

Пример настройки соединения по протоколу IPSec между маршрутизаторами с использованием ключей RSA поверх туннеля GRE с RIP

Содержание

[Введение](#)

[Предварительные условия](#)

[Требования](#)

[Используемые компоненты](#)

[Условные обозначения](#)

[Настройка](#)

[Схема сети](#)

[Конфигурации](#)

[Проверка](#)

[Устранение неполадок](#)

[Процедура устранения неполадок](#)

[Команды для устранения неполадок](#)

[Дополнительные сведения](#)

[Введение](#)

В этом документе приводится пример конфигурации для маршрутизаторов с ключами RSA. Оба маршрутизатора настроены для ключей RSA и туннеля IPSec/универсальной инкапсуляции (GRE) с протоколом маршрутной информации (RIP).

[Предварительные условия](#)

[Требования](#)

Для этого документа отсутствуют особые требования.

[Используемые компоненты](#)

Сведения, содержащиеся в данном документе, касаются следующих версий программного обеспечения и оборудования:

- Маршрутизатор Cisco под управлением выпуска ПО Cisco IOS® 12.2

Сведения, представленные в этом документе, были получены от устройств, работающих в

специальной лабораторной среде. Все устройства, описанные в этом документе, были запущены с чистой (стандартной) конфигурацией. В рабочей сети необходимо изучить потенциальное воздействие всех команд до их использования.

Условные обозначения

[Дополнительные сведения об условных обозначениях в документах см. Cisco Technical Tips Conventions.](#)

Настройка

В этом разделе содержатся сведения о настройке функций, описанных в этом документе.

Примечание: [Поиск дополнительной информации о командах в данном документе можно выполнить с помощью средства "Command Lookup" \(Поиск команд\) \(только для зарегистрированных клиентов\).](#)

Схема сети

В настоящем документе используется следующая схема сети:

Конфигурации

Эти конфигурации используются в данном документе:

- [Конфигурация операторов crypto для маршрутизатора 101](#)
- [Маршрутизатор 101](#)
- [Крипто - настройка для маршрутизатора 102](#)
- [Маршрутизатор 102](#)

Конфигурация операторов crypto для маршрутизатора 101

```
101(config)#crypto isakmp enable 101(config)#crypto
isakmp identity hostname 101(config)#crypto isakmp
policy 1 101(config-isakmp)#authentication rsa-encr
101(config)#access-list 101 permit gre host 20.1.1.1
host 20.1.1.2 101(config)#crypto ipsec transform-set
test esp-des esp-sha-hmac 101(cfg-crypto-trans)#mode
transport 101(config)#crypto map test 10 ip
101(config)#crypto map test 10 ipsec-is % NOTE: This new
crypto map will remain disabled until a peer and a valid
access list have been configured. 101(config-crypto-
map)#set transform-set test 101(config-crypto-map)#match
address 101 101(config-crypto-map)#set peer 20.1.1.2
101(config-crypto-map)# 101(config)#access-list 101
permit gre host 20.1.1.1 host 20.1.1.2
101(config)#interface Tunnel0 101(config-if)#crypto map
test 101(config)#interface ethernet 1/0 101(config-
if)#crypto map test
```

Маршрутизатор 101

Building configuration...

```
Current configuration : 1486 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 101
!
!
clock timezone PST -8
ip subnet-zero
ip domain name cisco.com
ip host 102.cisco.com 20.1.1.2
!
ip audit notify log
ip audit po max-events 100
!
crypto isakmp policy 1
  authentication rsa-encr
crypto isakmp identity hostname
crypto isakmp keepalive 20 5
!
!
crypto ipsec transform-set test esp-des esp-sha-hmac
  mode transport
!
crypto map test 10 ipsec-isakmp
  set peer 20.1.1.2
  set transform-set test
  match address 101
!
!
crypto key pubkey-chain rsa
  named-key 102.cisco.com
  key-string
    305C300D 06092A86 4886F70D 01010105 00034B00 30480241
00DB4FEB EF0C0D3D
    72FC5BD3 29C8E94B 726161BC F1AF337C E5F2D11D FBFC2245
95EA2AB7 9D09156C
    08A5A7CD 36E43D94 F1E3C978 37A79379 384D2A72 CE575E91
3F020301 0001
  quit
!
!
!
interface Loopback1
ip address 192.168.1.1 255.255.255.0
!
interface Tunnel0
ip address 10.10.10.1 255.255.255.252
ip mtu 1420
tunnel source Ethernet1/0
tunnel destination 20.1.1.2
crypto map test
!
interface Ethernet0/0
ip address 1.1.1.1 255.255.255.0
!
interface Ethernet1/0
ip address 20.1.1.1 255.255.255.0
crypto map test
!
```

```

interface Serial2/0
  no ip address
  shutdown
!
interface Serial3/0
  no ip address
  shutdown
!
router rip
  version 2
  passive-interface Ethernet1/0
  network 10.0.0.0
  network 192.168.1.0
!
ip classless
no ip http server
!
!
access-list 101 permit gre host 20.1.1.1 host 20.1.1.2
!
!
line con 0
line aux 0
line vty 0 4
  login
!
end
101#

```

Крипто - настройка для маршрутизатора 102

```

102(config)#crypto isakmp enable 102(config)#crypto
isakmp identity hostname 102(config)#crypto isakmp
policy 1 102(config-isakmp)#authentication rsa-encr
102(config)#access-list 101 permit gre host 20.1.1.2
host 20.1.1.1 102(config)#crypto ipsec transform-set
test esp-des esp-sha-hmac 102(cfg-crypto-trans)#mode
transport 102(config)#crypto map test 10 ip
102(config)#crypto map test 10 ipsec-is % NOTE: This new
crypto map will remain disabled until a peer and a valid
access list have been configured. 102(config-crypto-
map)#set transform-set test 102(config-crypto-map)#match
address 101 102(config-crypto-map)#set peer 20.1.1.1
102(config-crypto-map)# 102(config)#interface Tunnel0
102(config-if)#crypto map test 102(config)#interface
ethernet 1/0 102(config-if)#crypto map test

```

Маршрутизатор 102

```

102#write terminal Building configuration... Current
configuration : 1484 bytes ! version 12.2 service
timestamps debug datetime msec service timestamps log
datetime msec no service password-encryption ! hostname
102 ! ! clock timezone PST -8 ip subnet-zero ip domain
name cisco.com ip host 101.cisco.com 20.1.1.1 ! ip audit
notify log ip audit po max-events 100 ! crypto isakmp
policy 1 authentication rsa-encr crypto isakmp identity
hostname crypto isakmp keepalive 20 5 ! ! crypto ipsec
transform-set test esp-des esp-sha-hmac mode transport !
crypto map test 10 ipsec-isakmp set peer 20.1.1.1 set
transform-set test match address 101 ! ! crypto key
pubkey-chain rsa named-key 101.cisco.com address
20.1.1.1 key-string 305C300D 06092A86 4886F70D 01010105
00034B00 30480241 00A7D24F E6E15787 5EE1434A A76A3DC1
ADE96A4D C6B4D0F3 A7DDAD10 446EF83A 89D1115F 0C517118

```

```
ECAF418E F4C84823 2A017B97 F85690EF EBCF3414 AB3E81F6
A5020301 0001 quit ! ! ! interface Loopback1 ip address
172.16.1.1 255.255.255.0 ! interface Tunnel0 ip address
10.10.10.2 255.255.255.252 ip mtu 1420 tunnel source
Ethernet0/0 tunnel destination 20.1.1.1 crypto map test
! interface Ethernet0/0 ip address 20.1.1.2
255.255.255.0 crypto map test ! interface Ethernet1/0 no
ip address ! interface Serial2/0 no ip address shutdown
! interface Serial3/0 no ip address shutdown ! router
rip version 2 passive-interface Ethernet0/0 network
10.0.0.0 network 172.16.0.0 ! ip classless no ip http
server ! ! access-list 101 permit gre host 20.1.1.2 host
20.1.1.1 ! ! line con 0 line aux 0 line vty 0 4 login !
end 102#
```

Проверка

В этом разделе содержатся сведения, которые помогают убедиться в надлежащей работе конфигурации.

Некоторые команды **show** поддерживаются Средством интерпретации выходных данных(только зарегистрированные клиенты), которое позволяет просматривать аналитику выходных данных команды **show**.

- **show crypto isakmp sa detail**– показывает все текущие ассоциации безопасности протокола IKE (Internet Key Exchange, обмен ключами в Интернете) на одноранговом узле.
- **show crypto ipsec sa** — отображает настройки, используемые текущими SA.
- **show crypto engine connections active**– показывает сводку по конфигурации криптоядер.
- **show ip route** – отображение текущего состояния таблицы маршрутизации.

Выходные данные команд для маршрутизатора 101

```
101#show crypto isakmp sa detail *Dec 28 21:15:19.371: ISAKMP (0:14): purging node 543282640
Codes: C - IKE configuration mode, D - Dead Peer Detection K - Keepalives, N - NAT-traversal X -
IKE Extended Authentication psk - Preshared key, rsig - RSA signature renc - RSA encryption Conn
id Local Remote Encr Hash Auth DH Lifetime Capabilities 14 20.1.1.1 20.1.1.2 des sha rsig 1
23:59:06 D 101#show crypto ipsec sa interface: Ethernet1/0 Crypto map tag: test, local addr.
20.1.1.1 local ident (addr/mask/prot/port): (20.1.1.1/255.255.255.255/47/0) remote ident
(addr/mask/prot/port): (20.1.1.2/255.255.255.255/47/0) current_peer: 20.1.1.2:500 PERMIT,
flags={origin_is_acl,} #pkts encaps: 0, #pkts encrypt: 0, #pkts digest 0 #pkts decaps: 0, #pkts
decrypt: 0, #pkts verify 0 #pkts compressed: 0, #pkts decompressed: 0 #pkts not compressed: 0,
#pkts compr. failed: 0 #pkts not decompressed: 0, #pkts decompress failed: 0 #send errors 1,
#recv errors 0 local crypto endpt.: 20.1.1.1, remote crypto endpt.: 20.1.1.2 path mtu 1420,
media mtu 1420 current outbound spi: 7FB7A347 inbound esp sas: spi: 0x7221D7D2(1914820562)
transform: esp-des esp-sha-hmac , in use settings ={Transport, } slot: 0, conn id: 2000,
flow_id: 1, crypto map: test sa timing: remaining key lifetime (k/sec): (4468975/3586) IV size:
8 bytes replay detection support: Y inbound ah sas: inbound pcp sas: outbound esp sas: spi:
0x7FB7A347(2142741319) transform: esp-des esp-sha-hmac , in use settings ={Transport, } slot: 0,
conn id: 2001, flow_id: 2, crypto map: test sa timing: remaining key lifetime (k/sec):
(4468975/3586) IV size: 8 bytes replay detection support: Y outbound ah sas: outbound pcp sas:
interface: Tunnel0 Crypto map tag: test, local addr. 20.1.1.1 local ident (addr/mask/prot/port):
(20.1.1.1/255.255.255.255/47/0) remote ident (addr/mask/prot/port):
(20.1.1.2/255.255.255.255/47/0) current_peer: 20.1.1.2:500 PERMIT, flags={origin_is_acl,} #pkts
encaps: 0, #pkts encrypt: 0, #pkts digest 0 #pkts decaps: 0, #pkts decrypt: 0, #pkts verify 0
#pkts compressed: 0, #pkts decompressed: 0 #pkts not compressed: 0, #pkts compr. failed: 0 #pkts
not decompressed: 0, #pkts decompress failed: 0 #send errors 1, #recv errors 0 local crypto
```

```
endpt.: 20.1.1.1, remote crypto endpt.: 20.1.1.2 path mtu 1420, media mtu 1420 current outbound
spi: 7FB7A347 inbound esp sas: spi: 0x7221D7D2(1914820562) transform: esp-des esp-sha-hmac , in
use settings ={Transport, } slot: 0, conn id: 2000, flow_id: 1, crypto map: test sa timing:
remaining key lifetime (k/sec): (4468975/3585) IV size: 8 bytes replay detection support: Y
inbound ah sas: inbound pcp sas: outbound esp sas: spi: 0x7FB7A347(2142741319) transform: esp-
des esp-sha-hmac , in use settings ={Transport, } slot: 0, conn id: 2001, flow_id: 2, crypto
map: test sa timing: remaining key lifetime (k/sec): (4468975/3584) IV size: 8 bytes replay
detection support: Y outbound ah sas: outbound pcp sas: 101#show crypto engine connections
active ID Interface IP-Address State Algorithm Encrypt Decrypt 14 Ethernet1/0 20.1.1.1 set
HMAC_SHA+DES_56_CB 0 0 2000 Ethernet1/0 20.1.1.1 set HMAC_SHA+DES_56_CB 0 6 2001 Ethernet1/0
20.1.1.1 set HMAC_SHA+DES_56_CB 5 0 101#show ip route Codes: 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 i - IS-IS, 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
Gateway of last resort is not set 20.0.0.0/24 is subnetted, 1 subnets C 20.1.1.0 is directly
connected, Ethernet1/0 R 172.16.0.0/16 [120/1] via 10.10.10.2, 00:00:08, Tunnel0 10.0.0.0/30 is
subnetted, 1 subnets C 10.10.10.0 is directly connected, Tunnel0 C 192.168.1.0/24 is directly
connected, Loopback1 101#
```

Выходные данные команды маршрутизатора 102

```
102#show crypto isakmp sa detail Codes: C - IKE configuration mode, D - Dead Peer Detection K -
Keepalives, N - NAT-traversal X - IKE Extended Authentication psk - Preshared key, rsig - RSA
signature renc - RSA encryption Conn id Local Remote Encr Hash Auth DH Lifetime Capabilities 15
20.1.1.2 20.1.1.1 des sha rsig 1 23:58:44 D 102#show crypto ipsec sa interface: Ethernet0/0
Crypto map tag: test, local addr. 20.1.1.2 local ident (addr/mask/prot/port):
(20.1.1.2/255.255.255.255/47/0) remote ident (addr/mask/prot/port):
(20.1.1.1/255.255.255.255/47/0) current_peer: 20.1.1.1:500 PERMIT, flags={origin_is_acl,} #pkts
encaps: 4, #pkts encrypt: 4, #pkts digest 4 #pkts decaps: 3, #pkts decrypt: 3, #pkts verify 3
#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.: 20.1.1.2, remote crypto endpt.: 20.1.1.1 path mtu 1420, media mtu 1420 current outbound
spi: 92F52EF2 inbound esp sas: spi: 0x1D25013E(488964414) transform: esp-des esp-sha-hmac , in
use settings ={Transport, } slot: 0, conn id: 2000, flow_id: 1, crypto map: test sa timing:
remaining key lifetime (k/sec): (4596388/3494) IV size: 8 bytes replay detection support: Y
inbound ah sas: inbound pcp sas: outbound esp sas: spi: 0x92F52EF2(2465541874) transform: esp-
des esp-sha-hmac , in use settings ={Transport, } slot: 0, conn id: 2001, flow_id: 2, crypto
map: test sa timing: remaining key lifetime (k/sec): (4596388/3494) IV size: 8 bytes replay
detection support: Y outbound ah sas: outbound pcp sas: interface: Tunnel0 Crypto map tag: test,
local addr. 20.1.1.2 local ident (addr/mask/prot/port): (20.1.1.2/255.255.255.255/47/0) remote
ident (addr/mask/prot/port): (20.1.1.1/255.255.255.255/47/0) current_peer: 20.1.1.1:500 PERMIT,
flags={origin_is_acl,} #pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4 #pkts decaps: 3, #pkts
decrypt: 3, #pkts verify 3 #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.: 20.1.1.2, remote crypto endpt.: 20.1.1.1 path mtu 1420,
media mtu 1420 current outbound spi: 92F52EF2 inbound esp sas: spi: 0x1D25013E(488964414)
transform: esp-des esp-sha-hmac , in use settings ={Transport, } slot: 0, conn id: 2000,
flow_id: 1, crypto map: test sa timing: remaining key lifetime (k/sec): (4596388/3493) IV size:
8 bytes replay detection support: Y inbound ah sas: inbound pcp sas: outbound esp sas: spi:
0x92F52EF2(2465541874) transform: esp-des esp-sha-hmac , in use settings ={Transport, } slot: 0,
conn id: 2001, flow_id: 2, crypto map: test sa timing: remaining key lifetime (k/sec):
(4596388/3493) IV size: 8 bytes replay detection support: Y outbound ah sas: outbound pcp sas:
102#show crypto engine connections active ID Interface IP-Address State Algorithm Encrypt
Decrypt 15 Ethernet0/0 20.1.1.2 set HMAC_SHA+DES_56_CB 0 0 2000 Ethernet0/0 20.1.1.2 set
HMAC_SHA+DES_56_CB 0 3 2001 Ethernet0/0 20.1.1.2 set HMAC_SHA+DES_56_CB 4 0 102# 102#show ip
route Codes: 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 i - IS-IS, 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 Gateway of last resort is not set 20.0.0.0/24 is subnetted, 1
subnets C 20.1.1.0 is directly connected, Ethernet0/0 172.16.0.0/24 is subnetted, 1 subnets C
172.16.1.0 is directly connected, Loopback1 10.0.0.0/30 is subnetted, 1 subnets C 10.10.10.0 is
```

directly connected, Tunnel0 R 192.168.1.0/24 [120/1] via 10.10.10.1, 00:00:08, Tunnel0

Устранение неполадок

В этом разделе описывается процесс устранения неполадок конфигурации.

[Дополнительные сведения о поиске и устранении неполадок см. в документе Устранение неполадок, связанных с безопасностью IP. Обзор команд debug и порядок их использования.](#)

Процедура устранения неполадок

Для устранения неполадок конфигурации выполните следующие действия.

1. Создайте ключи RSA на маршрутизаторе 101.

```
101#show crypto key mypubkey rsa 101# 101#
101#conf t 101(config)#ip domain-name cisco.com 101(config)#crypto key generate rsa ?
general-keys Generate a general purpose RSA key pair for signing and encryption usage-keys
Generate separate RSA key pairs for signing and encryption 101(config)#crypto key generate
rsa The name for the keys will be: 101.cisco.com Choose the size of the key modulus in the
range of 360 to 2048 for your General Purpose Keys. Choosing a key modulus greater than 512
may take a few minutes. How many bits in the modulus [512]: % Generating 512 bit RSA keys
...[OK] 101#show crypto key mypubkey rsa % Key pair was generated at: 12:02:08 PST Dec 28
2002 Key name: 101.cisco.com Usage: General Purpose Key Key Data: 305C300D 06092A86
4886F70D 01010105 00034B00 30480241 00A7D24F E6E15787 5EE1434A A76A3DC1 ADE96A4D C6B4D0F3
A7DDAD10 446EF83A 89D1115F 0C517118 ECAF418E F4C84823 2A017B97 F85690EF EBCF3414 AB3E81F6
A5020301 0001 % Key pair was generated at: 12:02:12 PST Dec 28 2002 Key name:
101.cisco.com.server Usage: Encryption Key Key Data: 307C300D 06092A86 4886F70D 01010105
00036B00 30680261 00B2092A 86483641 EB09900B BA0CD88A BE915C5E 05C1496B 70093D8B BC277A88
0E256BBE 4DB7EF92 8FE93C61 710309A3 451DAB72 93F35CD0 1CAD15AC B904B2B4 73B7A9F5 65A79E66
8D145427 F06DD89C 862B88BB 4C671508 AB3443BB 6270388C A7020301 0001 101#
```
2. Генерируйте RSA, включает маршрутизатор 102.

```
102#configure terminal Enter configuration commands, one per line. End with CNTL/Z.
102(config)#ip domain-name cisco.com 102(config)#crypto key gen rsa The name for the keys
will be: 102.cisco.com Choose the size of the key modulus in the range of 360 to 2048 for
your General Purpose Keys. Choosing a key modulus greater than 512 may take a few minutes.
How many bits in the modulus [512]: % Generating 512 bit RSA keys ...[OK] 102#show crypto
key mypubkey rsa % Key pair was generated at: 12:03:45 PST Dec 28 2002 Key name:
102.cisco.com Usage: General Purpose Key Key Data: 305C300D 06092A86 4886F70D 01010105
00034B00 30480241 00DB4FEB EF0C0D3D 72FC5BD3 29C8E94B 726161BC F1AF337C E5F2D11D FBFC2245
95EA2AB7 9D09156C 08A5A7CD 36E43D94 F1E3C978 37A79379 384D2A72 CE575E91 3F020301 0001 % Key
pair was generated at: 12:03:48 PST Dec 28 2002 Key name: 102.cisco.com.server Usage:
Encryption Key Key Data: 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00BFD36E
A1642BFC 77C88F89 8A260840 213E122E E1AF1E24 AF39B984 DACA06BC C303AD77 95BB6B6C 89CC6D13
B16CC4E3 45C101E4 61A13924 5559891A AB59B40D 826A5066 231B48D6 AEB2B367 94F6C492 016F8778
74B368A2 BFD1424D 79C63C94 5F020301 0001 102#
```
3. Выполните разрешение адреса по имени хоста.

```
102(config)#ip host 101.cisco.com
20.1.1.1
```
4. Выполните обмен ключами общего назначения на маршрутизаторе

```
101.101(config)#crypto key pubkey-chain rsa 101(config-pubkey-chain)#named-key
102.cisco.com % Named public key resolved to ip address: 20.1.1.2 101(config-pubkey-
key)#key-string ? Enter a public key as a hexadecimal number .... 101(config-pubkey)#$6F70D
01010105 00034B00 30480241 00DB4FEB EF0C0D3D 101(config-pubkey)#$26161BC F1AF337C E5F2D11D
FBFC2245 95EA2AB7 9D09156C 101(config-pubkey)#$1E3C978 37A79379 384D2A72 CE575E91 3F020301
0001 101(config-pubkey)#quit 101(config-pubkey-key)#exit
```
5. Exchange Общая цель включает маршрутизатор 102.

```
102(config)#crypto key pubkey-chain
rsa 102(config-pubkey-chain)#named-key 101.cisco.com % Named public key resolved to ip
address: 20.1.1.1 102(config-pubkey-key)#key-string Enter a public key as a hexadecimal
number .... 102(config-pubkey)#$6F70D 01010105 00034B00 30480241 00A7D24F E6E15787
102(config-pubkey)#$DE96A4D C6B4D0F3 A7DDAD10 446EF83A 89D1115F 0C517118 102(config-
pubkey)#$A017B97 F85690EF EBCF3414 AB3E81F6 A5020301 0001 102(config-pubkey)#quit
```

```
102(config-pubkey-key)#exit 102(config-pubkey-chain)#exit 102(config)#exit
```

Команды для устранения неполадок

Некоторые команды show поддерживаются Средством интерпретации выходных данных(только зарегистрированные клиенты), которое позволяет просматривать аналитику выходных данных команды show.

Примечание: Прежде чем вызывать команды debug, обратитесь к разделу Важные сведения о командах отладки.

Отладка маршрутизатора 101:

```
101#
101#
101#
101#
*Dec 28 21:14:27.011: IPSEC(sa_request): ,
  (key eng. msg.) OUTBOUND local= 20.1.1.1, remote= 20.1.1.2,
  local_proxy= 20.1.1.1/255.255.255.255/47/0 (type=1),
  remote_proxy= 20.1.1.2/255.255.255.255/47/0 (type=1),
  protocol= ESP, transform= esp-des esp-sha-hmac ,
  lifedur= 3600s and 4608000kb,
  spi= 0xA12DDC39(2704137273), conn_id= 0, keysize= 0, flags= 0x400C
*Dec 28 21:14:27.051: ISAKMP: received ke message (1/1)
*Dec 28 21:14:27.051: ISAKMP: local port 500, remote port 500
*Dec 28 21:14:27.099: ISAKMP: set new node 0 to QM_IDLE
*Dec 28 21:14:27.099: ISAKMP (0:14): constructed NAT-T vendor-03 ID
*Dec 28 21:14:27.099: ISAKMP (0:14): constructed NAT-T vendor-02 ID
*Dec 28 21:14:27.099: ISAKMP (0:14): Input = IKE_MSG_FROM_IPSEC, IKE_SA_REQ_MM
*Dec 28 21:14:27.099: ISAKMP (0:14): Old State = IKE_READY New State = IKE_I_MM1

*Dec 28 21:14:27.099: ISAKMP (0:14): beginning Main Mode exchange
*Dec 28 21:14:27.099: ISAKMP (0:14): sending packet to 20.1.1.2 my_port
500 peer_port 500 (I) MM_NO_STATE
*Dec 28 21:14:27.343: ISAKMP (0:14): received packet from 20.1.1.2 dport
500 sport 500 (I) MM_NO_STATE
*Dec 28 21:14:27.343: ISAKMP (0:14): Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:14:27.343: ISAKMP (0:14): Old State = IKE_I_MM1 New State = IKE_I_MM2

*Dec 28 21:14:27.411: ISAKMP (0:14): processing SA payload. message ID = 0
*Dec 28 21:14:27.411: ISAKMP (0:14): processing vendor id payload
*Dec 28 21:14:27.411: ISAKMP (0:14): vendor ID seems Unity/DPD but bad major
*Dec 28 21:14:27.411: ISAKMP (0:14): vendor ID is NAT-T
*Dec 28 21:14:27.411: ISAKMP (0:14): Checking ISAKMP transform 1 against priority 1 policy
*Dec 28 21:14:27.411: ISAKMP:      encryption DES-CBC
*Dec 28 21:14:27.411: ISAKMP:      hash SHA
*Dec 28 21:14:27.411: ISAKMP:      default group 1
*Dec 28 21:14:27.411: ISAKMP:      auth RSA sig
*Dec 28 21:14:27.411: ISAKMP:      life type in seconds
*Dec 28 21:14:27.411: ISAKMP:      life duration (VPI) of  0x0 0x1 0x51 0x80
*Dec 28 21:14:27.411: ISAKMP (0:14): Authentication method offered does not
match policy!
*Dec 28 21:14:27.411: ISAKMP (0:14): atts are not acceptable. Next payload is 0
*Dec 28 21:14:27.411: ISAKMP (0:14): Checking ISAKMP transform 1 against
priority 65535 policy
*Dec 28 21:14:27.411: ISAKMP:      encryption DES-CBC
*Dec 28 21:14:27.411: ISAKMP:      hash SHA
*Dec 28 21:14:27.411: ISAKMP:      default group 1
*Dec 28 21:14:27.411: ISAKMP:      auth RSA sig
*Dec 28 21:14:27.411: ISAKMP:      life type in seconds
```

*Dec 28 21:14:27.411: ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80
*Dec 28 21:14:27.411: ISAKMP (0:14): atts are acceptable. Next payload is 0
*Dec 28 21:14:27.411: ISAKMP (0:14): processing vendor id payload
*Dec 28 21:14:27.411: ISAKMP (0:14): vendor ID seems Unity/DPD but bad major
*Dec 28 21:14:27.411: ISAKMP (0:14): vendor ID is NAT-T
*Dec 28 21:14:27.411: ISAKMP (0:14): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Dec 28 21:14:27.411: ISAKMP (0:14): Old State = IKE_I_MM2
New State = IKE_I_MM2

*Dec 28 21:14:27.503: ISAKMP (0:14): constructed HIS NAT-D
*Dec 28 21:14:27.503: ISAKMP (0:14): constructed MINE NAT-D
*Dec 28 21:14:27.503: ISAKMP (0:14): sending packet to 20.1.1.2 my_port
500 peer_port 500 (I) MM_SA_SETUP
*Dec 28 21:14:27.503: ISAKMP (0:14): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Dec 28 21:14:27.503: ISAKMP (0:14): Old State = IKE_I_MM2 New State = IKE_I_MM3

*Dec 28 21:14:27.763: ISAKMP (0:14): received packet from 20.1.1.2 dport
500 sport 500 (I) MM_SA_SETUP
*Dec 28 21:14:27.763: ISAKMP (0:14): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:14:27.763: ISAKMP (0:14): Old State = IKE_I_MM3 New State = IKE_I_MM4

*Dec 28 21:14:27.811: ISAKMP (0:14): processing KE payload. message ID = 0
*Dec 28 21:14:27.811: ISAKMP (0:14): processing NONCE payload. message ID = 0
*Dec 28 21:14:27.811: ISAKMP (0:14): SKEYID state generated
*Dec 28 21:14:27.811: ISAKMP (0:14): processing vendor id payload
*Dec 28 21:14:27.811: ISAKMP (0:14): vendor ID is Unity
*Dec 28 21:14:27.811: ISAKMP (0:14): vendor ID is NAT-T
*Dec 28 21:14:27.811: ISAKMP (0:14): processing vendor id payload
*Dec 28 21:14:27.811: ISAKMP (0:14): vendor ID is DPD
*Dec 28 21:14:27.811: ISAKMP (0:14): vendor ID is NAT-T
*Dec 28 21:14:27.811: ISAKMP (0:14): processing vendor id payload
*Dec 28 21:14:27.811: ISAKMP (0:14): speaking to another IOS box!
*Dec 28 21:14:27.811: ISAKMP:received payload type 17
*Dec 28 21:14:27.811: ISAKMP (0:14): Detected NAT-D payload
*Dec 28 21:14:27.811: ISAKMP (0:14): NAT match MINE hash
*Dec 28 21:14:27.811: ISAKMP:received payload type 17
*Dec 28 21:14:27.811: ISAKMP (0:14): Detected NAT-D payload
*Dec 28 21:14:27.811: ISAKMP (0:14): NAT match HIS hash
*Dec 28 21:14:27.811: ISAKMP (0:14): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Dec 28 21:14:27.811: ISAKMP (0:14): Old State = IKE_I_MM4
New State = IKE_I_MM4

*Dec 28 21:14:27.903: ISAKMP (0:14): Send initial contact
*Dec 28 21:14:27.903: ISAKMP (0:14): SA is doing RSA signature
authentication using id type ID_FQDN
*Dec 28 21:14:27.903: ISAKMP (14): ID payload
next-payload : 9
type : 2
FQDN name : 101.cisco.com
protocol : 17
port : 0
length : 17
*Dec 28 21:14:27.903: ISAKMP (14): Total payload length: 21
*Dec 28 21:14:27.903: ISAKMP (0:14): using the default keypair to sign
*Dec 28 21:14:28.003: ISAKMP (0:14): sending packet to 20.1.1.2
my_port 500 peer_port 500 (I) MM_KEY_EXCH
*Dec 28 21:14:28.003: ISAKMP (0:14): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Dec 28 21:14:28.003: ISAKMP (0:14): Old State = IKE_I_MM4 New State = IKE_I_MM5

*Dec 28 21:14:28.435: ISAKMP (0:14): received packet from 20.1.1.2 dport

```
500 sport 500 (I) MM_KEY_EXCH
*Dec 28 21:14:28.435: ISAKMP (0:14): Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:14:28.435: ISAKMP (0:14): Old State = IKE_I_MM5 New State = IKE_I_MM6

*Dec 28 21:14:28.435: ISAKMP (0:14): received packet from 20.1.1.2 dport
500 sport 500 (I) MM_KEY_EXCH
*Dec 28 21:14:28.435: ISAKMP: set new node 226463539 to QM_IDLE
*Dec 28 21:14:28.435: ISAKMP (0:14): Unknown Input: state = IKE_I_MM6,
major, minor = IKE_MSG_FROM_PEER, IKE_INFO_DELETE

*Dec 28 21:14:28.435: %CRYPTO-6-IKMP_MODE_FAILURE: Processing of
Informational mode failed with peer at 20.1.1.2
*Dec 28 21:14:28.503: ISAKMP (0:14): processing ID payload. message ID = 0
*Dec 28 21:14:28.503: ISAKMP (14): Process ID payload
    type          : 2
    FQDN name     : 102.cisco.com
    protocol      : 17
    port          : 0
    length        : 13
*Dec 28 21:14:28.503: ISAKMP (0:14): processing SIG payload. message ID = 0
*Dec 28 21:14:28.503: ISAKMP (14): sa->peer.name = , sa->peer_id.id.id_fqdn.fqdn =
102.cisco.com
*Dec 28 21:14:28.551: ISAKMP (0:14): SA has been authenticated with 20.1.1.2
*Dec 28 21:14:28.551: ISAKMP (0:14): IKE_DPD is enabled, initializing timers
*Dec 28 21:14:28.551: ISAKMP: Locking peer struct 0x18E6620, IKE refcount 2
for from crypto_ikmp_dpd_ike_init
*Dec 28 21:14:28.551: ISAKMP (0:14): Input = IKE_MSG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Dec 28 21:14:28.551: ISAKMP (0:14): Old State = IKE_I_MM6 New State = IKE_I_MM6

*Dec 28 21:14:28.551: ISAKMP (0:14): received packet from 20.1.1.2 dport 500 sport
500 (I) MM_KEY_EXCH
*Dec 28 21:14:28.551: ISAKMP: set new node 2089493550 to QM_IDLE
*Dec 28 21:14:28.551: ISAKMP (0:14): Unknown Input: state = IKE_I_MM6, major,
minor = IKE_MSG_FROM_PEER, IKE_INFO_DELETE

*Dec 28 21:14:28.611: ISAKMP (0:14): Input = IKE_MSG_INTERNAL,
IKE_PROCESS_COMPLETE
*Dec 28 21:14:28.611: ISAKMP (0:14): Old State = IKE_I_MM6
New State = IKE_P1_COMPLETE

*Dec 28 21:14:28.651: ISAKMP (0:14): beginning Quick Mode exchange,
M-ID of 543282640
*Dec 28 21:14:28.683: ISAKMP (0:14): sending packet to 20.1.1.2
my_port 500 peer_port 500 (I) QM_IDLE
*Dec 28 21:14:28.683: ISAKMP (0:14): Node 543282640, Input = IKE_MSG_INTERNAL,
IKE_INIT_QM
*Dec 28 21:14:28.683: ISAKMP (0:14): Old State = IKE_QM_READY
New State = IKE_QM_I_QM1
*Dec 28 21:14:28.683: ISAKMP (0:14): Input = IKE_MSG_INTERNAL,
IKE_PHASE1_COMPLETE
*Dec 28 21:14:28.683: ISAKMP (0:14): Old State = IKE_P1_COMPLETE
New State = IKE_P1_COMPLETE

*Dec 28 21:14:29.303: ISAKMP (0:14): received packet from 20.1.1.2
dport 500 sport 500 (I) QM_IDLE
*Dec 28 21:14:29.303: ISAKMP (0:14): processing HASH payload. message
ID = 543282640
*Dec 28 21:14:29.303: ISAKMP (0:14): processing SA payload. message
ID = 543282640
*Dec 28 21:14:29.303: ISAKMP (0:14): Checking IPSec proposal 1
*Dec 28 21:14:29.303: ISAKMP: transform 1, ESP_DES
*Dec 28 21:14:29.303: ISAKMP:   attributes in transform:
*Dec 28 21:14:29.303: ISAKMP:     encaps is 2
```

```
*Dec 28 21:14:29.303: ISAKMP: SA life type in seconds
*Dec 28 21:14:29.303: ISAKMP: SA life duration (basic) of 3600
*Dec 28 21:14:29.303: ISAKMP: SA life type in kilobytes
*Dec 28 21:14:29.303: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Dec 28 21:14:29.303: ISAKMP: authenticator is HMAC-SHA
*Dec 28 21:14:29.303: ISAKMP (0:14): atts are acceptable.
*Dec 28 21:14:29.303: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 20.1.1.1, remote= 20.1.1.2,
local_proxy= 20.1.1.1/255.255.255.255/47/0 (type=1),
remote_proxy= 20.1.1.2/255.255.255.255/47/0 (type=1),
protocol= ESP, transform= esp-des esp-sha-hmac ,
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
*Dec 28 21:14:29.303: ISAKMP (0:14): processing NONCE payload.
message ID = 543282640
*Dec 28 21:14:29.303: ISAKMP (0:14): processing ID payload. message ID = 543282640
*Dec 28 21:14:29.303: ISAKMP (0:14): processing ID payload. message ID = 543282640
*Dec 28 21:14:29.351: ISAKMP: Locking peer struct 0x18E6620, IPSEC refcount 1
for for stuff_ke
*Dec 28 21:14:29.351: ISAKMP (0:14): Creating IPSec SAs
*Dec 28 21:14:29.351: inbound SA from 20.1.1.2 to 20.1.1.1
(proxy 20.1.1.2 to 20.1.1.1)
*Dec 28 21:14:29.351: has spi 0xA12DDC39 and conn_id 2000 and flags 4
*Dec 28 21:14:29.351: lifetime of 3600 seconds
*Dec 28 21:14:29.351: lifetime of 4608000 kilobytes
*Dec 28 21:14:29.351: has client flags 0x0
*Dec 28 21:14:29.351: outbound SA from 20.1.1.1
to 20.1.1.2 (proxy 20.1.1.1 to 20.1.1.2 )
*Dec 28 21:14:29.351: has spi -437189881 and conn_id 2001 and flags C
*Dec 28 21:14:29.351: lifetime of 3600 seconds
*Dec 28 21:14:29.351: lifetime of 4608000 kilobytes
*Dec 28 21:14:29.351: has client flags 0x0
*Dec 28 21:14:29.351: ISAKMP (0:14): sending packet to 20.1.1.2 my_port
500 peer_port 500 (I) QM_IDLE
*Dec 28 21:14:29.351: ISAKMP (0:14): deleting node 543282640 error
FALSE reason ""
*Dec 28 21:14:29.351: ISAKMP (0:14): Node 543282640, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH
*Dec 28 21:14:29.351: ISAKMP (0:14): Old State = IKE_QM_I_QM1
New State = IKE_QM_PHASE2_COMPLETE
*Dec 28 21:14:29.371: IPSEC(key_engine): got a queue event...
*Dec 28 21:14:29.371: IPSEC(initialize_sas): ,
(key eng. msg.) INBOUND local= 20.1.1.1, remote= 20.1.1.2,
local_proxy= 20.1.1.1/0.0.0.0/47/0 (type=1),
remote_proxy= 20.1.1.2/0.0.0.0/47/0 (type=1),
protocol= ESP, transform= esp-des esp-sha-hmac ,
lifedur= 3600s and 4608000kb,
spi= 0xA12DDC39(2704137273), conn_id= 2000, keysize= 0, flags= 0x4
*Dec 28 21:14:29.371: IPSEC(initialize_sas): ,
(key eng. msg.) OUTBOUND local= 20.1.1.1, remote= 20.1.1.2,
local_proxy= 20.1.1.1/0.0.0.0/47/0 (type=1),
remote_proxy= 20.1.1.2/0.0.0.0/47/0 (type=1),
protocol= ESP, transform= esp-des esp-sha-hmac ,
lifedur= 3600s and 4608000kb,
spi= 0xE5F10307(3857777415), conn_id= 2001, keysize= 0, flags= 0xC
*Dec 28 21:14:29.371: IPSEC(add mtree): src 20.1.1.1, dest 20.1.1.2, dest_port 0
*Dec 28 21:14:29.371: IPSEC(create_sa): sa created,
(sa) sa_dest= 20.1.1.1, sa_prot= 50,
sa_spi= 0xA12DDC39(2704137273),
sa_trans= esp-des esp-sha-hmac , sa_conn_id= 2000
*Dec 28 21:14:29.371: IPSEC(create_sa): sa created,
(sa) sa_dest= 20.1.1.2, sa_prot= 50,
sa_spi= 0xE5F10307(3857777415),
```

sa_trans= esp-des esp-sha-hmac , sa_conn_id= 2001

Отладка маршрутизатора 102:

102#

```
*Dec 28 21:18:12.111: ISAKMP (0:0): received packet from 20.1.1.1
dport 500 sport 500 (N) NEW SA
*Dec 28 21:18:12.111: ISAKMP: local port 500, remote port 500
*Dec 28 21:18:12.147: ISAKMP (0:15): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:18:12.147: ISAKMP (0:15): Old State = IKE_READY New State = IKE_R_MM1

*Dec 28 21:18:12.187: ISAKMP (0:15): processing SA payload. message ID = 0
*Dec 28 21:18:12.187: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID seems Unity/DPD but bad major
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.187: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID seems Unity/DPD but bad major
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.187: ISAKMP (0:15): Checking ISAKMP transform 1 against
priority 1 policy
*Dec 28 21:18:12.187: ISAKMP: encryption DES-CBC
*Dec 28 21:18:12.187: ISAKMP: hash SHA
*Dec 28 21:18:12.187: ISAKMP: default group 1
*Dec 28 21:18:12.187: ISAKMP: auth RSA sig
*Dec 28 21:18:12.187: ISAKMP: life type in seconds
*Dec 28 21:18:12.187: ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80
*Dec 28 21:18:12.187: ISAKMP (0:15): Authentication method offered does not
match policy!
*Dec 28 21:18:12.187: ISAKMP (0:15): atts are not acceptable. Next payload is 0
*Dec 28 21:18:12.187: ISAKMP (0:15): Checking ISAKMP transform 1 against
priority 65535 policy
*Dec 28 21:18:12.187: ISAKMP: encryption DES-CBC
*Dec 28 21:18:12.187: ISAKMP: hash SHA
*Dec 28 21:18:12.187: ISAKMP: default group 1
*Dec 28 21:18:12.187: ISAKMP: auth RSA sig
*Dec 28 21:18:12.187: ISAKMP: life type in seconds
*Dec 28 21:18:12.187: ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80
*Dec 28 21:18:12.187: ISAKMP (0:15): atts are acceptable. Next payload is 0
*Dec 28 21:18:12.187: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID seems Unity/DPD but bad major
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.187: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID seems Unity/DPD but bad major
*Dec 28 21:18:12.187: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.187: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Dec 28 21:18:12.187: ISAKMP (0:15): Old State = IKE_R_MM1 New State = IKE_R_MM1

*Dec 28 21:18:12.255: ISAKMP (0:15): constructed NAT-T vendor-03 ID
*Dec 28 21:18:12.255: ISAKMP (0:15): sending packet to 20.1.1.1 my_port
500 peer_port 500 (R) MM_SA_SETUP
*Dec 28 21:18:12.255: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Dec 28 21:18:12.255: ISAKMP (0:15): Old State = IKE_R_MM1 New State = IKE_R_MM2

*Dec 28 21:18:12.563: ISAKMP (0:15): received packet from 20.1.1.1 dport
500 sport 500 (R) MM_SA_SETUP
*Dec 28 21:18:12.563: ISAKMP (0:15): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:18:12.563: ISAKMP (0:15): Old State = IKE_R_MM2 New State = IKE_R_MM3

*Dec 28 21:18:12.619: ISAKMP (0:15): processing KE payload. message ID = 0
*Dec 28 21:18:12.619: ISAKMP (0:15): processing NONCE payload. message ID = 0
*Dec 28 21:18:12.695: ISAKMP (0:15): SKEYID state generated
*Dec 28 21:18:12.695: ISAKMP (0:15): processing vendor id payload
```

```

*Dec 28 21:18:12.695: ISAKMP (0:15): vendor ID is Unity
*Dec 28 21:18:12.695: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.695: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.695: ISAKMP (0:15): vendor ID is DPD
*Dec 28 21:18:12.695: ISAKMP (0:15): vendor ID is NAT-T
*Dec 28 21:18:12.695: ISAKMP (0:15): processing vendor id payload
*Dec 28 21:18:12.695: ISAKMP (0:15): speaking to another IOS box!
*Dec 28 21:18:12.695: ISAKMP:received payload type 17
*Dec 28 21:18:12.695: ISAKMP (0:15): Detected NAT-D payload
*Dec 28 21:18:12.695: ISAKMP (0:15): NAT match MINE hash
*Dec 28 21:18:12.695: ISAKMP:received payload type 17
*Dec 28 21:18:12.695: ISAKMP (0:15): Detected NAT-D payload
*Dec 28 21:18:12.695: ISAKMP (0:15): NAT match HIS hash
*Dec 28 21:18:12.695: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
    IKE_PROCESS_MAIN_MODE
*Dec 28 21:18:12.695: ISAKMP (0:15): Old State = IKE_R_MM3
    New State = IKE_R_MM3

*Dec 28 21:18:12.735: ISAKMP (0:15): constructed HIS NAT-D
*Dec 28 21:18:12.735: ISAKMP (0:15): constructed MINE NAT-D
*Dec 28 21:18:12.735: ISAKMP (0:15): sending packet to 20.1.1.1
    my_port 500 peer_port 500 (R)
MM_KEY_EXCH *Dec 28 21:18:12.735: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
    IKE_PROCESS_COMPLETE
*Dec 28 21:18:12.735: ISAKMP (0:15): Old State = IKE_R_MM3 New State = IKE_R_MM4

*Dec 28 21:18:13.395: ISAKMP (0:15): received packet from 20.1.1.1 dport
    500 sport 500 (R) MM_KEY_EXCH
*Dec 28 21:18:13.395: ISAKMP (0:15): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Dec 28 21:18:13.395: ISAKMP (0:15): Old State = IKE_R_MM4 New State = IKE_R_MM5

*Dec 28 21:18:13.435: ISAKMP (0:15): processing ID payload. message ID = 0
*Dec 28 21:18:13.435: ISAKMP (15): Process ID payload
    type          : 2
    FQDN name     : 101.cisco.com
    protocol      : 17
    port          : 0
    length        : 13
*Dec 28 21:18:13.435: ISAKMP (0:15): processing SIG payload. message ID = 0
*Dec 28 21:18:13.435: ISAKMP (15): sa->peer.name = ,
    sa->peer_id.id.id_fqdn.fqdn = 101.cisco.com
*Dec 28 21:18:13.567: ISAKMP:received payload type 14
*Dec 28 21:18:13.567: ISAKMP (0:15): processing NOTIFY INITIAL_CONTACT protocol 1
    spi 0, message ID = 0, sa = 1AD8D08
*Dec 28 21:18:13.567: ISAKMP (0:15): Process initial contact,
bring down existing phase 1 and 2 SA's with local 20.1.1.2 remote 20.1.1.1
    remote port 500
*Dec 28 21:18:13.587: ISAKMP (0:15): SA has been authenticated with 20.1.1.1
*Dec 28 21:18:13.587: ISAKMP (0:15): IKE_DPD is enabled, initializing timers
*Dec 28 21:18:13.587: ISAKMP: Locking peer struct 0x18EA370, IKE refcount 2
    for from crypto_ikmp_dpd_ike_init
*Dec 28 21:18:13.587: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
    IKE_PROCESS_MAIN_MODE
*Dec 28 21:18:13.587: ISAKMP (0:15): Old State = IKE_R_MM5 New State = IKE_R_MM5

*Dec 28 21:18:13.599: IPSEC(key_engine): got a queue event...
*Dec 28 21:18:13.627: ISAKMP (0:15): SA is doing RSA signature authentication
    using id type ID_FQDN
*Dec 28 21:18:13.627: ISAKMP (15): ID payload
    next-payload : 9
    type          : 2
    FQDN name     : 102.cisco.com
    protocol      : 17
    port          : 0

```

```

length      : 17
*Dec 28 21:18:13.627: ISAKMP (15): Total payload length: 21
*Dec 28 21:18:13.627: ISAKMP (0:15): using the default keypair to sign
*Dec 28 21:18:13.731: ISAKMP (0:15): sending packet to 20.1.1.1 my_port
500 peer_port 500 (R) MM_KEY_EXCH
*Dec 28 21:18:13.731: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Dec 28 21:18:13.731: ISAKMP (0:15): Old State = IKE_R_MM5
New State = IKE_P1_COMPLETE

*Dec 28 21:18:13.779: ISAKMP (0:15): Input = IKE_MESG_INTERNAL,
IKE_PHASE1_COMPLETE
*Dec 28 21:18:13.779: ISAKMP (0:15): Old State = IKE_P1_COMPLETE
New State = IKE_P1_COMPLETE

*Dec 28 21:18:14.215: ISAKMP (0:15): received packet from 20.1.1.1
dport 500 sport 500 (R) QM_IDLE
*Dec 28 21:18:14.215: ISAKMP: set new node 1098460553 to QM_IDLE
*Dec 28 21:18:14.215: ISAKMP (0:15): processing HASH payload.
message ID = 1098460553
*Dec 28 21:18:14.215: ISAKMP (0:15): processing SA payload.
message ID = 1098460553
*Dec 28 21:18:14.215: ISAKMP (0:15): Checking IPsec proposal 1
*Dec 28 21:18:14.215: ISAKMP: transform 1, ESP_DES
*Dec 28 21:18:14.215: ISAKMP:   attributes in transform:
*Dec 28 21:18:14.215: ISAKMP:     encaps is 2
*Dec 28 21:18:14.215: ISAKMP:     SA life type in seconds
*Dec 28 21:18:14.215: ISAKMP:     SA life duration (basic) of 3600
*Dec 28 21:18:14.215: ISAKMP:     SA life type in kilobytes
*Dec 28 21:18:14.215: ISAKMP:     SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Dec 28 21:18:14.215: ISAKMP:     authenticator is HMAC-SHA
*Dec 28 21:18:14.215: ISAKMP (0:15): atts are acceptable.
*Dec 28 21:18:14.215: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 20.1.1.2, remote= 20.1.1.1,
local_proxy= 20.1.1.2/255.255.255.255/47/0 (type=1),
remote_proxy= 20.1.1.1/255.255.255.255/47/0 (type=1),
protocol= ESP, transform= esp-des esp-sha-hmac ,
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
*Dec 28 21:18:14.215: ISAKMP (0:15): processing NONCE payload.
message ID = 1098460553
*Dec 28 21:18:14.215: ISAKMP (0:15): processing ID payload.
message ID = 1098460553
*Dec 28 21:18:14.215: ISAKMP (0:15): processing ID payload.
message ID = 1098460553
*Dec 28 21:18:14.215: ISAKMP (0:15): asking for 1 spis from ipsec
*Dec 28 21:18:14.215: ISAKMP (0:15): Node 1098460553, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH
*Dec 28 21:18:14.215: ISAKMP (0:15): Old State = IKE_QM_READY
New State = IKE_QM_SPI_STARVE
*Dec 28 21:18:14.235: IPSEC(key_engine): got a queue event...
*Dec 28 21:18:14.235: IPSEC(spi_response): getting spi 488964414 for SA
from 20.1.1.2 to 20.1.1.1 for prot 3
*Dec 28 21:18:14.267: ISAKMP: received ke message (2/1)
*Dec 28 21:18:14.547: ISAKMP (0:15): sending packet to 20.1.1.1 my_port
500 peer_port 500 (R) QM_IDLE

*Dec 28 21:18:14.547: ISAKMP (0:15): Node 1098460553, Input = IKE_MESG_FROM_IPSEC,
IKE_SPI_REPLY
*Dec 28 21:18:14.547: ISAKMP (0:15): Old State = IKE_QM_SPI_STARVE
New State = IKE_QM_R_QM2
*Dec 28 21:18:14.707: ISAKMP (0:15): received packet from 20.1.1.1
dport 500 sport 500 (R) QM_IDLE
*Dec 28 21:18:14.747: ISAKMP: Locking peer struct 0x18EA370, IPSEC

```

```

refcount 1 for for stuff_ke
*Dec 28 21:18:14.747: ISAKMP (0:15): Creating IPSec SAs
*Dec 28 21:18:14.747:      inbound SA from 20.1.1.1 to 20.1.1.2
      (proxy 20.1.1.1 to 20.1.1.2)
*Dec 28 21:18:14.747:      has spi 0x1D25013E and conn_id 2000 and flags 4
*Dec 28 21:18:14.747:      lifetime of 3600 seconds
*Dec 28 21:18:14.747:      lifetime of 4608000 kilobytes
*Dec 28 21:18:14.747:      has client flags 0x0
*Dec 28 21:18:14.747:      outbound SA from 20.1.1.2      to 20.1.1.1
(proxy 20.1.1.2      to 20.1.1.1      )
*Dec 28 21:18:14.747:      has spi -1829425422 and conn_id 2001 and flags C
*Dec 28 21:18:14.747:      lifetime of 3600 seconds
*Dec 28 21:18:14.747:      lifetime of 4608000 kilobytes
*Dec 28 21:18:14.747:      has client flags 0x0
*Dec 28 21:18:14.747: ISAKMP (0:15): deleting node 1098460553 error FALSE
      reason "quick mode done (await())"
*Dec 28 21:18:14.747: ISAKMP (0:15): Node 1098460553, Input = IKE_MSG_FROM_PEER,
      IKE_QM_EXCH
*Dec 28 21:18:14.747: ISAKMP (0:15): Old State = IKE_QM_R_QM2
      New State = IKE_QM_PHASE2_COMPLETE
*Dec 28 21:18:14.767: IPSEC(key_engine): got a queue event...
*Dec 28 21:18:14.767: IPSEC(initialize_sas): ,
      (key eng. msg.) INBOUND local= 20.1.1.2, remote= 20.1.1.1,
      local_proxy= 20.1.1.2/0.0.0.0/47/0 (type=1),
      remote_proxy= 20.1.1.1/0.0.0.0/47/0 (type=1),
      protocol= ESP, transform= esp-des esp-sha-hmac ,
      lifedur= 3600s and 4608000kb,
      spi= 0x1D25013E(488964414), conn_id= 2000, keysize= 0, flags= 0x4
*Dec 28 21:18:14.767: IPSEC(initialize_sas): ,
      (key eng. msg.) OUTBOUND local= 20.1.1.2, remote= 20.1.1.1,
      local_proxy= 20.1.1.2/0.0.0.0/47/0 (type=1),
      remote_proxy= 20.1.1.1/0.0.0.0/47/0 (type=1),
      protocol= ESP, transform= esp-des esp-sha-hmac ,
      lifedur= 3600s and 4608000kb,
      spi= 0x92F52EF2(2465541874), conn_id= 2001, keysize= 0, flags= 0xC
*Dec 28 21:18:14.767: IPSEC(add mtree): src 20.1.1.2, dest 20.1.1.1, dest_port 0

*Dec 28 21:18:14.767: IPSEC(create_sa): sa created,
      (sa) sa_dest= 20.1.1.2, sa_prot= 50,
      sa_spi= 0x1D25013E(488964414),
      sa_trans= esp-des esp-sha-hmac , sa_conn_id= 2000
*Dec 28 21:18:14.767: IPSEC(create_sa): sa created,
      (sa) sa_dest= 20.1.1.1, sa_prot= 50,
      sa_spi= 0x92F52EF2(2465541874),
      sa_trans= esp-des esp-sha-hmac , sa_conn_id= 2001

```

[Дополнительные сведения](#)

- [Страница поддержки IPSec](#)
- [Техническая поддержка - Cisco Systems](#)