
      sa timing: remaining key lifetime (k/sec): (4608000/3556)
     IV size: 16 bytes
     replay detection support: Y
     Status: ACTIVE(ACTIVE)

  inbound ah sas:

  inbound pcp sas:

  outbound esp sas:
   spi: 0xEF1D3BA2(4011670434)
     transform: esp-aes esp-sha-hmac ,
     in use settings ={Tunnel, }
     conn id: 2005, flow_id: CSR:5, sibling_flags FFFFFFFF80000049, crypto map: Tunnel1-head-0
      sa timing: remaining key lifetime (k/sec): (4607998/3556)
     IV size: 16 bytes
     replay detection support: Y
     Status: ACTIVE(ACTIVE)

  outbound ah sas:

  outbound pcp sas:
```

Troubleshoot

Para resolver problemas del túnel, utilice estos comandos debug:

- debug crypto ikev2
- debug crypto ikev2 error
- debug crypto ipsec
- debug crypto ipsec error

Acerca de esta traducción
Cisco ha traducido este documento combinando la traducción automática y los recursos humanos a fin de ofrecer a nuestros usuarios en todo el mundo contenido en su propio idioma.

Tenga en cuenta que incluso la mejor traducción automática podría no ser tan precisa como la proporcionada por un traductor profesional.

Cisco Systems, Inc. no asume ninguna responsabilidad por la precisión de estas traducciones y recomienda remitirse siempre al documento original escrito en inglés (insertar vínculo URL).