使用增强注册命令的 Cisco IOS 证书注册配置示例

目录

简介

本文档演示如何使用增强的证书自动注册命令。此功能是旨在简化路由器证书管理的增强功能。证书自动注册功能在 **crypto ca trustpoint** 命令中引入了五个新的子命令。这些命令包括 **ip-address** (ca-trustpoint)、password (ca-trustpoint)、serial-number、subject-name 和 usage。这些命令为证书请求提供了新的选项，并使用户能够在配置中指定字段，而不必浏览提示。然而，如果未启用此功能，提示行为仍保留为默认行为。用户可以在配置中预先加载所有必要信息。这样，每个路由器便可以在引导时自动获取其证书。

信任点证书颁发机构(CA)组合并且替换标识和可信的根CA的功能。因此，**crypto ca trustpoint** 命令已不再使用 crypto ca identity 和 crypto ca trusted-root 命令。同时，本文档还对 **auto-enroll regenerate** 和 rsakey label 命令进行了探讨。

请参阅如何使用 ASA 上的 ASDM 从 Microsoft Windows CA 获得数字证书，以便了解有关 PIX/ASA 7.x 中的相同方案的详细信息。

请参阅配置 Cisco VPN 3000 集中器 4.7.x 以获得数字证书和 SSL 证书，以便了解有关 Cisco VPN 3000 系列集中器中的相同方案的详细信息。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息适用于以下软件和硬件版本。

- Cisco 7204、2611 和 1720 路由器
- Microsoft 独立证书服务器
- Cisco IOS® 软件版本 12.2(12.10)T 和 12.2.11T

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。

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

背景信息

除证书注册命令之外，本文档还讨论了以下各种证书注册增强命令：

- **crypto ca trustpoint** - 声明路由器应使用的 CA。
- **subject-name [x.500-name]** - 在证书请求中指定主题名称。如果未使用 **subject-name** 子命令，默认情况下，将使用路由器的完全限定域名 (FQDN)。该命令用于 ca-trustpoint 配置模式。例如，x.500 name 格式为 subject-name OU=ROME, O=ITALY。
- **IP-address (IP-address|interface)** - 指定证书请求中包含的点分 IP 地址或接口。该命令用于 ca-trustpoint 配置模式。
- **password string** - 指定证书的撤销口令。该命令用于 ca-trustpoint 配置模式。因为证书撤销列表(CRL)没有用于本文，所有密码设置对“无”。
- **serial-number [none]** - 指定证书请求中是否应包括序号。该命令用于 ca-trustpoint 配置模式。
- **usage method1 [method2, [method3]]** - 指定证书的目标用途。可用的选项是Internet Key Exchange (IKE)、SSL客户端和Ssl服务器。本文档中用法为 IKE。该命令用于 ca-trustpoint 配置模式。
- **auto-enroll [regenerate]** - 从 CA 自动请求使用配置中的参数的路由器证书。只有当新密钥不用请求的标签，存在此命令生成一新的Rivest Shamir Adelman (RSA)密钥。该命令用于 ca-trustpoint 配置模式，可检查过期的路由器证书。当路由器证书过期时，为自动注册配置的信任点将尝试重新注册。该命令的优点之一在于，某些 CA 需要新密钥才能进行重新注册。因此，该子命令用于生成新密钥。对于已配置的没有有效证书的任何信任点 CA，将在启动时执行自动注册。当信任点 CA（已针对自动注册进行配置）颁发的证书过期时，将请求新证书。虽然此功能不提供无缝证书续订功能，但它提供无人值守的从过期后恢复的功能。
- **rsakeypair key-label [key-size [encryption-key-size]]** - 指定与证书关联的密钥对。该命令用于 ca-trustpoint 配置模式。在许多情况下，路由器可能需要在多台证书服务器上注册。然而，每台 CA 服务器都可能具有不同的策略要求（例如，密钥长度）。该子命令允许关联大小各异的 RSA 密钥对，以便标识来自不同 CA 服务器的证书。如果未使用此子命令，默认情况下，将使

用路由器 FQDN。如果密钥标签已不存在，或者如果已发出自动注册重新生成命令，则会在注册期间生成密钥标签。指定 key-size 以便生成密钥，并指定 encryption-key-size 以便请求单独加密、签名密钥和证书。例如：

```
2611-VPN(config)#crypto ca trustpoint caserver2
2611-VPN(ca-trustpoint)#rsakeypair tacvpn 512 512
```

注意： 默认情况下，自动注册功能会在旧证书过期后请求新证书。当为此请求提供服务时，可能会断开连接，这是因为在生成新密钥之后将立即删除当前证书和密钥对。在完成此过程之前，新密钥没有与之匹配的证书，因此无法建立传入 IKE 连接，直到已颁发新证书为止。通过 Cisco IOS 软件版本 12.3(7)T 中引入的证书续订功能的密钥滚动，可以在证书过期之前发出证书续订请求，并保留旧密钥和证书，直到新证书可用为止。有关此功能的更多信息，请参阅证书续订的密钥滚动。

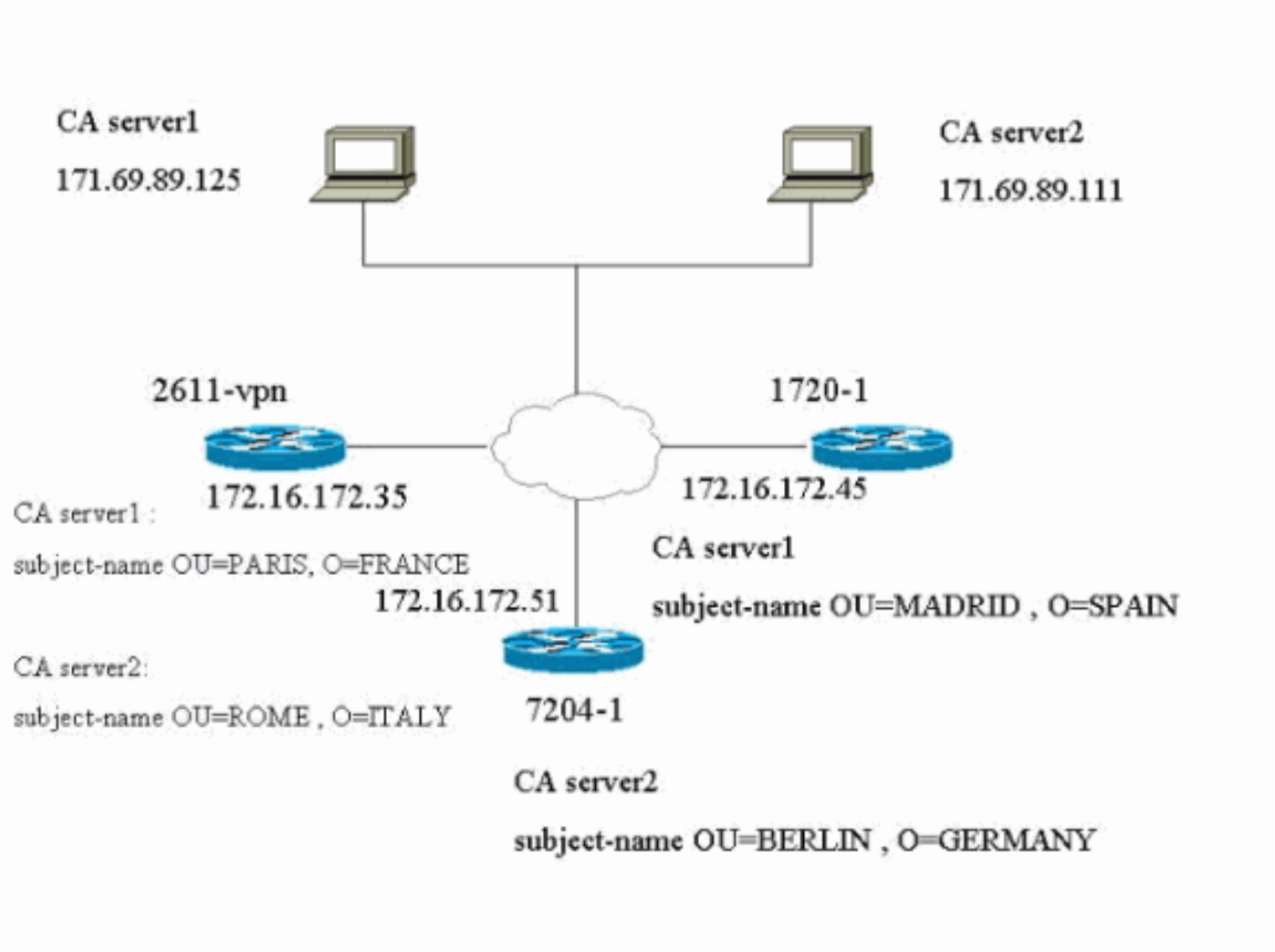
配置

本部分提供了用于配置本文档所述功能的信息。

注意： 有关本文档所用命令的详细信息，请使用命令查找工具（仅限注册用户）。

网络图

此网络图显示实验室中采用的路由器、CA 服务器以及路由器从两台 CA 服务器获得的身份证书的主题名称。



配置

本文档使用以下配置。2611-VPN 路由器是在 CA 服务器 1 和 CA 服务器 2 上注册的中心路由器。2611-1 路由器在 CA 服务器 1 上注册，7204-1 路由器在 CA 服务器 2 上注册。

- 两台不同 CA 服务器上的 2611-VPN 中心路由器配置和证书
- CA 服务器 1 上的 1720-1 路由器配置和证书
- CA 服务器 2 上的 7204-1 路由器配置和证书

两台不同 CA 服务器上的 2611-VPN 中心路由器配置和证书

```
show verify
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-IK8S-M), Version
12.2(12.10)T,
  MAINTENANCE INTERIM SOFTWARE
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Fri 27-Sep-02 21:25 by ccai
Image text-base: 0x80008098, data-base: 0x819B8124

ROM: System Bootstrap, Version 11.3(2)XA4, RELEASE
SOFTWARE (fc1)
ROM: C2600 Software (C2600-IK8S-M), Version
```

```
12.2(12.10)T,
  MAINTENANCE INTERIM SOFTWARE

2611-VPN uptime is 18 hours, 16 minutes
System returned to ROM by reload
System restarted at 04:00:46 UTC Sun Oct 27 2002
System image file is "flash:c2600-ik8s-mz.122-12.10.t"

cisco 2611 (MPC860) processor (revision 0x203) with
59392K/6144K
  bytes of memory.
Processor board ID JAD03456979 (1914264035)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
 2 Ethernet/IEEE 802.3 interface(s)
4 Low-speed serial(sync/async) network interface(s)
1 Virtual Private Network (VPN) Module(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash
(Read/Write)

Configuration register is 0x2102

2611-VPN#show run
Building configuration...

Current configuration : 15431 bytes
!
! Last configuration change at 22:09:05 UTC Sun Oct 27
2002
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 2611-VPN
!
!
memory-size iomem 10
ip subnet-zero
!
!
ip domain name cisco.com
ip host caserver2 171.69.89.111
ip host caserver1 171.69.89.125
!
!
crypto ca trustpoint caserver1
enrollment retry period 5
enrollment mode ra
enrollment url
http://171.69.89.125:80/certsrv/mscep/mscep.dll
usage ike
serial-number
fqdn 2611-vpn.cisco.com
ip-address Ethernet0/0
password 7 1107160B12
subject-name OU=PARIS O=FRANCE
crl optional
rsakeypair ciscovpn
auto-enroll regenerate
!
```

```
crypto ca trustpoint caserver2
enrollment retry period 5
enrollment mode ra
enrollment url
http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
fqdn 2611-vpn.cisco.com
ip-address Ethernet0/0
password 7 130B181C0E
subject-name OU=ROME O=ITALY
rsakeypair tacvpn
auto-enroll regenerate
crypto ca certificate chain caserver1
certificate ca 0E7EC1B68A2F14BD4C4515AF44C45732
 308202BE 30820268 A0030201 0202100E 7EC1B68A 2F14BD4C
4515AF44 C4573230
 0D06092A 864886F7 0D010105 05003076 310B3009 06035504
06130255 53310B30
!--- Certificate is abbreviated for easier viewing. quit
certificate 6103EE0A000000000038 3082040F 308203B9
A0030201 02020A61 03EE0A00 00000000 38300D06 092A8648
86F70D01 01050500 3076310B 30090603 55040613 02555331
0B300906 03550408 13024341 3111300F 06035504 07130853
616E204A 6F736531 16301406 0355040A !--- Certificate is
abbreviated for easier viewing. quit certificate
6104020F000000000039 3082040F 308203B9 A0030201 02020A61
04020F00 00000000 39300D06 092A8648 86F70D01 01050500
3076310B 30090603 55040613 02555331 0B300906 03550408
13024341 3111300F 06035504 07130853 616E204A 6F736531
16301406 0355040A !--- Certificate is abbreviated for
easier viewing. quit crypto ca certificate chain
caserver2
certificate 3DAA9059000000000033
 308203CF 30820379 A0030201 02020A3D AA905900 00000000
33300D06 092A8648
 86F70D01 01050500 3061310B 30090603 55040613 02555331
13301106 03550408
 130A6361 6C69666F 726E6961 3111300F 06035504 07130873
616E206A 6F736531
!--- Certificate is abbreviated for easier viewing. quit
certificate 3DAA867D000000000032 308203CF 30820379
A0030201 02020A3D AA867D00 00000000 32300D06 092A8648
86F70D01 01050500 3061310B 30090603 55040613 02555331
13301106 03550408 130A6361 6C69666F 726E6961 3111300F
06035504 07130873 616E206A 6F736531 !--- Certificate is
abbreviated for easier viewing. quit certificate ca
3E34CD199392A0914621EA778B13F357 30820284 3082022E
A0030201 0202103E 34CD1993 92A09146 21EA778B 13F35730
0D06092A 864886F7 0D010105 05003061 310B3009 06035504
06130255 53311330 11060355 0408130A 63616C69 666F726E
69613111 300F0603 55040713 0873616E !--- Certificate is
abbreviated for easier viewing. quit ! crypto isakmp
policy 10 hash md5 crypto isakmp identity hostname ! !
crypto ipsec transform-set myset esp-des esp-md5-hmac !
crypto map vpn 10 ipsec-isakmp set peer 172.16.172.45
set transform-set myset match address 101 crypto map vpn
20 ipsec-isakmp set peer 172.16.172.51 set transform-set
myset match address 102 crypto map vpn 30 ipsec-isakmp
set peer 172.16.172.53 set transform-set myset match
address 103 ! mta receive maximum-recipients 0 ! ! ! !
interface Ethernet0/0 ip address 172.16.172.35
255.255.255.240 half-duplex crypto map vpn ! interface
Ethernet0/1 ip address 192.168.4.1 255.255.255.0 half-
```

```
duplex ! interface Serial1/0 no ip address shutdown !
interface Serial1/1 no ip address shutdown ! interface
Serial1/2 no ip address shutdown ! interface Serial1/3
no ip address shutdown ! ip classless ip route 0.0.0.0
0.0.0.0 172.16.172.33 ip http server ! access-list 101
permit ip 192.168.4.0 0.0.0.255 20.1.1.0 0.0.0.255
access-list 102 permit ip 192.168.4.0 0.0.0.255 3.3.3.0
0.0.0.255 access-list 103 permit ip 192.168.4.0
0.0.0.255 200.1.1.0 0.0.0.255 access-list 169 deny ip
host 172.16.172.60 any access-list 169 deny ip host
172.16.172.61 any access-list 169 deny ip host
172.16.172.62 any access-list 169 permit ip any any !
call rsvp-sync ! ! mgcp profile default ! ! ! dial-peer
cor custom ! ! ! ! ! line con 0 line aux 0 line vty 0 4
login ! ! end
```

CA 服务器 1 上的 1720-1 路由器配置和证书

```
show verify
Cisco Internetwork Operating System Software
IOS (tm) C1700 Software (C1700-K9SY7-M), Version
12.2(11)T, RELEASE
SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Wed 31-Jul-02 12:28 by ccai
Image text-base: 0x80008124, data-base: 0x80D1654C
ROM: System Bootstrap, Version 12.0(3)T, RELEASE
SOFTWARE (fc1)


1720-1 uptime is 18 hours, 50 minutes
System returned to ROM by reload at 12:03:01 UTC Fri Oct
25 2002
System restarted at 03:28:54 UTC Sun Oct 27 2002
System image file is "flash:c1700-k9sy7-mz.122-11.T.bin"


cisco 1720 (MPC860T) processor (revision 0x601) with
44237K/4915K bytes
of memory.
Processor board ID JAD0449013N (791802990), with
hardware revision
0000
MPC860T processor: part number 0, mask 32
Bridging software.
X.25 software, Version 3.0.0.
1 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
1 Serial network interface(s)
1 Virtual Private Network (VPN) Module(s)
WIC T1-DSU
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash
(Read/Write)


Configuration register is 0x2102


1720-1#show run
Building configuration...
```

```
Current configuration : 8177 bytes
!
! Last configuration change at 21:05:50 UTC Sun Oct 27
2002
! NVRAM config last updated at 04:03:16 UTC Tue Oct 26
2004
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 1720-1
!
!
username cisco password 0 cisco
ip subnet-zero
!
!
no ip domain lookup
ip domain name tac.com
ip host caserver1 171.69.89.125
!
!


crypto ca trustpoint caserver1
enrollment retry count 5
enrollment retry period 2
enrollment mode ra
enrollment url
http://171.69.89.125:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address FastEthernet0
subject-name OU=MADRID O=SPAIN
crl optional
rsakeypair ipsecpki
auto-enroll 100 regenerate
crypto ca certificate chain caserver1
certificate ca 0E7EC1B68A2F14BD4C4515AF44C45732
 308202BE 30820268 A0030201 0202100E 7EC1B68A 2F14BD4C
4515AF44
C4573230
 0D06092A 864886F7 0D010105 05003076 310B3009 06035504
06130255
53310B30
!--- Certificate is abbreviated for easier viewing. quit
certificate 611652F700000000003A 30820407 308203B1
A0030201 02020A61 1652F700 00000000 3A300D06 092A8648
86F70D01 01050500 3076310B 30090603 55040613 02555331
0B300906 03550408 !--- Certificate is abbreviated for
easier viewing. quit certificate 61165F5B00000000003B
30820407 308203B1 A0030201 02020A61 165F5B00 00000000
3B300D06 092A8648 86F70D01 01050500 3076310B 30090603
55040613 02555331 0B300906 03550408 !--- Certificate is
abbreviated for easier viewing. quit ! crypto isakmp
policy 10 hash md5 crypto isakmp identity hostname ! !
crypto ipsec transform-set myset esp-des esp-md5-hmac
crypto map vpn 10 ipsec-isakmp set peer 172.16.172.35
set transform-set myset match address 102 ! ! ! !
interface Loopback0 ip address 20.1.1.1 255.255.255.0 !
```

```
interface Ethernet0 no ip address shutdown half-duplex !
interface FastEthernet0 ip address 172.16.172.45
255.255.255.240 speed auto crypto map vpn ! interface
Serial0 no ip address no keepalive shutdown ! ip
classless ip route 0.0.0.0 0.0.0.0 172.16.172.33 ip http
server ! ! access-list 1 permit 10.1.1.0 0.0.0.255
access-list 102 permit ip 20.1.1.0 0.0.0.255 192.168.4.0
0.0.0.255 ! ! line con 0 line aux 0 line vty 0 4 login !
ntp clock-period 17179867 ntp master 1 end
```

CA 服务器 2 上的 7204-1 路由器配置和证书

```
show verify
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JK9O3S-M), Version
12.2(11)T1,
RELEASE SOFTWARE (fc2)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Sat 28-Sep-02 12:29 by ccai
Image text-base: 0x60008940, data-base: 0x61D72000
ROM: System Bootstrap, Version 12.1(20000824:081033)
[dbeazley-cosmos_e_LATEST
101], DEVELOPMENT SOFTWARE


7204-1 uptime is 1 hour, 16 minutes
System returned to ROM by reload at 23:22:25 PST Sat Oct
25 2003
System restarted at 21:07:06 PST Sat Oct 26 2002
System image file is "slot0:c7200-jk9o3s-mz.122-
11.T1.bin"


cisco 7204VXR (NPE300) processor (revision D) with
122880K/40960K bytes
of memory.
Processor board ID 23663249
R7000 CPU at 262Mhz, Implementation 39, Rev 2.1, 256KB
L2, 2048KB L3
Cache
4 slot VXR midplane, Version 2.3


Last reset from power-on
 Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology
Corp).
TN3270 Emulation software.
4 Ethernet/IEEE 802.3 interface(s)
1 HSSI network interface(s)
125K bytes of non-volatile configuration memory.


20480K bytes of Flash PCMCIA card at slot 0 (Sector size
128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2102


7204-1#show run
```

```
Building configuration...


Current configuration : 8245 bytes
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$lOd0$bXKx.l0gHbotsggIli0UL0
enable password tajmahal
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!


no ip domain lookup
ip domain name cisco.com
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url
http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 151C040201
subject-name OU=BERLIN O=GERMANY
crl optional
rsakeypair ciscotac
auto-enroll regenerate
crypto ca certificate chain caserver2
certificate 3DA1D131000000000031
 308203AA 30820354 A0030201 02020A3D A1D13100 00000000
31300D06
092A8648
 86F70D01 01050500 3061310B 30090603 55040613 02555331
13301106
03550408
!--- Certificate is abbreviated for easier viewing. quit
certificate 3DA1C8FA000000000030 308203AA 30820354
A0030201 02020A3D A1C8FA00 00000000 30300D06 092A8648
86F70D01 01050500 3061310B 30090603 55040613 02555331
13301106 03550408 !--- Certificate is abbreviated for
easier viewing. quit certificate ca
```

```
3E34CD199392A0914621EA778B13F357 30820284 3082022E
A0030201 0202103E 34CD1993 92A09146 21EA778B 13F35730
0D06092A 864886F7 0D010105 05003061 310B3009 06035504
06130255 53311330 !--- Certificate is abbreviated for
easier viewing. quit ! crypto isakmp policy 10 hash md5
crypto isakmp identity hostname ! crypto ipsec
transform-set myset esp-des esp-md5-hmac ! crypto map
vpn 10 ipsec-isakmp set peer 172.16.172.35 set
transform-set myset match address 101 ! ! ! voice call
carrier capacity active ! ! ! ! interface Ethernet1/0 no
ip address duplex half ! interface Ethernet1/1 ip
address 172.16.172.51 255.255.255.240 no ip redirects
duplex half crypto map vpn ! interface Ethernet1/2 ip
address 3.3.3.2 255.255.255.0 no keepalive duplex half !
interface Ethernet1/3 no ip address duplex half !
interface Hssi4/0 ip address 200.1.1.1 255.255.255.0
load-interval 30 fair-queue 64 16 0 hssi dce serial
restart_delay 0 clockrate 1524705 ! ip classless ip
route 0.0.0.0 0.0.0.0 172.16.172.49 no ip http server ip
pim bidir-enable ! ! access-list 101 permit ip 3.3.3.0
0.0.0.255 192.168.4.0 0.0.0.255 ! snmp-server community
public RO snmp-server enable traps tty ! ! call rsvp-
sync ! ! mgcp profile default ! dial-peer cor custom ! !
! ! gatekeeper shutdown ! ! line con 0 exec-timeout 0 0
line aux 0 line vty 0 4 privilege level 15 password
cisco login line vty 5 15 login ! no scheduler max-task-
time ! end 7204-1# 7204-1# 7204-1#show crypto ca
certificate
Certificate
 Status: Available
 Certificate Serial Number: 3DA1D131000000000031
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 17:16:57 PST
Oct 26 2002
 end date: 17:26:57
PST Oct 26 2003
 renew date: 17:26:55 PST
Oct 26 2003
 Associated Trustpoints: caserver2


Certificate
 Status: Available
 Certificate Serial Number: 3DA1C8FA000000000030
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
```

```
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 17:16:55 PST Oct 26 2002
 end date: 17:26:55 PST Oct 26 2003
 Associated Trustpoints: caserver2


CA Certificate
 Status: Available
 Certificate Serial Number:
3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
 start date: 21:19:50 PST Dec 6 2001
 end date: 21:29:42 PST Dec 6 2003
 Associated Trustpoints: caserver2


7204-1#show crypto key mypubkey rsa
% Key pair was generated at: 13:55:35 PST Oct 25 2002
Key name: ciscotac
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241
0099BC9C
175AD748
 C991D24E 4F328960 997CADCB E665B876 4C53E2A0 449CA082
4C503E05
87604F32
 EECDF7B5 5CA0ADB6 2C664F9D 883EBAD6 671C6A8F A0C5D9EE
23020301
0001
% Key pair was generated at: 13:55:35 PST Oct 25 2002
Key name: ciscotac
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241
```

```
00D4FE8A
3DE940E6
 42277A82 87DDDA45 A0F77AE4 AF47D91F BA134F65 92886D3B
7489BEBB
DE650EA1
 029A5A5C 72F39FCA A83BC018 246B0D1D 270DBCF2 B9B29587
21020301
0001
% Key pair was generated at: 22:07:13 PST Oct 26 2002
Key name: ciscotac.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261
00E47825
7E60D6AC
 4C078368 925191FD 2B2AAC50 6A6D6AF1 8A01C9B6 D21C4C80
05DD8277
D63F60B1
 01A2DDCF 407BE088 D333FE1D 4F5DE892 47970454 A50C54EC
B962FEE4
A9BF5197
 4C2B0656 503E0045 BB3168C4 2228155A B6BF0385 0B493FC5
79020301
0001
7204-1#
7204-1#
7204-1#
7204-1#
```

验证

以下各部分提供如何确定在发出以下 **show** 命令时配置是否有效。这些命令会对 CA 进行验证，并确认身份证书（路由器证书）是否由该 CA 服务器颁发。

命令输出解释程序（仅限注册用户）(OIT) 支持某些 **show** 命令。使用 OIT 可查看对 show 命令输出的分析。

- **show crypto ca certificate** - 显示有关证书、证书颁发机构证书和所有注册机构证书的信息。请在 EXEC 模式下使用 **show crypto ca certificates** 命令。
- **crypto ca authenticate** - 验证证书颁发机构（检索 CA 证书）。请在全局配置模式下使用 **crypto ca authenticate** 命令。
- **show crypto key mypubkey rsa** - 显示路由器的 RSA 公钥。请在 EXEC 模式下使用 **show crypto key mypubkey rsa** 命令。
- **show crypto isakmp sa** —显示所有当前互联网密钥交换安全关联(SAS)在对等体。请在 EXEC 模式下使用 **show crypto isakmp sa** 命令。
- **show crypto ipsec sa** - 显示当前 IPSec SA 所采用的设置。请在 EXEC 模式下使用 **show crypto ipsec sa** 命令。
- **show clock** - 显示路由器上的当前系统时间。
- **calendar set hh:*mm:ss* day month year** - 设置日历系统时间。有关路由器上的各种时钟和设置外部时间源的详细信息，请参阅执行基本系统管理。

有关与 CA 互操作性、IPSec 和 IKE 相关的更多命令，请参阅 SR：第 4 部分：IP 安全与加密和证书颁发机构互操作性命令。

下面显示 **show crypto ca certificate** 命令的输出。

```
2611-VPN#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 3DAA9059000000000033
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
!--- The received certificate from CA server2 contains the !--- FQDN, IP address, and subject
name. The renew date !--- states when the next enroll date is. Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "ROME O=ITALY"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 00:26:30 UTC Oct 27 2002
 end date: 00:36:30 UTC Oct 27 2003
 renew date: 00:36:28 UTC Oct 27 2003
 Associated Trustpoints: caserver2

Certificate
 Status: Available
 Certificate Serial Number: 3DAA867D000000000032
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = San Jose ST = California C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "ROME O=ITALY"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 00:26:28 UTC Oct 27 2002
 end date: 00:36:28 UTC Oct 27 2003
 Associated Trustpoints: caserver2

CA Certificate
 Status: Available
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = San Jose ST = California C = US
```

```
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = San Jose ST = California C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 04:19:50 UTC Dec 7 2001
 end date: 04:29:42 UTC DEC 7 2003
 Associated Trustpoints: caserver2

CA Certificate
 Status: Available
 Certificate Serial Number: 0E7EC1B68A2F14BD4C4515AF44C45732
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 20:52:48 UTC Sep 17 2002
 end date: 21:02:37 UTC Sep 17 2017
 Associated Trustpoints: caserver1

Certificate
 Status: Available
 Certificate Serial Number: 6103EE0A000000000038
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 03:33:05 UTC Oct 26 2002
 end date: 03:43:05 UTC Oct 26 2003
 Associated Trustpoints: caserver1

Certificate
```

```
 Status: Available
 Certificate Serial Number: 6104020F000000000039
 Certificate Usage: Encryption
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
!--- The received certificate from CA server2 contains the !--- FQDN, IP address, and subject
name. The renew date !--- states when the next enroll date is. Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 03:33:10 UTC Oct 26 2002
 end date: 03:43:10 UTC Oct 26 2003
 renew date: 03:43:05 UTC Oct 26 2003
 Associated Trustpoints: caserver1

2611-VPN#show crypto key mypubkey rsa
% Key pair was generated at: 00:14:06 UTC Mar 1 1993
Key name: ciscovpn
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A2DE57 2C7A4555
 BF87D3CC 4A260DBF 56574554 472FC72C 0461A35B E41B5B53 BE81A47E 264A68D7
 08662555 27E4E301 2AF04B1C E472F70B 74DF38A0 6EB286F9 01020301 0001
% Key pair was generated at: 00:14:10 UTC Mar 1 1993
Key name: ciscovpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D10224 8CBEC2D7
 B517DF99 7363717D 6F6CA0F1 83FB7874 E60BB169 CD4AD9CA 92E04143 16D4D253
 5CBF212F FF6268A5 329AB988 2655568C 8EC19017 6F4A4C86 43020301 0001
% Key pair was generated at: 00:14:59 UTC Mar 1 1993
Key name: tacvpn
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00AB2884 22A070D0
 A8C84C3E CD45A382 F4CDB158 5B31B624 5C92632C 5DC1977E 686E1C18 DA16BE57
 6FBA9518 4D2F01B8 0D59528D 447014D3 02D5A631 84E54CD4 FB020301 0001
% Key pair was generated at: 00:15:00 UTC Mar 1 1993
Key name: tacvpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00AB7576 9D0A2D65
 7BB9B465 AF227B73 2B83AFD6 3791FA54 3A2DB845 55E4540F 35972460 B87C613E
 82DBC4D2 51E6F9A7 07164C57 B02D28B8 93F8D50F D5C3444F 01020301 0001
% Key pair was generated at: 22:02:57 UTC Oct 27 2002
Key name: ciscovpn.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00D42A5E 4C9D27F1
 195CC537 7CF9E390 935DFBA3 2DA01B3B C5E50620 57B902A3 50876FA1 1A9D83FD
 0EB437F7 E0568EB7 830A46FA E9D9BA4F 3E8B132D F24A08B8 E2154944 36829D64
 E48077EF 224BF142 A3A92672 F0BC57F5 063EF64A 8B775979 CD020301 0001
```

RSA 密钥对重新生成

7204-1 路由器上的这些命令演示如何使用 **auto-enroll regenerate** 和 rsakey label 命令。该图显示在路由器上声明 CA 之后以及在发出 **crypto ca authenticate ca server** 命令之后的事件序列。仅当已验证 CA 之后，才能运行 **auto-enroll** 命令。在验证 CA 之后，路由器将自动在 CA 服务器上注册。无需发出 **crypto ca enroll ca server** 命令。一旦身份证书过期，路由器将自动在 CA 服务器上注册。随着此命令的引入，身份（路由器）证书过期之后，无需在 CA 服务器上进行手动注册。

如果您在路由器上使用 **calendar set** 命令来设置日历系统，您无需在该路由器上使用外部时间源（NTP 服务器）即可设置正确时间。重新加载路由器会使系统时钟与日历系统同步。

注意： **calendar set** 命令无法用于 1700 和 2600 路由器。请在这些路由器上使用外部时间源。

CA 在路由器上配置。此输出详细说明在 7204-1 路由器上自动注册身份证书和重新生成 RSA 密钥对的过程。此输出中的某些区域显示为粗体，以强调重要信息。

```
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 151C040201
subject-name OU=BERLIN O=GERMANY
crl optional
rsakeypair ciscotac
auto-enroll regenerate
!--- Execute this command to authenticate the CA by obtaining !--- the CA's self-signed
certificate which contains the CA's public key. Because !--- the CA signs its own certificate,
the CA's public key should be manually !--- authenticated by contacting the CA administrator to
compare the CA certificate's !--- fingerprint. Note that after you execute the command the
router immediately !--- enrolls with the CA server to obtain its identity certificate. 7204-
1(config)#crypto ca authenticate caserver2
Certificate has the following attributes:
Fingerprint: A1E8B61A FD1A66D6 2DE35501 99C43D83
% Do you accept this certificate? [yes/no]:
Oct 27 06:45:09: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2
HTTP/1.0



Oct 27 06:45:09: CRYPTO_PKI: can not resolve server name/IP address
Oct 27 06:45:09: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 27 06:45:09: CRYPTO_PKI: http connection opened
Oct 27 06:45:10: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:19:09 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert

Content-Type indicates we have received CA and RA certificates.
Oct 27 06:45:10: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
Oct 27 06:45:10: CRYPTO_PKI:CA and RA certs (cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
```

```
 hex data omitted
 03 13 0B 73 6A 76 70 6E 70 y
Trustpoint CA certificate accepted.
7204-1(config)#6B 69 2D 72 61 30 81
 9F 30 0D 06 09 2A 86 48 86 F7 0D 01 01 01
05 00
 hex data omitted
 A9 13 93 1E E6 E1 E4 30 07 31 00
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: serial number = 3E
34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: serial number = 14
6C F2 85 00 00 00 00 00 09
Oct 27 06:45:10: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: serial number = 14
6C F1 A9 00 00 00 00 00 08
Oct 27 06:45:10: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:10: CRYPTO_PKI: InsertCertData: serial number = 3E
34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 27 06:45:10: CRYPTO_PKI: transaction GetCACert completed
Oct 27 06:45:10: CRYPTO_PKI: CA certificate received.
Oct 27 06:45:10: CRYPTO_PKI: CA certificate
received.
```

```
Oct 27 06:45:10: CRYPTO_PKI: crypto_pki_authenticate_tp_cert()
Oct 27 06:45:10: CRYPTO_PKI: trustpoint caserver2 authentication status
= 2
Oct 27 06:45:12: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:12: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:45:12: CRYPTO_PKI: InsertCertData: serial number = 3E
34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 27 06:45:12: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)

7204-1#% Time to Re-enroll trust_point caserver2
Can not select my full public key (ciscotac)% Start certificate enrollment
..
% The subject name in the certificate will
be: OU=BERLIN O=GERMANY
% The subject name in the certificate will
be: 7204-1.cisco.com
% The serial number in the certificate will
be: 01691291
% Certificate request sent to Certificate
Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
 Signing Certificate Reqeust Fingerprint:
 E92A4B6C D213B9A9 4AD07064 23BFABA1
Oct 27 06:46:32: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message=caserver2
HTTP/1.0

Oct 27 06:46:32: CRYPTO_PKI: can not resolve server name/IP address
Oct 27 06:46:32: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 27 06:46:32: CRYPTO_PKI: http connection opened
Oct 27 06:46:33: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:20:32 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert

Content-Type indicates we have received CA and RA certificates.
Oct 27 06:46:33: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
Oct 27 06:46:33: CRYPTO_PKI:CA and RA certs (cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 Encryption Certi0A 06 03
 55 04 03 13 03 76 70 6E 30 1E 17 0D 30 32
30 39
 hex data omitted
 A9 13 93 1E E6 E1 E4 30 07 31 00
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
```

```
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 3E
34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 14
6C F2 85 00 00 00 00 00 09
Oct 27 06:46:33: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 14
6C F1 A9 00 00 00 00 00 08
Oct 27 06:46:33: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 14
6C F1 A9 00 00 00 00 00 08
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 14
6C F2 85 00 00 00 00 00 09
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
```

```
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:46:33: CRYPTO_PKI: InsertCertData: serial number = 3E
34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 27 06:46:33: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
Oct 27 06:46:33: CRYPTO_PKI: transaction PKCSReq completed
Oct 27 06:46:33: CRYPTO_PKI: status:
Oct 27 06:46:33: CRYPTO_PKI: All sockets are closed for trustpoint
caserver2.
Oct 27 06:46:33: CRYPTO_PKI:Write out pkcs#10 content:319
 30 82 01 3B 30 81 E6 02 01 00 30 4C 31 19
30 17
 hex data omitted
 FB EE 80 3D 5D 62 B9 BD 85 24 03 49 6D 2C
98
Oct 27 06:46:33: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
Oct 27 06:46:33: CRYPTO_PKI:Signed Data for trustpoint caserver2 (1410
bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted

 00 00
Oct 27 06:46:33: CRYPTO_PKI: can not resolve server name/IP address
Oct 27 06:46:33: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 27 06:46:33: CRYPTO_PKI: http connection opened
Oct 27 06:46:35: CRYPTO_PKI:Write out pkcs#10 content:319
 30 82 01 3B 30 81 E6 02 01 00 30 4C 31 19
30 17
 hex data omitted
 A0 F6 FB F3 9F E3 3C AF AB BE 24 9F 30 11
10
ficate Request Fingerprint:
 3B7DB296 E21FCDDB 3B4E29D4 A472A4A7
Oct 27 06:47:03: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
Oct 27 06:47:03: CRYPTO_PKI:Signed Data for trustpoint caserver2 (1410
bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted


 B1 B3 DB 54 0F F9 4A 5D 56 45 00 00 00 00 00
00
 00 00
Oct 27 06:47:03: CRYPTO_PKI: can not resolve server name/IP address
Oct 27 06:47:03: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 27 06:47:03: CRYPTO_PKI: http connection opened
Oct 27 06:47:05: CRYPTO_PKI: received msg of 1930 bytes
Oct 27 06:47:05: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:20:35 GMT
```

```
Content-Length: 1784
Content-Type: application/x-pki-message


Oct 27 06:47:05: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1784 bytes
 30 82 06 F4 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 4E 15 B3 43 58 17 42 73
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: serial number = 14
6C F1 A9 00 00 00 00 00 08
Oct 27 06:47:05: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:47:05: CRYPTO_PKI: signed attr: pki-message-type:
13 01 33
Oct 27 06:47:05: CRYPTO_PKI: signed attr: pki-status: 13
01 30
Oct 27 06:47:05: CRYPTO_PKI: signed attr: pki-recipient-nonce:
 04 10 46 C3 F3 B9 FA 5B B6 C0 D9 55 1D B6
E6 57
 7E 67
Oct 27 06:47:05: CRYPTO_PKI: signed attr: pki-transaction-id:
 13 20 33 33 36 34 31 39 32 38 35 37 37 33
43 38
 39 34 46 35 46 35 30 41 32 45 46 38 31 37
33 35
 32 37
Oct 27 06:47:05: CRYPTO_PKI: status = 100: certificate is granted
Oct 27 06:47:05: CRYPTO_PKI:Verified signed data for trustpoint caserver2
(1217 bytes):
 30 82 04 BD 06 09 2A 86 48 86 F7 0D 01 07
03 A0
 hex data omitted
 BE
Oct 27 06:47:05: CRYPTO_PKI:Decrypted enveloped content:
 30 82 03 D9 06 09 2A 86 48 86 F7 0D 01 07
02 A0
 hex data omitted
 AF 15 F0 AD BF 22 7A 41 72 49 5D 31 00
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: subject name =
 30 4E 31 10 30 0E 06 03 55 04 05 13 07 31 36
39
 hex data omitted
 42 45 52 4C 49 4E 20 4F 3D 47 45 52 4D 41
4E 59
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: serial number = 61
11 C6 69 00 00 00 00 00 34
Oct 27 06:47:05: CRYPTO_PKI: WARNING: Certificate, private key or CRL
```

```
was not found while selecting CRL
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: subject name =
 30 4E 31 10 30 0E 06 03 55 04 05 13 07 31 36
39
 hex data omitted
 42 45 52 4C 49 4E 20 4F 3D 47 45 52 4D 41
4E 59
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:05: CRYPTO_PKI: InsertCertData: serial number = 61
11 C6 69 00 00 00 00 00 34
Oct 27 06:47:05: %CRYPTO-6-CERTRET: Certificate
received from Certificate Authority
Oct 27 06:47:15: CRYPTO_PKI: received msg of 1930 bytes
Oct 27 06:47:15: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:21:05 GMT
Content-Length: 1784
Content-Type: application/x-pki-message


Oct 27 06:47:15: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1784 bytes
 30 82 06 F4 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 79 37 99 3A AD 1F 3B 2F
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: serial number = 14
6C F1 A9 00 00 00 00 00 08
Oct 27 06:47:15: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:47:15: CRYPTO_PKI: signed attr: pki-message-type:
13 01 33
Oct 27 06:47:15: CRYPTO_PKI: signed attr: pki-status: 13
01 30
Oct 27 06:47:15: CRYPTO_PKI: signed attr: pki-recipient-nonce:
 04 10 66 D6 56 C7 8C CB 3D A3 E7 B6 84 F8
EE 80
 65 18
Oct 27 06:47:15: CRYPTO_PKI: signed attr: pki-transaction-id:
 13 20 33 33 46 33 36 30 36 45 39 37 31 43
35 34
 34 46 39 32 36 34 36 30 46 42 46 30 42 35
37 39
 35 32
Oct 27 06:47:15: CRYPTO_PKI: status = 100: certificate is granted
Oct 27 06:47:15: CRYPTO_PKI:Verified signed data for trustpoint caserver2
(1217 bytes):
 30 82 04 BD 06 09 2A 86 48 86 F7 0D 01 07
03 A0
```

```
 hex data omitted
 7A 43 16 55 C5 57 97 DF FE D4 3A 0C 14 24
5D D1
 96
Oct 27 06:47:15: CRYPTO_PKI:Decrypted enveloped content:
 30 82 03 D9 06 09 2A 86 48 86 F7 0D 01 07
02 A0
 hex data omitted
 94 01 57 71 AC A9 92 C8 2D F8 24 31 00
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: subject name =
 30 4E 31 10 30 0E 06 03 55 04 05 13 07 31 36
39
 hex data omitted
 42 45 52 4C 49 4E 20 4F 3D 47 45 52 4D 41
4E 59
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: serial number = 61
12 3C 0A 00 00 00 00 00 35
Oct 27 06:47:15: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: subject name =
 30 4E 31 10 30 0E 06 03 55 04 05 13 07 31 36
39
 hex data omitted
 42 45 52 4C 49 4E 20 4F 3D 47 45 52 4D 41
4E 59
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 27 06:47:15: CRYPTO_PKI: InsertCertData: serial number = 61
12 3C 0A 00 00 00 00 00 35
Oct 27 06:47:15: CRYPTO_PKI: All enrollment requests completed for trustpoint
caserver2.
Oct 27 06:47:15: CRYPTO_PKI: All enrollment requests completed for
trustpoint caserver2.
Oct 27 06:47:15: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
Oct 27 06:47:15: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
7204-1#
7204-1#
!--- View detailed information on certificate. 7204-1#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 61123C0A000000000035
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2
```

= 7204-1.cisco.com
OID.2.5.4.5 = 1691291
CRL Distribution Point:
http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
start date: 19:11:05
PST Oct 26 2002
end date:
19:21:05 PST Oct 27 2002
renew date: 19:20:35
PST Oct 27 2002
!--- Note that the certificate issued here is only !--- valid for a day. The router !--- auto-enrolls at the renew date given. **Associated Trustpoints: caserver2**
Certificate
Status: Available
Certificate Serial Number: 6111C669000000000034
Certificate Usage: Signature
Issuer:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US
Subject:
Name: 7204-1.cisco.com
Serial Number: 01691291
OU = "BERLIN O=GERMANY"
OID.1.2.840.113549.1.9.2
= 7204-1.cisco.com
OID.2.5.4.5 = 1691291
CRL Distribution Point:
http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
start date: 19:10:35 PST
Oct 26 2002
end date: 19:20:35 PST Oct
27 2002
Associated Trustpoints: caserver2
CA Certificate
Status: Available
Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
Certificate Usage: Signature
Issuer:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US
Subject:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US
CRL Distribution Point:
http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
start date: 21:19:50 PST Dec 6 2001
end date: 21:29:42 PST Dec 6 2003
Associated Trustpoints: caserver2

```
7204-1#show cry key mypubkey rsa
% Key pair was generated at: 13:55:35 PST
Oct 25 2002
!--- Note that the RSA key pairs are regenerated once the router !--- has reenrolled for the
certificates. Key name: ciscotac Usage: Signature Key Key Data: 305C300D 06092A86 4886F70D
01010105 00034B00 30480241 0099BC9C 175AD748 C991D24E 4F328960 997CADCB E665B876 4C53E2A0
449CA082 4C503E05 87604F32 EECDF7B5 5CA0ADB6 2C664F9D 883EBAD6 671C6A8F A0C5D9EE 23020301 0001 %
Key pair was generated at: 13:55:35 PST Oct 25 2002 Key name: ciscotac Usage: Encryption Key Key
Data: 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D4FE8A 3DE940E6 42277A82 87DDDA45
A0F77AE4 AF47D91F BA134F65 92886D3B 7489BEBB DE650EA1 029A5A5C 72F39FCA A83BC018 246B0D1D
270DBCF2 B9B29587 21020301 0001 % Key pair was generated at: 22:07:13 PST Oct 26 2002 Key name:
ciscotac.server Usage: Encryption Key Key Data: 307C300D 06092A86 4886F70D 01010105 00036B00
30680261 00E47825 7E60D6AC 4C078368 925191FD 2B2AAC50 6A6D6AF1 8A01C9B6 D21C4C80 05DD8277
D63F60B1 01A2DDCF 407BE088 D333FE1D 4F5DE892 47970454 A50C54EC B962FEE4 A9BF5197 4C2B0656
503E0045 BB3168C4 2228155A B6BF0385 0B493FC5 79020301 0001 7204-1# !--- The router configuration
with the certificates. 7204-1#show run
Building configuration...
Current configuration : 8367 bytes
!
! Last configuration change at 23:45:33 PST Sat Oct 26 2002
! NVRAM config last updated at 23:43:25 PST Sat Oct 26 2002
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$GdwM$YPQYieph20DPAhQeNvHa30
enable password ipsecpki
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!
!
no ip domain lookup
ip domain name cisco.com
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 151C040201
subject-name OU=BERLIN O=GERMANY
 crl optional
```

```
rsakeypair ciscotac
auto-enroll regenerate
crypto ca certificate chain caserver2
certificate 61123C0A000000000035
 308203AA 30820354 A0030201 02020A61 123C0A00 00000000 35300D06
092A8648
 86F70D01 01050500 3061310B 30090603 55040613 02555331 13301106
03550408
!--- Certificate is abbreviated for easier viewing. quit certificate 6111C669000000000034
308203AA 30820354 A0030201 02020A61 11C66900 00000000 34300D06 092A8648 86F70D01 01050500
3061310B 30090603 55040613 02555331 13301106 03550408 !--- Certificate is abbreviated for easier
viewing. quit certificate ca 3E34CD199392A0914621EA778B13F357 30820284 3082022E A0030201
0202103E 34CD1993 92A09146 21EA778B 13F35730 0D06092A 864886F7 0D010105 05003061 310B3009
06035504 06130255 53311330 !--- Certificate is abbreviated for easier viewing. quit ! crypto
isakmp policy 10 hash md5 crypto isakmp identity hostname ! ! crypto ipsec transform-set myset
esp-des esp-md5-hmac ! crypto map vpn 10 ipsec-isakmp set peer 172.16.172.35 set transform-set
myset match address 101 ! ! ! voice call carrier capacity active ! ! ! ! ! ! ! ! ! ! ! !
interface Ethernet1/0 no ip address duplex half ! interface Ethernet1/1 ip address 172.16.172.51
255.255.255.240 no ip redirects duplex half crypto map vpn ! interface Ethernet1/2 ip address
3.3.3.2 255.255.255.0 no keepalive duplex half ! interface Ethernet1/3 no ip address duplex half
! interface Hssi4/0 ip address 200.1.1.1 255.255.255.0 load-interval 30 fair-queue 64 16 0 hssi
dce serial restart_delay 0 clockrate 1524705 ! ip classless ip route 0.0.0.0 0.0.0.0
172.16.172.49 no ip http server ip pim bidir-enable ! ! access-list 101 permit ip 3.3.3.0
0.0.0.255 192.168.4.0 0.0.0.255 ! snmp-server community public RO snmp-server enable traps tty !
! call rsvp-sync ! ! mgcp profile default ! dial-peer cor custom ! ! ! ! gatekeeper shutdown ! !
line con 0 exec-timeout 0 0 line aux 0 line vty 0 4 privilege level 15 password cisco login line
vty 5 15 login ! no scheduler max-task-time ! end !--- The system clock is used to view the
time. 7204-1#show clock
23:54:39.059 PST Sat Oct 26 2002
7204-1#show clock
23:58:08.127 PST Sat Oct 26 2002
7204-1#show clock
*19:35:57.227 PST Sat Oct 26 2002
7204-1#
7204-1#
7204-1#
7204-1#show crypto ca certificate
CA Certificate
 Status: Available
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 21:19:50 PST Dec 6 2001
 end date: 21:29:42 PST Dec 6 2003
 Associated Trustpoints: caserver2
Certificate
 Status: Available
 Certificate Serial Number: 6111C669000000000034
```

```
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 19:10:35 PST Oct 26 2002
 end date: 19:20:35 PST Oct 27 2002
 Associated Trustpoints: caserver2
Certificate
 Status: Available
 Certificate Serial Number: 61123C0A000000000035
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 19:11:05 PST Oct 26 2002
 end date: 19:21:05 PST Oct 27 2002
 renew date: 19:20:35 PST Oct 27 2002
 Associated Trustpoints: caserver2
 !--- The system clock is used to view the time. 7204-1#show clock
*19:38:33.387 PST Sat Oct 26 2002
7204-1#show clock
*19:38:34.735 PST Sat Oct 26 2002
7204-1#
7204-1#
7204-1#
7204-1#show clock
*19:45:09.735 PST Sat Oct 26 2002
7204-1#show clock
7204-1#show clock
*17:28:30.662 PST Sun Oct 27 2002
7204-1#show clock
*17:28:48.646 PST Sun Oct 27 2002
7204-1#
7204-1#show clock
*17:41:15.410 PST Sun Oct 27 2002
7204-1#
7204-1#show clock
*18:08:45.430 PST Sun Oct 27 2002
```

```
7204-1#show clock
*18:24:54.702 PST Sun Oct 27 2002
7204-1#show clock
*18:37:13.322 PST Sun Oct 27 2002
7204-1# show clock
*18:47:53.270 PST Sun Oct 27 2002
7204-1# show clock
*18:58:56.202 PST Sun Oct 27 2002
7204-1# show clock
*19:10:27.746 PST Sun Oct 27 2002
7204-1# show clock
*19:10:31.254 PST Sun Oct 27 2002
7204-1# show clock
*19:10:32.658 PST Sun Oct 27 2002
7204-1# show clock
*19:15:44.054 PST Sun Oct 27 2002
7204-1# show clock
*19:15:48.054 PST Sun Oct 27 2002
7204-1# show clock
*19:15:49.606 PST Sun Oct 27 2002
7204-1#show clock
*19:17:02.882 PST Sun Oct 27 2002
7204-1#show clock
*19:17:15.722 PST Sun Oct 27 2002
7204-1#
7204-1#
7204-1#
 show clock
*19:17:26.038 PST Sun Oct 27 2002
7204-1#show clock
*19:17:27.170 PST Sun Oct 27 2002
7204-1#show clock
*19:17:28.418 PST Sun Oct 27 2002
7204-1#show clock
*19:18:50.650 PST Sun Oct 27 2002
7204-1#show debug
Cryptographic Subsystem:
 Crypto PKI Msg debugging is on
 Crypto PKI Trans debugging is on
7204-1#
7204-1#
*19:19:16.574 PST Sun Oct 27 2002
7204-1#show clock
*19:19:22.202 PST Sun Oct 27 2002
7204-1#show clock
*19:19:23.762 PST Sun Oct 27 2002
7204-1#show clock
*19:19:25.354 PST Sun Oct 27 2002
7204-1#show clock
*19:19:28.202 PST Sun Oct 27 2002
7204-1#show clock
*19:19:34.482 PST Sun Oct 27 2002
7204-1#show clock
*19:19:53.118 PST Sun Oct 27 2002
7204-1#show clock
*19:19:55.014 PST Sun Oct 27 2002
7204-1#show clock
*19:20:28.654 PST Sun Oct 27 2002
7204-1#show clock
*19:20:32.770 PST Sun Oct 27 2002
!--- The certificate renew date is 19:20:35 PST !--- Oct 27 2002. At the following time the
router automatically enrolls !--- with CA server2 in order to obtain another identity
certificate !--- before the current identity certificate expires. The router also !---
regenerates the RSA key pair. 7204-1#show clock
```

```
*19:20:34.182 PST Sun Oct 27 2002
7204-1#show clock
Time to re-enroll
trust_point caserver2
Can not select my full public
key (ciscotac)
*19:20:35.314 PST Sun Oct 27
2002
7204-1#% Start certificate enrollment
..
% The subject name in the certificate will
be: OU=BERLIN O=GERMANY
% The subject name in the certificate will
be: 7204-1.cisco.com
% The serial number in the certificate will
be: 01691291
% Certificate request sent to Certificate
Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
*Oct 28 02:20:35: %SSH-5-DISABLED: SSH 1.5 has been disabled
*Oct 28 02:20:35: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
 Signing Certificate Reqeust Fingerprint:
 2EF6D7F3 AF5B4491 E254E6D0 229878CF
*Oct 28 02:20:35: %SSH-5-ENABLED: SSH 1.5 has been enabled
*Oct 28 02:20:36: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
*Oct 28 02:20:36: CRYPTO_PKI:Insert Selfsigned Certificate:
 30 82 01 4A 30 81 F5 02 20 35 45 35 42 44 43
39
 hex data omitted
 9F 2C DB 5F FA DC A2 DC E3 49 6D 28 C8 F8
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 21 31 1F 30 1D 06 09 2A 86 48 86 F7 0D 01
09
 02 16 10 37 32 30 34 2D 31 2E 63 69 73 63
6F 2E
 l number =
 35 45 35 42 44 43 39 45 30 32 45 38 41 36
42 31
 45 39 46 45 32 42 33 31 45 46 45 43 45 34
38 46
*Oct 28 02:20:36: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message=caserver2
HTTP/1.0
63 6F 6D
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 21 31 1F 30 1D 06 09 2A 86 48 86 F7 0D
01 09
 02 16 10 37 32 30 34 2D 31 2E 63 69 73 63
6F 2E
 63 6F 6D
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: seria
Encryption Certificate Request Fingerprint:
 58D999C4 BA8F34FD F5C10A30 81D7A054
*Oct 28 02:20:36: CRYPTO_PKI: can not resolve server name/IP address
*Oct 28 02:20:36: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 28 02:20:36: CRYPTO_PKI: http connection opened
*Oct 28 02:20:36: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 02:20:43 GMT
Content-Length: 2811
```

```
Content-Type: application/x-x509-ca-ra-cert


Content-Type indicates we have received CA and RA certificates.
*Oct 28 02:20:36: CRYPTO_PKI:crypto_process_ca_ra_cKI:CA and RA certs
(cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 82 0A E8 30 82 0A E4ert(trustpoint=caserver2)
*Oct 28 02:20:36: CRYPTO_P 02 01 01 31 00 30 0B 06 09
 hex data omitted
 A9 13 93 1E E6 E1 E4 30 07 31 00
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
*Oct 28 02:20:36: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
*Oct 28 02:20:36: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
```

```
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:36: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
*Oct 28 02:20:36: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
*Oct 28 02:20:36: CRYPTO_PKI: transaction PKCSReq completed
*Oct 28 02:20:36: CRYPTO_PKI: status:
*Oct 28 02:20:36: CRYPTO_PKI:Write out pkcs#10 content:319
 30 82 01 3B 30 81 E6 02 01 00 30 4C 31 19
30 17
 hex data omitted
 9A 0E DE 86 AB 85 DD 67 79 6B 67 1F 2B 53
51
*Oct 28 02:20:36: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
*Oct 28 02:20:36: CRYPTO_PKI:Signed Data for trustpoint caserver2 (1410
bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted
 00 00
*Oct 28 02:20:36: CRYPTO_PKI: can not resolve server name/IP address
*Oct 28 02:20:36: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 28 02:20:36: CRYPTO_PKI: http connection opened
*Oct 28 02:20:38: CRYPTO_PKI:Write out pkcs#10 content:319
 30 82 01 3B 30 81 E6 02 01 00 30 4C 31 19
30 17
 hex data omitted
 1E 74 00 9F A9 C1 ED 00 3C 7F 72 E3 61 D5
84
*Oct 28 02:20:38: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 04 08 5A 0B 69 47 5E C6 23 4C 00 00 00 00
00 00
 00 00 00 00
*Oct 28 02:20:38: CRYPTO_PKI:Signed Data for trustpoint caserver2 (1410
bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
```

```
 hex data omitted
 65 86 05 93 84 87 9F 8D B4 5F 00 00 00 00
00 00
 00 00
*Oct 28 02:20:38: CRYPTO_PKI: can not resolve server name/IP address
*Oct 28 02:20:38: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 28 02:20:39: CRYPTO_PKI: http connection opened
*Oct 28 02:20:40: %AMDP2_FE-5-LATECOLL: Ethernet1/1 transmit error
*Oct 28 02:20:41: %SCHED-3-STUCKTMR: Sleep with expired timer 63B997A8,
time 0x51A21B4 (00:00:00 ago).
-Process= "Crypto PKI RECV ", ipl= 4, pid= 92
-Traceback= 6064AD0C 6064B0C8 607237BC 60725E60 60796C00 6079C2B0 61CCF6D4
61CC9838 61CC9944 61CC864C 60630A98 60630A84
*Oct 28 02:20:41: CRYPTO_PKI: received msg of 1930 bytes
*Oct 28 02:20:41: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 02:20:46 GMT
Content-Length: 1784
Content-Type: application/x-pki-message


*Oct 28 02:20:41: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1784 bytes
 30 82 06 F4 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 A0 82 04 AE 30 82 04 AA 02 01 00 31 81 9E
30 81
*Oct 28 02:20:41: %CRYPTO-6-CERTRET: Certificate received from Certificate
Authority
*Oct 28 02:20:51: CRYPTO_PKI: received msg of 1930 bytes
*Oct 28 02:20:51: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 02:20:49 GMT
Content-Length: 1784
Content-Type: application/x-pki-message


*Oct 28 02:20:51: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1784 bytes
 30 82 06 F4 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 ED 9F 4E 20 DB 91 A7 55
*Oct 28 02:20:51: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
*Oct 28 02:20:51: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
*Oct 28 02:20:51: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
*Oct 28 02:20:51: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 28 02:20:51: CRYPTO_PKI: signed attr: pki-message-type:
13 01 33
*Oct 28 02:20:51: CRYPTO_PKI: signed attr: pki-status: 13
01 30
```

```
*Oct 28 02:20:51: CRYPTO_PKI: signed attr: pki-recipient-nonce:
 04 10 CE AB A0 E3 52 BD BF 95 D9 F8 DB 1A
07 D9
 FA C6
*Oct 28 02:20:51: CRYPTO_PKI: signed attr: pki-transaction-id:
 13 20 35 31 43 35 43 43 37 33 42 42 30 31
38 41
 33 35 35 39 34 39 39 43 39 30 42 31 44 32
37 38
 31 30
*Oct 28 02:20:51: CRYPTO_PKI: status = 100:
certificate is granted
*Oct 28 02:20:51: CRYPTO_PKI:Verified signed
data for trustpoint caserver2 (1217 bytes):
 30 82 04 BD 06 09 2A 86 48 86 F7 0D 01 07
03 A0
 hex data omitted
 3A 74 B6 8F F8 E5 29
*Oct 28 02:20:52: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 28 02:21:02: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
7204-1#
7204-1#
7204-1#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 053859FC000000000039
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2
= 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 19:10:49 PST
!--- Another identity certificate is !--- received and the renew date is now different. Oct 27
2002
 end date: 19:20:49
PST Oct 28 2002
 renew date: 19:20:46 PST
Oct 28 2002
 Associated Trustpoints: caserver2
Certificate
 Status: Available
 Certificate Serial Number: 05384E3F000000000038
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
```

```
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 19:10:46 PST Oct 27 2002
 end date: 19:20:46 PST Oct 28 2002
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 21:19:50 PST Dec 6 2001
 end date: 21:29:42 PST Dec 6 2003
 Associated Trustpoints: caserver2


7204-1# show crypto key mypubkey rsa
%
!--- The RSA key pair was regenerated at the time of !--- certificate auto-enroll. Key pair was
generated at: 19:20:35 PST
Oct 27 2002
Key name: ciscotac
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A540B1
062AEF70
 081605F2 F81402EE A52DEAF4 05462747 CCE21BCC 8A1A21B0 C7BDF333
90728D48
 68D46B81 19FC15EE 33045A3F 7BE50D85 FDD9F3DE 55E29F6F 67020301
0001
% Key pair was generated at: 19:20:35 PST Oct 27 2002
Key name: ciscotac
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A9F8A8
4E5AA9AF
 22D9B0E0 B3754D5A 4387995D 23B09D8F E9AB70B7 CDFA126A 63A25EAF
055065EB
 C076B36B 5A034A9D CE82206B 031C8231 B85DE829 E35FF874 39020301
0001
% Key pair was generated at: 19:20:36 PST Oct 27 2002
```

```
Key name: ciscotac.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00E47825
7E60D6AC
 4C078368 925191FD 2B2AAC50 6A6D6AF1 8A01C9B6 D21C4C80 05DD8277
D63F60B1
 01A2DDCF 407BE088 D333FE1D 4F5DE892 47970454 A50C54EC B962FEE4
A9BF5197
 4C2B0656 503E0045 BB3168C4 2228155A B6BF0385 0B493FC5 79020301
0001
7204-1#
7204-1#
7204-1#
!--- The router configuration with the new identity certificates. 7204-1# 7204-1#show run
Building configuration...
Current configuration : 8245 bytes
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$GdwM$YPQYieph20DPAhQeNvHa30
enable password ipsecpki
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!
!
no ip domain lookup
ip domain name cisco.com
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 094241071C
subject-name OU=BERLIN O=GERMANY
crl optional
rsakeypair ciscotac
auto-enroll regenerate
 crypto ca certificate chain caserver2
certificate 053859FC000000000039
 308203AA 30820354 A0030201 02020A05 3859FC00 00000000 39300D06
```

```
092A8648
!--- Certificate is abbreviated for easier viewing. quit certificate 05384E3F000000000038
308203AA 30820354 A0030201 02020A05 384E3F00 00000000 38300D06 092A8648 86F70D01 01050500
3061310B 30090603 55040613 02555331 13301106 03550408 !--- Certificate is abbreviated for easier
viewing. quit certificate ca 3E34CD199392A0914621EA778B13F357 30820284 3082022E A0030201
0202103E 34CD1993 92A09146 21EA778B 13F35730 0D06092A 864886F7 0D010105 05003061 310B3009
06035504 06130255 53311330 !--- Certificate is abbreviated for easier viewing. quit ! crypto
isakmp policy 10 hash md5 crypto isakmp identity hostname - ! ! crypto ipsec transform-set myset
esp-des esp-md5-hmac ! crypto map vpn 10 ipsec-isakmp set peer 172.16.172.35 set transform-set
myset match address 101 ! ! ! voice call carrier capacity active ! ! interface Ethernet1/0 no ip
address duplex half ! interface Ethernet1/1 ip address 172.16.172.51 255.255.255.240 no ip
redirects duplex half crypto map vpn !interface Ethernet1/2 ip address 3.3.3.2 255.255.255.0 no
keepalive duplex half ! interface Ethernet1/3 no ip address duplex half ! interface Hssi4/0 ip
address 200.1.1.1 255.255.255.0 load-interval 30 fair-queue 64 16 0 hssi dce serial
restart_delay 0 clockrate 1524705 ! ip classless ip route 0.0.0.0 0.0.0.0 172.16.172.49 no ip
http server ip pim bidir-enable ! ! access-list 101 permit ip 3.3.3.0 0.0.0.255 192.168.4.0
0.0.0.255 ! snmp-server community public RO snmp-server enable traps tty ! ! call rsvp-sync ! !
mgcp profile default ! dial-peer cor custom ! ! ! ! gatekeeper shutdown ! ! line con 0 exec-
timeout 0 0 line aux 0 line vty 0 4 privilege level 15 password cisco login line vty 5 15 login
! no scheduler max-task-time ! end 7204-1# 7204-1#
```

此输出显示 1720-1 路由器上用于显示 RSA 密钥重新生成的 **show crypto ca certificate** 命令。

```
1720-1#
1720-1#show crypto ca certificate
CA Certificate
Status: Available
Certificate Serial Number: 0E7EC1B68A2F14BD4C4515AF44C45732
Certificate Usage: Signature
Issuer:
CN = SJVPNTAC-CAServer
OU = TAC-VPN-SJ
O = Cisco Systems
L = San Jose
ST = CA
C = US
Subject:
CN = SJVPNTAC-CAServer
OU = TAC-VPN-SJ
O = Cisco Systems
L = San Jose
ST = CA
C = US
CRL Distribution Point:
http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
Validity Date:
start date: 20:52:48 UTC Sep 17 2002
end date: 21:02:37 UTC Sep 17 2017
Associated Trustpoints: caserver1

Certificate
Status: Available
Certificate Serial Number: 611652F700000000003A
Certificate Usage: Signature
Issuer:
CN = SJVPNTAC-CAServer
OU = TAC-VPN-SJ
O = Cisco Systems
L = San Jose
ST = CA
C = US
Subject:
Name: 1720-1.tac.com
```

IP Address: 172.16.172.45
Serial Number: 2F31F46E
OU = "MADRID O=SPAIN"
OID.1.2.840.113549.1.9.2 = 1720-1.tac.com
OID.1.2.840.113549.1.9.8 = 172.16.172.45
OID.2.5.4.5 = 2F31F46E
CRL Distribution Point:
http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
Validity Date:
start date: 03:53:11 UTC Oct 26 2002
end date: 04:03:11 UTC Oct 26 2003
Associated Trustpoints: caserver1

Certificate
Status: Available
Certificate Serial Number: 61165F5B00000000003B
Certificate Usage: Encryption
Issuer:
CN = SJVPNTAC-CAServer
OU = TAC-VPN-SJ
O = Cisco Systems
L = San Jose
ST = CA
C = US
Subject:
Name: 1720-1.tac.com
IP Address: 172.16.172.45
Serial Number: 2F31F46E
OU = "MADRID O=SPAIN"
OID.1.2.840.113549.1.9.2 = 1720-1.tac.com
OID.1.2.840.113549.1.9.8 = 172.16.172.45
OID.2.5.4.5 = 2F31F46E
CRL Distribution Point:
http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
Validity Date:
start date: 03:53:14 UTC Oct 26 2002
end date: 04:03:14 UTC Oct 26 2003
renew date: 04:03:11 UTC Oct 26 2003
Associated Trustpoints: caserver1

此输出显示 1720-1 路由器上的 **show crypto key** 命令。

1720-1#**show crypto key mypubkey rsa**
% Key pair was generated at: 00:49:35 UTC Mar 1 1993
Key name: ipsecpki
Usage: Signature Key
Key Data:
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D3D4B1 CC3DC9DE
04373E6C F3ADA37B DBE56BD4 C9945889 E24626DF D0CC45FE 7CBA196C 1DB10C15
EE6332F8 A614561E 991549DD 787E4D7C 30ECC465 B0D67BEA E1020301 0001
% Key pair was generated at: 00:49:36 UTC Mar 1 1993
Key name: ipsecpki
Usage: Encryption Key
Key Data:
305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00C6D61D D126D546
678D5C7D A99E9D22 E2B7C82E 72D69478 3A241FE9 A5F5B761 81A6A85D 9389FD03
D27D58CF 21122EF5 8B3F4278 B2C71C58 DD0E5485 B00A02AE 0B020301 0001
% Key pair was generated at: 21:30:31 UTC Oct 27 2002
Key name: ipsecpki.server
Usage: Encryption Key
Key Data:
307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00DB0878 020052BA

```
BE67DEBF 001DA215 D6EB8CA9 8DD5B077 A27809D7 792166C4 5F1F2AD4 F4BE813B
087E1747 4677570B 7F692A78 D897951A B37A1A0B 1E167044 F6ADA763 67AECAE6
BF2D9AF3 0EA492B5 1E601EAF 7E280B80 091A2D89 2116685A 59020301 0001
```

当 RSA 密钥对不存在时

在自动注册期间，如果 RSA 密钥对不存在，则会在注册期间自动生成一对通用密钥，如此输出所示。此示例在启动时并未在 7204-1 路由器上进行证书配置，并且未生成 RSA 密钥对。

```
 show run
Building configuration...
Current configuration : 1828 bytes
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$GdwM$YPQYieph20DPAhQeNvHa30
enable password ipsecpki
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!

!
no ip domain lookup
ip domain name cisco.com
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto isakmp policy 10
hash md5
crypto isakmp identity hostname
!
!
crypto ipsec transform-set myset esp-des esp-md5-hmac
!
crypto map vpn 10 ipsec-isakmp
set peer 172.16.172.35
set transform-set myset
match address 101
!
!
voice call carrier capacity active
!
!
interface Ethernet1/0
```

```
no ip address
duplex half
!
interface Ethernet1/1
ip address 172.16.172.51 255.255.255.240
no ip redirects
 duplex half
crypto map vpn
!
interface Ethernet1/2
ip address 3.3.3.2 255.255.255.0
no keepalive
duplex half
!
interface Ethernet1/3
no ip address
duplex half
!
interface Hssi4/0
ip address 200.1.1.1 255.255.255.0
load-interval 30
fair-queue 64 16 0
hssi dce
serial restart_delay 0
clockrate 1524705
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.16.172.49
no ip http server
ip pim bidir-enable
!
!
access-list 101 permit ip 3.3.3.0 0.0.0.255 192.168.4.0 0.0.0.255
!
snmp-server community public RO
snmp-server enable traps tty
!
!
call rsvp-sync
!
!
mgcp profile default
!
dial-peer cor custom
!
!
!
!
gatekeeper
shutdown
!
!
line con 0
exec-timeout 0 0
line aux 0
line vty 0 4
privilege level 15
password cisco
login
line vty 5 15
login
!
no scheduler max-task-time
!
```

```
end

7204-1#show clock
*17:18:44.780 PST Mon Oct 28 2002
7204-1#conf t
7204-1#show crypto key mypubkey rsa
7204-1#show cry key mypubkey rsa
!--- An RSA key pair has not been generated. 7204-1#show cry key mypubkey rsa
7204-1#
7204-1#
7204-1#
7204-1#
7204-1#configure terminal
!--- Defining the CA server communication parameters. Enter configuration commands, one per
line. End with CNTL/Z. 7204-1(config)#crypto ca trustpoint caserver2
7204-1(ca-trustpoint)# enrollment retry period 2
7204-1(ca-trustpoint)# enrollment mode ra
7204-1(ca-trustpoint)# enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
7204-1(ca-trustpoint)# usage ike
7204-1(ca-trustpoint)# serial-number
7204-1(ca-trustpoint)# ip-address none
7204-1(ca-trustpoint)# password 7 030A540503
7204-1(ca-trustpoint)# subject-name OU=BERLIN O=GERMANY
7204-1(ca-trustpoint)# crl optional
7204-1(ca-trustpoint)# rsakeypair ciscotac
7204-1(ca-trustpoint)# auto-enroll regenerate
7204-1(ca-trustpoint)#
7204-1(ca-trustpoint)#^Z
7204-1#
7204-1#
7204-1#
7204-1#
7204-1#
*Oct 29 00:19:39: %SYS-5-CONFIG_I: Configured from console by consolesh
clo
7204-1#show clock
*17:19:42.656 PST Mon Oct 28 2002
7204-1#show run
Building configuration...
Current configuration : 2131 bytes
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$GdwM$YPQYieph20DPAhQeNvHa30
enable password ipsecpki
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!
!
no ip domain lookup
ip domain name cisco.com
```

```
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 000A1C0801
subject-name OU=BERLIN O=GERMANY
crl optional
rsakeypair ciscotac
auto-enroll regenerate
crypto isakmp policy 10
hash md5
crypto isakmp identity hostname
!
!
crypto ipsec transform-set myset esp-des esp-md5-hmac
!
crypto map vpn 10 ipsec-isakmp
set peer 172.16.172.35
set transform-set myset
match address 101
!
!
!
voice call carrier capacity active
!
!
!
!
!
!
!
q
7204-1#debug crypto pki transactions
Crypto PKI Trans debugging is on
7204-1#
7204-1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
7204-1(config)#crypto ca authenticate
caserver2
Certificate has the following attributes:
Fingerprint: A1E8B61A FD1A66D6 2DE35501 99C43D83
% Do you accept this certificate? [yes/no]:
*Oct 29 00:20:56: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message=caserver2
HTTP/1.0
*Oct 29 00:20:56: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:20:56: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:20:56: CRYPTO_PKI: http connection opened
*Oct 29 00:20:56: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:21:02 GMT
Content-Length: 2811
```

```
Content-Type: application/x-x509-ca-ra-cert


Content-Type indicates we have received CA and RA certificates.
y
Trustpoint CA certificate accepted.
7204-1(config)#
*Oct 29 00:20:56: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
*Oct 29 00:20:56: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:20:56: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:20:56: CRYPTO_PKI: transaction GetCACert completed
*Oct 29 00:20:56: CRYPTO_PKI: CA certificate
received.
*Oct 29 00:20:56: CRYPTO_PKI: CA certificate received.
*Oct 29 00:20:56: CRYPTO_PKI: crypto_pki_authenticate_tp_cert()
*Oct 29 00:20:56: CRYPTO_PKI: trustpoint caserver2 authentication status
= 2
*Oct 29 00:20:58: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
7204-1(config)#
7204-1#show crypto key mypubkey rsa
!--- The RSA key pair has not yet been generated. !--- Only the CA has been authenticated. 7204-
1#show crypto ca certificate
!--- Only the CA certificate has been received. CA Certificate Status: Available Certificate
Serial Number: 3E34CD199392A0914621EA778B13F357 Certificate Usage: Signature Issuer: CN = vpn OU
= cisco O = tac L = san jose ST = california C = US Subject: CN = vpn OU = cisco O = tac L = san
jose ST = california C = US CRL Distribution Point: http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date: start date: 21:19:50 PST Dec 6 2001 end date: 21:29:42 PST Dec 6 2003 Associated
Trustpoints: caserver2

7204-1# Time to Re-enroll trust_point caserver2
Can not select my full public key (ciscotac)
Can not select my full public key (ciscotac)
Can not select my full public key (ciscotac)%
% Start certificate enrollment ..
% The subject name in the certificate will
be: OU=BERLIN O=GERMANY
% The subject name in the certificate will
be: 7204-1.cisco.com
% The serial number in the certificate will
be: 01691291
% Certificate request sent to Certificate
Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
 key mypubkey
rsa Fingerprint: 6FD37B13 7329725C B524C666 2CFB08BB
*Oct 29 00:22:13: %SSH-5-ENABLED: SSH 1.5 has been enabled
*Oct 29 00:22:13: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
*Oct 29 00:22:13: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message=caserver2
HTTP/1.0
*Oct 29 00:22:13: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:22:13: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:22:13: CRYPTO_PKI: http connection opened
*Oct 29 00:22:14: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:22:20 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert
```

```
Content-Type indicates we have received CA and RA certificates.
*Oct 29 00:22:14: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
*Oct 29 00:22:14: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:22:14: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:22:14: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
*Oct 29 00:22:14: CRYPTO_PKI: transaction PKCSReq completed
*Oct 29 00:22:14: CRYPTO_PKI: status:
*Oct 29 00:22:14: CRYPTO_PKI: All sockets are closed for trustpoint
caserver2.
*Oct 29 00:22:14: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:22:14: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:22:14: CRYPTO_PKI: http connection opened
*Oct 29 00:22:16: CRYPTO_PKI: received msg of 1930 bytes
*Oct 29 00:22:16: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:22:22 GMT
Content-Length: 1784
Content-Type: application/x-pki-message


*Oct 29 00:22:16: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:22:16: CRYPTO_PKI: status = 100: certificate is granted
*Oct 29 00:22:16: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 29 00:22:16: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
*Oct 29 00:22:16: CRYPTO_PKI: All enrollment requests completed for
trustpoint caserver2.
*Oct 29 00:22:16: %CRYPTO-6-CERTRET: Certificate received from Certificate
Authority
*Oct 29 00:22:16: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
*Oct 29 00:22:16: %CRYPTO-4-NOAUTOSAVE: Configuration was modified.
Issue "write memory" to save new certificate
*Oct 29 00:22:16: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 29 00:22:16: CRYPTO_PKI: All enrollment requests completed for
trustpoint caserver2.
% Key pair was generated at: 17:22:13 PST
Oct 28 2002
Key name: ciscotac
Usage: General Purpose Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00B05722
43B43599
 A2506398 A2205406 755D3AA2 9888FD4C 76CF3C78 CA91BA4A 5EDB4BF8
121A924D
 A093D24C 282085BD 3ED9AD76 4CD8C7AD 0EA5582C 70D4E5AF FD020301
0001
% Key pair was generated at: 17:22:13 PST Oct 28 2002
Key name: ciscotac.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00CE8A87
0698C6DF
 D13D7CF8 C5504394 24D23E0E 2B8367AE 11E6F5AF BD5B6A27 11E63F99
EB768894
 A234A6FD 54B90A93 F352B551 08FC32E7 5D0B1F68 2E42974A 4BEB7A9C
```

```
EA989DD1
 35267E59 D1C84CC5 DA436E72 8BAB6B3B 60D0AB62 129FAB02 1F020301
0001
7204-1#
7204-1#
7204-1#
7204-1#show crypto key mypubkey rsa
% Key pair was generated at: 17:22:13 PST Oct 28 2002
Key name: ciscotac
!--- As defined in the configuration, a general !--- purpose RSA key pair. Usage: General
Purpose Key was generated during auto-enrollment. Key Data: 305C300D 06092A86 4886F70D 01010105
00034B00 30480241 00B05722 43B43599 A2506398 A2205406 755D3AA2 9888FD4C 76CF3C78 CA91BA4A
5EDB4BF8 121A924D A093D24C 282085BD 3ED9AD76 4CD8C7AD 0EA5582C 70D4E5AF FD020301 0001 % Key pair
was generated at: 17:22:13 PST Oct 28 2002 Key name: ciscotac.server Usage: Encryption Key Key
Data: 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00CE8A87 0698C6DF D13D7CF8 C5504394
24D23E0E 2B8367AE 11E6F5AF BD5B6A27 11E63F99 EB768894 A234A6FD 54B90A93 F352B551 08FC32E7
5D0B1F68 2E42974A 4BEB7A9C EA989DD1 35267E59 D1C84CC5 DA436E72 8BAB6B3B 60D0AB62 129FAB02
1F020301 0001 7204-1# 7204-1# 7204-1# 7204-1#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 09F246B800000000003C
 Certificate Usage: General Purpose
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 17:12:22 PST Oct 28 2002
 end date: 17:22:22 PST Oct 29 2002
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 21:19:50 PST Dec 6 2001
 end date: 21:29:42 PST Dec 6 2003
```

```
 Associated Trustpoints: caserver2

7204-1#
7204-1#
 !--- Generates an RSA usage-key pair. 7204-1# 7204-1# 7204-1#show run
Building configuration...
Current configuration : 2139 bytes
!
version 12.2
service timestamps debug datetime
service timestamps log datetime
no service password-encryption
service udp-small-servers
service tcp-small-servers
no service dhcp
!
hostname 7204-1
!
boot system flash slot
boot system flash slot0:c7200-jk9o3s-mz.122-11.T1.bin
logging buffered 50000 debugging
enable secret 5 $1$GdwM$YPQYieph20DPAhQeNvHa30
enable password ipsecpki
!
username cisco password 0 cisco
clock timezone PST -7
ip subnet-zero
!
no ip domain lookup
ip domain name cisco.com
ip host caserver2 171.69.89.111
!
!
ip vrf test
no ip cef
ip audit notify log
ip audit po max-events 100
!
crypto ca trustpoint caserver2
enrollment retry period 2
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
ip-address none
password 7 0608002F49
subject-name OU=BERLIN O=GERMANY
crl optional
rsakeypair ciscotac 512 512
!--- The RSA key pair defined is for usage-keys. auto-enroll regenerate crypto isakmp policy 10
hash md5 crypto isakmp identity hostname ! ! crypto ipsec transform-set myset esp-des esp-md5-
hmac ! crypto map vpn 10 ipsec-isakmp set peer 172.16.172.35 set transform-set myset match
address 101 ! ! ! voice call carrier capacity active ! ! interface Ethernet1/0 no ip address
duplex half ! interface Ethernet1/1 ip address 172.16.172.51 255.255.255.240 no ip redirects
duplex half crypto map vpn ! interface Ethernet1/2 ip address 3.3.3.2 255.255.255.0 no keepalive
duplex half ! interface Ethernet1/3 no ip address duplex half ! interface Hssi4/0 ip address
200.1.1.1 255.255.255.0 load-interval 30 fair-queue 64 16 0 hssi dce serial restart_delay 0
clockrate 1524705 ! ip classless ip route 0.0.0.0 0.0.0.0 172.16.172.49 no ip http server ip pim
bidir-enable ! ! access-list 101 permit ip 3.3.3.0 0.0.0.255 192.168.4.0 0.0.0.255 ! snmp-server
community public RO snmp-server enable traps tty ! ! call rsvp-sync ! ! mgcp profile default !
dial-peer cor custom ! ! ! ! gatekeeper shutdown ! ! line con 0 exec-timeout 0 0 line aux 0 line
vty 0 4 privilege level 15 password cisco login line vty 5 15 login ! 7204-1# 7204-1# 7204-1#
7204-1#% Time to Re-enroll trust_point caserver2% You must authenticate the Certificate
Authority before you can enroll with it. sh cry ke 7204-1#show crypto key mypubkey rsa
```

```
!--- There is no RSA key pair on the router at this time. 7204-1# 7204-1#show clock
*17:27:54.232 PST Mon Oct 28 2002
7204-1#show crypto ca certificate
7204-1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
7204-1(config)# crypto ca authenticate caserver2
7204-1#show d
*Oct 29 00:28:17: %SYS-5-CONFIG_I: Configured from console by consoleebug
Cryptographic Subsystem:
 Crypto PKI Trans debugging is on
7204-1#
7204-1#
7204-1#configure terminal
7204-1(config)#crypto ca authenticate caserver2
Certificate has the following attributes:
Fingerprint: A1E8B61A FD1A66D6 2DE35501 99C43D83
% Do you accept this certificate? [yes/no]:
*Oct 29 00:28:33: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2
HTTP/1.0
*Oct 29 00:28:33: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:28:33: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:28:33: CRYPTO_PKI: http connection opened
*Oct 29 00:28:34: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:28:40 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert


Content-Type indicates we have received CA and RA certificates.
*Oct 29 00:28:34: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
*Oct 29 00:28:34: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:28:34: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:28:34: CRYPTO_PKI: transaction GetCACert completed
*Oct 29 00:28:34: CRYPTO_PKI: CA certificate received.
*Oct 29 00:28:34: CRYPTO_PKI: CA certificate received.
*Oct 29 00:28:34: CRYPTO_PKI: crypto_pki_authenticate_tp_cert()
*Oct 29 00:28:34: CRYPTO_PKI: trustpoint caserver2 authentication status
= 2
% Please answer 'yes' or 'no'.
% Do you accept this certificate? [yes/no]:
y
Trustpoint CA certificate accepted.
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
*Oct 29 00:28:40: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#
7204-1(config)#% Time to Re-enroll trust_point
caserver2
Can not select my full public key (ciscotac)
```

Can not select my full public key (ciscotac)
Can not select my full public key (ciscotac)%
Start certificate enrollment ..
% The subject name in the certificate will
be: OU=BERLIN O=GERMANY
% The subject name in the certificate will
be: 7204-1.cisco.com
% The serial number in the certificate will
be: 01691291
% Certificate request sent to Certificate
Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
*Oct 29 00:29:10: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
 Signing Certificate Reqeust Fingerprint:
 D3EA83A5 B255CDA0 C65BF99D 4C1A978B
*Oct 29 00:29:10: %SSH-5-ENABLED: SSH 1.5 has been enabled
*Oct 29 00:29:10: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
*Oct 29 00:29:10: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2
HTTP/1.0

*Oct 29 00:29:10: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:29:10: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:29:11: CRYPTO_PKI: http connection opened
*Oct 29 00:29:11: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:29:17 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert

Content-Type indicates we have received CA and RA certificates.
*Oct 29 00:29:11: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
*Oct 29 00:29:11: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:29:11: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:29:11: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
*Oct 29 00:29:11: CRYPTO_PKI: transaction PKCSReq completed
*Oct 29 00:29:11: CRYPTO_PKI: status:
*Oct 29 00:29:11: CRYPTO_PKI: All sockets are closed for trustpoint
caserver2.
*Oct 29 00:29:11: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:29:11: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:29:11: CRYPTO_PKI: http connection opened
Encryption Certificate Request Fingerprint:
 3258F1D9 0412BFA8 2FD14FBC B7345089
*Oct 29 00:29:13: CRYPTO_PKI: can not resolve server name/IP address
*Oct 29 00:29:13: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
*Oct 29 00:29:13: CRYPTO_PKI: http connection opened
*Oct 29 00:29:15: CRYPTO_PKI: received msg of 1930 bytes
*Oct 29 00:29:15: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:29:19 GMT
Content-Length: 1784
Content-Type: application/x-pki-message

```
*Oct 29 00:29:15: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:29:15: CRYPTO_PKI: status = 100: certificate is granted
*Oct 29 00:29:15: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 29 00:29:15: %CRYPTO-6-CERTRET: Certificate received from Certificate
Authority
*Oct 29 00:29:25: CRYPTO_PKI: received msg of 1930 bytes
*Oct 29 00:29:25: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Tue, 29 Oct 2002 00:29:21 GMT
Content-Length: 1784
Content-Type: application/x-pki-message

*Oct 29 00:29:25: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL
*Oct 29 00:29:25: CRYPTO_PKI: status = 100: certificate is granted
*Oct 29 00:29:25: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 29 00:29:25: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
*Oct 29 00:29:25: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
*Oct 29 00:29:25: %CRYPTO-6-CERTRET: Certificate
received from Certificate Authority
*Oct 29 00:29:25: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.
*Oct 29 00:29:25: %CRYPTO-4-NOAUTOSAVE: Configuration was modified.
Issue "write memory" to save new certificate
*Oct 29 00:29:25: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
*Oct 29 00:29:25: CRYPTO_PKI: All enrollment requests completed for
trustpoint caserver2.
7204-1(config)#
7204-1(config)#^Z
7204-1#
7204-1#
7204-1#
*Oct 29 00:30:32: %SYS-5-CONFIG_I: Configured from console by console
7204-1#
 !---- An RSA usage-key pair was generated. 7204-1#show crypto key mypubkey rsa
% Key pair was generated at: 17:29:10 PST
Oct 28 2002
Key name: ciscotac
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00E29E58
FD93989D
 F6997DA1 D191123C 661FEB81 789522EE 0CB8D5AD 8A4E9DED E5CDCFDC
78829A68
 41962AD9 5D51AA21 F1C31271 23A7EA4D 6F632CD1 2CFD95C9 D3020301
0001
% Key pair was generated at: 17:29:10 PST Oct 28 2002
Key name: ciscotac
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 009FB6F5
73B9C0D7
 0BF59C1F 579606A6 E4CEE4AD 8BC307B9 3EC3955B 5FA1B355 665750E2
EC09F8EF
 2B5F1D72 0E2FDB8B 0AA16911 492A749F 08113C64 6A203BB7 A9020301
0001
% Key pair was generated at: 17:29:11 PST Oct 28 2002
```

```
Key name: ciscotac.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00CE8A87
0698C6DF
 D13D7CF8 C5504394 24D23E0E 2B8367AE 11E6F5AF BD5B6A27 11E63F99
EB768894
 A234A6FD 54B90A93 F352B551 08FC32E7 5D0B1F68 2E42974A 4BEB7A9C
EA989DD1
 35267E59 D1C84CC5 DA436E72 8BAB6B3B 60D0AB62 129FAB02 1F020301
0001
7204-1#
7204-1#
7204-1#
7204-1#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 09F8AC9500000000003E
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 17:19:21 PST Oct 28 2002
 end date: 17:29:21 PST Oct 29 2002
 renew date: 17:29:19 PST Oct 29 2002
 Associated Trustpoints: caserver2
Certificate
 Status: Available
 Certificate Serial Number: 09F8A45E00000000003D
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 7204-1.cisco.com
 Serial Number: 01691291
 OU = "BERLIN O=GERMANY"
 OID.1.2.840.113549.1.9.2 = 7204-1.cisco.com
 OID.2.5.4.5 = 1691291
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 17:19:19 PST Oct 28 2002
 end date: 17:29:19 PST Oct 29 2002
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
```

```
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
 start date: 21:19:50 PST Dec 6 2001
 end date: 21:29:42 PST Dec 6 2003
 Associated Trustpoints: caserver2
7204-1#
```

当身份证书过期时

2611-VPN 未配置外部时间源，并且使用系统时钟跟踪时间。在路由器上声明 CA 服务器 2，验证 CA 服务器，并且 2611-VPN 路由器将在 CA 服务器上自动注册其身份证书。配置 CA 服务器，以便颁发有效日期仅为一天的身份证书。一旦证书过期，路由器将在 CA 服务器上自动注册，此输出显示了相关事件序列。

```
2611-VPN#clock set 19:30:00 26 oct 2002
!--- Sets the system clock. 2611-VPN# 2611-VPN(config)#crypto ca trustpoint caserver2
!--- Declares the CA server communication parameters. 2611-VPN(ca-trustpoint)# enrollment retry
period 5
2611-VPN(ca-trustpoint)# enrollment mode ra
2611-VPN(ca-trustpoint)# enrollment url url http://171.69.89.111:80/certsrv/mscep/
mscep.dll
2611-VPN(ca-trustpoint)# usage ike
2611-VPN(ca-trustpoint)# serial-number
2611-VPN(ca-trustpoint)# fqdn 2611-vpn.cisco.com
2611-VPN(ca-trustpoint)# ip-address Ethernet0/0
2611-VPN(ca-trustpoint)# password 7 12170A1917
2611-VPN(ca-trustpoint)# subject-name OU=ROME O=ITALY
2611-VPN(ca-trustpoint)# crl optional
2611-VPN(ca-trustpoint)# rsakeypair tacvpn
2611-VPN(ca-trustpoint)# auto-enroll regenerate
2611-VPN(ca-trustpoint)#
Oct 26 19:30:53.772: CRYPTO_PKI:Insert Selfsigned Certificate:
 30 82 01 4E 30 81 F9 02 20 38 42 33 34 38 41
44
 Hex data omitted
 AF 16 7B C1 4E 61 99 24 86 55 30 0D 96 91
4D 47
 70 62
Oct 26 19:30:53.820: CRYPTO_PKI: InsertCertData: subject name =
 30 23 31 21 30 1F 06 09 2A 86 48 86 F7 0D 01
09
 02 16 12 32 36 31 31 2D 76 70 6E 2E 63 69
73 63
```

```
 6F 2E 63 6F 6D
Oct 26 19:30:53.828: CRYPTO_PKI: InsertCertData: issuer name =
 30 23 31 21 30 1F 06 09 2A 86 48 86 F7 0D 01
09
 02 16 12 32 36 31 31 2D 76 70 6E 2E 63 69
73 63
 6F 2E 63 6F 6D
Oct 26 19:30:53.832: CRYPTO_PKI: InsertCertData: serial number =
 38 42 33 34 38 41 44 39 38 39 38 34 34 32
44 34
 45 46 30 39 32 33 43 39 39 42 34 46 36 46
30 39
2611-VPN(config)#crypto ca authenticate caserver2
!--- Authenticates the CA server. Certificate has the following attributes: Fingerprint:
A1E8B61A FD1A66D6 2DE35501 99C43D83 % Do you accept this certificate? [yes/no]: Oct 26
19:31:10.936: CRYPTO_PKI: Sending CA Certificate Request: GET
/certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2 HTTP/1.0 Oct 26
19:31:10.940: CRYPTO_PKI: can not resolve server name/IP address Oct 26 19:31:10.940:
CRYPTO_PKI: Using unresolved IP Address 171.69.89.111 Oct 26 19:31:10.944: CRYPTO_PKI: http
connection opened Oct 26 19:31:11.401: CRYPTO_PKI: HTTP response header: HTTP/1.1 200 OK Server:
Microsoft-IIS/5.0 Date: Sun, 27 Oct 2002 02:30:22 GMT Content-Length: 2811 Content-Type:
application/x-x509-ca-ra-cert Content-Type indicates we have received CA
and RA certificates.
Oct 26 19:31:11.405: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
Oct 26 19:31:11.405: CRYPTO_PKI:CA and RA certs (cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 55 04 0A 13 05 63 69 73 63 6F 31 0C 30 0A
06y
Trustpoint CA certificate accepted.
2611-VPN(config)# 03
 55 04 0B 13 03 74 61 63 31 14 30 12 06 03
55 04
 hex data omitted
 A9 13 93 1E E6 E1 E4 30 07 31 00
Oct 26 19:31:11.801: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:11.813: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:11.825: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 26 19:31:11.865: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:31:11.885: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:11.897: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
Oct 26 19:31:11.901: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:31:11.941: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
```

```
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:31:11.957: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:11.969: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 26 19:31:11.977: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:31:11.981: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:11.998: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:12.010: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 26 19:31:12.014: CRYPTO_PKI: transaction GetCACert completed
Oct 26 19:31:12.014: CRYPTO_PKI: CA certificate
received.
Oct 26 19:31:12.014: CRYPTO_PKI: CA certificate received.
Oct 26 19:31:12.030: CRYPTO_PKI: crypto_pki_authenticate_tp_cert()
Oct 26 19:31:12.030: CRYPTO_PKI: trustpoint caserver2
authentication status = 2
Oct 26 19:31:13.837: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:13.849: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:31:13.861: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
 % Time to Re-enroll trust_point caserver2
Can not select my full public key (tacvpn)%
Start certificate enrollment ..
% The subject name in the certificate will
be: OU=ROME O=ITALY
% The fully-qualified domain name in the certificate
will be: 2611-vpn.cisco.com
% The subject name in the certificate will
be: 2611-vpn.cisco.com
% The serial number in the certificate will
be: 721959E3% Certificate request sent to Certificate Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
 Signing Certificate Reqeust Fingerprint:
 00599B4B 62BAAE44 1706AF6E CD689B5D
Oct 26 19:32:43.532: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2
HTTP/1.0
```

```
Oct 26 19:32:43.532: CRYPTO_PKI: can not resolve server name/IP address
Oct 26 19:32:43.532: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 26 19:32:43.540: CRYPTO_PKI: http connection opened
Oct 26 19:32:44.032: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:31:55 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert


Content-Type indicates we have received CA and RA certificates.
Oct 26 19:32:44.032: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
Oct 26 19:32:44.032: CRYPTO_PKI:CA and RA certs (cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 61 6C 69 66 6F 72 6E 69 61 31 11 3
 Encryption Certificate Request Fingerprint:
 798894EE 357D6023 FD4F6C4E 75BF9611
 hex data omitted
 A9 13 93 1E E6 E1 E4 30 07 31 00
Oct 26 19:32:44.489: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.505: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hexdata omitted
 76 70 6E
Oct 26 19:32:44.517: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 26 19:32:44.557: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:32:44.573: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.589: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
Oct 26 19:32:44.593: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:32:44.641: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:32:44.657: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.669: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 26 19:32:44.677: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:32:44.681: CRYPTO_PKI: InsertCertData: subject name =
```

```
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:32:44.697: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03 13
03
 76 70 6E
Oct 26 19:32:44.710: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 26 19:32:44.718: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 26 19:32:44.730: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.742: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
Oct 26 19:32:44.750: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.762: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 26 19:32:44.774: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 26 19:32:44.778: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
Oct 26 19:32:44.782: CRYPTO_PKI: transaction PKCSReq completed
Oct 26 19:32:44.782: CRYPTO_PKI: status:
Oct 26 19:32:44.974: CRYPTO_PKI:Write out pkcs#10 content:347
 30 82 01 57 30 82 01 01 02 01 00 30 67 31
15 30
 hex data omitted
 E0 7C A2 40 42 6B 87 AA 59 25 01
Oct 26 19:32:45.102: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
Oct 26 19:32:45.383: CRYPTO_PKI:Signed Data for trustpoint caserver2
(1448 bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted
 00 00 00 00 00 00 00 00
Oct 26 19:32:45.571: CRYPTO_PKI: can not resolve server name/IP address
Oct 26 19:32:45.571: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 26 19:32:45.579: CRYPTO_PKI: http connection opened
Oct 26 19:32:47.779: CRYPTO_PKI:Write out pkcs#10 content:347
 30 82 01 57 30 82 01 01 02 01 00 30 67 31
15 30
 hex data omitted
 C0 71 E0 1C B9 47 E7 DB 0E 8A 61
```

```
Oct 26 19:32:47.907: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
Oct 26 19:32:48.191: CRYPTO_PKI:Signed Data for trustpoint caserver2
(1448 bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted
 00 00 00 00 00 00 00 00
Oct 26 19:32:48.380: CRYPTO_PKI: can not resolve server name/IP address
Oct 26 19:32:48.380: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 26 19:32:48.452: CRYPTO_PKI: http connection opened
Oct 26 19:32:50.483: CRYPTO_PKI: received msg of 1972 bytes
Oct 26 19:32:50.483: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:31:59 GMT
Content-Length: 1826
Content-Type: application/x-pki-message


Oct 26 19:32:50.487: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1826 bytes
 30 82 07 1E 06 09 2A 86 48 86 F7 0D 01 07 02
A0
hex data omitted

 80 82 04 08 71 23 FE
Oct 26 19:32:51.465: %CRYPTO-6-CERTRET:
Certificate received from Certificate Authority
Oct 26 19:33:11.469: CRYPTO_PKI: received msg of 1972 bytes
Oct 26 19:33:11.469: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Sun, 27 Oct 2002 02:32:02 GMT
Content-Length: 1826
Content-Type: application/x-pki-message


Oct 26 19:33:11.473: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1826 bytes
 30 82 07 1E 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 54 25
Oct 26 19:33:11.734: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted

 70 6B 69 2D 72 61
Oct 26 19:33:11.750: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
hex data omitted

 76 70 6E
Oct 26 19:33:11.762: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 26 19:33:11.770: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:33:11.842: CRYPTO_PKI: signed attr: pki-message-type:
```

```
13 01 33
Oct 26 19:33:11.842: CRYPTO_PKI: signed attr: pki-status:
13 01 30
Oct 26 19:33:11.846: CRYPTO_PKI: signed attr: pki-recipient-nonce:
 04 10 E0 59 89 15 0A E0 C5 2D 2B 44 82 72
7B E7
 4D EF
Oct 26 19:33:11.850: CRYPTO_PKI: signed attr: pki-transaction-id:
 13 20 41 45 32 37 39 37 41 32 33 41 41 32
44 45
 30 32 38 37 45 38 34 39 35 45 36 37 30 34
33 38
 34 30
Oct 26 19:33:11.854: CRYPTO_PKI: status = 100: certificate is granted
Oct 26 19:33:11.854: CRYPTO_PKI:Verified signed data for trustpoint
caserver2 (1259 bytes):
 30 82 04 E7 06 09 2A 86 48 86 F7 0D 01 07
03 A0
 hex data omitted
 1B D5 43 D5 E3 88 F6 F5 D5 09 45
Oct 26 19:33:12.191: CRYPTO_PKI:Decrypted enveloped content:
 30 82 03 FE 06 09 2A 86 48 86 F7 0D 01 07
02 A0
 hex data omitted
 54 DD C1 E0 03 85 EC B3 E9 B0 63 3D FF F2
C9 7F

Oct 26 19:33:12.355: CRYPTO_PKI: InsertCertData: subject name =
 30 6B 31 11 30 0F 06 03 55 04 05 13 08 37 32
31
 hex data omitted
 0C 52 4F 4D 45 20 4F 3D 49 54 41 4C 59
Oct 26 19:33:12.371: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13
02 55 53 31
 hex data omitted
 76 70 6E
Oct 26 19:33:12.383: CRYPTO_PKI: InsertCertData: serial number =
61 1C 41 E0 00 00 00 00 00 37
Oct 26 19:33:12.391: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 26 19:33:12.407: CRYPTO_PKI: InsertCertData: subject name =
 30 6B 31 11 30 0F 06 03 55 04 05 13 08 37 32
31
 39 35 39 45 33 31 1C 30 1A 06 09
Oct 26 19:33:12.459: CRYPTO_PKI: WARNING: Certificate, private key
or CRL was not found while selecting CRL
Oct 26 19:33:22.503: CRYPTO_PKI: All enrollment
requests completed for trustpoint caserver2.

2611-VPN#show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 611C41E0000000000037
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
```

!--- The subject name, IP address, and serial !--- numbers of the certificate issued by CA server2. **IP Address: 172.16.172.35**
Serial Number: 721959E3
OU = "ROME O=ITALY"
OID.1.2.840.113549.1.9.2
= 2611-vpn.cisco.com
OID.1.2.840.113549.1.9.8
= 172.16.172.35
OID.2.5.4.5 = 721959E3
CRL Distribution Point:
http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
start date: 02:22:02 UTC
Oct 27 2002
end date: 02:32:02
UTC Oct 28 2002

!--- CA server2 issued a certificate with a !--- validity period of one day. !--- The renew date indicates the time for reenrollment !--- with the CA server. **renew date: 02:31:59 UTC**
Oct 28 2002
Associated Trustpoints: caserver2
Certificate
Status: Available
Certificate Serial Number: 611C3624000000000036
Certificate Usage: Signature
Issuer:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US
Subject:
Name: 2611-vpn.cisco.com
IP Address: 172.16.172.35
Serial Number: 721959E3
OU = "ROME O=ITALY"
OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
OID.1.2.840.113549.1.9.8 = 172.16.172.35
OID.2.5.4.5 = 721959E3
CRL Distribution Point:
http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
Validity Date:
start date: 02:21:59 UTC Oct 27 2002
end date: 02:31:59 UTC Oct 28 2002
Associated Trustpoints: caserver2
CA Certificate
Status: Available
Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
Certificate Usage: Signature
Issuer:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US
Subject:
CN = vpn
OU = cisco
O = tac
L = san jose
ST = california
C = US

```
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 04:19:50 UTC Dec 7 2001
 end date: 04:29:42 UTC Dec 7 2003
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
 Certificate Serial Number: 0E7EC1B68A2F14BD4C4515AF44C45732
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 20:52:48 UTC Sep 17 2002
 end date: 21:02:37 UTC Sep 17 2017
 Associated Trustpoints: caserver1
Certificate
 Status: Available
 Certificate Serial Number: 6103EE0A000000000038
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 03:33:05 UTC Oct 26 2002
 end date: 03:43:05 UTC Oct 26 2003
 Associated Trustpoints: caserver1
Certificate
 Status: Available
 Certificate Serial Number: 6104020F000000000039
 Certificate Usage: Encryption
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
```

```
 ST = CA
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 03:33:10 UTC
Oct 26 2002
 end date: 03:43:10
UTC Oct 26 2003
 renew date: 03:43:05 UTC
Oct 26 2003
 Associated Trustpoints: caserver1


2611-VPN#show crypto key mypubkey rsa
% Key pair was generated at: 00:14:06 UTC
Mar 1 1993
Key name: ciscovpn
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A2DE57
2C7A4555
 BF87D3CC 4A260DBF 56574554 472FC72C 0461A35B E41B5B53 BE81A47E
264A68D7
 08662555 27E4E301 2AF04B1C E472F70B 74DF38A0 6EB286F9 01020301
0001
% Key pair was generated at: 00:14:10 UTC Mar 1 1993
Key name: ciscovpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D10224
8CBEC2D7
 B517DF99 7363717D 6F6CA0F1 83FB7874 E60BB169 CD4AD9CA 92E04143
16D4D253
 5CBF212F FF6268A5 329AB988 2655568C 8EC19017 6F4A4C86 43020301
0001
% Key pair was generated at: 00:14:59 UTC Mar 1 1993
!--- The RSA key pair is generated during !--- the next auto reenroll . Key name: tacvpn
!--- This key pair was generated before the system !--- clock was set, hence the 1993 date.
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00AB2884
22A070D0
 A8C84C3E CD45A382 F4CDB158 5B31B624 5C92632C 5DC1977E 686E1C18
DA16BE57
 6FBA9518 4D2F01B8 0D59528D 447014D3 02D5A631 84E54CD4 FB020301
0001
% Key pair was generated at: 00:15:00 UTC Mar 1 1993
Key name: tacvpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00AB7576
9D0A2D65
 7BB9B465 AF227B73 2B83AFD6 3791FA54 3A2DB845 55E4540F 35972460
B87C613E
 82DBC4D2 51E6F9A7 07164C57 B02D28B8 93F8D50F D5C3444F 01020301
```

```
0001
% Key pair was generated at: 22:02:57 UTC Oct 27 2002
Key name: ciscovpn.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00D42A5E
4C9D27F1
 195CC537 7CF9E390 935DFBA3 2DA01B3B C5E50620 57B902A3 50876FA1
1A9D83FD
 0EB437F7 E0568EB7 830A46FA E9D9BA4F 3E8B132D F24A08B8 E2154944
36829D64
 E48077EF 224BF142 A3A92672 F0BC57F5 063EF64A 8B775979 CD020301
0001
2611-VPN#
2611-VPN#
2611-VPN# show clock
19:29:20.304 UTC Sun Oct 27 2002
2611-VPN#
2611-VPN#
2611-VPN#
!--- The certificate from CA server2 expired and the router is !--- reenrolling automatically
without user intervention. 2611-VPN#% Time to Re-enroll trust_point caserver2 Can not select my
full public key (tacvpn)% Start certificate enrollment ..
% The subject name in the certificate will
be: OU=ROME O=ITALY
% The fully-qualified domain name in the certificate
will be: 2611-vpn.cisco.com
% The subject name in the certificate will
be: 2611-vpn.cisco.com
% The serial number in the certificate will
be: 721959E3% Certificate request sent to Certificate Authority
% The certificate request fingerprint will
be displayed.
% The 'show crypto ca certificate' command
will also show the fingerprint.
Oct 28 02:32:01.210: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
Oct 28 02:32:02.924: %CRYPTO-6-AUTOGEN: Generated new 512 bit key pair
Oct 28 02:32:02.944: CRYPTO_PKI: Sending CA Certificate Request:
GET /certsrv/mscep/mscep.dll/pkiclient.exe?operation=GetCACert&message;=caserver2
HTTP/1.0
Oct 28 02:32:02.944: CRYPTO_PKI: can not resolve server name/IP address
Oct 28 02:32:02.944: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
 Signing Certificate Reqeust Fingerprint:
 99E260CF 476B54E1 B6486AF3 98FD0F02
Oct 28 02:32:02.952: CRYPTO_PKI: http connection opened
Oct 28 02:32:03.461: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 09:31:15 GMT
Content-Length: 2811
Content-Type: application/x-x509-ca-ra-cert


Content-Type indicates we have received CA and RA certificates.
Oct 28 02:32:03.461: CRYPTO_PKI:crypto_process_ca_ra_cert(trustpoint=caserver2)
Oct 28 02:32:03.461: CRYPTO_PKI:CA and RA certs (cert data):
 30 82 0A F7 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 00 9D B4 04 E9 46 13 45 37 10 59 AE B1 F7 39
C1
 73 D3 F2 DB 0C 95 5A F7 C9 F
 Encryption Certificate Request Fingerprint:
 BE1C5800 A6F895FF AC8DBAF9 0DED9356
```

```
 A9 13 93 1E E6 E1 E4 30 07 31
00
 hex data omitted
Oct 28 02:32:03.922: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 28 02:32:03.934: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 13 30 11 06 03 55 04 08 13 0A 63 61 6C 69
66 6F
 72 6E 69 61 31 11 30 0F 06 03 55 04 07 13
08 73
 61 6E 20 6A 6F 73 65 31 0C 30 0A 06 03 55
04 0A
 13 03 74 61 63 31 0E 30 0C 06 03 55 04 0B
13 05
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03
13 03
 76 70 6E
Oct 28 02:32:03.946: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 28 02:32:03.990: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 28 02:32:04.006: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 28 02:32:04.018: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
Oct 28 02:32:04.026: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 28 02:32:04.066: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted

 70 6B 69 2D 72 61
Oct 28 02:32:04.082: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 13 30 11 06 03 55 04 08 13 0A 63 61 6C 69
66 6F
 72 6E 69 61 31 11 30 0F 06 03 55 04 07 13
08 73
 61 6E 20 6A 6F 73 65 31 0C 30 0A 06 03 55
04 0A
 13 03 74 61 63 31 0E 30 0C 06 03 55 04 0B
13 05
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03
13 03
 76 70 6E
Oct 28 02:32:04.094: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 28 02:32:04.098: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 28 02:32:04.106: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
```

```
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 28 02:32:04.122: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 28 02:32:04.134: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 28 02:32:04.138: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 28 02:32:04.154: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 13 30 11 06 03 55 04 08 13 0A 63 61 6C 69
66 6F
 72 6E 69 61 31 11 30 0F 06 03 55 04 07 13
08 73
 61 6E 20 6A 6F 73 65 31 0C 30 0A 06 03 55
04 0A
 13 03 74 61 63 31 0E 30 0C 06 03 55 04 0B
13 05
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03
13 03
 76 70 6E
Oct 28 02:32:04.166: CRYPTO_PKI: InsertCertData: serial number =
14 6C F2 85 00 00 00 00 00 09
Oct 28 02:32:04.174: CRYPTO_PKI: InsertCertData: subject name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 28 02:32:04.186: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 13 30 11 06 03 55 04 08 13 0A 63 61 6C 69
66 6F
 72 6E 69 61 31 11 30 0F 06 03 55 04 07 13
08 73
 61 6E 20 6A 6F 73 65 31 0C 30 0A 06 03 55
04 0A
 13 03 74 61 63 31 0E 30 0C 06 03 55 04 0B
13 05
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03
13 03
 76 70 6E
Oct 28 02:32:04.202: CRYPTO_PKI: InsertCertData: serial number =
3E 34 CD 19 93 92 A0 91 46 21 EA 77 8B 13 F3 57
Oct 28 02:32:04.202: CRYPTO_PKI: crypto_process_ra_certs(trust_point=caserver2)
Oct 28 02:32:04.206: CRYPTO_PKI: transaction PKCSReq completed
Oct 28 02:32:04.206: CRYPTO_PKI: status:
Oct 28 02:32:04.399: CRYPTO_PKI:Write out pkcs#10 content:347
 30 82 01 57 30 82 01 01 02 01 00 30 67 31
15 30
 hex data omitted
 79 A3 FC A6 13 E5 35 5B 6E 48 6D
Oct 28 02:32:04.527: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
```

```
 04 08 69 29 B2 72 10 92 09 AF 00 00 00 00 00
00
 00 00 00 00
Oct 28 02:32:04.807: CRYPTO_PKI:Signed Data for trustpoint caserver2
(2129 bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted
 F0 20 30 3F 15 41 BD A6 F5 00 00 00 00 00 00
00
 00
Oct 28 02:32:05.080: CRYPTO_PKI: can not resolve server name/IP address
Oct 28 02:32:05.084: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 28 02:32:05.088: CRYPTO_PKI: http connection opened
Oct 28 02:32:07.292: CRYPTO_PKI:Write out pkcs#10 content:347
 30 82 01 57 30 82 01 01 02 01 00 30 67 31
15 30
 13 06 03 55 04 0B 13 0C 52 4F 4D 45 20 4F
3D 49
 hex data omitted
 A5 FF 13 4A CF B0 2B 0C A8 7D BF
Oct 28 02:32:07.416: CRYPTO_PKI:Enveloped Data for trustpoint caserver2...
 30 80 06 09 2A 86 48 86 F7 0D 01 07 03 A0 80
30
 hex data omitted
 00 00 00 00
Oct 28 02:32:07.716: CRYPTO_PKI:Signed Data for trustpoint caserver2
(2129 bytes)
 30 80 06 09 2A 86 48 86 F7 0D 01 07 02 A0
80 30
 hex data omitted
 0A F2 8F 78 FB 4E 6B C2 CB 00 00 00 00 00 00
00
 00
Oct 28 02:32:07.989: CRYPTO_PKI: can not resolve server name/IP address
Oct 28 02:32:07.989: CRYPTO_PKI: Using unresolved IP Address 171.69.89.111
Oct 28 02:32:08.049: CRYPTO_PKI: http connection opened
Oct 28 02:32:10.064: CRYPTO_PKI: received msg of 2012 bytes
Oct 28 02:32:10.064: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 09:31:20 GMT
Content-Length: 1866
Content-Type: application/x-pki-message


Oct 28 02:32:10.064: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1866 bytes
 30 82 07 46 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 6D DB 94 FF 71 DD A0 E6 1B E9 31 66 76 D2 5C
FC
Oct 28 02:32:11.070: %CRYPTO-6-CERTRET:
Certificate received from Certificate Authority
Oct 28 02:32:31.075: CRYPTO_PKI: received msg of 2012 bytes
Oct 28 02:32:31.075: CRYPTO_PKI: HTTP response header:
HTTP/1.1 200 OK
Server: Microsoft-IIS/5.0
Date: Mon, 28 Oct 2002 09:31:23 GMT
Content-Length: 1866
Content-Type: application/x-pki-message
```

```
Oct 28 02:32:31.079: CRYPTO_PKI:Received pki message (PKCS7) for trustpoint
caserver2: 1866 bytes
 30 82 07 46 06 09 2A 86 48 86 F7 0D 01 07 02
A0
 hex data omitted
 95 4B D4 80 86 DC 91 FF F2 C8 30 CF 20 42 07
BE
 BA F2 B1 6A 9A 24 FC 46 35 61
Oct 28 02:32:31.343: CRYPTO_PKI: InsertCertData: subject name =
 30 81 83 31 20 30 1E 06 09 2A 86 48 86 F7 0D
01
 hex data omitted
 70 6B 69 2D 72 61
Oct 28 02:32:31.359: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 76 70 6E
Oct 28 02:32:31.375: CRYPTO_PKI: InsertCertData: serial number =
14 6C F1 A9 00 00 00 00 00 08
Oct 28 02:32:31.379: CRYPTO_PKI: WARNING: Certificate, private key or
CRL was not found while selecting CRL
Oct 28 02:32:31.451: CRYPTO_PKI: signed attr: pki-message-type:
13 01 33
Oct 28 02:32:31.455: CRYPTO_PKI: signed attr: pki-status:
13 01 30
Oct 28 02:32:31.455: CRYPTO_PKI: signed attr: pki-recipient-nonce:
 04 10 0C CF 22 65 E3 50 72 E0 0C 59 42 A2
54 6F
 1F 6B
Oct 28 02:32:31.459: CRYPTO_PKI: signed attr: pki-transaction-id:
 13 20 34 39 36 31 38 32 36 35 37 42 33 39
33 34
 44 45 38 34 33 44 43 33 42 31 42 33 36 32
41 46
 34 33
Oct 28 02:32:31.467: CRYPTO_PKI:
status = 100: certificate is granted
Oct 28 02:32:31.467: CRYPTO_PKI:Verified signed data for trustpoint
caserver2 (1299 bytes):
 30 82 05 0F 06 09 2A 86 48 86 F7 0D 01 07
03 A0
 hex data omitted

 0B 7E 8B 1F 53 17 7E 13 BC 62 9A 3E F5 13 44
D6
 2C CE 8F
Oct 28 02:32:31.800: CRYPTO_PKI:Decrypted enveloped content:
 30 82 03 FE 06 09 2A 86 48 86 F7 0D 01 07
02 A0
 hex data omitted
 EF 3D 6E 15 63 C3 3C F9 79 54 BA 6D 57 68 5B
43
 31 00
Oct 28 02:32:31.988: CRYPTO_PKI: InsertCertData: subject name =
 30 6B 31 11 30 0F 06 03 55 04 05 13 08 37 32
31
hex data omitted
 0C 52 4F 4D 45 20 4F 3D 49 54 41 4C 59
Oct 28 02:32:32.000: CRYPTO_PKI: InsertCertData: issuer name =
 30 61 31 0B 30 09 06 03 55 04 06 13 02 55 53
31
 hex data omitted
 63 69 73 63 6F 31 0C 30 0A 06 03 55 04 03 13
```

```
03
 76 70 6E
Oct 28 02:32:32.016: CRYPTO_PKI: InsertCertData: serial number =
06
Oct 28 02:32:32.116: CRYPTO_PKI:removing superceded cert serial #:
611C41E0000000000037
Oct 28 02:32:32.120: CRYPTO_PKI:removing superceded cert serial #:
611C3624000000000036
Oct 28 02:32:42.121: CRYPTO_PKI:
All enrollment requests completed for trustpoint caserver2.
2611-VPN#show crypto key mypubkey rsa
% Key pair was generated at: 00:14:06 UTC Mar 1 1993
Key name: ciscovpn
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00A2DE57
2C7A4555
 BF87D3CC 4A260DBF 56574554 472FC72C 0461A35B E41B5B53 BE81A47E
264A68D7
 08662555 27E4E301 2AF04B1C E472F70B 74DF38A0 6EB286F9 01020301
0001
% Key pair was generated at: 00:14:10 UTC Mar 1 1993
Key name: ciscovpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00D10224
8CBEC2D7
 B517DF99 7363717D 6F6CA0F1 83FB7874 E60BB169 CD4AD9CA 92E04143
16D4D253
 5CBF212F FF6268A5 329AB988 2655568C 8EC19017 6F4A4C86 43020301
0001
% Key pair was generated at: 02:32:01 UTC Oct 28 2002
Key name: tacvpn
Usage: Signature Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00BFC0C4
6217E11E
 96447AE7 3579A8AC 0E3354BD 54080ABD 32A94C9D CAFC009A DD441CD4
7962C6E8
 82A6C63D DCBF454A 342B0815 3C7FF706 583316D3 ABF7E53D 51020301
0001
!--- The RSA key pair was regenerated with the !--- reenroll of the identity certificate. % Key
pair was generated at: 02:32:02
UTC Oct 28 2002
Key name: tacvpn
Usage: Encryption Key
Key Data:
 305C300D 06092A86 4886F70D 01010105 00034B00 30480241 00E65D19
513BCF3C
 486F722E 9E9EB410 E26A8BA0 F492C824 AF276EB4 53F5D22C 5BE90B52
91889E0E
 C896DF08 E4D3A899 B8F6C8CE 9884B4EE 49C787D5 DFFC9907 29020301
0001
% Key pair was generated at: 11:33:57 UTC Oct 28 2002
Key name: ciscovpn.server
Usage: Encryption Key
Key Data:
 307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00BBD14F
A16AE1D8
 98D25643 0A5BCA1B BE3809DA EED3672B A0CA07F3 E221A31C 3D64B59B
62A145B1
 82BE03D5 5D7FA248 064BA826 CFC35CAB 330CDCDD 8994F95D 450580DC
2B003FE1
 EB834755 AC083989 4F058F63 2E00CD3A 720075F2 500D38DE C1020301
```

```
0001
2611-VPN# show crypto ca certificate
Certificate
 Status: Available
 Certificate Serial Number: 06C28C8B00000000003B
 Certificate Usage: Encryption
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "ROME O=ITALY"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 09:21:23
UTC Oct 28 2002
!--- The CA server2 issued a new !--- identity certificate with a new renew date. end date:
09:31:23
UTC Oct 29 2002
 renew date: 09:31:20
UTC Oct 29 2002
 Associated Trustpoints: caserver2
Certificate
 Status: Available
 Certificate Serial Number: 06C2807F00000000003A
 Certificate Usage: Signature
 Issuer:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "ROME O=ITALY"
 OID.1.2.840.113549.1.9.2
= 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8
= 172.16.172.35
 OID.2.5.4.5 = 721959E3
/CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 09:21:20 UTC Oct 28 2002
 end date: 09:31:20 UTC Oct 29 2002
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
 Certificate Serial Number: 3E34CD199392A0914621EA778B13F357
 Certificate Usage: Signature
 Issuer:
```

```
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
 ST = california
 C = US
 Subject:
 CN = vpn
 OU = cisco
 O = tac
 L = san jose
ST = california
 C = US
 CRL Distribution Point:
 http://tac-2hq8cg5ti0h/CertEnroll/vpn.crl
 Validity Date:
 start date: 04:19:50 UTC Dec 7 2001
 end date: 04:29:42 UTC Dec 7 2003
 Associated Trustpoints: caserver2
CA Certificate
 Status: Available
 Certificate Serial Number: 0E7EC1B68A2F14BD4C4515AF44C45732
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 20:52:48 UTC Sep 17 2002
 end date: 21:02:37 UTC Sep 17 2017
 Associated Trustpoints: caserver1
Certificate
 Status: Available
 Certificate Serial Number: 6103EE0A000000000038
 Certificate Usage: Signature
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2 = 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8 = 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
```

```
 Validity Date:
 start date: 03:33:05 UTC Oct 26 2002
 end date: 03:43:05 UTC Oct 26 2003
 Associated Trustpoints: caserver1
Certificate
 Status: Available
 Certificate Serial Number: 6104020F000000000039
 Certificate Usage: Encryption
 Issuer:
 CN = SJVPNTAC-CAServer
 OU = TAC-VPN-SJ
 O = Cisco Systems
 L = San Jose
 ST = CA
 C = US
 Subject:
 Name: 2611-vpn.cisco.com
 IP Address: 172.16.172.35
 Serial Number: 721959E3
 OU = "PARIS O=FRANCE"
 OID.1.2.840.113549.1.9.2
= 2611-vpn.cisco.com
 OID.1.2.840.113549.1.9.8
= 172.16.172.35
 OID.2.5.4.5 = 721959E3
 CRL Distribution Point:
 http://ca-server/CertEnroll/SJVPNTAC-CAServer.crl
 Validity Date:
 start date: 03:33:10 UTC Oct 26 2002
 end date: 03:43:10 UTC Oct 26 2003
 renew date: 03:43:05 UTC Oct 26 2003
 Associated Trustpoints: caserver1
!--- Router with the new certificate !--- after automatic reenrollment. 2611-VPN#show run
Building configuration...
Current configuration : 15523 bytes
!
! Last configuration change at 19:31:48 UTC Sat Oct 26 2002
! NVRAM config last updated at 23:37:39 UTC Sun Oct 27 2002
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname 2611-VPN
!
!
memory-size iomem 10
ip subnet-zero
!
!
ip domain name cisco.com
ip host caserver2 171.69.89.111
ip host caserver1 171.69.89.125
!
!
crypto ca trustpoint caserver1
enrollment retry period 5
enrollment mode ra
enrollment url http://171.69.89.125:80/certsrv/mscep/mscep.dll
usage ike
serial-number
fqdn 2611-vpn.cisco.com
ip-address Ethernet0/0
```

```
password 7 011D090A5E
subject-name OU=PARIS O=FRANCE
crl optional
rsakeypair ciscovpn
auto-enroll regenerate
!
crypto ca trustpoint caserver2
enrollment retry period 5
enrollment mode ra
enrollment url http://171.69.89.111:80/certsrv/mscep/mscep.dll
usage ike
serial-number
fqdn 2611-vpn.cisco.com
ip-address Ethernet0/0
password 7 151C040201
 subject-name OU=ROME O=ITALY
crl optional
rsakeypair tacvpn
auto-enroll regenerate
crypto ca certificate chain caserver1
certificate ca 0E7EC1B68A2F14BD4C4515AF44C45732
 308202BE 30820268 A0030201 0202100E 7EC1B68A 2F14BD4C 4515AF44
C4573230
 0D06092A 864886F7 0D010105 05003076 310B3009 06035504 06130255
53310B30
 !--- Certificate is abbreviated for easier viewing. quit certificate 6103EE0A000000000038
3082040F 308203B9 A0030201 02020A61 03EE0A00 00000000 38300D06 092A8648 86F70D01 01050500
3076310B 30090603 55040613 02555331 0B300906 03550408 !--- Certificate is abbreviated for easier
viewing. quit certificate 6104020F000000000039 3082040F 308203B9 A0030201 02020A61 04020F00
00000000 39300D06 092A8648 86F70D01 01050500 3076310B 30090603 55040613 02555331 0B300906
03550408 !--- Certificate is abbreviated for easier viewing. quit crypto ca certificate chain
caserver2 certificate 06C28C8B00000000003B 308203CF 30820379 A0030201 02020A06 C28C8B00 00000000
3B300D06 092A8648 86F70D01 01050500 3061310B 30090603 55040613 02555331 13301106 03550408 !---
Certificate is abbreviated for easier viewing. 97363 quit certificate 06C2807F00000000003A
308203CF 30820379 A0030201 02020A06 C2807F00 00000000 3A300D06 092A8648 !--- Certificate is
abbreviated for easier viewing. quit certificate ca 3E34CD199392A0914621EA778B13F357 30820284
3082022E A0030201 0202103E 34CD1993 92A09146 21EA778B 13F35730 0D06092A 864886F7 0D010105
05003061 310B3009 06035504 06130255 53311330 !--- Certificate is abbreviated for easier viewing.
quit ! crypto isakmp policy 10 hash md5 crypto isakmp identity hostname ! ! crypto ipsec
transform-set myset esp-des esp-md5-hmac ! crypto map vpn 10 ipsec-isakmp set peer 172.16.172.45
set transform-set myset match address 101 crypto map vpn 20 ipsec-isakmp set peer 172.16.172.51
set transform-set myset match address 102 crypto map vpn 30 ipsec-isakmp set peer 172.16.172.53
set transform-set myset match address 103 ! ! ! ! ! ! ! ! ! ! ! mta receive maximum-recipients
0 ! ! ! ! interface Ethernet0/0 ip address 172.16.172.35 255.255.255.240 half-duplex crypto map
vpn interface Ethernet0/1 ip address 192.168.4.1 255.255.255.0 half-duplex ! interface Serial1/0
no ip address shutdown ! interface Serial1/1 no ip address shutdown ! interface Serial1/2 no ip
address shutdown ! interface Serial1/3 no ip address shutdown ! ip classless ip route 0.0.0.0
0.0.0.0 172.16.172.33 ip http server ! ! access-list 101 permit ip 192.168.4.0 0.0.0.255
20.1.1.0 0.0.0.255 access-list 102 permit ip 192.168.4.0 0.0.0.255 3.3.3.0 0.0.0.255 access-list
103 permit ip 192.168.4.0 0.0.0.255 200.1.1.0 0.0.0.255 access-list 169 deny ip host
172.16.172.60 any access-list 169 deny ip host 172.16.172.61 any access-list 169 deny ip host
172.16.172.62 any access-list 169 permit ip any any ! call rsvp-sync ! ! mgcp profile default !
! ! dial-peer cor custom ! line con 0 exec-timeout 0 0 line aux 0 line vty 0 4 login ! ! end
2611-VPN#
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除命令

命令输出解释程序工具（仅限注册用户）支持某些 **show** 命令，使用此工具可以查看对 show 命令输出的分析。

注意： 在发出 **debug** 命令之前，请参阅有关 debug 命令的重要信息。

- **debug crypto pki transaction**
- **debug crypto pki messages**
- **debug crypto ipsec**
- **debug crypto isakmp**

路由器上的调试

此输出显示三个路由器的 IKE 和 IPSec 调试。在与 IPSec 对等体进行 IKE 协商期间，2600 路由器必须决定要使用的 CA 服务器。在测试方案中，1720-1 和 7204 发起通往 2600 VPN 路由器的 IPSec 隧道。

此输出使用 **show crypto** 命令显示 2611-VPN 路由器上的 IKE/IPSec 调试。

```
2611-VPN#show debug


Cryptographic Subsystem:
 Crypto ISAKMP debugging is on
 Crypto IPSEC debugging is on
!--- Debugs on the router when the 1720-1 router has initiated !--- an IPSec tunnel to the
router. Oct 27 22:20:23.337: ISAKMP (0:0): received packet from 172.16.172.45 dport 500 sport
500 (N) NEW SA Oct 27 22:20:23.337: ISAKMP: local port 500, remote port 500 Oct 27 22:20:23.341:
ISAKMP (0:408): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH Oct 27 22:20:23.341: ISAKMP (0:408): Old
State = IKE_READY New State = IKE_R_MM1 Oct 27 22:20:23.341: ISAKMP (0:408): processing SA
payload. message ID = 0 Oct 27 22:20:23.341: ISAKMP (0:408): Checking ISAKMP transform 1 against
priority 10 policy Oct 27 22:20:23.341: ISAKMP: encryption DES-CBC Oct 27 22:20:23.341: ISAKMP:
hash MD5 Oct 27 22:20:23.345: ISAKMP: default group 1 Oct 27 22:20:23.345: ISAKMP: auth RSA sig
Oct 27 22:20:23.345: ISAKMP: life type in seconds Oct 27 22:20:23.345: ISAKMP: life duration
(VPI) of 0x0 0x1 0x51 0x80 Oct 27 22:20:23.345: ISAKMP (0:408): atts are acceptable. Next
payload is 3 Oct 27 22:20:23.389: ISAKMP (0:408): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE Oct 27 22:20:23.389: ISAKMP (0:408): Old State = IKE_R_MM1 New State =
IKE_R_MM1 Oct 27 22:20:23.389: ISAKMP (0:408): sending packet to 172.16.172.45 my_port 500
peer_port 500 (R) MM_SA_SETUP Oct 27 22:20:23.393: ISAKMP (0:408): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE Oct 27 22:20:23.393: ISAKMP (0:408): Old State = IKE_R_MM1 New State =
IKE_R_MM2 Oct 27 22:20:23.538: ISAKMP (0:408): received packet from 172.16.172.45 dport 500
sport 500 (R) MM_SA_SETUP Oct 27 22:20:23.538: ISAKMP (0:408): Input = IKE_MESG_FROM_PEER,
IKE_MM_EXCH Oct 27 22:20:23.538: ISAKMP (0:408): Old State = IKE_R_MM2 New State = IKE_R_MM3 Oct
27 22:20:23.542: ISAKMP (0:408): processing KE payload. message ID = 0 Oct 27 22:20:23.582:
ISAKMP (0:408): processing NONCE payload. message ID = 0 Oct 27 22:20:23.626: ISAKMP (0:408):
SKEYID state generated Oct 27 22:20:23.630: ISAKMP (0:408): processing CERT_REQ payload. message
ID = 0 Oct 27 22:20:23.630: ISAKMP (0:408): peer wants a CT_X509_SIGNATURE cert Oct 27
22:20:23.634: ISAKMP (0:408): peer want cert issued by CN = SJVPNTAC-CAServer,
 OU = TAC-VPN-SJ,
  O = Cisco Systems,

 L = San Jose, ST = CA, C = US
!--- The router has determined that the !--- IPSec peer sends a certificate !--- that CA server1
has issued. Oct 27 22:20:23.642: ISAKMP (0:408): Choosing trustpoint caserver1 as issuer
Oct 27 22:20:23.642: ISAKMP (0:408): processing vendor id payload
Oct 27 22:20:23.642: ISAKMP (0:408): vendor ID is Unity
Oct 27 22:20:23.642: ISAKMP (0:408): processing vendor id payload
Oct 27 22:20:23.646: ISAKMP (0:408): vendor ID is DPD
Oct 27 22:20:23.646: ISAKMP (0:408): processing vendor id payload
```

```
Oct 27 22:20:23.646: ISAKMP (0:408): speaking to another IOS box!
Oct 27 22:20:23.646: ISAKMP (0:408): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
Oct 27 22:20:23.646: ISAKMP (0:408): Old State = IKE_R_MM3 New State = IKE_R_MM3

Oct 27 22:20:23.666: ISAKMP (0:408): sending packet to 172.16.172.45
my_port 500 peer_port 500 (R)
 MM_KEY_EXCH
Oct 27 22:20:23.670: ISAKMP (0:408): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 22:20:23.670: ISAKMP (0:408): Old State = IKE_R_MM3 New State = IKE_R_MM4

Oct 27 22:20:24.207: ISAKMP (0:408): received packet from 172.16.172.45
dport 500 sport 500 (R)
 MM_KEY_EXCH
Oct 27 22:20:24.219: ISAKMP (0:408): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 22:20:24.219: ISAKMP (0:408): Old State = IKE_R_MM4 New State = IKE_R_MM5

Oct 27 22:20:24.223: ISAKMP (0:408): processing ID payload. message ID = 0
Oct 27 22:20:24.223: ISAKMP (408): Process ID payload
 type : 2
 FQDN name : 1720-1.tac.com
 protocol : 17
 port : 500
 length : 14
Oct 27 22:20:24.223: ISAKMP (0:408): processing CERT payload. message ID = 0
Oct 27 22:20:24.223: ISAKMP (0:408): processing a CT_X509_SIGNATURE cert
Oct 27 22:20:24.267: ISAKMP (0:408): peer's pubkey isn't cached
Oct 27 22:20:24.319: ISAKMP (0:408): cert approved with warning
!--- Subject name of 1720-1 router's !--- certificates from CA server1. !--- FQDN of 1720-1. Oct
27 22:20:24.383: ISAKMP (0:408): OU = MADRID O=SPAIN
Oct 27 22:20:24.419: ISAKMP (0:408): processing SIG payload. message ID = 0
Oct 27 22:20:24.419: ISAKMP (408): sa->peer.name = , sa->peer_id.id_fqdn.fqdn =
 1720-1.tac.com
Oct 27 22:20:24.475: ISAKMP (0:408): processing NOTIFY INITIAL_CONTACT protocol 1
 spi 0, message ID = 0, sa = 82F6FE80
Oct 27 22:20:24.475: ISAKMP (0:408): Process initial contact, bring down existing phase
 1 and 2 SA's

 with local 172.16.172.35 remote 172.16.172.45
Oct 27 22:20:24.479: ISAKMP (0:408): SA has been authenticated with 172.16.172.45
Oct 27 22:20:24.479: ISAKMP (0:408): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 22:20:24.479: ISAKMP (0:408): Old State = IKE_R_MM5 New State = IKE_R_MM5

Oct 27 22:20:24.479: IPSEC(key_engine): got a queue event...
Oct 27 22:20:24.483: ISAKMP (0:408): SA is doing RSA signature authentication using
 id type ID_FQDN
Oct 27 22:20:24.483: ISAKMP (408): ID payload
 next-payload : 6
 type : 2
 FQDN name : 2611-vpn.cisco.com
 protocol : 17
 port : 0
 length : 22
Oct 27 22:20:24.483: ISAKMP (408): Total payload length: 26
Oct 27 22:20:24.495: ISKAMP: growing send buffer from 1024 to 3072
Oct 27 22:20:24.507: ISAKMP (0:408): using the caserver1 trustpoint's
keypair to sign
Oct 27 22:20:24.956: ISAKMP (0:408): sending packet to 172.16.172.45
my_port 500 peer_port 500 (R)
 MM_KEY_EXCH
Oct 27 22:20:24.956: ISAKMP (0:408): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
Oct 27 22:20:24.956: ISAKMP (0:408): Old State = IKE_R_MM5 New State =
IKE_P1_COMPLETE
```

```
Oct 27 22:20:24.960: ISAKMP (0:408): Input = IKE_MESG_INTERNAL,
IKE_PHASE1_COMPLETE
Oct 27 22:20:24.960: ISAKMP (0:408): Old State = IKE_P1_COMPLETE
New State = IKE_P1_COMPLETE

Oct 27 22:20:25.168: ISAKMP (0:408): received packet from 172.16.172.45
dport 500 sport 500 (R)
 QM_IDLE
Oct 27 22:20:25.172: ISAKMP: set new node -2090109070 to QM_IDLE
Oct 27 22:20:25.192: ISAKMP (0:408): processing HASH payload. message ID = -2090109070
Oct 27 22:20:25.192: ISAKMP (0:408): processing SA payload. message ID = -2090109070
Oct 27 22:20:25.192: ISAKMP (0:408): Checking IPSec proposal 1
Oct 27 22:20:25.192: ISAKMP: transform 1, ESP_DES
Oct 27 22:20:25.192: ISAKMP: attributes in transform:
Oct 27 22:20:25.192: ISAKMP: encaps is 1
Oct 27 22:20:25.192: ISAKMP: SA life type in seconds
Oct 27 22:20:25.196: ISAKMP: SA life duration (basic) of 3600
Oct 27 22:20:25.196: ISAKMP: SA life type in kilobytes
Oct 27 22:20:25.196: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
Oct 27 22:20:25.196: ISAKMP: authenticator is HMAC-MD5
Oct 27 22:20:25.196: ISAKMP (0:408): atts are acceptable.
Oct 27 22:20:25.196: IPSEC(validate_proposal_request): proposal part #1,
 (key eng. msg.) INBOUND local= 172.16.172.35, remote= 172.16.172.45,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 0s and 0kb,
 spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x2
Oct 27 22:20:25.200: ISAKMP (0:408): processing NONCE payload. message ID = -2090109070
Oct 27 22:20:25.200: ISAKMP (0:408): processing ID payload. message ID = -2090109070
Oct 27 22:20:25.204: ISAKMP (0:408): processing ID payload. message ID = -2090109070
Oct 27 22:20:25.204: ISAKMP (0:408): asking for 1 spis from ipsec
Oct 27 22:20:25.204: ISAKMP (0:408): Node -2090109070, Input = IKE_MESG_FROM_PEER,
 IKE_QM_EXCH
Oct 27 22:20:25.204: ISAKMP (0:408): Old State = IKE_QM_READY New State =
 IKE_QM_SPI_STARVE
Oct 27 22:20:25.204: IPSEC(key_engine): got a queue event...
Oct 27 22:20:25.208: IPSEC(spi_response): getting spi 2951036365 for SA
 from 172.16.172.35 to 172.16.172.45 for prot 3
Oct 27 22:20:25.208: ISAKMP: received ke message (2/1)
Oct 27 22:20:25.493: ISAKMP (0:408): sending packet to 172.16.172.45
my_port 500 peer_port 500 (R)
 QM_IDLE
Oct 27 22:20:25.493: ISAKMP (0:408): Node -2090109070, Input = IKE_MESG_FROM_IPSEC,
 IKE_SPI_REPLY
Oct 27 22:20:25.493: ISAKMP (0:408): Old State = IKE_QM_SPI_STARVE New State =
 IKE_QM_R_QM2
Oct 27 22:20:25.577: ISAKMP (0:408): received packet from 172.16.172.45 dport 500
  sport 500 (R)
 QM_IDLE
Oct 27 22:20:25.669: ISAKMP (0:408): Creating IPSec SAs
Oct 27 22:20:25.669: inbound SA from 172.16.172.45 to 172.16.172.35
 (proxy 20.1.1.0 to 192.168.4.0)
Oct 27 22:20:25.669: has spi 0xAFE53DCD and conn_id 420 and flags 2
Oct 27 22:20:25.669: lifetime of 3600 seconds
Oct 27 22:20:25.669: lifetime of 4608000 kilobytes
Oct 27 22:20:25.669: has client flags 0x0
Oct 27 22:20:25.673: outbound SA from 172.16.172.35 to 172.16.172.45
 (proxy 192.168.4.0 to 20.1.1.0 )
Oct 27 22:20:25.673: has spi 563992317 and conn_id 421 and flags A
Oct 27 22:20:25.673: lifetime of 3600 seconds
Oct 27 22:20:25.673: lifetime of 4608000 kilobytes
Oct 27 22:20:25.673: has client flags 0x0
```

```
Oct 27 22:20:25.673: ISAKMP (0:408): deleting node -2090109070 error FALSE reason
  "quick mode done (await()"
Oct 27 22:20:25.673: ISAKMP (0:408): Node -2090109070, Input = IKE_MESG_FROM_PEER,
 IKE_QM_EXCH
Oct 27 22:20:25.677: ISAKMP (0:408): Old State = IKE_QM_R_QM2 New State =
 IKE_QM_PHASE2_COMPLETE
Oct 27 22:20:25.677: IPSEC(key_engine): got a queue event...
Oct 27 22:20:25.677: IPSEC(initialize_sas): ,
 (key eng. msg.) INBOUND local= 172.16.172.35, remote= 172.16.172.45,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xAFE53DCD(2951036365), conn_id= 420, keysize= 0, flags= 0x2
Oct 27 22:20:25.681: IPSEC(initialize_sas): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.35, remote= 172.16.172.45,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0x219DD6FD(563992317), conn_id= 421, keysize= 0, flags= 0xA
Oct 27 22:20:25.681: IPSEC(add mtree): src 192.168.4.0, dest 20.1.1.0, dest_port 0

Oct 27 22:20:25.681: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.35, sa_prot= 50,
 sa_spi= 0xAFE53DCD(2951036365),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 420
Oct 27 22:20:25.685: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.45, sa_prot= 50,
 sa_spi= 0x219DD6FD(563992317),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 421
Oct 27 22:20:26.070: ISAKMP (0:407): purging SA., sa=82F7ADE0, delme=82F7ADE0
2611-VPN#
2611-VPN#
2611-VPN#
2611-VPN#
```

!--- Debugs on the router when the 7204-1 router has initiated !--- an IPSec tunnel to the router. Oct 27 22:32:02.740: ISAKMP (0:0): received packet from 172.16.172.51 dport 500 sport 500 (N) NEW SA Oct 27 22:32:02.740: ISAKMP: local port 500, remote port 500 Oct 27 22:32:02.740: ISAKMP (0:412): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH Oct 27 22:32:02.744: ISAKMP (0:412): Old State = IKE_READY New State = IKE_R_MM1 Oct 27 22:32:02.744: ISAKMP (0:412): processing SA payload. message ID = 0 Oct 27 22:32:02.744: ISAKMP (0:412): Checking ISAKMP transform 1 against priority 10 policy Oct 27 22:32:02.744: ISAKMP: encryption DES-CBC Oct 27 22:32:02.744: ISAKMP: hash MD5 Oct 27 22:32:02.744: ISAKMP: default group 1 Oct 27 22:32:02.748: ISAKMP: auth RSA sig Oct 27 22:32:02.748: ISAKMP: life type in seconds Oct 27 22:32:02.748: ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80 Oct 27 22:32:02.748: ISAKMP (0:412): atts are acceptable. Next payload is 3 Oct 27 22:32:02.792: ISAKMP (0:412): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE Oct 27 22:32:02.792: ISAKMP (0:412): Old State = IKE_R_MM1 New State = IKE_R_MM1 Oct 27 22:32:02.792: ISAKMP (0:412): sending packet to 172.16.172.51 my_port 500 peer_port 500 (R) MM_SA_SETUP Oct 27 22:32:02.796: ISAKMP (0:412): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE Oct 27 22:32:02.796: ISAKMP (0:412): Old State = IKE_R_MM1 New State = IKE_R_MM2 Oct 27 22:32:02.820: ISAKMP (0:412): received packet from 172.16.172.51 dport 500 sport 500 (R) MM_SA_SETUP Oct 27 22:32:02.820: ISAKMP (0:412): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH Oct 27 22:32:02.824: ISAKMP (0:412): Old State = IKE_R_MM2 New State = IKE_R_MM3 Oct 27 22:32:02.824: ISAKMP (0:412): processing KE payload. message ID = 0 Oct 27 22:32:02.868: ISAKMP (0:412): processing NONCE payload. message ID = 0 Oct 27 22:32:02.908: ISAKMP (0:412): SKEYID state generated Oct 27 22:32:02.912: ISAKMP (0:412): processing CERT_REQ payload. message ID = 0 Oct 27 22:32:02.912: ISAKMP (0:412): peer wants a CT_X509_SIGNATURE cert Oct 27 22:32:02.916: ISAKMP (0:412): **peer want cert issued by CN = vpn, OU = cisco, O = tac, L = san jose, ST = california, C = US**

!--- The router has determined that the !--- IPSec peer is sending a certificate !--- that CA

server2 has issued. Oct 27 22:32:02.924: ISAKMP (0:412): **Choosing trustpoint caserver2 as issuer**
Oct 27 22:32:02.928: ISAKMP (0:412): processing vendor id payload
Oct 27 22:32:02.928: ISAKMP (0:412): vendor ID is Unity
Oct 27 22:32:02.928: ISAKMP (0:412): processing vendor id payload
Oct 27 22:32:02.928: ISAKMP (0:412): vendor ID is DPD
Oct 27 22:32:02.928: ISAKMP (0:412): processing vendor id payload
Oct 27 22:32:02.928: ISAKMP (0:412): speaking to another IOS box!
Oct 27 22:32:02.932: ISAKMP (0:412): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
Oct 27 22:32:02.932: ISAKMP (0:412): Old State = IKE_R_MM3 New State = IKE_R_MM3

Oct 27 22:32:02.952: ISAKMP (0:412): sending packet to 172.16.172.51 my_port 500
  peer_port 500
 (R) MM_KEY_EXCH
Oct 27 22:32:02.952: ISAKMP (0:412): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
Oct 27 22:32:02.952: ISAKMP (0:412): Old State = IKE_R_MM3 New State = IKE_R_MM4

Oct 27 22:32:03.016: ISAKMP (0:412): received packet from 172.16.172.51 dport 500
  sport 500
 (R) MM_KEY_EXCH
Oct 27 22:32:03.032: ISAKMP (0:412): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 22:32:03.032: ISAKMP (0:412): Old State = IKE_R_MM4 New State = IKE_R_MM5

Oct 27 22:32:03.032: ISAKMP (0:412): processing ID payload. message ID = 0
Oct 27 22:32:03.032: ISAKMP (412): Process ID payload
 type : 2
 FQDN name : 7204-1.cisco.com
 protocol : 17
 port : 500
 length : 16
Oct 27 22:32:03.032: ISAKMP (0:412): processing CERT payload. message ID = 0
Oct 27 22:32:03.036: ISAKMP (0:412): processing a CT_X509_SIGNATURE cert
Oct 27 22:32:03.076: ISAKMP (0:412): peer's pubkey isn't cached
Oct 27 22:32:03.129: ISAKMP (0:412): cert approved with warning
!--- Subject name of 7204-1 router's certificate issued by CA server2. Oct 27 22:32:03.189:
ISAKMP (0:412): **OU = BERLIN O=GERMANY**
Oct 27 22:32:03.229: ISAKMP (0:412): processing SIG payload. message ID = 0
!--- FQDN of 7204-1. Oct 27 22:32:03.229: ISAKMP (412): **sa->peer.name = , sa-**
>peer_id.id_fqdn.fqdn =
7204-1.cisco.com
Oct 27 22:32:03.265: ISAKMP (0:412): processing NOTIFY INITIAL_CONTACT protocol 1
 spi 0, message ID = 0, sa = 82F69D84
Oct 27 22:32:03.269: ISAKMP (0:412): **Process initial contact, bring down existing phase 1**
and 2 SA's with local

172.16.172.35 remote 172.16.172.51
Oct 27 22:32:03.269: ISAKMP (0:412): **SA has been authenticated with 172.16.172.51**
Oct 27 22:32:03.269: ISAKMP (0:412): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 22:32:03.269: ISAKMP (0:412): Old State = IKE_R_MM5 New State = IKE_R_MM5

Oct 27 22:32:03.269: IPSEC(key_engine): got a queue event...
Oct 27 22:32:03.273: ISAKMP (0:412): SA is doing RSA signature authentication
  using id type ID_FQDN
Oct 27 22:32:03.273: ISAKMP (412): ID payload
 next-payload : 6
 type : 2
 FQDN name : 2611-vpn.cisco.com
 protocol : 17
 port : 0
 length : 22
Oct 27 22:32:03.273: ISAKMP (412): Total payload length: 26
Oct 27 22:32:03.285: ISKAMP: growing send buffer from 1024 to 3072
Oct 27 22:32:03.297: ISAKMP (0:412): using the caserver2 trustpoint's keypair to sign

```
Oct 27 22:32:03.762: ISAKMP (0:412): sending packet to 172.16.172.51 my_port 500
  peer_port 500
 (R) MM_KEY_EXCH
Oct 27 22:32:03.762: ISAKMP (0:412): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 22:32:03.766: ISAKMP (0:412): Old State = IKE_R_MM5 New State = IKE_P1_COMPLETE

Oct 27 22:32:03.766: ISAKMP (0:412): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
Oct 27 22:32:03.766: ISAKMP (0:412): Old State = IKE_P1_COMPLETE New State =
  IKE_P1_COMPLETE

Oct 27 22:32:03.790: ISAKMP (0:412): received packet from 172.16.172.51 dport 500
  sport 500
 (R) QM_IDLE
Oct 27 22:32:03.790: ISAKMP: set new node 1631242332 to QM_IDLE
Oct 27 22:32:03.810: ISAKMP (0:412): processing HASH payload. message ID = 1631242332
Oct 27 22:32:03.810: ISAKMP (0:412): processing SA payload. message ID = 1631242332
Oct 27 22:32:03.810: ISAKMP (0:412): Checking IPSec proposal 1
Oct 27 22:32:03.810: ISAKMP: transform 1, ESP_DES
Oct 27 22:32:03.810: ISAKMP: attributes in transform:
Oct 27 22:32:03.810: ISAKMP: encaps is 1
Oct 27 22:32:03.814: ISAKMP: SA life type in seconds
Oct 27 22:32:03.814: ISAKMP: SA life duration (basic) of 3600
Oct 27 22:32:03.814: ISAKMP: SA life type in kilobytes
Oct 27 22:32:03.814: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
Oct 27 22:32:03.814: ISAKMP: authenticator is HMAC-MD5
Oct 27 22:32:03.814: ISAKMP (0:412): atts are acceptable.
Oct 27 22:32:03.818: IPSEC(validate_proposal_request): proposal part #1,
 (key eng. msg.) INBOUND local= 172.16.172.35, remote= 172.16.172.51,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 0s and 0kb,
 spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x2
Oct 27 22:32:03.818: ISAKMP (0:412): processing NONCE payload. message ID = 1631242332
Oct 27 22:32:03.822: ISAKMP (0:412): processing ID payload. message ID = 1631242332
Oct 27 22:32:03.822: ISAKMP (0:412): processing ID payload. message ID = 1631242332
Oct 27 22:32:03.822: ISAKMP (0:412): asking for 1 spis from ipsec
Oct 27 22:32:03.822: ISAKMP (0:412): Node 1631242332, Input = IKE_MESG_FROM_PEER,
  IKE_QM_EXCH
Oct 27 22:32:03.822: ISAKMP (0:412): Old State = IKE_QM_READY New State =
  IKE_QM_SPI_STARVE
Oct 27 22:32:03.822: IPSEC(key_engine): got a queue event...
Oct 27 22:32:03.826: IPSEC(spi_response): getting spi 3365950736 for SA
 from 172.16.172.35 to 172.16.172.51 for prot 3
Oct 27 22:32:03.826: ISAKMP: received ke message (2/1)
Oct 27 22:32:04.090: ISAKMP (0:412): sending packet to 172.16.172.51 my_port 500
  peer_port 500
 (R) QM_IDLE
Oct 27 22:32:04.094: ISAKMP (0:412): Node 1631242332, Input =
  IKE_MESG_FROM_IPSEC, IKE_SPI_REPLY
Oct 27 22:32:04.094: ISAKMP (0:412): Old State = IKE_QM_SPI_STARVE New State =
  IKE_QM_R_QM2
Oct 27 22:32:04.102: ISAKMP (0:412): received packet from 172.16.172.51
  dport 500 sport 500
 (R) QM_IDLE
Oct 27 22:32:04.190: ISAKMP (0:412): Creating IPSec SAs
Oct 27 22:32:04.190: inbound SA from 172.16.172.51 to 172.16.172.35
 (proxy 3.3.3.0 to 192.168.4.0)
Oct 27 22:32:04.190: has spi 0xC8A05510 and conn_id 422 and flags 2
Oct 27 22:32:04.190: lifetime of 3600 seconds
Oct 27 22:32:04.190: lifetime of 4608000 kilobytes
Oct 27 22:32:04.190: has client flags 0x0
Oct 27 22:32:04.194: outbound SA from 172.16.172.35 to 172.16.172.51
  (proxy 192.168.4.0 to 3.3.3.0 )
```

```
Oct 27 22:32:04.194: has spi -788374095 and conn_id 423 and flags A
Oct 27 22:32:04.194: lifetime of 3600 seconds
Oct 27 22:32:04.194: lifetime of 4608000 kilobytes
Oct 27 22:32:04.194: has client flags 0x0
Oct 27 22:32:04.194: ISAKMP (0:412): deleting node 1631242332 error FALSE
  reason "quick mode done
 (await()"
Oct 27 22:32:04.194: ISAKMP (0:412): Node 1631242332, Input =
  IKE_MESG_FROM_PEER, IKE_QM_EXCH
Oct 27 22:32:04.198: ISAKMP (0:412): Old State = IKE_QM_R_QM2 New State =
  IKE_QM_PHASE2_COMPLETE
Oct 27 22:32:04.198: IPSEC(key_engine): got a queue event...
Oct 27 22:32:04.198: IPSEC(initialize_sas): ,
 (key eng. msg.) INBOUND local= 172.16.172.35, remote= 172.16.172.51,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xC8A05510(3365950736), conn_id= 422, keysize= 0, flags= 0x2
Oct 27 22:32:04.202: IPSEC(initialize_sas): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.35, remote= 172.16.172.51,
 local_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xD1025DB1(3506593201), conn_id= 423, keysize= 0, flags= 0xA
Oct 27 22:32:04.202: IPSEC(add mtree): src 192.168.4.0, dest 3.3.3.0, dest_port 0

Oct 27 22:32:04.202: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.35, sa_prot= 50,
 sa_spi= 0xC8A05510(3365950736),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 422
Oct 27 22:32:04.206: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.51, sa_prot= 50,
 sa_spi= 0xD1025DB1(3506593201),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 423
2611-VPN#
2611-VPN#
2611-VPN#show crypto en conn ac

 ID Interface
IP-Address State Algorithm
Encrypt Decrypt
411 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
0 0
412 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
0 0
420 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
0 8
421 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
8 0
422 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
0 9
423 Ethernet0/0
172.16.172.35 set HMAC_MD5+DES_56_CB
9 0
2611-VPN#
2611-VPN#
2611-VPN#
```

```
2611-VPN#
2611-VPN#show crypto map

Crypto Map "vpn" 10 ipsec-isakmp
 Peer
= 172.16.172.45
 Extended
IP access list 101

access-list 101 permit ip 192.168.4.0 0.0.0.255 20.1.1.0 0.0.0.255
 Current
peer: 172.16.172.45
 Security
association lifetime: 4608000 kilobytes/3600 seconds
 PFS
(Y/N): N
 Transform
sets={

myset,
 }
Crypto Map "vpn" 20 ipsec-isakmp
 Peer
= 172.16.172.51
 Extended
IP access list 102

access-list 102 permit ip 192.168.4.0 0.0.0.255 3.3.3.0 0.0.0.255
 Current
peer: 172.16.172.51
 Security
association lifetime: 4608000 kilobytes/3600 seconds
 PFS
(Y/N): N
 Transform
sets={

myset,
 }
Crypto Map "vpn" 30 ipsec-isakmp
 Peer = 172.16.172.53
 Extended
IP access list 103

access-list 103 permit ip 192.168.4.0 0.0.0.255 200.1.1.0 0.0.0.255
 Current
peer: 172.16.172.53
 Security
association lifetime: 4608000 kilobytes/3600 seconds
 PFS
(Y/N): N
 Transform
sets={

myset,
 }
 Interfaces
using crypto map vpn:

Ethernet0/0
2611-VPN#show crypto isa sa
dst
src
state conn-id
```

```
slot
172.16.172.35 172.16.172.51
QM_IDLE
412 0
172.16.172.35 172.16.172.45
QM_IDLE
411 0
2611-VPN#show crypto ipsec sa
interface: Ethernet0/0
 Crypto map tag: vpn, local
addr. 172.16.172.35
 local ident (addr/mask/prot/port):
(192.168.4.0/255.255.255.0/0/0)
 remote ident (addr/mask/prot/port):
(200.1.1.0/255.255.255.0/0/0)
 current_peer: 172.16.172.53:500
 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 0, #recv errors
0
 local crypto endpt.:
172.16.172.35, remote crypto endpt.: 172.16.172.53
 path mtu 1500, media
mtu 1500
 current outbound spi:
0
 inbound esp sas:
 inbound ah sas:
 inbound pcp sas:
 outbound esp sas:
 outbound ah sas:
 outbound pcp sas:
 local ident (addr/mask/prot/port):
(192.168.4.0/255.255.255.0/0/0)
 remote ident (addr/mask/prot/port):
(3.3.3.0/255.255.255.0/0/0)
 current_peer: 172.16.172.51:500
 PERMIT, flags={origin_is_acl,}
 #pkts encaps: 9, #pkts encrypt:
9, #pkts digest 9
 #pkts decaps: 9, #pkts decrypt:
9, #pkts verify 9
 #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.:
172.16.172.35, remote crypto endpt.: 172.16.172.51
 path mtu 1500, media
mtu 1500
 current outbound spi:
```

```
D1025DB1
 inbound esp sas:
 spi: 0xC8A05510(3365950736)
 transform:
esp-des esp-md5-hmac ,
 in
use settings ={Tunnel, }
 slot:
0, conn id: 422, flow_id: 3, crypto map: vpn
 sa
timing: remaining key lifetime (k/sec): (4607998/3519)
 IV
size: 8 bytes
 replay
detection support: Y
 inbound ah sas:
 inbound pcp sas:
 outbound esp sas:
 spi: 0xD1025DB1(3506593201)
 transform:
esp-des esp-md5-hmac ,
 in
use settings ={Tunnel, }
 slot:
0, conn id: 423, flow_id: 4, crypto map: vpn
 sa
timing: remaining key lifetime (k/sec): (4607998/3519)
 IV
size: 8 bytes
 replay
detection support: Y
 outbound ah sas:
 outbound pcp sas:
 local ident (addr/mask/prot/port):
(192.168.4.0/255.255.255.0/0/0)
 remote ident (addr/mask/prot/port):
(20.1.1.0/255.255.255.0/0/0)
 current_peer: 172.16.172.45:500
 PERMIT, flags={origin_is_acl,}
 #pkts encaps: 8, #pkts encrypt:
8, #pkts digest 8
 #pkts decaps: 8, #pkts decrypt:
8, #pkts verify 8
 #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.:
172.16.172.35, remote crypto endpt.: 172.16.172.45
 path mtu 1500, media
mtu 1500
 current outbound spi:
5F57E177
 inbound esp sas:
 spi: 0xC7DB301B(3353030683)
 transform:
esp-des esp-md5-hmac ,
 in
use settings ={Tunnel, }
 slot:
```

```
0, conn id: 420, flow_id: 1, crypto map: vpn
 sa
timing: remaining key lifetime (k/sec): (4607998/3410)
 IV
size: 8 bytes
 replay
detection support: Y
 inbound ah sas:
 inbound pcp sas:
 outbound esp sas:
 spi: 0x5F57E177(1599594871)
 transform:
esp-des esp-md5-hmac ,
 in
use settings ={Tunnel, }
 slot:
0, conn id: 421, flow_id: 2, crypto map: vpn
 sa
timing: remaining key lifetime (k/sec): (4607998/3409)
 IV
size: 8 bytes
 replay
detection support: Y
 outbound ah sas:
 outbound pcp sas:
2611-VPN#
2611-VPN#
```

此输出使用 **show crypto** 命令显示 1720-1 路由器上的 IKE/IPSec 调试。此输出发起通往 2611-VPN 路由器的 IPSec 隧道。

```
Oct 27 22:21:04.994: IPSEC(sa_request): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.45, remote= 172.16.172.35,
 local_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0x219DD6FD(563992317), conn_id= 0, keysize=
0, flags= 0x400C
Oct 27 22:21:04.998: ISAKMP: received ke message (1/1)
Oct 27 22:21:04.998: ISAKMP: local port 500, remote port 500
Oct 27 22:21:05.002: ISAKMP (0:3): Input = IKE_MESG_FROM_IPSEC, IKE_SA_REQ_MM
Oct 27 22:21:05.002: ISAKMP (0:3): Old State = IKE_READY New
State = IKE_I_MM1
Oct 27 22:21:05.002: ISAKMP (0:3): beginning Main Mode exchange
Oct 27 22:21:05.002: ISAKMP (0:3): sending packet to 172.16.172.35
(I) MM_NO_STATE
Oct 27 22:21:05.062: ISAKMP (0:3): received packet from 172.16.172.35
(I) MM_NO_STATE
Oct 27 22:21:05.062: ISAKMP (0:3): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 22:21:05.066: ISAKMP (0:3): Old State = IKE_I_MM1 New
State = IKE_I_MM2
Oct 27 22:21:05.066: ISAKMP (0:3): processing SA payload. message ID
= 0
Oct 27 22:21:05.066: ISAKMP (0:3): Checking ISAKMP transform 1 against
priority 10 policy
Oct 27 22:21:05.066: ISAKMP: encryption
DES-CBC
Oct 27 22:21:05.066: ISAKMP: hash MD5
Oct 27 22:21:05.066: ISAKMP: default
group 1
Oct 27 22:21:05.066: ISAKMP: auth RSA
sig
```

```
Oct 27 22:21:05.066: ISAKMP: life type
in seconds
Oct 27 22:21:05.070: ISAKMP: life duration
(VPI) of 0x0 0x1 0x51 0x80
Oct 27 22:21:05.070: ISAKMP (0:3): atts are acceptable. Next payload
is 0
Oct 27 22:21:05.190: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 22:21:05.190: ISAKMP (0:3): Old State = IKE_I_MM2 New
State = IKE_I_MM2
Oct 27 22:21:05.202: ISAKMP (0:3): sending packet to 172.16.172.35.
(I) MM_SA_SETUP
Oct 27 22:21:05.202: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 22:21:05.202: ISAKMP (0:3): Old State = IKE_I_MM2 New
State = IKE_I_MM3
Oct 27 22:21:05.338: ISAKMP (0:3): received packet from 172.16.172.35
(I) MM_SA_SETUP
Oct 27 22:21:05.342: ISAKMP (0:3): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 22:21:05.342: ISAKMP (0:3): Old State = IKE_I_MM3 New
State = IKE_I_MM4
Oct 27 22:21:05.342: ISAKMP (0:3): processing KE payload. message ID
= 0
Oct 27 22:21:05.466: ISAKMP (0:3): processing NONCE payload. message
ID = 0
Oct 27 22:21:05.490: ISAKMP (0:3): SKEYID state generated
Oct 27 22:21:05.490: ISAKMP (0:3): processing CERT_REQ payload. message
ID = 0
Oct 27 22:21:05.490: ISAKMP (0:3): peer wants a CT_X509_SIGNATURE cert
Oct 27 22:21:05.494: ISAKMP (0:3): peer want cert issued by CN = vpn,
OU = cisco, O = tac, L = san jose, ST = california, C = US
Oct 27 22:21:05.498: ISAKMP (0:3): processing CERT_REQ payload. message
ID = 0
Oct 27 22:21:05.498: ISAKMP (0:3): peer wants a CT_X509_SIGNATURE cert
Oct 27 22:21:05.502: ISAKMP (0:3): peer want
cert issued by CN = SJVPNTAC-CAServer, OU = TAC-VPN-SJ, O = Cisco Systems,
L = San Jose, ST = CA, C = US
Oct 27 22:21:05.506: ISAKMP (0:3): Choosing
trustpoint caserver1 as issuer
Oct 27 22:21:05.506: ISAKMP (0:3): processing vendor id payload
Oct 27 22:21:05.506: ISAKMP (0:3): vendor ID is Unity
Oct 27 22:21:05.510: ISAKMP (0:3): processing vendor id payload
Oct 27 22:21:05.510: ISAKMP (0:3): vendor ID is DPD
Oct 27 22:21:05.510: ISAKMP (0:3): processing vendor id payload
Oct 27 22:21:05.510: ISAKMP (0:3): speaking to another IOS box!
Oct 27 22:21:05.510: ISAKMP (0:3): processing vendor id payload
Oct 27 22:21:05.510: I.!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 4/5/8 ms
1720-1#SAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 22:21:05.510: ISAKMP (0:3): Old State = IKE_I_MM4 New
State = IKE_I_MM4
Oct 27 22:21:05.514: ISAKMP (0:3): Send initial contact
Oct 27 22:21:05.514: ISAKMP (0:3): SA is doing RSA signature authentication
using id type ID_FQDN
Oct 27 22:21:05.514: ISAKMP (3): ID payload
 next-payload : 6
 type
: 2
 protocol
: 17
 port
: 500
 length
: 18
Oct 27 22:21:05.514: ISAKMP (3): Total payload length: 22
Oct 27 22:21:05.530: ISKAMP: growing send buffer from 1024 to 3072
```

```
Oct 27 22:21:05.538: ISAKMP (0:3): using the caserver1 trustpoint's
keypair to sign
Oct 27 22:21:05.870: ISAKMP (0:3): sending packet to 172.16.172.35
(I) MM_KEY_EXCH
Oct 27 22:21:05.870: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 22:21:05.874: ISAKMP (0:3): Old State = IKE_I_MM4 New
State = IKE_I_MM5
Oct 27 22:21:06.630: ISAKMP (0:3): received packet from 172.16.172.35
(I) MM_KEY_EXCH
Oct 27 22:21:06.638: ISAKMP (0:3): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 22:21:06.638: ISAKMP (0:3): Old State = IKE_I_MM5 New
State = IKE_I_MM6
Oct 27 22:21:06.638: ISAKMP (0:3): processing ID payload. message ID
= 0
Oct 27 22:21:06.638: ISAKMP (0:3): processing CERT payload. message
ID = 0
Oct 27 22:21:06.638: ISAKMP (0:3): processing a CT_X509_SIGNATURE cert
Oct 27 22:21:06.670: ISAKMP (0:3): peer's pubkey isn't cached
Oct 27 22:21:06.714: ISAKMP (0:3): cert approved with warning
Oct 27 22:21:06.762: ISAKMP (0:3): OU = PARIS
O=FRANCE <-----------
The certificate subject name from 2621-VPN router
Oct 27 22:21:06.794: ISAKMP (0:3): processing SIG payload. message
ID = 0
Oct 27 22:21:06.794: ISAKMP (3): sa->peer.name
= , sa->peer_id.id.id_fqdn.fqdn = 2611-vpn.cisco.com
Oct 27 22:21:06.818: ISAKMP (0:3): SA has been
authenticated with 172.16.172.35
Oct 27 22:21:06.822: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 22:21:06.822: ISAKMP (0:3): Old State = IKE_I_MM6 New
State = IKE_I_MM6
Oct 27 22:21:06.822: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 22:21:06.826: ISAKMP (0:3): Old State = IKE_I_MM6 New
State = IKE_P1_COMPLETE
Oct 27 22:21:06.826: ISAKMP (0:3): beginning Quick Mode exchange, M-ID
of -2090109070
Oct 27 22:21:06.834: ISAKMP (0:3): sending packet to 172.16.172.35
(I) QM_IDLE
Oct 27 22:21:06.838: ISAKMP (0:3): Node -2090109070, Input = IKE_MESG_INTERNAL,
IKE_INIT_QM
Oct 27 22:21:06.838: ISAKMP (0:3): Old State = IKE_QM_READY New
State = IKE_QM_I_QM1
Oct 27 22:21:06.838: ISAKMP (0:3): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
Oct 27 22:21:06.838: ISAKMP (0:3): Old State = IKE_P1_COMPLETE
New State = IKE_P1_COMPLETE
Oct 27 22:21:07.162: ISAKMP (0:3): received packet from 172.16.172.35
(I) QM_IDLE
Oct 27 22:21:07.174: ISAKMP (0:3): processing HASH payload. message
ID = -2090109070
Oct 27 22:21:07.174: ISAKMP (0:3): processing SA payload. message ID
= -2090109070
Oct 27 22:21:07.174: ISAKMP (0:3): Checking IPSec proposal 1
Oct 27 22:21:07.174: ISAKMP: transform 1, ESP_DES
Oct 27 22:21:07.174: ISAKMP: attributes in transform:
Oct 27 22:21:07.174: ISAKMP: encaps is
1
Oct 27 22:21:07.174: ISAKMP: SA life
type in seconds
Oct 27 22:21:07.174: ISAKMP: SA life
duration (basic) of 3600
Oct 27 22:21:07.174: ISAKMP: SA life
type in kilobytes
Oct 27 22:21:07.178: ISAKMP: SA life
duration (VPI) of 0x0 0x46 0x50 0x0
```

```
Oct 27 22:21:07.178: ISAKMP: authenticator
is HMAC-MD5
Oct 27 22:21:07.178: ISAKMP (0:3): atts are acceptable.
Oct 27 22:21:07.178: IPSEC(validate_proposal_request): proposal part
#1,
 (key eng. msg.) INBOUND local= 172.16.172.45, remote= 172.16.172.35,
 local_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 0s and 0kb,
 spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
Oct 27 22:21:07.182: ISAKMP (0:3): processing NONCE payload. message
ID = -2090109070
Oct 27 22:21:07.182: ISAKMP (0:3): processing ID payload. message ID
= -2090109070
Oct 27 22:21:07.182: ISAKMP (0:3): processing ID payload. message ID
= -2090109070
Oct 27 22:21:07.230: ISAKMP (0:3): Creating IPSec SAs
Oct 27 22:21:07.230:
inbound SA from 172.16.172.35 to 172.16.172.45
 (proxy 192.168.4.0 to 20.1.1.0)
Oct 27 22:21:07.230:
has spi 0x219DD6FD and conn_id 200 and flags 4
Oct 27 22:21:07.234:
lifetime of 3600 seconds
Oct 27 22:21:07.234:
lifetime of 4608000 kilobytes
Oct 27 22:21:07.234:
outbound SA from 172.16.172.45 to 172.16.172.35
(proxy 20.1.1.0 to 192.168.4.0
)
Oct 27 22:21:07.234:
has spi -1343930931 and conn_id 201 and flags C
Oct 27 22:21:07.234:
lifetime of 3600 seconds
Oct 27 22:21:07.234:
lifetime of 4608000 kilobytes
Oct 27 22:21:07.234: IPSEC(key_engine): got a queue event...
Oct 27 22:21:07.234: IPSEC(initialize_sas): ,
 (key eng. msg.) INBOUND local= 172.16.172.45, remote= 172.16.172.35,
 local_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0x219DD6FD(563992317), conn_id= 200, keysize=
0, flags= 0x4
Oct 27 22:21:07.238: IPSEC(initialize_sas): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.45, remote= 172.16.172.35,
 local_proxy= 20.1.1.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xAFE53DCD(2951036365), conn_id= 201, keysize=
0, flags= 0xC
Oct 27 22:21:07.238: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.45, sa_prot= 50,
 sa_spi= 0x219DD6FD(563992317),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 200
Oct 27 22:21:07.242: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.35, sa_prot= 50,
 sa_spi= 0xAFE53DCD(2951036365),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 201
Oct 27 22:21:07.246: ISAKMP (0:3): sending packet to 172.16.172.35
(I) QM_IDLE
```

```
Oct 27 22:21:07.246: ISAKMP (0:3): deleting node -2090109070 error
FALSE reason ""
Oct 27 22:21:07.246: ISAKMP (0:3): Node -2090109070, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH
Oct 27 22:21:07.246: ISAKMP (0:3): Old State = IKE_QM_I_QM1 New
State = IKE_QM_PHASE2_COMPLETE
Oct 27 22:21:07.710: ISAKMP (0:2): purging SA., sa=8182AB8C, delme=8182AB8C

1720-1# show crypto map
Crypto Map "vpn" 10 ipsec-isakmp
 Peer = 172.16.172.35
 Extended IP access list
102

access-list 102 permit ip 20.1.1.0 0.0.0.255 192.168.4.0 0.0.0.255
 Current peer: 172.16.172.35
 Security association lifetime:
4608000 kilobytes/3600 seconds
 PFS (Y/N): N
 Transform sets={ myset,
}
 Interfaces using crypto
map vpn:

FastEthernet0
1720-1#show crypto en conn ac
Oct 27 22:21:57.246: ISAKMP (0:3): purging node -2090109070onn ac
 ID Interface IP-Address
State Algorithm
Encrypt Decrypt
 3 <none>
<none> set
HMAC_MD5+DES_56_CB
0 0
200 FastEthernet0 172.16.172.45 set
HMAC_MD5+DES_56_CB
0 8
201 FastEthernet0 172.16.172.45 set
HMAC_MD5+DES_56_CB
8 0

1720-1#show crypto isa sa
dst
src
state conn-id
slot
172.16.172.35 172.16.172.45 QM_IDLE
3 0
1720-1#show crypto ipsec sa
interface: FastEthernet0
 Crypto map tag: vpn, local addr. 172.16.172.45
 local ident (addr/mask/prot/port): (20.1.1.0/255.255.255.0/0/0)
 remote ident (addr/mask/prot/port): (192.168.4.0/255.255.255.0/0/0)
 current_peer: 172.16.172.35
 PERMIT, flags={origin_is_acl,}
 #pkts encaps: 8, #pkts encrypt: 8, #pkts digest
8
 #pkts decaps: 8, #pkts decrypt: 8, #pkts verify
8
 #pkts compressed: 0, #pkts decompressed: 0
 #pkts not compressed: 0, #pkts compr. failed: 0,
#pkts decompress failed: 0
 #send errors 2, #recv errors 0
 local crypto endpt.: 172.16.172.45, remote
```

```
crypto endpt.: 172.16.172.35
 path mtu 1500, media mtu 1500
 current outbound spi: AFE53DCD
 inbound esp sas:
 spi: 0x219DD6FD(563992317)
 transform: esp-des esp-md5-hmac
,
 in use settings ={Tunnel,
}
 slot: 0, conn id: 200, flow_id:
1, crypto map: vpn
 sa timing: remaining key lifetime (k/sec): (4607998/3530)
 IV size: 8 bytes
 replay detection support:
Y
 inbound ah sas:
 inbound pcp sas:
 outbound esp sas:
 spi: 0xAFE53DCD(2951036365)
 transform: esp-des esp-md5-hmac
,
 in use settings ={Tunnel,
}
 slot: 0, conn id: 201, flow_id:
2, crypto map: vpn
 sa timing: remaining key
lifetime (k/sec): (4607998/3521)
 IV size: 8 bytes
 replay detection support:
Y
 outbound ah sas:
 outbound pcp sas:

1720-1#
1720-1#
```

此输出使用 **show crypto** 命令显示 7204-1 路由器上的 IKE/IPSec 调试，并发起通往 2611-VPN 路由器的 IPSec 隧道。

```
Oct 27 05:24:23: IPSEC(sa_request): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.51, remote= 172.16.172.35,
 local_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xD1025DB1(3506593201), conn_id= 0, keysize=
0, flags= 0x400C
Oct 27 05:24:23: ISAKMP: received ke message (1/1)
Oct 27 05:24:23: ISAKMP: local port 500, remote port 500
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_FROM_IPSEC, IKE_SA_REQ_MM
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_READY New State
= IKE_I_MM1
Oct 27 05:24:23: ISAKMP (0:1): beginning Main Mode exchange
Oct 27 05:24:23: ISAKMP (0:1): sending packet to 172.16.172.35 (I)
MM_NO_STATE
Oct 27 05:24:23: ISAKMP (0:1): received packet from 172.16.172.35 (I)
MM_NO_STATE
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM1 New State
= IKE_I_MM2


Oct 27 05:24:23: ISAKMP (0:1): processing SA payload. message ID = 0
```

```
Oct 27 05:24:23: ISAKMP (0:1): Checking ISAKMP transform 1 against
priority 10 policy
Oct 27 05:24:23: ISAKMP: encryption DES-CBC
Oct 27 05:24:23: ISAKMP: hash MD5
Oct 27 05:24:23: ISAKMP: default group
1
Oct 27 05:24:23: ISAKMP: auth RSA sig
Oct 27 05:24:23: ISAKMP: life type in
seconds
Oct 27 05:24:23: ISAKMP: life duration
(VPI) of 0x0 0x1 0x51 0x80
Oct 27 05:24:23: ISAKMP (0:1): atts are acceptable. Next payload is
0
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 4/8/16 ms
7204-1# 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM2 New State
= IKE_I_MM2


Oct 27 05:24:23: ISAKMP (0:1): sending packet to 172.16.172.35 (I) MM_SA_SETUP
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM2 New State
= IKE_I_MM3


Oct 27 05:24:23: ISAKMP (0:1): received packet from 172.16.172.35 (I)
MM_SA_SETUP
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM3 New State
= IKE_I_MM4


Oct 27 05:24:23: ISAKMP (0:1): processing KE payload. message ID = 0
Oct 27 05:24:23: ISAKMP (0:1): processing NONCE payload. message ID
= 0
Oct 27 05:24:23: ISAKMP (0:1): SKEYID state generated
Oct 27 05:24:23: ISAKMP (0:1): processing CERT_REQ payload. message
ID = 0
Oct 27 05:24:23: ISAKMP (0:1): peer wants a CT_X509_SIGNATURE cert
Oct 27 05:24:23: ISAKMP (0:1): peer want cert
issued by CN = vpn, OU = cisco, O = tac, L = san jose, ST = california,
C = US
Oct 27 05:24:23: CRYPTO_PKI: Trust-Point caserver2
picked up
Oct 27 05:24:23: ISAKMP (0:1): Choosing trustpoint
caserver2 as issuer
Oct 27 05:24:23: ISAKMP (0:1): processing CERT_REQ payload. message
ID = 0
Oct 27 05:24:23: ISAKMP (0:1): peer wants a CT_X509_SIGNATURE cert
Oct 27 05:24:23: ISAKMP (0:1): peer want cert
issued by CN = SJVPNTAC-CAServer, OU = TAC-VPN-SJ, O = Cisco Systems, L
= San Jose, ST = CA, C = US
Oct 27 05:24:23: ISAKMP (0:1): processing vendor id payload
Oct 27 05:24:23: ISAKMP (0:1): vendor ID is Unity
Oct 27 05:24:23: ISAKMP (0:1): processing vendor id payload
Oct 27 05:24:23: ISAKMP (0:1): vendor ID is DPD
Oct 27 05:24:23: ISAKMP (0:1): processing vendor id payload
Oct 27 05:24:23: ISAKMP (0:1): speaking to another IOS box!
Oct 27 05:24:23: ISAKMP (0:1): processing vendor id payload
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM4 New State
= IKE_I_MM4
```

```
Oct 27 05:24:23: ISAKMP (0:1): Send initial contact
Oct 27 05:24:23: ISAKMP (0:1): SA is doing RSA signature authentication
using id type ID_FQDN
Oct 27 05:24:23: ISAKMP (1): ID payload
 next-payload : 6
 type
: 2
 protocol
: 17
 port
: 500
 length
: 20
Oct 27 05:24:23: ISAKMP (1): Total payload length: 24
Oct 27 05:24:23: ISAKMP (0:1): using the caserver2 trustpoint's keypair
to sign
Oct 27 05:24:23: ISKAMP: growing send buffer from 1024 to 3072
Oct 27 05:24:23: ISAKMP (0:1): sending packet to 172.16.172.35 (I)
MM_KEY_EXCH
Oct 27 05:24:23: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 05:24:23: ISAKMP (0:1): Old State = IKE_I_MM4 New State
= IKE_I_MM5


Oct 27 05:24:24: ISAKMP (0:1): received packet from 172.16.172.35 (I)
MM_KEY_EXCH
Oct 27 05:24:24: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_I_MM5 New State
= IKE_I_MM6


Oct 27 05:24:24: ISAKMP (0:1): processing ID payload. message ID = 0
Oct 27 05:24:24: ISAKMP (0:1): processing CERT payload. message ID
= 0
Oct 27 05:24:24: ISAKMP (0:1): processing a CT_X509_SIGNATURE cert
Oct 27 05:24:24: ISAKMP (0:1): peer's pubkey isn't cached
Oct 27 05:24:24: CRYPTO_PKI: WARNING: Certificate, private key or CRL
was not found while selecting CRL


Oct 27 05:24:24: CRYPTO_PKI: cert revocation status unknown.
!--- The subject name of the certificate from the 2611-VPN router !--- obtained from CA server2.
Oct 27 05:24:24: ISAKMP (0:1): cert approved with warning
Oct 27 05:24:24: ISAKMP (0:1): OU = ROME O=ITALY

Oct 27 05:24:24: ISAKMP (0:1): processing SIG payload. message ID = 0
Oct 27 05:24:24: ISAKMP (1): sa->peer.name
= , sa->peer_id.id.id_fqdn.fqdn = 2611-vpn.cisco.com
Oct 27 05:24:24: ISAKMP (0:1): SA has been authenticated with 172.16.172.35
Oct 27 05:24:24: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_I_MM6 New State
= IKE_I_MM6


Oct 27 05:24:24: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_I_MM6 New State
= IKE_P1_COMPLETE


Oct 27 05:24:24: ISAKMP (0:1): beginning Quick Mode exchange, M-ID of
1631242332
Oct 27 05:24:24: ISAKMP (0:1): sending packet to 172.16.172.35 (I)
QM_IDLE
```

```
Oct 27 05:24:24: ISAKMP (0:1): Node 1631242332, Input = IKE_MESG_INTERNAL,
IKE_INIT_QM


Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_QM_READY New State
= IKE_QM_I_QM1


Oct 27 05:24:24: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_P1_COMPLETE New
State = IKE_P1_COMPLETE


Oct 27 05:24:24: ISAKMP (0:1): received packet from 172.16.172.35 (I)
QM_IDLE
Oct 27 05:24:24: ISAKMP (0:1): processing HASH payload. message ID
= 1631242332
Oct 27 05:24:24: ISAKMP (0:1): processing SA payload. message ID =
1631242332
Oct 27 05:24:24: ISAKMP (0:1): Checking IPSec proposal 1
Oct 27 05:24:24: ISAKMP: transform 1, ESP_DES
Oct 27 05:24:24: ISAKMP: attributes in transform:
Oct 27 05:24:24: ISAKMP: encaps is 1
Oct 27 05:24:24: ISAKMP: SA life type
in seconds
Oct 27 05:24:24: ISAKMP: SA life duration
(basic) of 3600
Oct 27 05:24:24: ISAKMP: SA life type
in kilobytes
Oct 27 05:24:24: ISAKMP: SA life duration
(VPI) of 0x0 0x46 0x50 0x0
Oct 27 05:24:24: ISAKMP: authenticator
is HMAC-MD5
Oct 27 05:24:24: ISAKMP (0:1): atts are acceptable.
Oct 27 05:24:24: IPSEC(validate_proposal_request): proposal part #1,
 (key eng. msg.) INBOUND local= 172.16.172.51, remote= 172.16.172.35,
 local_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 0s and 0kb,
 spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
Oct 27 05:24:24: ISAKMP (0:1): processing NONCE payload. message ID
= 1631242332
Oct 27 05:24:24: ISAKMP (0:1): processing ID payload. message ID =
1631242332
Oct 27 05:24:24: ISAKMP (0:1): processing ID payload. message ID =
1631242332
Oct 27 05:24:24: ISAKMP (0:1): Creating IPSec SAs
Oct 27 05:24:24: inbound
SA from 172.16.172.35 to 172.16.172.51
 (proxy 192.168.4.0 to 3.3.3.0)
Oct 27 05:24:24: has
spi 0xD1025DB1 and conn_id 2000 and flags 4
Oct 27 05:24:24: lifetime
of 3600 seconds
Oct 27 05:24:24: lifetime
of 4608000 kilobytes
Oct 27 05:24:24: outbound
SA from 172.16.172.51 to 172.16.172.35 (proxy 3.3.3.0
to 192.168.4.0 )
Oct 27 05:24:24: has
spi -929016560 and conn_id 2001 and flags C
Oct 27 05:24:24: lifetime
of 3600 seconds
```

```
Oct 27 05:24:24: lifetime
of 4608000 kilobytes
Oct 27 05:24:24: ISAKMP (0:1): sending packet to 172.16.172.35 (I)
QM_IDLE
Oct 27 05:24:24: ISAKMP (0:1): deleting node 1631242332 error FALSE
reason ""
Oct 27 05:24:24: ISAKMP (0:1): Node 1631242332, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH


Oct 27 05:24:24: ISAKMP (0:1): Old State = IKE_QM_I_QM1 New State
= IKE_QM_PHASE2_COMPLETE


Oct 27 05:24:24: IPSEC(key_engine): got a queue event...
Oct 27 05:24:24: IPSEC(initialize_sas): ,
 (key eng. msg.) INBOUND local= 172.16.172.51, remote= 172.16.172.35,
 local_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xD1025DB1(3506593201), conn_id= 2000, keysize=
0, flags= 0x4
Oct 27 05:24:24: IPSEC(initialize_sas): ,
 (key eng. msg.) OUTBOUND local= 172.16.172.51, remote= 172.16.172.35,
 local_proxy= 3.3.3.0/255.255.255.0/0/0 (type=4),
 remote_proxy= 192.168.4.0/255.255.255.0/0/0 (type=4),
 protocol= ESP, transform= esp-des esp-md5-hmac ,
 lifedur= 3600s and 4608000kb,
 spi= 0xC8A05510(3365950736), conn_id= 2001, keysize=
0, flags= 0xC
Oct 27 05:24:24: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.51, sa_prot= 50,
 sa_spi= 0xD1025DB1(3506593201),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2000
Oct 27 05:24:24: IPSEC(create_sa): sa created,
 (sa) sa_dest= 172.16.172.35, sa_prot= 50,
 sa_spi= 0xC8A05510(3365950736),
 sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2001
7204-1#
7204-1#
7204-1#
7204-1#
7204-1#

7204-1#show crypto isa sa
dst
src
state conn-id
slot
172.16.172.35 172.16.172.51 QM_IDLE
1 0

7204-1#show crypto en conn ac


 ID Interface IP-Address
State Algorithm
Encrypt Decrypt
 1 <none>
<none> set
HMAC_MD5+DES_56_CB 0
0
2000 Ethernet1/1 172.16.172.51
```

```
set HMAC_MD5+DES_56_CB
0 9
2001 Ethernet1/1 172.16.172.51
set HMAC_MD5+DES_56_CB
9 0


7204-1#show crypto ipsec sa


interface: Ethernet1/1
 Crypto map tag: vpn, local addr. 172.16.172.51


 local ident (addr/mask/prot/port): (3.3.3.0/255.255.255.0/0/0)
 remote ident (addr/mask/prot/port): (192.168.4.0/255.255.255.0/0/0)
 current_peer: 172.16.172.35
 PERMIT, flags={origin_is_acl,}
 #pkts encaps: 13, #pkts encrypt: 13, #pkts digest
13
 #pkts decaps: 13, #pkts decrypt: 13, #pkts verify
13
 #pkts compressed: 0, #pkts decompressed: 0
 #pkts not compressed: 0, #pkts compr. failed: 0,
#pkts decompress failed: 0
 #send errors 32, #recv errors 0


 local crypto endpt.: 172.16.172.51, remote
crypto endpt.: 172.16.172.35
 path mtu 1500, media mtu 1500
 current outbound spi: C8A05510


 inbound esp sas:
 spi: 0xD1025DB1(3506593201)
 transform: esp-des esp-md5-hmac
,
 in use settings ={Tunnel,
}
 slot: 0, conn id: 2000,
flow_id: 1, crypto map: vpn
sa timing: remaining key lifetime (k/sec): (4607998/3435)
 IV size: 8 bytes
 replay detection support:
Y


 inbound ah sas:


 inbound pcp sas:


 outbound esp sas:
 spi: 0xC8A05510(3365950736)
 transform: esp-des esp-md5-hmac
,
 in use settings ={Tunnel,
}
 slot: 0, conn id: 2001,
flow_id: 2, crypto map: vpn
 sa timing: remaining key
lifetime (k/sec): (4607998/3435)
```

```
 IV size: 8 bytes
 replay detection support:
Y


 outbound ah sas:


 outbound pcp sas:


7204-1# show crypto en conf


 crypto engine name:
unknown
 crypto engine type:
software

serial number: 01691291
 crypto engine state: installed
 crypto engine in slot: N/A

platform: predator crypto_engine


 Encryption Process Info:
 input queue
size: 500
 input
queue top: 26
 input
queue bot: 26
 input queue count:
0


 Crypto Adjacency Counts:

Lock Count: 0

Unlock Count: 0


7204-1#show crypto map
Crypto Map "vpn" 10 ipsec-isakmp
 Peer = 172.16.172.35
 Extended IP access list
101

access-list 101 permit ip 3.3.3.0 0.0.0.255 192.168.4.0 0.0.0.255
 Current peer: 172.16.172.35
 Security association lifetime:
4608000 kilobytes/3600 seconds
 PFS (Y/N): N
 Transform sets={ myset,
}
 Interfaces using crypto
map vpn:

Ethernet1/1


7204-1#
```

```
7204-1#
7204-1#
```

相关信息

- Cisco IOS 安全命令参考，版本 12.2
- Cisco IOS 安全配置指南，版本 12.2
- 如何使用数字证书在路由器和 PIX 之间配置 LAN 到 LAN IPSec
- IPsec 协商/IKE 协议
- 技术支持和文档 - Cisco Systems