

Elmatic Sparrow NW10

Industrial Cellular VPN Router

Application Note 029

DMVPN with RIP

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1. Introduction

1.1 Overview

This document contains information regarding the configuration and use of DMVPN with RIP.

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product, and of the requirements for their specific application.

1.2 Compatibility

This application note applies to:

Models Shown: Sparrow NW10 / Sparrow NW20

Firmware Version: 1.0.0 or newer

Other Compatible Models: None

1.3 Version

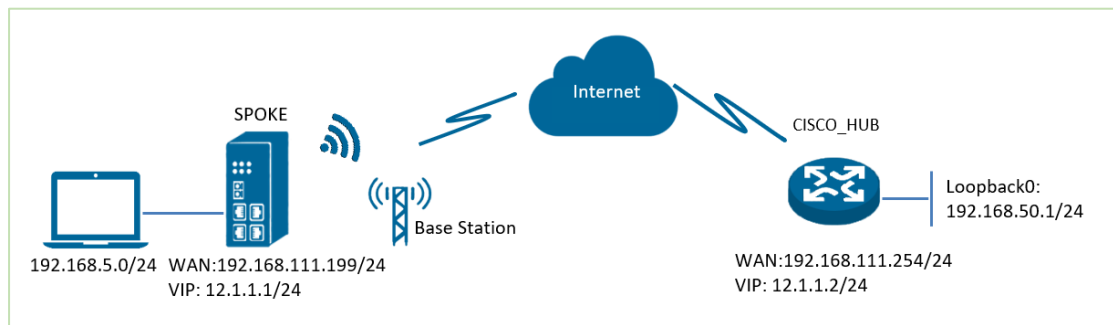
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2021/09/30	V1.0.0	1.0.0	First released

1.4 Corrections

Appreciate for corrections or rectifications to this application note, and if any request for new application notes please email to: elmark@elmark.com.pl

2. Topology



1. Sparrow runs as DMVPN spoke with any kind of IP, which can ping DMVPN hub successfully.
2. CISCO router runs as DMVPN hub with a static public IP.
3. The tunnel is established between spoke and hub, the subnet can PING each other successfully.
4. Both Sparrow and CISCO runs RIP.

3. Configuration

a) HUB Configuration

1. The configuration of **Hub on CISCO** like below:

=====

```
cisco2811#show running-config
Building configuration...
version 12.4
hostname cisco2811
ip address-pool local
no ipv6 cef
!
username cisco password 0 cisco
!
crypto isakmp policy 10
  encr 3des
  hash md5
  authentication pre-share
  group 2
crypto isakmp key 6 cisco address 0.0.0.0 0.0.0.0
!
crypto ipsec transform-set DMVPN esp-3des esp-sha-hmac
  mode transport
!
crypto ipsec profile DMVPN-PROFILE
  set transform-set DMVPN

interface Loopback0
  ip address 192.168.50.1 255.255.255.0
!

interface Tunnel1
  ip address 12.1.1.2 255.255.255.0
  no ip redirects
  ip nhrp authentication cisco
  ip nhrp map multicast dynamic
  ip nhrp network-id 3
  ip nhrp holdtime 120
  ip nhrp redirect
  no ip split-horizon
```

```
tunnel source 192.168.111.254
tunnel mode gre multipoint
tunnel key 123456
tunnel protection ipsec profile DMVPN-PROFILE
!
interface FastEthernet0/0
ip address 192.168.111.254 255.255.255.0
ip nat outside
ip nat enable
ip virtual-reassembly
duplex full
speed auto
no mop enabled
!
interface FastEthernet0/1
ip address 192.168.6.3 255.255.255.0
ip nat inside
ip nat enable
ip virtual-reassembly
duplex auto
speed auto
!
router rip
version 2
network 12.0.0.0
network 192.168.50.0
no auto-summary
!
ip forward-protocol nd
no ip http server
no ip http secure-server
!

ip nat inside source list 10 interface FastEthernet0/0 overload
!
access-list 10 permit 192.168.6.0 0.0.0.255
snmp-server community public RO
cisco2811#
=====
```

3.2 Spoke Configuration

1. Go to **VPN>DMVPN**, enable DMVPN and configure DMVPN as below picture.

Status DMVPN

NHRP Settings

Enable

Hub Address

NHRP Mapping Address ?

NHRP Authentication Key

NHRP Holdtime

mGRE Settings

mGRE Local Virtual IP

mGRE Local Virtual Netmask

mGRE Tunnel key ?

IPsec Settings

Negotiation Mode

Local ID Type

IKE Encryption Algorithm

IKE Hash Algorithm

IKE Diffie-Hellman Group

Pre-shared Key

ESP Encryption Algorithm

ESP Hash Algorithm

ESP Diffie-Hellman Group

Save **Apply**

2. Click Save>Apply.

3. Go to **Network>Route>RIP**, enable RIP and configure RIP as below picture.

Status Static Route RIP OSPF BGP

RIP Settings

Enable

Version

Neighbor

Default Metric

Distance

Update Interval ?

Timeout ?

Garbage Collect Time ?

Enable Redistribute Kernel Routes

Enable Redistribute Static Routes

Enable Redistribute Connected Routes

Log Level

Network Settings

Index	Description	Network	
2		192.168.5.0/24	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
1		12.1.1.0/24	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Interfaces Settings

Index	Interface	Enable Passive	Split-horizon	
-------	-----------	----------------	---------------	--

Save **Apply**

4.Route had connected to CISCO HUB. Go to **VPN>DMVPN>Status** to check the connection status.

Overview	Status DMVPN
Link Management	DMVPN Status
Industrial Interface	Status Connected
Network	Uptime 02:41:04

4. Route Table

1. Route Table on CISCO HUB for reference.

```

cisco2811#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is 192.168.111.1 to network 0.0.0.0

C    192.168.88.0/24 is directly connected, Loopback3
C    192.168.111.0/24 is directly connected, FastEthernet0/0
    172.16.0.0/24 is subnetted, 2 subnets
C      172.16.1.0 is directly connected, Loopback1
C      172.16.2.0 is directly connected, Loopback2
R    192.168.5.0/24 [120/1] via 12.1.1.1, 00:00:17, Tunnel1
    12.0.0.0/24 is subnetted, 1 subnets
C      12.1.1.0 is directly connected, Tunnel1
C    192.168.50.0/24 is directly connected, Loopback0
S*   0.0.0.0/0 [1/0] via 192.168.111.1
cisco2811#
  
```

2. Route Table on SPOKE for reference.

Overview	Status Static Route RIP
Link Management	Route Table Information
Industrial Interface	Index Destination Netmask Gateway Metric Interface
Network	1 0.0.0.0 0.0.0.0 192.168.111.1 0 wan
Firewall	2 12.1.1.0 255.255.255.0 0.0.0.0 0 dmvptun
Route	3 192.168.5.0 255.255.255.0 0.0.0.0 0 lan0
VRRP	4 192.168.50.0 255.255.255.0 12.1.1.2 20 dmvptun
Applications	5 192.168.111.0 255.255.255.0 0.0.0.0 0 wan

5. Testing

1. Enable CMD and Ping from end device of SPOKE to subnet of CISCO HUB.


```
Administrator: Command Prompt
C:\Users\Administrator>
C:\Users\Administrator>ping 192.168.50.1

Pinging 192.168.50.1 with 32 bytes of data:
Reply from 192.168.50.1: bytes=32 time=4ms TTL=254
Reply from 192.168.50.1: bytes=32 time=4ms TTL=254
Reply from 192.168.50.1: bytes=32 time=4ms TTL=254
Reply from 192.168.50.1: bytes=32 time=4ms TTL=254

Ping statistics for 192.168.50.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\Users\Administrator>
```

2. Ping from CISCO HUB to end device of SPOKE.

```
cisco2811#ping 192.168.5.2 source 192.168.50.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.5.2, timeout is 2 seconds:
Packet sent with a source address of 192.168.50.1
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
cisco2811#
```

3. Test successfully.