

Cisco Virtual Office: High Availability Design Guide

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DMVPN Redundancy

Dual (or multiple) hubs, single cloud

Use this model if all your spokes will use the same hub as primary. This model applies whether the hubs are co-located in the same data center or in different, geographically separated, data centers.

Each spoke will have one multipoint Generic Router Encapsulation (mGRE) tunnel interface (DMVPN cloud) configured with two next-hop servers, and will have simultaneous active connections to both hubs. The routing metrics on the hub routers can be used to specify which hub is primary (lower metric) and which hub is secondary.

Sample spoke tunnel configuration:

```
interface Tunnel1
  description Spoke Tunnel
  bandwidth 2000
  ip address 10.1.1.3 255.255.255.0
  no ip redirects
  ip mtu 1400
  ip hello-interval eigrp 99 30
  ip hold-time eigrp 99 90
  ip nhrp map multicast 192.168.1.1
  ip nhrp map multicast 192.168.1.2
  ip nhrp map 10.1.1.1 192.168.1.1
  ip nhrp map 10.1.1.2 192.168.1.2
  ip nhrp network-id 123
  ip nhrp holdtime 300
  ip nhrp nhs 10.1.1.1
  ip nhrp nhs 10.1.1.2
  ip nhrp registration no-unique
  ip nhrp shortcut
  ip tcp adjust-mss 1360
  load-interval 30
  delay 2000
  tunnel source FastEthernet4
  tunnel mode gre multipoint
  tunnel key 123
  tunnel protection ipsec profile protect
```

Sample hub tunnel configuration

Primary Hub:

```
interface Tunnel1
  bandwidth 2000
  ip address 10.1.1.1 255.255.255.0
  no ip redirects
  ip mtu 1400
```

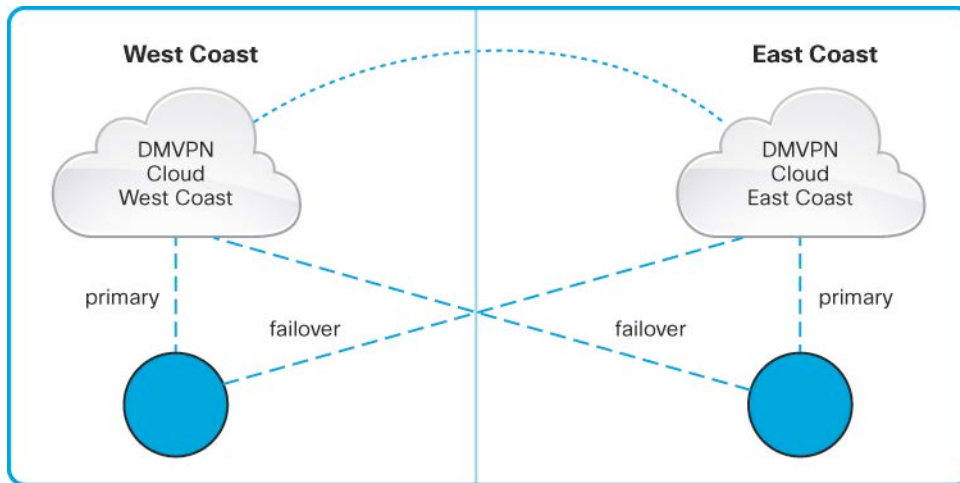
```
ip hello-interval eigrp 99 30
ip hold-time eigrp 99 90
no ip split-horizon eigrp 99
ip pim dr-priority 10
ip pim nbma-mode
ip pim sparse-dense-mode
ip nhrp map multicast dynamic
ip nhrp network-id 123
ip nhrp redirect
ip tcp adjust-mss 1360
delay 1900
qos pre-classify
tunnel source Loopback1
tunnel mode gre multipoint
tunnel key 123
tunnel protection ipsec profile protect shared
```

Secondary Hub:

```
interface Tunnell
bandwidth 2000
ip address 10.1.1.2 255.255.255.0
no ip redirects
ip mtu 1400
ip hello-interval eigrp 99 30
ip hold-time eigrp 99 90
no ip split-horizon eigrp 99
ip pim dr-priority 10
ip pim nbma-mode
ip pim sparse-dense-mode
ip nhrp map multicast dynamic
ip nhrp network-id 123
ip nhrp redirect
ip tcp adjust-mss 1360
delay 2000
qos pre-classify
tunnel source Loopback1
tunnel mode gre multipoint
tunnel key 123
tunnel protection ipsec profile protect shared
```

Dual (or multiple) hubs, dual clouds

Use this model if you have geographically dispersed spokes and you want each region to connect to a different primary DMVPN hub. The use case can be described in the diagram provided below.



Each spoke will have simultaneous active connections to both clouds, and each hub will belong to only one cloud. For the East Coast spoke, the East Coast cloud will act as primary, and the west coast cloud will provide failover and vice versa for the west coast spoke.

Each cloud will:

- Represent one tunnel interface configuration on the spoke.
- Have a separate tunnel IP address
- Use a different metric for its tunnel interface

The primary and failover cloud is selected by utilizing the tunnel metric. For the primary, the metric will be set to a lower value than the cloud that is further away.

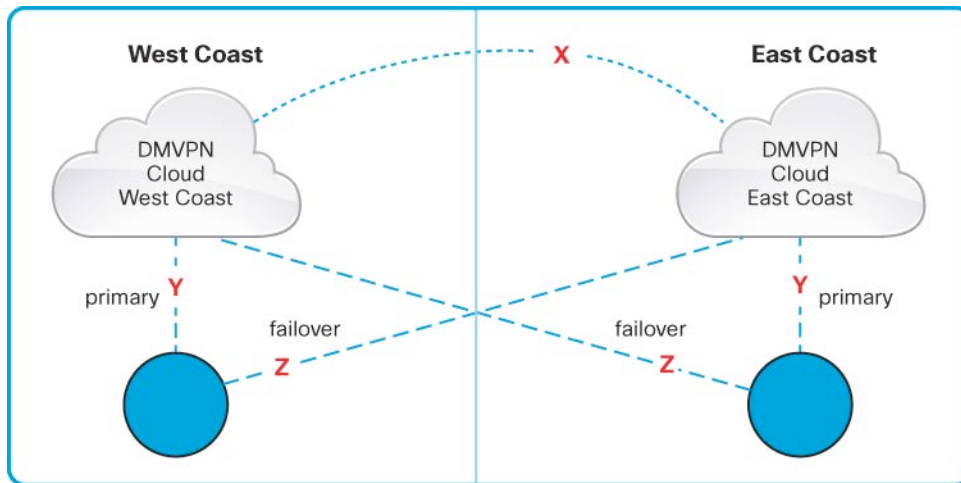
Sample spoke tunnel configurations using Enhanced Interior Gateway Protocol (EIGRP):

```
interface Tunnel0
description Primary Tunnel
bandwidth 2000
ip address 10.1.1.3 255.255.255.0
no ip redirects
ip mtu 1400
ip hello-interval eigrp 99 30
ip hold-time eigrp 99 90
ip nhrp map multicast 192.168.1.1
ip nhrp map 10.1.1.1 192.168.1.1
ip nhrp network-id 123
ip nhrp holdtime 300
ip nhrp nhs 10.1.1.1
```

```
ip nhrp registration no-unique
ip nhrp shortcut
ip tcp adjust-mss 1360
load-interval 30
delay 1900
tunnel source FastEthernet4
tunnel mode gre multipoint
tunnel key 123
tunnel protection ipsec profile protect shared
```

```
interface Tunnell
description Secondary Tunnel
bandwidth 2000
ip address 10.50.50.3 255.255.255.0
no ip redirects
ip mtu 1400
ip hello-interval eigrp 99 30
ip hold-time eigrp 99 90
ip nhrp map multicast 172.16.1.1
ip nhrp map 10.50.50.1 172.16.1.1
ip nhrp network-id 567
ip nhrp holdtime 300
ip nhrp nhs 10.50.50.1
ip nhrp registration no-unique
ip nhrp shortcut
ip tcp adjust-mss 1360
load-interval 30
delay 2000
tunnel source FastEthernet4
tunnel mode gre multipoint
tunnel key 567
tunnel protection ipsec profile protect shared
```

Note: If asymmetric routing between the West Coast spokes and East Coast spokes (shown in the figure above) should be avoided, make sure that the sum of the metrics on the link between the hubs and the link between each regional hub and its corresponding spokes is less than the metric on the link between the hub in one region and the spokes in the other region. Looking at the figure below, make sure that $X+Y<Z$.



Public Key Infrastructure High Availability

When using a Cisco IOS[®] Certificate Authority (CA) in Cisco Virtual Office, high availability can be achieved using the Public Key Infrastructure (PKI)-HA feature. Please refer to the following guide for more details on PKI-HA. The Secure Device Provisioning (SDP) registrar should be provisioned on both the primary and backup CAs:

http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6586/ps6638/ps6664/configuration_guide_c07_621400.html

ManageExpress Virtual Office (MEVO) High Availability

MEVO doesn't sit in the data/critical path in Cisco Virtual Office. If the MEVO server goes down, the spokes that are already online will not be affected. The only functions affected will be the addition of new spokes, and configuration and image changes.

With that in mind, it is enough to backup the MEVO database and restore it in case the server goes down, as shown in this document (use your Arcana Networks download credentials to download the file): <http://downloads.arcananet.com/files/docs/ME-BackupProcedure.pdf>. A MEVO backup can be done while the service is running, without causing any outage.

In the case where a MEVO active/active HA is still desired, here are deployment options you can use:

- VMware vMotion
- Microsoft SQL merge replication (log shipping is also supported for an active/standby model)
- Windows DFS for template and configuration file replication
- Windows NLB for providing a single virtual IP address.
- Content switches and clustered SQL servers are also supported. The SQL cluster can be shared or dedicated.

Preferred OS: Windows 2008R2

Preferred database: Microsoft SQL 2008R2



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