strongSwan作为连接到Cisco IOS软件的远程访问VPN客户端(Xauth) — 配置示例

目录

简介

本文档介绍如何将strongSwan配置为连接到Cisco IOS®软件的远程访问IPSec VPN客户端。

strongSwan是开源软件，用于构建互联网密钥交换(IKE)/IPSec VPN隧道，以及使用Cisco IOS软件构建LAN到LAN和远程访问隧道。

先决条件

要求

Cisco 建议您具有以下主题的基础知识：

- Linux配置
- Cisco IOS软件上的VPN配置

使用的组件

本文档中的信息基于以下软件版本：

- 思科IOS软件版本15.3T

- strongSwan 5.0.4
- Linux内核3.2.12

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。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

配置

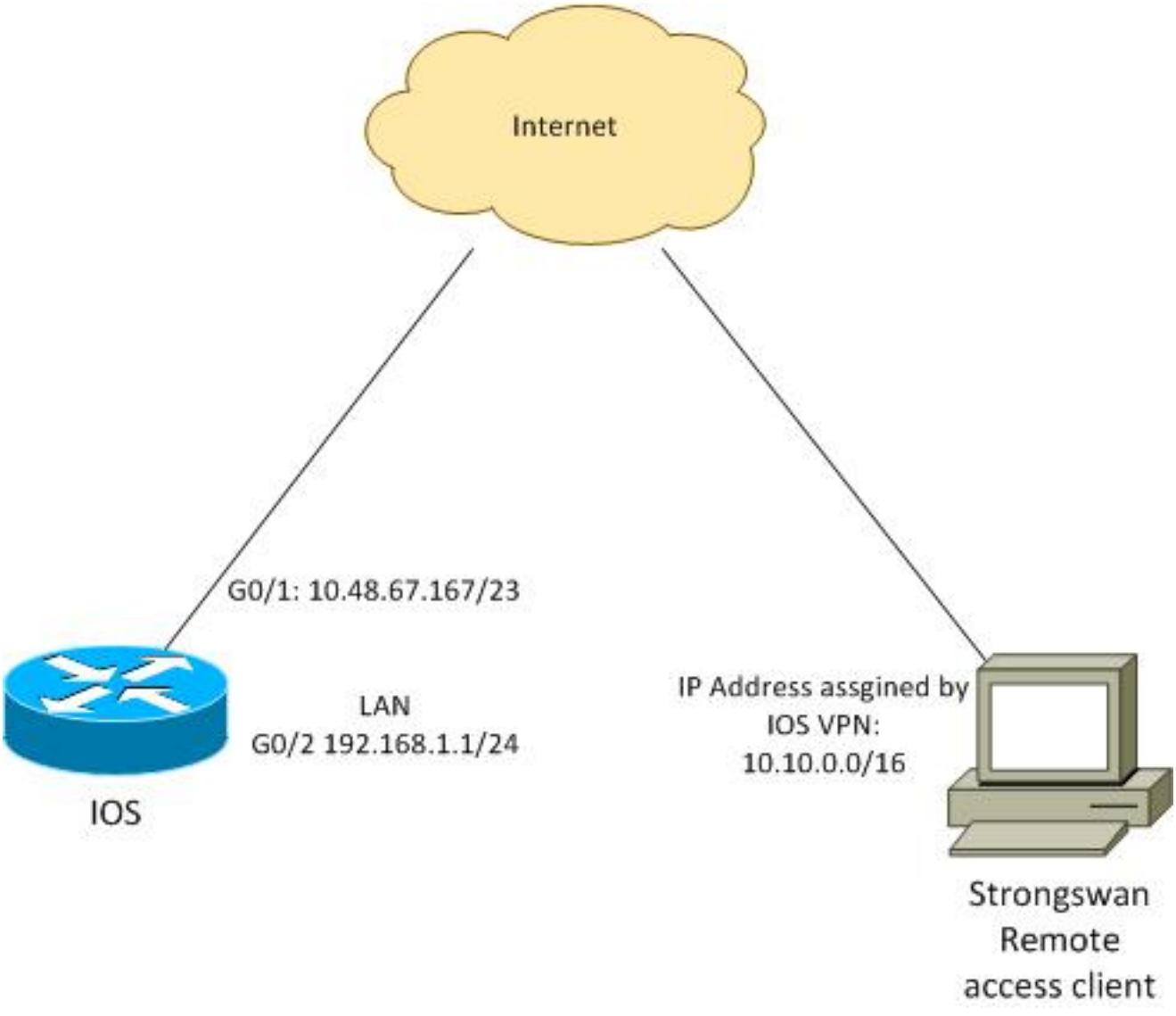
注意：

使用命令查找工具（仅限注册用户）可获取有关本部分所使用命令的详细信息。

命令输出解释程序工具（仅限注册用户）支持某些 show 命令。使用输出解释器工具来查看 show 命令输出的分析。

使用 **debug 命令之前，请参阅**有关 Debug 命令的重要信息。

拓扑



远程客户端从池10.10.0.0/16接收IP地址。10.10.0.0/16和192.168.1.0/24之间的流量受保护。

配置Cisco IOS软件

在本例中，strongSwan客户端需要安全访问Cisco IOS软件LAN网络192.168.1.0/24。远程客户端使用组名RA（这是IKEID）以及用户名cisco和密码Cisco。

客户端从池10.10.0.0/16获取IP地址。此外，拆分的访问控制列表(ACL)被推送到客户端；该ACL将强制客户端通过VPN将流量发送到192.168.1.0/24。

```
aaa new-model
aaa authentication login AUTH local
aaa authorization network NET local
username cisco password 0 cisco

crypto isakmp policy 1
 encryption aes
 hash sha
 authentication pre-share
 group 2
 lifetime 3600
crypto isakmp keepalive 10

crypto isakmp client configuration group RA
 key cisco
 domain cisco.com
 pool POOL
 acl split
 save-password
 netmask 255.255.255.0

crypto isakmp profile test
   match identity group RA
   client authentication list AUTH
   isakmp authorization list NET
   client configuration address respond
   client configuration group RA
   virtual-template 1

crypto ipsec transform-set test esp-aes esp-sha-hmac
 mode tunnel

crypto ipsec profile ipsecprof
 set security-association lifetime kilobytes disable
 set transform-set test
 set isakmp-profile test

interface GigabitEthernet0/1
 ip address 10.48.67.167 255.255.254.0
!
interface GigabitEthernet0/2
description LAN
 ip address 192.168.1.1 255.255.255.0

interface Virtual-Template1 type tunnel
 ip unnumbered GigabitEthernet0/1
 tunnel source GigabitEthernet0/1
 tunnel mode ipsec ipv4
 tunnel protection ipsec profile ipsecprof
```

```
ip local pool POOL 10.10.0.0 10.10.255.255
ip access-list extended split
 permit ip host 192.168.1.1 any
```

思科建议您不要在虚拟模板上分配通常的静态IP地址。虚拟访问接口会被克隆，并从父虚拟模板继承其配置，这可能会创建重复的IP地址。但是，虚拟模板确实通过“ip unnumbered”关键字引用IP地址以填充邻接表。“ip unnumbered”关键字只是对路由器上物理或逻辑IP地址的引用。

为了在IKEv2中与IKE路由进行转发兼容，请使用内部地址，并避免将IPSec“本地地址”用作“ip unnumbered”。

配置strongSwan

此程序描述如何配置strongSwan:

1. 在/etc/ipsec.conf文件中使用此配置：

```
version 2
config setup
       strictcrlpolicy=no
       charondebug="ike 4, knl 4, cfg 2" #useful debugs

conn %default
       ikelifetime=1440m
       keylife=60m
       rekeymargin=3m
       keyingtries=1
       keyexchange=ikev1
       authby=xauthpsk

conn "ezvpn"
       keyexchange=ikev1
       ikelifetime=1440m
       keylife=60m
       aggressive=yes
       ike=aes-sha1-modp1024 #Phase1 parameters
       esp=aes-sha1 #Phase2 parameters
       xauth=client #Xauth client mode
       left=10.48.62.178 #local IP used to connect to IOS
       leftid=RA #IKEID (group name) used for IOS
       leftsourceip=%config  #apply received IP
       leftauth=psk
       rightauth=psk
       leftauth2=xauth #use PSK for group RA and Xauth for user cisco
       right=10.48.67.167 #gateway (IOS) IP
       rightsubnet=192.168.1.0/24
       xauth_identity=cisco #identity for Xauth, password in ipsec.secrets
       auto=add
```

已设置rightsubnet关键字以指示应保护哪些流量。 在此场景中，IPSec安全关联(SA)建立在192.168.1.0/24（在Cisco IOS软件上）和从池10.10.0.0/16接收的strongSwan IP地址之间。

如果未指定右子网，您可能希望在客户端IP地址和0.0.0.0网络之间拥有0.0.0.0网络和IPSec SA。这是Cisco IOS软件用作客户端时的行为。

但这种预期对强天鹅来说并不正确。在未定义右子网的情况下，strongSwan在协商的第2阶段

提出一个外部网关（Cisco IOS软件）IP地址；在本场景中，该网关为10.48.67.167。由于目标是保护流向Cisco IOS软件(192.168.1.0/24)上的内部LAN的流量，而不是流向外部Cisco IOS软件IP地址的流量，因此已使用了右子网。

2. 在/etc/ipsec.secrets文件中使用此配置：

```
10.48.67.167 : PSK "cisco"        #this is PSK for group password
cisco : XAUTH "cisco" #this is password for XAuth (user cisco)
```

验证

使用本部分可确认配置能否正常运行。

此程序描述如何测试和验证strongSwan配置：

1. 启用调试后启动strongSwan:

```
gentoo1 ~ # /etc/init.d/ipsec start
 * Starting  ...
Starting strongSwan 5.0.4 IPsec [starter]...
Loading config setup
 strictcrlpolicy=no
 charondebug=ike 4, knl 4, cfg 2
Loading conn %default
 ikelifetime=1440m
 keylife=60m
 rekeymargin=3m
 keyingtries=1
 keyexchange=ikev1
 authby=xauthpsk
Loading conn 'ezvpn'
 keyexchange=ikev1
 ikelifetime=1440m
 keylife=60m
 aggressive=yes
 ike=aes-sha1-modp1024
 esp=aes-sha1
 xauth=client
 left=10.48.62.178
 leftid=RA
 leftsourceip=%config
 leftauth=psk
 rightauth=psk
 leftauth2=xauth
 right=10.48.67.167
 rightsubnet=192.168.1.0/24
 xauth_identity=cisco
 auto=add
found netkey IPsec stack
No leaks detected, 9 suppressed by whitelist
```

2. 启动来自strongSwan的隧道时，会显示有关第1阶段、Xauth和第2阶段的所有一般信息：

```
gentoo1 ~ # ipsec up ezvpn
initiating Aggressive Mode IKE_SA ezvpn[1] to 10.48.67.167
```

```
generating AGGRESSIVE request 0 [ SA KE No ID V V V V ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (374 bytes)
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (404 bytes)
parsed AGGRESSIVE response 0 [ SA V V V V V KE ID No HASH NAT-D NAT-D ]
received Cisco Unity vendor ID
received DPD vendor ID
received unknown vendor ID: 8d:75:b5:f8:ba:45:4c:6b:02:ac:bb:09:84:13:32:3b
received XAuth vendor ID
received NAT-T (RFC 3947) vendor ID
generating AGGRESSIVE request 0 [ NAT-D NAT-D HASH ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (92 bytes)
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (92 bytes)
parsed INFORMATIONAL_V1 request 3265561043 [ HASH N((24576)) ]
received (24576) notify
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (68 bytes)
parsed TRANSACTION request 4105447864 [ HASH CP ]
generating TRANSACTION response 4105447864 [ HASH CP ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (76 bytes)
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (68 bytes)
parsed TRANSACTION request 1681157416 [ HASH CP ]
XAuth authentication of 'cisco' (myself) successful
IKE_SA ezvpn[1] established between 10.48.62.178[RA]...10.48.67.167[10.48.67.167]
scheduling reauthentication in 86210s
maximum IKE_SA lifetime 86390s
generating TRANSACTION response 1681157416 [ HASH CP ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (68 bytes)
generating TRANSACTION request 1406391467 [ HASH CP ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (68 bytes)
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (68 bytes)
parsed TRANSACTION response 1406391467 [ HASH CP ]
installing new virtual IP 10.10.0.1
generating QUICK_MODE request 1397274205 [ HASH SA No ID ID ]
sending packet: from 10.48.62.178[500] to 10.48.67.167[500] (196 bytes)
received packet: from 10.48.67.167[500] to 10.48.62.178[500] (180 bytes)
parsed QUICK_MODE response 1397274205 [ HASH SA No ID ID N((24576)) ]
connection 'ezvpn' established successfully
No leaks detected, 1 suppressed by whitelist
```

3. 在strongSwan上启用调试时，可以返回许多信息。这是启动隧道时使用的最重要调试：

```
#IKE Phase
06[CFG] received stroke: initiate 'ezvpn'
04[IKE] initiating Aggressive Mode IKE_SA ezvpn[1] to 10.48.67.167
03[CFG]   proposal matches
03[CFG] received proposals: IKE:AES_CBC_128/HMAC_SHA1_96/PRF_HMAC_SHA1/MODP_1024
03[CFG] selected proposal: IKE:AES_CBC_128/HMAC_SHA1_96/PRF_HMAC_SHA1/MODP_1024
16[IKE] IKE_SA ezvpn[1] state change: CONNECTING => ESTABLISHED
16[IKE] scheduling reauthentication in 86210s

#Xauth phase
15[KNL] 10.48.62.178 is on interface eth1
15[IKE] installing new virtual IP 10.10.0.1
15[KNL] virtual IP 10.10.0.1 installed on eth1

#Ipsec
05[CFG]   proposal matches
05[CFG] received proposals: ESP:AES_CBC_128/HMAC_SHA1_96/NO_EXT_SEQ
05[CFG] selected proposal: ESP:AES_CBC_128/HMAC_SHA1_96/NO_EXT_SEQ
05[KNL] adding SAD entry with SPI 7600acd8 and reqid

15[CFG] proposing traffic selectors for us:
15[CFG]  10.10.0.1/32
15[CFG] proposing traffic selectors for other:
```

```
15[CFG]  192.168.1.0/24

#Local settings
charon: 05[KNL] getting a local address in traffic selector 10.10.0.1/32
charon: 05[KNL] using host 10.10.0.1
charon: 05[KNL] using 10.48.62.129 as nexthop to reach 10.48.67.167
charon: 05[KNL] 10.48.62.178 is on interface eth1
charon: 05[KNL] installing route: 192.168.1.0/24 via 10.48.62.129 src 10.10.0.1
dev eth1
charon: 05[KNL] getting iface index for eth1
charon: 05[KNL] policy 10.10.0.1/32 === 192.168.1.0/24 out  (mark 0/0x00000000)
already exists, increasing refcount
charon: 05[KNL] updating policy 10.10.0.1/32 === 192.168.1.0/24 out
```

4. 从客户端发送流量：

```
gentoo1 ~ # ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_req=1 ttl=255 time=1.19 ms
64 bytes from 192.168.1.1: icmp_req=2 ttl=255 time=1.19 ms
64 bytes from 192.168.1.1: icmp_req=3 ttl=255 time=1.12 ms
64 bytes from 192.168.1.1: icmp_req=4 ttl=255 time=1.16 ms
64 bytes from 192.168.1.1: icmp_req=4 ttl=255 time=1.26 ms
^C
--- 192.168.1.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 1.128/1.171/1.199/0.036 ms
```

5. 检查Cisco IOS软件上的动态接口：

```
Bsns-7200-2#sh int Virtual-Access1
Virtual-Access1 is up, line protocol is up
 Hardware is Virtual Access interface
  Interface is unnumbered. Using address of GigabitEthernet0/1 (10.48.67.167)
 MTU 17878 bytes, BW 100000 Kbit/sec, DLY 50000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation TUNNEL
 Tunnel vaccess, cloned from Virtual-Template1
 Vaccess status 0x4, loopback not set
 Keepalive not set
 Tunnel source 10.48.67.167 (GigabitEthernet0/1), destination 10.48.62.178
  Tunnel Subblocks:
     src-track:
        Virtual-Access1 source tracking subblock associated with
GigabitEthernet0/1
         Set of tunnels with source GigabitEthernet0/1, 2 members (includes
iterators), on interface <OK>
  Tunnel protocol/transport IPSEC/IP
 Tunnel TTL 255
 Tunnel transport MTU 1438 bytes
 Tunnel transmit bandwidth 8000 (kbps)
 Tunnel receive bandwidth 8000 (kbps)
 Tunnel protection via IPSec (profile "ipsecprof")
 Last input never, output never, output hang never
 Last clearing of "show interface" counters 00:07:19
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue: 0/0 (size/max)
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 0 bits/sec, 0 packets/sec
    5 packets input, 420 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
```

```
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    5 packets output, 420 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 unknown protocol drops
    0 output buffer failures, 0 output buffers swapped out
```

6. 检查Cisco IOS软件上的IPSec计数器：

```
Bsns-7200-2#show crypto session detail
Crypto session current status

Code: C - IKE Configuration mode, D - Dead Peer Detection
K - Keepalives, N - NAT-traversal, T - cTCP encapsulation
X - IKE Extended Authentication, F - IKE Fragmentation

Interface: Virtual-Access1
Username: cisco
Profile: test
Group: RA
Assigned address: 10.10.0.1
Uptime: 00:39:25
Session status: UP-ACTIVE
Peer: 10.48.62.178 port 500 fvrf: (none) ivrf: (none)
     Phase1_id: RA
     Desc: (none)
 IKEv1 SA: local 10.48.67.167/500 remote 10.48.62.178/500 Active
         Capabilities:CDX connid:13002 lifetime:00:20:34
 IPSEC FLOW: permit ip 192.168.1.0/255.255.255.0 host 10.10.0.1
       Active SAs: 2, origin: crypto map
       Inbound:  #pkts dec'ed 5 drop 0 life (KB/Sec) KB Vol Rekey Disabled/1234
       Outbound: #pkts enc'ed 5 drop 0 life (KB/Sec) KB Vol Rekey Disabled/1234
```

7. 验证strongSwan的状态：

```
gentoo1 ~ # ipsec statusall
Status of IKE charon daemon (strongSwan 5.0.4, Linux 3.2.12-gentoo, x86_64):
 uptime: 41 minutes, since Jun 09 10:45:59 2013
 malloc: sbrk 1069056, mmap 0, used 896944, free 172112
 worker threads: 7 of 16 idle, 8/1/0/0 working, job queue: 0/0/0/0, scheduled: 2
 loaded plugins: charon aes des sha1 sha2 md5 random nonce x509 revocation
constraints pubkey pkcs1 pkcs8 pgp dnskey pem openssl gcrypt fips-prf gmp
xcbc cmac hmac attr kernel-netlink resolve socket-default stroke updown
eap-identity eap-sim eap-aka eap-aka-3gpp2 eap-simaka-pseudonym
eap-simaka-reauth eap-md5 eap-gtc eap-mschapv2 eap-radius xauth-generic dhcp
Listening IP addresses:
 192.168.0.10
 10.48.62.178
 2001:420:44ff:ff61:250:56ff:fe99:7661
 192.168.2.1
Connections:
      ezvpn:  10.48.62.178...10.48.67.167  IKEv1 Aggressive
      ezvpn:   local:  [RA] uses pre-shared key authentication
      ezvpn:   local:  [RA] uses XAuth authentication: any with XAuth identity
'cisco'
      ezvpn:   remote: [10.48.67.167] uses pre-shared key authentication
      ezvpn:   child:  dynamic === 192.168.1.0/24 TUNNEL
Security Associations (1 up, 0 connecting):
      ezvpn[1]: ESTABLISHED 41 minutes ago, 10.48.62.178[RA]...
10.48.67.167[10.48.67.167]
      ezvpn[1]: IKEv1 SPIs: 0fa722d2f09bffe0_i* 6b4c44bae512b278_r, pre-shared
key+XAuth reauthentication in 23 hours
```

```
      ezvpn[1]: IKE proposal: AES_CBC_128/HMAC_SHA1_96/PRF_HMAC_SHA1/MODP_1024
      ezvpn{1}:  INSTALLED, TUNNEL, ESP SPIs: c805b9ba_i 7600acd8_o
      ezvpn{1}:  AES_CBC_128/HMAC_SHA1_96, 420 bytes_i (5 pkts, 137s ago), 420
bytes_o (5 pkts, 137s ago), rekeying in 13 minutes
      ezvpn{1}:   10.10.0.1/32 === 192.168.1.0/24
No leaks detected, 1 suppressed by whitelist
```

故障排除

目前没有针对此配置的故障排除信息。

摘要

本文描述了将strongSwan客户端作为IPSec VPN客户端连接到Cisco IOS软件的配置。

也可以在Cisco IOS软件和strongSwan之间配置IPSec LAN到LAN隧道。此外，两台设备之间的IKEv2在远程和LAN到LAN访问中都能正常工作。

相关信息

- Openswan文档
- StrongSwan用户文档
- FlexVPN和Internet密钥交换版本2配置指南（Cisco IOS版本15M&T）的“配置互联网密钥交换版本2和FlexVPN站点到站点”部分
- 技术支持和文档 - Cisco Systems