配置ASR1000在OTV单播的加密

目录

简介

本文描述使用启动覆盖传输虚拟化的基本套配置(OTV)与IPSec加密。在OTV的加密不要求从OTV末端的任何另外的配置。您需要知道OTV和IPSEC如何共存。

为了添加在OTV的加密，您需要添加封装安全有效载荷(ESP)报头在OTV PDU顶部。您能通过两种方式达到在ASR1000边缘设备(ED)的加密：(i) IPSec (ii) GETVPN。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- ASR1000边缘设备的(ED)路由器
- 核心(ISP Cloud)
- Catalyst 2960交换机作为接入交换机任一个站点

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络实际，请保证您了解所有命令潜在影响。

背景信息

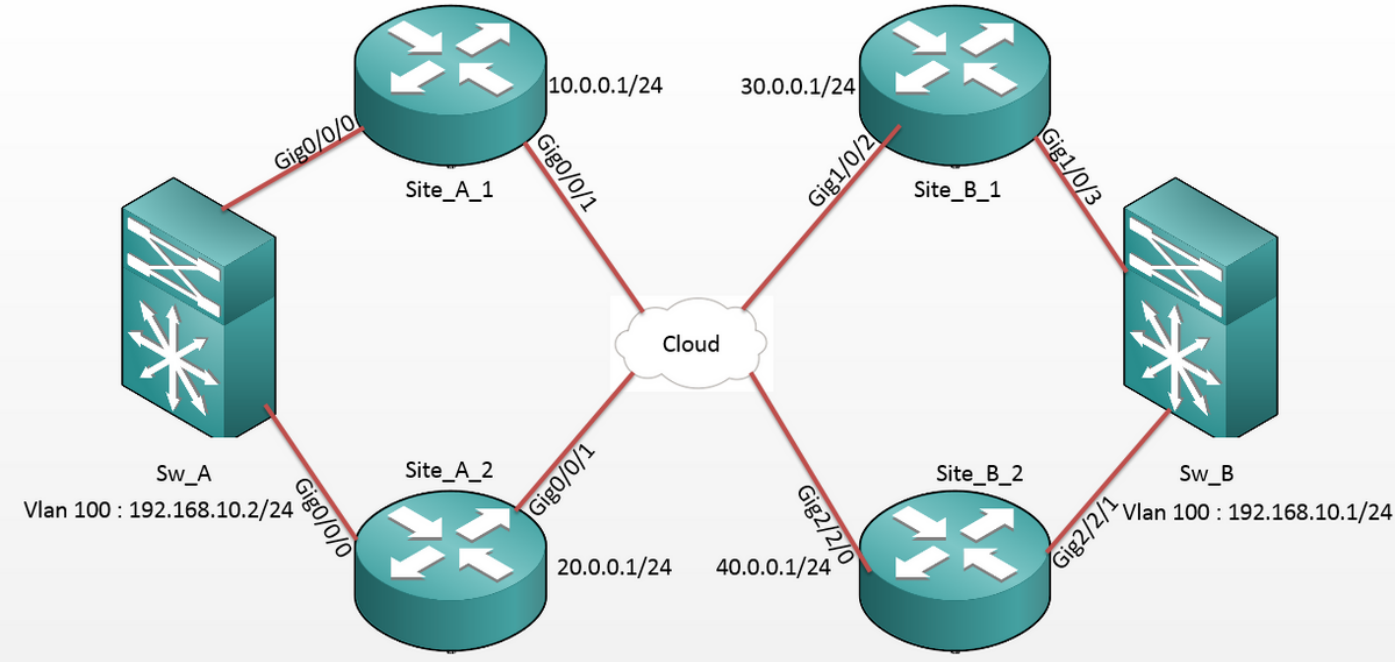
OTV的基本功能和配置被假定由本文的用户知道。

您能也跟随同样的这些文档：

- OTV单播配置
- OTV组播配置

配置

网络图



配置

站点回答: ED配置：

```
Site_A_1#show run
Building configuration...
otv site bridge-domain 99
!
otv site-identifier 0000.0000.0001
crypto isakmp policy 10
 hash md5
 authentication pre-share
crypto isakmp key cisco address 30.0.0.1
crypto isakmp key cisco address 40.0.0.1
!
crypto ipsec transform-set tset esp-aes
esp-md5-hmac
```

```
Site_A_2#show run
Building configuration...
otv site bridge-domain 99
!
otv site-identifier 0000.0000.0001
crypto isakmp policy 10
 hash md5
 authentication pre-share
crypto isakmp key cisco address 30.0.0.1
crypto isakmp key cisco address 40.0.0.1
!
crypto ipsec transform-set tset esp-aes
esp-md5-hmac
```

```
 mode tunnel
!
crypto map cmap 1 ipsec-isakmp
 set peer 30.0.0.1
 set transform-set tset
 match address cryptoacl
crypto map cmap 3 ipsec-isakmp
 set peer 40.0.0.1
 set transform-set tset
 match address cryptoacl3
!
interface Overlay99
 no ip address
 otv join-interface GigabitEthernet0/0/1
 otv adjacency-server unicast-only
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet0/0/0
 no ip address
service instance 99 ethernet
 encapsulation dot1q 99
 bridge-domain 99
 !
 service instance 100 ethernet
 encapsulation dot1q 100
```

```
 mode tunnel
!
crypto map cmap 2 ipsec-isakmp
 set peer 30.0.0.1
 set transform-set tset
 match address cryptoacl2
crypto map cmap 3 ipsec-isakmp
 set peer 40.0.0.1
 set transform-set tset
 match address cryptoacl3
!
interface Overlay99
 no ip address
 otv join-interface GigabitEthernet0/0/1
 otv use-adjacency-server 10.0.0.1 30.0.0.1
unicast-only
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet0/0/0
 no ip address
service instance 99 ethernet
 encapsulation dot1q 99
 bridge-domain 99
 !
 service instance 100 ethernet
 encapsulation dot1q 100
```

```
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet0/0/1
 ip address 10.0.0.1 255.255.255.0
 crypto map cmap
!
ip access-list extended cryptoacl
 permit gre host 10.0.0.1 host 30.0.0.1
ip access-list extended cryptoacl3
 permit gre host 10.0.0.1 host 40.0.0.1
```

```
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet0/0/1
 ip address 20.0.0.1 255.255.255.0
 crypto map cmap
!
ip access-list extended cryptoacl2
 permit gre host 20.0.0.1 host 30.0.0.1
ip access-list extended cryptoacl3
 permit gre host 20.0.0.1 host 40.0.0.1
```

站点B ：ED配置：

```
Site_B_1#sh run
Building configuration...
otv site bridge-domain 99
!
otv site-identifier 0000.0000.0002
crypto isakmp policy 10
 hash md5
 authentication pre-share
crypto isakmp key cisco address 10.0.0.1
crypto isakmp key cisco address 20.0.0.1
!
crypto ipsec transform-set tset esp-aes
esp-md5-hmac
 mode tunnel
!
```

```
Site_B_2#sh run
Building configuration...
otv site bridge-domain 99
!
otv site-identifier 0000.0000.0002
crypto isakmp policy 10
 hash md5
 authentication pre-share
crypto isakmp key cisco address 10.0.0.1
crypto isakmp key cisco address 20.0.0.1
!
crypto ipsec transform-set tset esp-aes
esp-md5-hmac
 mode tunnel
!
```

```
crypto map cmap 1 ipsec-isakmp
 set peer 10.0.0.1
 set transform-set tset
 match address cryptoacl
crypto map cmap 2 ipsec-isakmp
 set peer 20.0.0.1
 set transform-set tset
 match address cryptoacl2
!
interface Overlay99
 no ip address
 otv join-interface GigabitEthernet1/0/2
 otv use-adjacency-server 10.0.0.1 unicast-
only
 otv adjacency-server unicast-only
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet1/0/3
 no ip address
service instance 99 ethernet
 encapsulation dot1q 99
 bridge-domain 99
 !
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
```

```
crypto map cmap 1 ipsec-isakmp
 set peer 10.0.0.1
 set transform-set tset
 match address cryptoacl
crypto map cmap 2 ipsec-isakmp
 set peer 20.0.0.1
 set transform-set tset
 match address cryptoacl2
!
interface Overlay99
 no ip address
 otv join-interface GigabitEthernet2/2/0
 otv use-adjacency-server 10.0.0.1 30.0.0.1
unicast-only
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet2/2/1
 no ip address
 service instance 99 ethernet
 encapsulation dot1q 99
 bridge-domain 99
 !
 service instance 100 ethernet
 encapsulation dot1q 100
 bridge-domain 100
 !
```

```
 !
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet1/0/2
 ip address 30.0.0.1 255.255.255.0
crypto map cmap
!
ip access-list extended cryptoacl
 permit gre host 30.0.0.1 host 10.0.0.1
ip access-list extended cryptoacl2
 permit gre host 30.0.0.1 host 20.0.0.1
```

```
 service instance 101 ethernet
 encapsulation dot1q 101
 bridge-domain 101
 !
!
interface GigabitEthernet2/2/0
 ip address 40.0.0.1 255.255.255.0
 crypto map cmap
!
ip access-list extended cryptoacl
 permit gre host 40.0.0.1 host 10.0.0.1
ip access-list extended cryptoacl2
 permit gre host 40.0.0.1 host 20.0.0.1
```

验证

使用本部分可确认配置能否正常运行。

1. 检查内部VLAN主机(在这种情况下在2960 Catalyst交换机的SVI的) MAC地址是否在OTV路由表了解。
2. 检查crypto encap的和decap的是否为重叠(OTV流量)流量执行。

一旦OTV出现，在您配置在加入接口后的加密映射，请检查活动转发器本地VLAN (在这种情况下VLAN 100和101)。这显示Site_A_1和Site_B_2是均等VLAN的活动转发器，因为您为从在站点A的VLAN 100启动的ping将测试数据流加密对在站点B的VLAN 100 ：

```
Site_A_1#show otv vlan

Key:  SI - Service Instance, NA - Non AED, NFC - Not Forward Capable.

Overlay 99 VLAN Configuration Information

 Inst VLAN BD   Auth ED             State               Site If(s)

 0    100  100  *Site_A_1           active              Gi0/0/0:SI100

 0    101  101   Site_A_2           inactive(NA)        Gi0/0/0:SI101

 0    200  200  *Site_A_1           active              Gi0/0/0:SI200

 0    201  201   Site_A_2           inactive(NA)        Gi0/0/0:SI201
```

```
 Total VLAN(s): 4

Site_B_2#show otv vlan

Key:  SI - Service Instance, NA - Non AED, NFC - Not Forward Capable.


Overlay 99 VLAN Configuration Information

 Inst VLAN BD   Auth ED             State               Site If(s)

0    100  100  *Site_B_2           active              Gi2/2/1:SI100

 0    101  101   Site_B_1           inactive(NA)        Gi2/2/1:SI101

 0    200  200  *Site_B_2           active              Gi2/2/1:SI200

 0    201  201   Site_B_1           inactive(NA)        Gi2/2/1:SI201

 Total VLAN(s): 4
```

为了检查数据包是否在任一个ED的确被封装并且解了封装，您应该检查如果IPSec会话是活跃和计数器值在crypto会话上为了确认数据包的确被加密和解密。为了检查IPSec会话是否是活跃的，因为它变得激活，只有当任何流量流经，请检查**show crypto isakmp sa**输出。这里，激活转发器的仅输出被检查，但是这应该显示在所有ED的有效状态在加密的OTV的工作。

```
Site_B_2#show otv vlan

Key:  SI - Service Instance, NA - Non AED, NFC - Not Forward Capable.


Overlay 99 VLAN Configuration Information

 Inst VLAN BD   Auth ED             State               Site If(s)

0    100  100  *Site_B_2           active              Gi2/2/1:SI100

 0    101  101   Site_B_1           inactive(NA)        Gi2/2/1:SI101

 0    200  200  *Site_B_2           active              Gi2/2/1:SI200

 0    201  201   Site_B_1           inactive(NA)        Gi2/2/1:SI201

 Total VLAN(s): 4
```

现在，为了确认数据包是否被加密并且解密，您在输出中首先需要了解所期待的是**显示crypto会话详细信息**。因此，当您启动从Sw_A交换机的ICMP ECHO数据包往Sw_B时，这预计：

- 当从Site_A_1 ED的ICMP回音分支是VLAN 100的时的活动转发器，它将必须封装OTV有效负载(ICMP回音+ MPLS + GRE)
- 然后，一旦是VLAN 100的活动转发器的ICMP回音到达Site_B_2 ED，它将必须解封装OTV有效负载(ICMP回音+ MPLS + GRE)
- 现在，一旦Site_B_2 ED收到从Sw_B的ICMP echo应答，它再将必须封装OTV有效负载(ICMP回音+ MPLS + GRE)
- 并且，一旦ICMP echo应答到达Site_A_1 ED，我再再会必须**解封装**OTV有效负载(ICMP回音+ MPLS + GRE)

在从Sw_A的ping成功以后到Sw_B，请期望发现5个计数器的增量在“**显示crypto会话详细信息的**

enc”和“dec”部分的下在两个输出了活动转发器ED。

现在，请从ED检查同样：

```
Site_A_1(config-if)#do show crypto session detail | section enc

K - Keepalives, N - NAT-traversal, T - cTCP encapsulation

       Outbound: #pkts enc'ed 0 drop 0 life (KB/Sec) 4608000/3345

       Outbound: #pkts enc'ed 10 drop 0 life (KB/Sec) 4607998/3291 <<<< 10 counter before ping

Site_A_1(config-if)#do show crypto session detail | section dec

       Inbound:  #pkts dec'ed 0 drop 0 life (KB/Sec) 4608000/3343

       Inbound:  #pkts dec'ed 18 drop 0 life (KB/Sec) 4607997/3289 <<<< 18 counter before ping

Site_B_2(config-if)#do show crypto session detail | section enc

K - Keepalives, N - NAT-traversal, T - cTCP encapsulation

       Outbound: #pkts enc'ed 18 drop 0 life (KB/Sec) 4607997/3295 <<<< 18 counter before ping

       Outbound: #pkts enc'ed 9 drop 0 life (KB/Sec) 4607999/3295

Site_B_2(config-if)#do show crypto session detail | section dec

       Inbound:  #pkts dec'ed 10 drop 0 life (KB/Sec) 4607998/3293 <<<< 10 counter before ping

       Inbound:  #pkts dec'ed 1 drop 0 life (KB/Sec) 4607999/3293

Site_B_2(config-if)#do show crypto session detail | section dec

       Inbound:  #pkts dec'ed 10 drop 0 life (KB/Sec) 4607998/3293 <<<< 10 counter before ping

       Inbound:  #pkts dec'ed 1 drop 0 life (KB/Sec) 4607999/3293

Site_A_1(config-if)#do show crypto session detail | section enc

K - Keepalives, N - NAT-traversal, T - cTCP encapsulation

       Outbound: #pkts enc'ed 0 drop 0 life (KB/Sec) 4608000/3339

       Outbound: #pkts enc'ed 15 drop 0 life (KB/Sec) 4607997/3284 <<<< 15 counter after ping
(After ICMP Echo)

Site_A_1(config-if)#do show crypto session detail | section dec

       Inbound:  #pkts dec'ed 0 drop 0 life (KB/Sec) 4608000/3338

       Inbound:  #pkts dec'ed 23 drop 0 life (KB/Sec) 4607997/3283 <<<< 23 counter after ping
(After ICMP Echo Reply)

Site_B_2(config-if)#do show crypto session detail | section enc

K - Keepalives, N - NAT-traversal, T - cTCP encapsulation

       Outbound: #pkts enc'ed 23 drop 0 life (KB/Sec) 4607997/3282 <<<< 23 counter after ping
(After ICMP Echo Reply)
```

```
       Outbound: #pkts enc'ed 9 drop 0 life (KB/Sec) 4607999/3282

Site_B_2(config-if)#do show crypto session detail | section dec

       Inbound:  #pkts dec'ed 15 drop 0 life (KB/Sec) 4607997/3281 <<<< 15 counter after ping
(After ICMP Echo)

       Inbound:  #pkts dec'ed 1 drop 0 life (KB/Sec) 4607999/3281
```

此配置指南能表达与使用的必需的配置详细信息单播核心双重归属设置的IPSec。

故障排除

目前没有针对此配置的故障排除信息。