DMVPN Hub as the CA Server for the DMVPN Network Configuration Example

Document ID: 117688

Contributed by Atri Basu, Cisco TAC Engineer.
May 06, 2014

Contents

Introduction
Prerequisites
Requirements
Components Used
Background Information
Configure
Network Diagram
Hub + CA Configuration
Spoke1 Configuration
Verify
Hub
Spoke
Troubleshoot
IPSec Related Issues
PKI Related Issues
CA Server
DMVPN Spokes
Related Information

Introduction

This document describes how to configure a Dynamic Multipoint VPN (DMVPN) network with certificate authentication when the DMVPN hub is set up as the Certificate Authority (CA).

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Public Key Infrastructure (PKI)
- DMVPN with the use of preshared keys
- Network Time Protocol (NTP)

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure

that you understand the potential impact of any command.

Background Information

A fairly common practice and the recommended way to deploy a PKI−based DMVPN network is to configure the DMVPN with certificates and an explicit CA server. This document describes how to set up a a PKI infrastructure with a Cisco IOS® CA server:

Public Key Infrastructure Configuration Guide

Complete these steps in order to port this infrastructure to a DMVPN deployment:

1. Have the hub(s) and spoke(s) register and authenticate themselves with the CA server like any other router, as shown in this example.

   ```
   crypto pki trustpoint dmvpn
    enrollment url http://192.168.1.1:80
    revocation−check none
    rsakeypair dmvpn
   ```
2. Add this command to change the authentication method authentication policy to use PKI instead of a preshared key.

   ```
   crypto isakmp policy <number>
    authentication rsa−sig
   ```

   Note: The authentication method does not show up here as PKI is the default setting. Enter the ***show run all*** command on the router in order to see the configuration.

   ```
   crypto isakmp policy 2
    encr aes 192
    group 2
   ```

However, what happens when the DMVPN hub (or any other router that is part of the DMVPN infrastructure) is also required to act as the CA? In order for PKI to work successfully, both ends of the tunnel need to have a certificate that is signed by the same CA. However, if one of the DMVPN routers is itself the CA, then how do we get that particular router be an active member of the PKI infrastructure?

Complete these steps in order to register the router to itself:

1. Configure the router as a CA.

   ```
   crypto pki server dmvpn−ca
    issuer−name CN=rtpvpnoutbound7.cisco.com
    grant auto
    lifetime certificate 25
    lifetime ca−certificate 30
    auto−rollover
    database url nvram
   ```
2. Configure a trustpoint on the CA with an enrollment URL that points to the CA itself.

   ```
   crypto pki trustpoint dmvpn
    enrollment url http://192.168.1.1:80
    revocation−check none
    rsakeypair dmvpn
   !
   interface GigabitEthernet0/1  // <−− inerface on the same router.
    description utfwb0rder01
    ip address 192.168.1.1 255.255.255.252
   ```

```
 duplex full
 speed 1000
!
```

Enroll and authenticate the CA to itself with the standard procedures.

```
crypto pki authenticate <trustpoint>
crypto pki enroll <trustpoint>
```

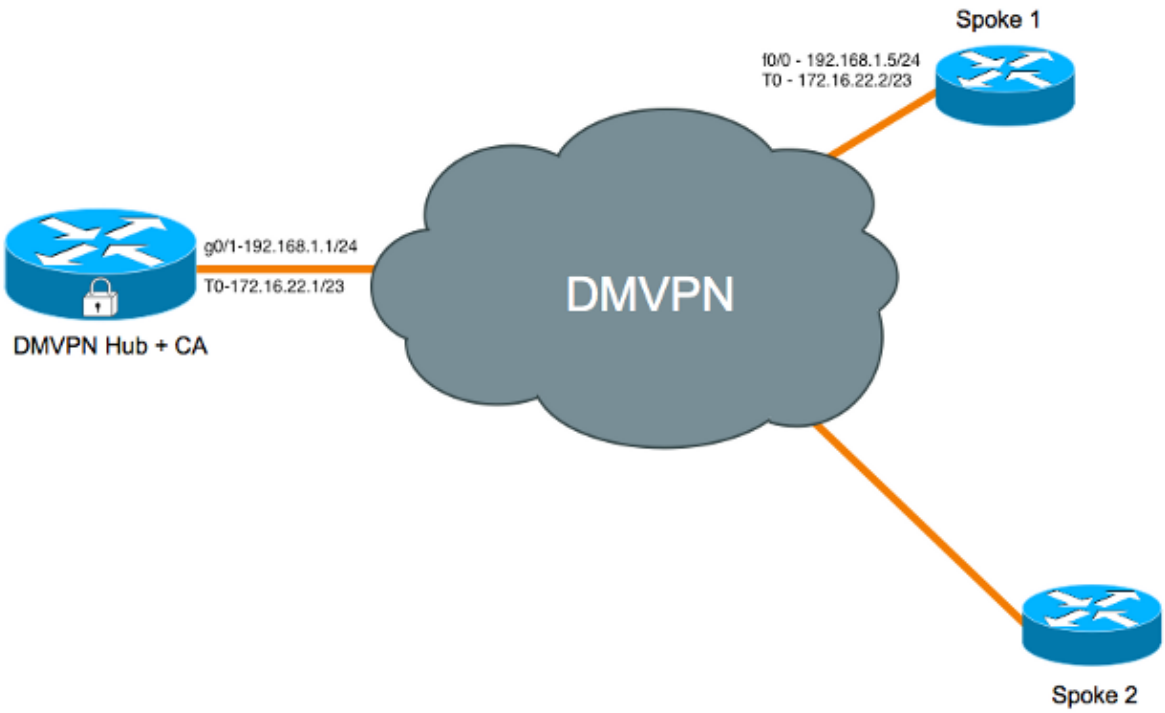
3. Configure the other routers which are part of the DMVPN infrastructure to enroll and authenticate to the CA.
4. Configure the Internet Security Association and Key Management Protocol (ISAKMP) policy to use PKI for authentication as described earlier.

Tip: Cisco recommends you use NTP in order to keep the clocks on the DMVPN routers synced. For information on how to configure NTP, see Configuring NTP.

Configure

Note: Use the Command Lookup Tool (registered customers only) in order to obtain more information on the commands used in this section.

Network Diagram



Hub + CA Configuration

```
hostname Hub-CA
!
aaa new-model
!
!
aaa authentication attempts login 2
aaa authentication login default group tacacs+ enable
aaa authorization exec default group tacacs+ none
```

```
aaa accounting send stop-record authentication failure
!
aaa session-id common
clock timezone MST -7
clock summer-time MDT recurring
!
!
ip cef
!
ip domain name cisco.com
!
!
crypto pki server dmvpn-ca
 issuer-name CN=Hub-CA.cisco.com
 grant auto
 lifetime certificate 25
 lifetime ca-certificate 30
 auto-rollover
 database url nvram
!
!         // trustpoint created for the CA server:
crypto pki trustpoint dmvpn-ca
 revocation-check crl
 rsakeypair dmvpn-ca
!
!      // trustpoint created for the hub to enroll with the CA which is itself
crypto pki trustpoint tp-dmvpn
 enrollment url http://192.168.1.1:80
 revocation-check none
 rsakeypair dmvpn
!
!
crypto pki certificate chain dmvpn-ca
 certificate ca rollover 02
  30820231 3082019A A0030201 02020102 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 34323931 35343932 385A170D
  31343035 32393135 34393238 5A302C31 2A302806 03550403 13217274 2D69746F
  63627261 6E636876 706E2E63 732E7A69 6F6E7362 616E6B2E 636F6D30 819F300D
  06092A86 4886F70D 01010105 0003818D 00308189 02818100 B495D3A6 98C00CE4
  DFE6661D 52104A06 50B893DB 2E1C95C1 2CFE8B36 370FA94D 82E3A217 6E0396A8
  ED42D1C5 9F07AF7D 5692EE37 34F14319 F969E133 3F9F52A0 A14C47A0 426F9871
  0D9DBFF8 E5372291 7374CC78 BB1433C4 3FE9B4A8 2D35B0A4 A0893308 BC9BC8CE
  F5A00192 E88F9158 C8CFFCFA D3FB6F51 089E6069 D56B3B05 02030100 01A36330
  61300F06 03551D13 0101FF04 05300301 01FF300E 0603551D 0F0101FF 04040302
  0186301F 0603551D 23041830 168014EC 7FE1CBA4 FE94D7E8 906834C1 17FB4FDF
  9B5B9530 1D060355 1D0E0416 0414EC7F E1CBA4FE 94D7E890 6834C117 FB4FDF9B
  5B95300D 06092A86 4886F70D 01010405 00038181 000C7B6D 52B4615B EB79778F
  19B3AA31 912E4151 B3D3F4E9 52D829A4 5FC4E14A 60AC5CC0 15148642 2A14B555
  C46EDCE1 B14787D6 71A0C699 D630E12F 9C6A193D 1C3CE55C 9C5676ED F5DBBE4F
  C975BC12 66C0371A 5E10821F 1CAD5428 EC73E2AC DFDE0C1A 18ADF552 6CFBF3BC
  4BE7453B EB933A65 DFDA5ACB 449C7776 ED23D88D AB
        quit
 certificate ca 01
  30820231 3082019A A0030201 02020101 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 33333031 35343932 385A170D
  31343034 32393135 34393238 5A302C31 2A302806 03550403 13217274 2D69746F
  63627261 6E636876 706E2E63 732E7A69 6F6E7362 616E6B2E 636F6D30 819F300D
  06092A86 4886F70D 01010105 0003818D 00308189 02818100 B4925D9E 6E210AB3
  700C3FC4 68B793DF 87CB7204 738A4442 3C040BD6 ACE7E031 176A255D AC196071
  0BCDA0D4 05F229B0 F60A8E54 05CFD2CC F33DB23C 9E0FAA8C CDAF254E 181475A3
  5C9C7C5E BE33673B 948DBB11 8EA72427 B4BBC2AA 3F4DEA42 294F8F17 4EDF7393
  5E0C2950 4BA4CBB7 41118CDE 458CABEB EAF1A5F2 E9584813 02030100 01A36330
  61300F06 03551D13 0101FF04 05300301 01FF300E 0603551D 0F0101FF 04040302
  0186301F 0603551D 23041830 16801460 6F4399AE 5C350060 C2A99B11 9CCF2B6D
```

```
  45239D30 1D060355 1D0E0416 0414606F 4399AE5C 350060C2 A99B119C CF2B6D45
  239D300D 06092A86 4886F70D 01010405 00038181 000C546E A83E7A37 218C1148
  C446FB66 6AFB1108 11B5B10F 182A33C0 F4F5F5C1 00A03BEA 67BCC87E 2C568EEA
  A66B3D02 D41A9345 A69A9EBC 3E9BDEC1 3190EA72 721CD708 F2B45D1F 6B60F57D
  BFC91B36 CFD7ABEE 4D9C6E86 7BAFBE37 11778E4D 58510B19 227E2E35 CB8D7CD9
  022CD880 CEA1642B 789AAFBB 6D03251D 10549E3E 00
        quit
crypto pki certificate chain tp-dmvpn
 certificate 04
  308201DF 30820148 A0030201 02020104 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 33333031 36323431 375A170D
  31343034 32343136 32343137 5A303231 30302E06 092A8648 86F70D01 09021621
  72742D69 746F6362 72616E63 6876706E 2E63732E 7A696F6E 7362616E 6B2E636F
  6D305C30 0D06092A 864886F7 0D010101 0500034B 00304802 4100D06D 77D7511B
  100FA533 43C82CED AE545AA1 15A6C247 306CFEC8 971497F9 1392B04B ECE4D8EB
  5696BBB4 30A22F02 2D8C903D 414735D9 3C3A3472 22663D90 52F50203 010001A3
  4F304D30 0B060355 1D0F0404 030205A0 301F0603 551D2304 18301680 14606F43
  99AE5C35 0060C2A9 9B119CCF 2B6D4523 9D301D06 03551D0E 04160414 FCD1DF31
  4BCFF453 046E764A 4FEB4531 A0498D5B 300D0609 2A864886 F70D0101 04050003
  8181008C B386FA0E E2B1889F 7F96FF2C 3B0EF7A3 D64C3A3E 72E5E83A 6FB346A5
  9E54DBC8 21EA0543 A68AB093 1E89F6B2 4D7F175D CE7FEA18 DDE23A55 A8AD5F15
  594DC247 C5594E9E 9AD0B370 F0736907 1BE4EE4D 735DC116 CCEB238B ADFD5836
  BD7B8E53 32E2B5B9 595DB0D6 D4EFCED1 98A74837 3CB2CB82 EFE5A6C3 52D081D5 840701
        quit
 certificate ca 01
  30820231 3082019A A0030201 02020101 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 33333031 35343932 385A170D
  31343034 32393135 34393238 5A302C31 2A302806 03550403 13217274 2D69746F
  63627261 6E636876 706E2E63 732E7A69 6F6E7362 616E6B2E 636F6D30 819F300D
  06092A86 4886F70D 01010105 0003818D 00308189 02818100 B4925D9E 6E210AB3
  700C3FC4 68B793DF 87CB7204 738A4442 3C040BD6 ACE7E031 176A255D AC196071
  0BCDA0D4 05F229B0 F60A8E54 05CFD2CC F33DB23C 9E0FAA8C CDAF254E 181475A3
  5C9C7C5E BE33673B 948DBB11 8EA72427 B4BBC2AA 3F4DEA42 294F8F17 4EDF7393
  5E0C2950 4BA4CBB7 41118CDE 458CABEB EAF1A5F2 E9584813 02030100 01A36330
  61300F06 03551D13 0101FF04 05300301 01FF300E 0603551D 0F0101FF 04040302
  0186301F 0603551D 23041830 16801460 6F4399AE 5C350060 C2A99B11 9CCF2B6D
  45239D30 1D060355 1D0E0416 0414606F 4399AE5C 350060C2 A99B119C CF2B6D45
  239D300D 06092A86 4886F70D 01010405 00038181 000C546E A83E7A37 218C1148
  C446FB66 6AFB1108 11B5B10F 182A33C0 F4F5F5C1 00A03BEA 67BCC87E 2C568EEA
  A66B3D02 D41A9345 A69A9EBC 3E9BDEC1 3190EA72 721CD708 F2B45D1F 6B60F57D
  BFC91B36 CFD7ABEE 4D9C6E86 7BAFBE37 11778E4D 58510B19 227E2E35 CB8D7CD9
  022CD880 CEA1642B 789AAFBB 6D03251D 10549E3E 00
        quit
!
crypto isakmp policy 1
 encr aes 192
 group 2
!
!
crypto ipsec transform-set TRANSFORM_SET esp-aes 192 esp-sha-hmac
 mode transport
!
crypto ipsec profile DMVPN
 set transform-set TRANSFORM_SET
!
!
interface Loopback0
 ip address 172.16.20.63 255.255.255.255
 no ip redirects
 no ip unreachables
 no ip proxy-arp
!
interface Tunnel0
 bandwidth 100
```

```
 ip address 172.16.22.1 255.255.254.0
 no ip redirects
 ip mtu 1400
 ip flow ingress
 ip nhrp authentication Cisco123
 ip nhrp map multicast dynamic
 ip nhrp network-id 99
 ip tcp adjust-mss 1360
 tunnel source GigabitEthernet0/1
 tunnel mode gre multipoint
 tunnel protection ipsec profile DMVPN
!
interface GigabitEthernet0/0
 ip address 172.16.4.2
 duplex full
 speed 1000
!
interface GigabitEthernet0/1
 ip address 192.168.1.1 255.255.255.0
 no ip redirects
 no ip unreachables
 no ip proxy-arp
 duplex full
 speed 1000
!
router eigrp 1
 passive-interface default
 no passive-interface loopback0
 no passive-interface Tunnel0
 no auto-summary
!
ip route 0.0.0.0 0.0.0.0 192.16.1.2
!  // required for the CA server to work
ip http server
!
!
ntp source GigabitEthernet0/1
ntp server 192.168.1.2
end
```

Spoke1 Configuration

```
hostname Spoke1
!
ip source-route
!
!
ip cef
!
!
crypto pki trustpoint tp-dmvpn
 enrollment url http://192.168.1.1:80
 revocation-check none
 rsakeypair dmpvn-cert
!
!
crypto pki certificate chain tp-dmvpn
 certificate 03
  308201E0 30820149 A0030201 02020103 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 33333031 35353834 385A170D
  31343034 32343135 35383438 5A303331 31302F06 092A8648 86F70D01 09021622
  4C41422D 72742D77 6573746A 6F726461 6E2E6373 2E7A696F 6E736261 6E6B2E63
  6F6D305C 300D0609 2A864886 F70D0101 01050003 4B003048 02410090 FD8FFD9F
  A6E78171 6563EAC6 61090A22 E51A87BC 7963E868 D47CA080 2637A4B8 9836DD1F
```

```
  F6C8DC5A EAB19653 EE1558AE 78D87BE5 11FC75B7 A9E3D2B2 48D15F02 03010001
  A34F304D 300B0603 551D0F04 04030205 A0301F06 03551D23 04183016 8014606F
  4399AE5C 350060C2 A99B119C CF2B6D45 239D301D 0603551D 0E041604 1474332C
  5904AA36 A85B4C6B A64C194E F6C8FC8B 9B300D06 092A8648 86F70D01 01040500
  03818100 7F5598C4 A568D54A 6993B692 DAF748F4 ADA65DF7 F11102AC D9C42D5B
  2A10BFB6 D1E952B8 2F7A6FFE 2646AAFE 6DB1BA60 192BC6BD C3070C97 EDB5C13A
  FD4984F4 52D808AB 851B3929 2208DC2A FE48D8E3 56AC4A38 8283BFC9 CBDB9F71
  A0106102 76DECEC2 35DCF37C A1B1CFE8 238808D7 21CA47F0 F2AB33BB B6884895 67412153
        quit
 certificate ca 01
  30820231 3082019A A0030201 02020101 300D0609 2A864886 F70D0101 04050030
  2C312A30 28060355 04031321 72742D69 746F6362 72616E63 6876706E 2E63732E
  7A696F6E 7362616E 6B2E636F 6D301E17 0D313430 33333031 35343932 385A170D
  31343034 32393135 34393238 5A302C31 2A302806 03550403 13217274 2D69746F
  63627261 6E636876 706E2E63 732E7A69 6F6E7362 616E6B2E 636F6D30 819F300D
  06092A86 4886F70D 01010105 0003818D 00308189 02818100 B4925D9E 6E210AB3
  700C3FC4 68B793DF 87CB7204 738A4442 3C040BD6 ACE7E031 176A255D AC196071
  0BCDA0D4 05F229B0 F60A8E54 05CFD2CC F33DB23C 9E0FAA8C CDAF254E 181475A3
  5C9C7C5E BE33673B 948DBB11 8EA72427 B4BBC2AA 3F4DEA42 294F8F17 4EDF7393
  5E0C2950 4BA4CBB7 41118CDE 458CABEB EAF1A5F2 E9584813 02030100 01A36330
  61300F06 03551D13 0101FF04 05300301 01FF300E 0603551D 0F0101FF 04040302
  0186301F 0603551D 23041830 16801460 6F4399AE 5C350060 C2A99B11 9CCF2B6D
  45239D30 1D060355 1D0E0416 0414606F 4399AE5C 350060C2 A99B119C CF2B6D45
  239D300D 06092A86 4886F70D 01010405 00038181 000C546E A83E7A37 218C1148
  C446FB66 6AFB1108 11B5B10F 182A33C0 F4F5F5C1 00A03BEA 67BCC87E 2C568EEA
  A66B3D02 D41A9345 A69A9EBC 3E9BDEC1 3190EA72 721CD708 F2B45D1F 6B60F57D
  BFC91B36 CFD7ABEE 4D9C6E86 7BAFBE37 11778E4D 58510B19 227E2E35 CB8D7CD9
  022CD880 CEA1642B 789AAFBB 6D03251D 10549E3E 00
        quit
!
!
crypto isakmp policy 2
 encr aes 192
 group 2
!
crypto ipsec transform-set TRANSFORM_SET esp-aes 192 esp-sha-hmac
 mode transport
!
crypto ipsec profile DMVPN
 set transform-set TRANSFORM_SET
!
!
interface Loopback0
 ip address 10.233.251.128 255.255.255.255
!
interface Tunnel0
 bandwidth 100
 ip address 172.16.22.2 255.255.254.0
 ip mtu 1400
 ip nhrp authentication Cisco123
 ip nhrp map 172.16.22.1 192.168.1.1
 ip nhrp map multicast 192.168.1.1
 ip nhrp network-id 99
 ip nhrp nhs 172.16.22.1
 ip tcp adjust-mss 1360
 tunnel source FastEthernet0/0
 tunnel destination 192.168.1.1
 tunnel protection ipsec profile DMVPN
!
interface FastEthernet0/0
 ip address 191.168.1.5 255.255.255.0
 duplex full
 speed 100
!
!
router eigrp 1
```

```
 passive-interface default
 no passive-interface FastEthernet0/0
  no passive-interface Tunnel0
 network 10.0.0.0
 network 172.16.22.2 0.0.0.0
 no auto-summary
!
ip route 0.0.0.0 0.0.0.0 192.168.1.2
!
```

Verify

Use this section in order to confirm that your configuration works properly.

The Output Interpreter Tool (registered customers only) supports certain ***show*** commands. Use the Output Interpreter Tool in order to view an analysis of ***show*** command output.

Hub

```
Hub-CA#
Hub-CA#shpw crypto pki cert
Certificate
  Status: Available
  Certificate Serial Number (hex): 04
  Certificate Usage: General Purpose
  Issuer:
    cn=Hub-CA.cisco.com
  Subject:
    Name: Hub-CA.cisco.com
    hostname=Hub-CA.cisco.com
  Validity Date:
    start date: 10:24:17 MDT Mar 30 2014
    end   date: 10:24:17 MDT Apr 24 2014
  Associated Trustpoints: tp-dmvpn

CA Certificate (Rollover)
  Status: Available
  Certificate Serial Number (hex): 02
  Certificate Usage: Signature
  Issuer:
    cn=Hub-CA.cisco.com
  Subject:
    Name: Hub-CA.cisco.com
    cn=Hub-CA.cisco.com
  Validity Date:
    start date: 09:49:28 MDT Apr 29 2014
    end   date: 09:49:28 MDT May 29 2014
  Associated Trustpoints: dmvpn-ca

CA Certificate
  Status: Available
  Certificate Serial Number (hex): 01
  Certificate Usage: Signature
  Issuer:
    cn=Hub-CA.cisco.com
  Subject:
    cn=Hub-CA.cisco.com
  Validity Date:
    start date: 09:49:28 MDT Mar 30 2014
    end   date: 09:49:28 MDT Apr 29 2014
  Associated Trustpoints: tp-dmvpn dmvpn-ca

Hub-CA#show crypto isakmp sa detail
```

```
Codes: C − IKE configuration mode, D − Dead Peer Detection
       K − Keepalives, N − NAT−traversal
       T − cTCP encapsulation, X − IKE Extended Authentication
       psk − Preshared key, rsig − RSA signature
       renc − RSA encryption
IPv4 Crypto ISAKMP SA

C−id  Local           Remote          I−VRF    Status Encr Hash Auth DH Lifetime Cap.

1640  192.168.1.1   192.168.1.5   BRANCHVP ACTIVE aes  sha  rsig 2  23:55:26 N
       Engine−id:Conn−id =  SW:640

IPv6 Crypto ISAKMP SA

Hub−CA#show crypto ipsec sa

interface: Tunnel0
    Crypto map tag: Tunnel0−head−0, local addr 192.168.1.1

   protected vrf: BRANCHVPN
   local  ident (addr/mask/prot/port): (192.168.1.1/255.255.255.255/47/0)
   remote ident (addr/mask/prot/port): (192.168.1.5/255.255.255.255/47/0)
   current_peer 192.168.1.5 port 11431
     PERMIT, flags={origin_is_acl,}
    #pkts encaps: 75, #pkts encrypt: 75, #pkts digest: 75
    #pkts decaps: 72, #pkts decrypt: 72, #pkts verify: 72
    #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.: 192.168.1.1, remote crypto endpt.: 192.168.1.5
     path mtu 1500, ip mtu 1500, ip mtu idb GigabitEthernet0/1
     current outbound spi: 0x124040FF(306200831)
     PFS (Y/N): N, DH group: none

     inbound esp sas:
      spi: 0x330534EB(855979243)
        transform: esp−192−aes esp−sha−hmac ,
        in use settings ={Transport UDP−Encaps, }
        conn id: 2065, flow_id: Onboard VPN:65, sibling_flags 80000006, crypto map: Tunnel0−head−
        sa timing: remaining key lifetime (k/sec): (4466981/3324)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE

     inbound ah sas:

     inbound pcp sas:

     outbound esp sas:
      spi: 0x124040FF(306200831)
        transform: esp−192−aes esp−sha−hmac ,
        in use settings ={Transport UDP−Encaps, }
        conn id: 2066, flow_id: Onboard VPN:66, sibling_flags 80000006, crypto map: Tunnel0−head−
        sa timing: remaining key lifetime (k/sec): (4466992/3324)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE

     outbound ah sas:

     outbound pcp sas:
```

Spoke

```
Spoke1# show crypto isakmp sa detail
Codes: C − IKE configuration mode, D − Dead Peer Detection
       K − Keepalives, N − NAT−traversal
       T − cTCP encapsulation, X − IKE Extended Authentication
       psk − Preshared key, rsig − RSA signature
       renc − RSA encryption
IPv4 Crypto ISAKMP SA

C−id  Local           Remote          I−VRF    Status Encr Hash Auth DH Lifetime Cap.

5227  192.168.1.5     192.168.1.1            ACTIVE aes  sha  rsig 2  23:57:33 N
       Engine−id:Conn−id =  SW:1227

IPv6 Crypto ISAKMP SA

Spoke1#show crypto ipsec sa

interface: Tunnel0
    Crypto map tag: Tunnel0−head−0, local addr 192.168.1.5

   protected vrf: (none)
   local  ident (addr/mask/prot/port): (192.168.1.5/255.255.255.255/47/0)
   remote ident (addr/mask/prot/port): (192.168.1.1/255.255.255.255/47/0)
   current_peer 192.168.1.1 port 4500
     PERMIT, flags={origin_is_acl,}
    #pkts encaps: 44, #pkts encrypt: 44, #pkts digest: 44
    #pkts decaps: 47, #pkts decrypt: 47, #pkts verify: 47
    #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.: 192.168.1.5, remote crypto endpt.: 192.168.1.1
     path mtu 1500, ip mtu 1500, ip mtu idb FastEthernet0/2/1
     current outbound spi: 0x330534EB(855979243)
     PFS (Y/N): N, DH group: none

     inbound esp sas:
      spi: 0x124040FF(306200831)
        transform: esp−192−aes esp−sha−hmac ,
        in use settings ={Transport UDP−Encaps, }
        conn id: 2239, flow_id: NETGX:239, sibling_flags 80000006, crypto map: Tunnel0−head−0
        sa timing: remaining key lifetime (k/sec): (4520665/3449)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE

     inbound ah sas:

     inbound pcp sas:

     outbound esp sas:
      spi: 0x330534EB(855979243)
        transform: esp−192−aes esp−sha−hmac ,
        in use settings ={Transport UDP−Encaps, }
        conn id: 2240, flow_id: NETGX:240, sibling_flags 80000006, crypto map: Tunnel0−head−0
        sa timing: remaining key lifetime (k/sec): (4520674/3449)
        IV size: 16 bytes
        replay detection support: Y
        Status: ACTIVE

     outbound ah sas:

     outbound pcp sas
```

Troubleshoot

This section provides information you can use in order to troubleshoot your configuration.

The Output Interpreter Tool (registered customers only) supports certain ***show*** commands. Use the Output Interpreter Tool in order to view an analysis of ***show*** command output.

Note: Refer to Important Information on Debug Commands before you use ***debug*** commands.

IPSec Related Issues

These debugs should be enabled on both the affected endpoints of the tunnel.

debug dmvpn all all − This particular command enables this set of debugs:

```
Spoke1#debug dmvpn all all
DMVPN all level debugging is on
Spoke1#show debug


NHRP:
  NHRP protocol debugging is on
  NHRP activity debugging is on
  NHRP extension processing debugging is on
  NHRP cache operations debugging is on
  NHRP routing debugging is on
  NHRP rate limiting debugging is on
  NHRP errors debugging is on
IKEV2:
  IKEV2 error debugging is on
  IKEV2 terse debugging is on
  IKEV2 event debugging is on
  IKEV2 packet debugging is on
  IKEV2 detail debugging is on



Cryptographic Subsystem:
  Crypto ISAKMP debugging is on
  Crypto ISAKMP Error debugging is on
  Crypto IPSEC debugging is on
  Crypto IPSEC Error debugging is on
  Crypto secure socket events debugging is on
Tunnel Protection Debugs:
  Generic Tunnel Protection debugging is on
DMVPN:
  DMVPN error  debugging is on
  DMVPN UP/DOWN event  debugging is on
  DMVPN detail  debugging is on
  DMVPN packet  debugging is on
  DMVPN all level debugging is on
```

Such detailed debugs are not always necessary and should not be enabled arbitrarily as it could overload the device. It is usually a better idea to create a subset of more relevant debugs from this super−set and enable those.

PKI Related Issues

CA Server

These commands are PKI server related. You need to enter a terminal monitor command if you connect with Telnet or Secure Shell (SSH).

Command	*Description*
debug crypto pki messages	Displays the details of the interaction (message dump) between the CA and the router
debug crypto pki server	Displays debugging for a crypto PKI certificate server
debug crypto pki transactions	Displays the interaction (message type) between the CA and the router

DMVPN Spokes

These commands are for both headend or branch. In order to see the debugging output, enter a terminal monitor command if Telnet/SSH was used to connect to the router.

Command	*Description*
debug crypto pki messages	Displays the details of the interaction (message dump) between the CA and the router
debug crypto pki server	Display debugging for a crypto PKI certificate server
debug crypto pki transactions	Displays the interaction (message type) between the CA and the router
debug crypto isakmp	Displays messages about ISAKMP and IKE events
debug crypto ipsec	Displays IPSec events
debug crypto engine	Displays debug messages about crypto engines, which perform encryption and decryption

Related Information

- ***Configure and Enroll a Cisco IOS Router to Another Cisco IOS Router Configured as a CA Server***
- ***Technical Support & Documentation − Cisco Systems***

Updated: May 06, 2014 Document ID: 117688