Troubleshoot SD-WAN Dynamic On-Demand Tunnels

Contents

Introduction

This document describes troubleshoot commands that can be used when configuring or checking an issue related to SD-WAN dynamic on-demand tunnels.

Prerequistes

Components Used

This document is based on these configuration reference, software and hardware versions:

- vManage version 20.9.3
- Edge Router ISR4K version 17.9.3
- All devices were configured for establish dynamic on-demand tunnels based in official documentation

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, ensure that you understand the potential impact of any command.

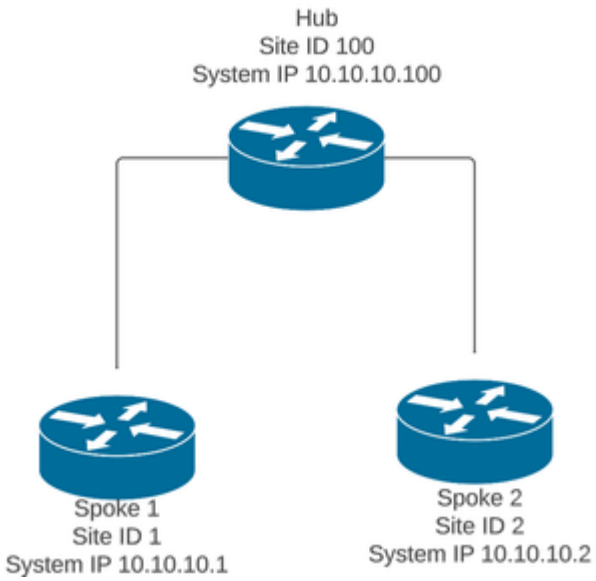
Note: Refer to this document for Dynamic On-Demand tunnels configuration.

Background Information

Cisco SD-WAN supports dynamic on-demand tunnels between any two Cisco SD-WAN spoke devices. These tunnels are triggered to be set up only when there is traffic between the two devices optimizing bandwidth usage and device performance.

Working Scenario

Topology Used



In a normal operation scenario the On-Demand tunnels trigger conditions are:

- BFD sessions between spokes cannot be established or even appear as down in the **show sdwan bfd sessions**
- BFD sessions can be triggered when interest traffic is sent between the endpoints
- Basic Dynamic On-Demand tunnels configurations must be set and confirmed

Triger On-demand Tunnel Activation

- Initially BFD sessions between spokes are not up, only sessions from Spokes to Hub are up and on-demand system status can be seen as inactive in both Spokes and in OMP table, backup route from Hub is set as C,I,R while route from Spoke 2 is set as I,U,IA

Spoke 1#show sdwan bfd sessions

SYSTEM IP	SITE ID	STATE	SOURCE TLOC COLOR	REMOTE TLOC COLOR	SOURCE IP	DST PUBLIC IP	DST PUBLIC PORT	ENCAP	DETECT MULTIP
10.10.10.100	100	up	blue	blue	10.10.10.1	10.100.100.1	12366	ipsec	7

Spoke 1#show sdwan system on-demand remote-system

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

IDLE-TIMEOUT-EXPIRY(sec)

---

2 10.10.10.2

yes inactive

-

Spoke 1#show sdwan omp routes vpn 10 10.2.2.2/32

Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

TENANT	VPN	PREFIX	PATH FROM PEER	ID	LABEL	STATUS	ATTRIBUTE TYPE	TLOC IP	COLOR	ENCAP	PRE
0	**10**	**10.2.2.2/32**	**192.168.0.1**	**61**	**1005**	**C,I,R**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**
			192.168.0.1	62	1003	I,U,IA	installed	10.10.10.2	default	ipsec	-
			192.168.0.1	64	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.1	65	1003	I,U,IA	installed	10.10.10.2	private1	ipsec	-
			192.168.0.1	67	1005	Inv,U	installed	10.10.10.100	blue	ipsec	-
			192.168.0.1	68	1003	I,U,IA	installed	10.10.10.2	private2	ipsec	-
			192.168.0.2	71	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	72	1003	U,IA	installed	10.10.10.2	default	ipsec	-
			192.168.0.2	74	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	75	1003	U,IA	installed	10.10.10.2	private1	ipsec	-
			192.168.0.2	77	1005	Inv,U	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	78	1003	U,IA	installed	10.10.10.2	private2	ipsec	-

Spoke 2#show sdwan bfd sessions

```
                            SOURCE TLOC REMOTE TLOC              DST PUBLIC    DST PUBLIC          DETE
SYSTEM IP     SITE ID STATE COLOR       COLOR        SOURCE IP   IP            PORT         ENCAP MULTI
-------------------------------------------------------------------------------------------------------
10.10.10.100   100    up     blue        blue        10.10.10.2 10.100.100.1    12366       ipsec     7
```

Spoke 2#show sdwan system on-demand remote-system

```
SITE-ID SYSTEM-IP
```

ON-DEMAND STATUS

```
 IDLE-TIMEOUT-EXPIRY(sec)
--------------------------------------------------------------------------
1       10.10.10.1
```

yes **inactive**

-

- To trigger on-demand tunnel activation interest traffic is needed. In this example ICMP traffic is used, after sending traffic the status of on-demand remote-system changes from status inactive to status active in both ends and destination prefix changes in OMP table from a C,I,R status from Hub to a C,I,R status from Spoke 2

<#root>

```
Spoke 1#ping vrf 10 10.2.2.2 re 20


Type escape sequence to abort.
Sending 20, 100-byte ICMP Echos to 10.2.2.2, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (20/20), round-trip min/avg/max = 1/3/31 ms


Spoke 1#show sdwan system on-demand remote-system


SITE-ID SYSTEM-IP
ON-DEMAND   STATUS
 IDLE-TIMEOUT-EXPIRY(sec)
------------------------------------------------------------------------------
2       10.10.10.2
 yes         active
 56


Spoke 1#show sdwan bfd sessions


                           SOURCE TLOC REMOTE TLOC            DST PUBLIC   DST PUBLIC       DETECT TX
SYSTEM IP     SITE ID STATE COLOR       COLOR     SOURCE IP    IP           PORT       ENCAP MULTIPLIER
-------------------------------------------------------------------------------------------------------
10.10.10.100   100     up blue          blue      10.10.10.1   10.100.100.1 12366      ipsec    7
10.10.10.2     2       up default       default   10.10.10.1   10.12.12.2   12366      ipsec    7


10.10.10.2     2       up blue          blue      10.10.10.1   10.12.12.2   12366      ipsec    7
```

Spoke 1#

show sdwan omp routes vpn 10 10.2.2.2/32

```
Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated
```

			PATH		ATTRIBUTE			
TENANT	VPN	PREFIX	FROM PEER	ID	LABEL	STATUS	TYPE	TLOC IP	COLOR	ENCAP
0	10	10.2.2.2/32	192.168.0.1	61	1005	R	installed	10.10.10.100	blue	ipsec
			192.168.0.1	**62**	**1003**	**C,I,R**	**installed**	**10.10.10.2**	**default**	**ipsec**
			192.168.0.1	64	1005	R	installed	10.10.10.100	blue	ipsec
			192.168.0.1	**65**	**1003**	**C,I,R**	**installed**	**10.10.10.2**	**private1**	**ipsec**
			192.168.0.1	67	1005	Inv,U	installed	10.10.10.100	blue	ipsec
			192.168.0.1	**68**	**1003**	**C,I,R**	**installed**	**10.10.10.2**	**private2**	**ipsec**
			192.168.0.2	71	1005	R	installed	10.10.10.100	blue	ipsec
			192.168.0.2	72	1003	C,R	installed	10.10.10.2	default	ipsec
			192.168.0.2	74	1005	R	installed	10.10.10.100	blue	ipsec
			192.168.0.2	75	1003	C,R	installed	10.10.10.2	private1	ipsec
			192.168.0.2	77	1005	Inv,U	installed	10.10.10.100	blue	ipsec
			192.168.0.2	78	1003	C,R	installed	10.10.10.2	private2	ipsec

Spoke 2#show sdwan system on-demand remote-system

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

IDLE-TIMEOUT-EXPIRY(sec)

---

1 10.10.10.1

yes active

53

Spoke 2#show sdwan bfd sessions

SYSTEM IP	SITE ID	STATE	SOURCE TLOC COLOR	REMOTE TLOC COLOR	SOURCE IP	DST PUBLIC IP	DST PUBLIC PORT	ENCAP	DETECT MULTIPLIE
10.10.10.100	100	up	blue	blue	10.10.10.2	10.100.100.1	12366	ipsec	7
10.10.10.1	**2**	**up**	**default**	**default**	**10.10.10.2**	**10.11.11.1**	**12366**	**ipsec**	**7**
10.10.10.1	**2**	**up**	**blue**	**blue**	**10.10.10.2**	**10.11.11.1**	**12366**	**ipsec**	**7**

- After interst traffic stops and idle time-out expires BFD sessions between spokes disappear and on-demand status returns to inactive and route returns to C,I,R backup route status from Hub in OMP table

<#root>

Spoke 1#show sdwan bfd sessions

```
                              SOURCE TLOC REMOTE TLOC               DST PUBLIC     DST PUBLIC     DETECT
SYSTEM IP     SITE ID STATE   COLOR        COLOR    SOURCE IP      IP              PORT    ENCAP MULTIP
-------------------------------------------------------------------------------------------------------
10.10.10.100  100      up     blue         blue     10.10.10.1      10.100.100.1   12366   ipsec   7
```

Spoke 1#show sdwan system on-demand remote-system

```
SITE-ID SYSTEM-IP
```

ON-DEMAND STATUS

```
 IDLE-TIMEOUT-EXPIRY(sec)
--------------------------------------------------------------------------
2      10.10.10.2
```

yes   **inactive**

```
 -
```

Spoke 2#show sdwan bfd sessions

```
                              SOURCE TLOC REMOTE TLOC               DST PUBLIC       DST PUBLIC    DETEC
SYSTEM IP     SITE ID   STATE COLOR         COLOR   SOURCE IP       IP               PORT   ENCAP MULTI
-------------------------------------------------------------------------------------------------------
10.10.10.100  100       up    blue          blue    10.10.10.2      10.100.100.1    12366   ipsec  7
```

Spoke 2#show sdwan system on-demand remote-system

```
SITE-ID SYSTEM-IP
```

ON-DEMAND STATUS

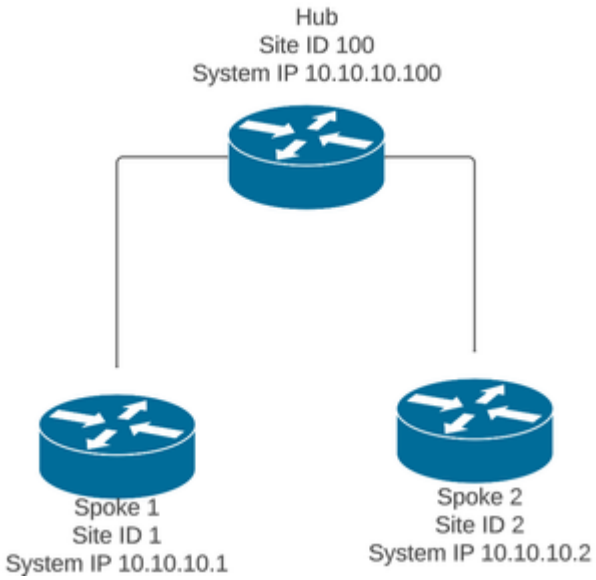
```
 IDLE-TIMEOUT-EXPIRY(sec)
--------------------------------------------------------------------------
1 10.10.10.1
```

```
yes inactive

-
```

Common Issue Scenarios

Topology Used



Scenario 1: Backup path through the hub considered invalid and unresolved by spokes

Symptom

- Destination prefix from Spoke 2 is unreachable, backup path from hub is seen but is considered invalid/uninstalled

Spoke 1#show sdwan omp routes vpn 10 10.2.2.2/32

Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

TENANT	VPN	PREFIX	FROM PEER	PATH ID	LABEL	STATUS	ATTRIBUTE TYPE	TLOC IP	COLOR	ENCAP	PREFERENC
0	10	10.2.2.2/32									
192.168.0.1	**61**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.1	62	1003	U,IA	installed	10.10.10.2	default	ipsec	-
192.168.0.1	**64**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.1	65	1003	U,IA	installed	10.10.10.2	private1	ipsec	-
192.168.0.1	**67**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.1	68	1003	U,IA	installed	10.10.10.2	private2	ipsec	-
192.168.0.2	**71**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.2	72	1003	U,IA	installed	10.10.10.2	default	ipsec	-
192.168.0.2	**74**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.2	75	1003	U,IA	installed	10.10.10.2	private1	ipsec	-
192.168.0.2	**77**	**1005**	**Inv,U**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**	**None**	**None**	**-**
			192.168.0.2	78	1003	U,IA	installed	10.10.10.2	private2	ipsec	-

Troubleshoot

1. Check if hub BFD sessions towards spokes are established

<#root>

```
Hub#show sdwan bfd sessions

                         SOURCE TLOC    REMOTE TLOC                    DST PUBLIC DST PUBLIC
SYSTEM IP  SITE ID  STATE COLOR          COLOR.          SOURCE IP      IP         PORT       ENCA
-------------------------------------------------------------------------------------------------
10.10.10.2  2       up   blue           blue            10.10.10.100   10.12.12.2 12366      ipse
10.10.10.1  1       up   default        default         10.10.10.100   10.11.11.1 12366      ipse
```

2. Check on-demand tunnel policy to confirm that all sites are included in the correct site lists according to their role (hub or spoke)

3. Confirm if on-demand feature is enabled and active in spokes using command **show sdwan system**

on-demand

<#root>

Spoke 1#show sdwan system on-demand

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

IDLE-TIMEOUT-CFG(min)

---

1 10.10.10.1

yes active

10

Spoke 2#show sdwan system on-demand

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

IDLE-TIMEOUT-CFG(min)

---

2 10.10.10.2

yes active

10

4. Confirm if Traffic Engineering service (service TE) is enabled in the hub site. Useful command could be **show sdwan run | inc TE**

<#root>

hub#show sdwan run | inc TE

!

Solution

- In this case service TE is not enabled in the hub site. To fix, configure it in hub side:

<#root>

```
hub#config-trans
hub(config)# sdwan
```

hub(config-vrf-global)# service TE vrf global

```
hub(config-vrf-global)# commit
```

- Check that in Spoke 1 OMP table has changed and now has this route as C,I,R for the entry that comes from hub 10.10.10.100 (before generate interest traffic) and gets C,I,R for the entry that comes from Spoke 2 10.10.10.2 (while interest traffic is generated). Also check that BFD session between spoke 1 and spoke 2, and on-demand tunnel is up with command **show sdwan system on-demand remote-system <remote system ip>** :

<#root>

Before interest traffic

Spoke 1#show sdwan omp routes vpn 10 10.2.2.2/32

```
Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

AFFINITY
                                    PATH               ATTRIBUTE GROUP
TENANT   VPN PREFIX      FROM PEER ID LABEL STATUS    TYPE     TLOC IP        COLOR      ENCAP PREFEREN
-------------------------------------------------------------------------------------------------------
```

0 10 10.2.2.2/32 192.168.0.1 61 1005 C,I,R installed 10.10.10.100 blue ipsec -

```
                        192.168.0.1 62 1003 I,U,IA   installed 10.10.10.2     default    ipsec   -
                        192.168.0.1 64 1005 C,R      installed 10.10.10.100   blue       ipsec   -
                        192.168.0.1 65 1003 I,U,IA   installed 10.10.10.2     private1   ipsec   -
                        192.168.0.1 67 1005 Inv,U    installed 10.10.10.100   blue       ipsec   -
                        192.168.0.1 68 1003 I,U,IA   installed 10.10.10.2     private2   ipsec   -
                        192.168.0.2 71 1005 C,R      installed 10.10.10.100   blue       ipsec   -
                        192.168.0.2 72 1003 U,IA     installed 10.10.10.2     default    ipsec   -
                        192.168.0.2 74 1005 C,R      installed 10.10.10.100   blue       ipsec   -
                        192.168.0.2 75 1003 U,IA     installed 10.10.10.2     private1   ipsec   -
                        192.168.0.2 77 1005 Inv,U    installed 10.10.10.100   blue       ipsec   -
                        192.168.0.2 78 1003 U,IA     installed 10.10.10.2     private2   ipsec   -
```

While interest traffic

Spoke 1#

show sdwan omp routes vpn 10 10.2.2.2/32

```
Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

                                                                                        AFFINITY
                                  PATH              ATTRIBUTE                           GROUP
TENANT VPN PREFIX      FROM PEER  ID LABEL STATUS   TYPE      TLOC IP COLOR ENCAP PREFERENCE NUMBER REGI
---------------------------------------------------------------------------------------------------------
0      10 10.2.2.2/32 192.168.0.1 61 1005 R        installed 10.10.10.100   blue          ipsec - None
```

192.168.0.1 62 1003 C,I,R installed 10.10.10.2 default ipsec - None None -

```
                      192.168.0.1 64 1005 R        installed 10.10.10.100   blue          ipsec - None
```

192.168.0.1 65 1003 C,I,R installed 10.10.10.2 private1 ipsec - None None -

```
                      192.168.0.1 67 1005 Inv,U    installed 10.10.10.100   blue          ipsec - None
```

192.168.0.1 68 1003 C,I,R installed 10.10.10.2 private2 ipsec - None None -

```
                      192.168.0.2 71 1005 R        installed 10.10.10.100   blue          ipsec - None
                      192.168.0.2 72 1003 C,R      installed 10.10.10.2     default       ipsec - None
```

```
                    192.168.0.2 74 1005 R        installed 10.10.10.100   blue          ipsec - None
                    192.168.0.2 75 1003 C,R      installed 10.10.10.2     private1      ipsec - None
                    192.168.0.2 77 1005 Inv,U    installed 10.10.10.100   blue          ipsec - None
                    192.168.0.2 78 1003 C,R      installed 10.10.10.2     private2      ipsec - None
```

Spoke 1#show sdwan bfd sessions

SYSTEM IP	SITE ID	STATE	SOURCE TLOC COLOR	REMOTE TLOC COLOR	DST PUBLIC SOURCE IP	DST PUBLIC IP	DST PUBLIC PORT	ENCAP
10.10.10.100	100	up	blue	blue	10.10.10.1	10.100.100.1	12366	ipsec
10.10.10.2	**2**	**up**	**default**	**default**	**10.10.10.1**	**10.12.12.2**	**12366**	**ipsec**
10.10.10.2	**2**	**up**	**blue**	**blue**	**10.10.10.1**	**10.12.12.2**	**12366**	**ipsec**

Spoke 1#show sdwan system on-demand remote-system system-ip 10.10.10.2

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

IDLE-TIMEOUT-EXPIRY(sec)

---

2 10.10.10.2 yes active 41 ------>on-demand tunnel established to spoke 2 10.10.10.2 due of

Scenario 2: BFD sessions between spokes remain up

Symptom

- In this case remote Spoke 2 endpoint is listed in the on-demand remote endpoints seen with command **show sdwan system on-demand remote-system** with a status of no on-demand, BFD session between Spoke 1 and Spoke 2 remains up even when no interest traffic is sent and destination prefix is learn directly from Spoke 2

<#root>

Spoke 1#show sdwan system on-demand remote-system

SITE-ID

SYSTEM-IP ON-DEMAND

STATUS IDLE-TIMEOUT-EXPIRY(sec)

2

10.10.10.2 no

- -

Spoke 1#show sdwan bfd sessions

SYSTEM IP	SITE ID	STATE	SOURCE TLOC COLOR	REMOTE TLOC COLOR	SOURCE IP	DST PUBLIC IP	DST PUBLIC PORT	ENCAP	DETECT TX MULTIPLIER
10.10.10.100	100	up	blue	blue	10.10.10.1	10.100.100.1	12366	ipsec	7
10.10.10.2	**2**	**up**	**default**	**default**	**10.10.10.1**	**10.12.12.2**	**12366**	**ipsec**	**7**
10.10.10.2	**2**	**up**	**blue**	**blue**	**10.10.10.1**	**10.12.12.2**	**12366**	**ipsec**	**7**

Spoke 1#show sdwan omp route vpn 10 10.2.2.2/32

Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

PATH ATTRIBUTE

```
TENANT VPN PREFIX          FROM PEER ID LABEL STATUS   TYPE      TLOC IP      COLOR      ENCAP PREFEREN
-------------------------------------------------------------------------------------------------------
0      10 10.2.2.2/32      192.168.0.1 73 1005 R       installed 10.10.10.100 blue       ipsec  -

192.168.0.1 74 1003 C,I,R    installed 10.10.10.2    default   ipsec  -          None       None      -

                           192.168.0.1 76 1005 R       installed 10.10.10.100 blue       ipsec  -

 192.168.0.1 77 1003 C,I,R    installed 10.10.10.2    private1  ipsec  -          None       None      -

                           192.168.0.1 79 1005 Inv,U   installed 10.10.10.100 blue       ipsec  -

192.168.0.1 80 1003 C,I,R    installed 10.10.10.2    private2  ipsec  -          None       None      -

                           192.168.0.2 89 1005 R       installed 10.10.10.100 blue       ipsec  -
                           192.168.0.2 90 1003 C,R     installed 10.10.10.2   default    ipsec  -
                           192.168.0.2 92 1005 R       installed 10.10.10.100 blue       ipsec  -
                           192.168.0.2 93 1003 C,R     installed 10.10.10.2   private1   ipsec  -
                           192.168.0.2 95 1005 Inv,U   installed 10.10.10.100 blue       ipsec  -
                           192.168.0.2 96 1003 C,R     installed 10.10.10.2   private2   ipsec  -
```

Troubleshoot

1. Check on-demand tunnel policy to confirm that all sites are included in the correct site lists according to their role (hub or spoke)

```
viptela-policy:policy
 control-policy ondemand
    sequence 1
     match route
      site-list Spokes
      prefix-list _AnyIpv4PrefixList
     !
     action accept
      set
       tloc-action backup
       tloc-list hub
      !
     !
    !
  default-action accept
 !
 lists
  site-list Spokes
   site-id 1-2
  !
  tloc-list hub
   tloc 10.10.10.100 color blue encap ipsec
   tloc 10.10.10.100 color default encap ipsec
   tloc 10.10.10.100 color private1 encap ipsec
   tloc 10.10.10.100 color private2 encap ipsec
  !
  prefix-list _AnyIpv4PrefixList
   ip-prefix 0.0.0.0/0 le 32
  !
 !
!
apply-policy
 site-list Spokes
  control-policy ondemand out
 !
!
```

2. Check if on-demand is enable with command **show sdwan run | inc on-demand** in Spokes and TE is enabled in hub with command **show sdwan run | inc TE**

<#root>

```
Spoke 1#show sdwan run | inc on-demand
on-demand enable
on-demand idle-timeout 10
```

```
Spoke 2#show sdwan run | inc on-demand
Spoke 2#

Hub#show sdwan run | inc TE
service TE vrf global
```

Solution

- In this case on-demand is not enabled in Spoke 2. To fix, configure it in Spoke 2 side

<#root>

```
Spoke 2#config-trans
Spoke 2(config)# system

Spoke 2(config-vrf-global)# on-demand enable
Spoke 2(config-vrf-global)# on-demand idle-timeout 10


Spoke 2(config-vrf-global)# commit
```

- Check that in Spoke 1 now Spoke 2 is seen as on-demand yes and the OMP table has changed and now has this route as C,I,R for the entry that comes from hub 10.10.10.100 (before generate interest traffic) and not directly from Spoke 2

<#root>

```
Spoke 1#show sdwan system on-demand remote-system
```

SITE-ID SYSTEM-IP ON-DEMAND STATUS IDLE-TIMEOUT-EXPIRY(sec)

2 10.10.10.2 yes inactive -

Spoke 1#show sdwan omp routes vpn 10 10.2.2.2/32

Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

AFFINITY
PATH ATTRIBUTE GROUP

TENANT	VPN	PREFIX	FROM PEER	ID	LABEL	STATUS	TYPE	TLOC IP	COLOR	ENCAP	PREFERENCE
0	**10**	**10.2.2.2/32**	**192.168.0.1**	**61**	**1005**	**C,I,R**	**installed**	**10.10.10.100**	**blue**	**ipsec**	**-**
			192.168.0.1	62	1003	I,U,IA	installed	10.10.10.2	default	ipsec	-
			192.168.0.1	64	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.1	65	1003	I,U,IA	installed	10.10.10.2	private1	ipsec	-
			192.168.0.1	67	1005	Inv,U	installed	10.10.10.100	blue	ipsec	-
			192.168.0.1	68	1003	I,U,IA	installed	10.10.10.2	private2	ipsec	-
			192.168.0.2	71	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	72	1003	U,IA	installed	10.10.10.2	default	ipsec	-
			192.168.0.2	74	1005	C,R	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	75	1003	U,IA	installed	10.10.10.2	private1	ipsec	-
			192.168.0.2	77	1005	Inv,U	installed	10.10.10.100	blue	ipsec	-
			192.168.0.2	78	1003	U,IA	installed	10.10.10.2	private2	ipsec	-

- When interest traffic is generated it gets C,I,R for the entry that comes from Spoke 2 10.10.10.2. Also check that BFD session between Spoke 1 and Spoke 2 is up, also check that on-demand tunnel is up with command **show sdwan system on-demand remote-system <remote system ip>**

<#root>

Spoke 1#

show sdwan omp routes vpn 10 10.2.2.2/32

```
Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

                                                PATH                ATTRIBUTE
TENANT  VPN        PREFIX          FROM PEER    ID LABEL STATUS     TYPE     TLOC IP      COLOR ENCAP PRE
-------------------------------------------------------------------------------------------------------
0       10         10.2.2.2/32     192.168.0.1  61 1005 R          installed 10.10.10.100  blue     ipsec
                                   192.168.0.1  62 1003 C,I,R      installed 10.10.10.2    default  ipsec

                                   192.168.0.1  64 1005 R          installed 10.10.10.100  blue     ipsec
                                   192.168.0.1  65 1003 C,I,R      installed 10.10.10.2    private1 ipsec
```

```
                                192.168.0.1 67 1005 Inv,U     installed 10.10.10.100  blue     ipsec
                                192.168.0.1 68 1003 C,I,R     installed 10.10.10.2    private2 ipsec

                                192.168.0.2 71 1005 R         installed 10.10.10.100  blue     ipsec
                                192.168.0.2 72 1003 C,R       installed 10.10.10.2    default  ipsec
                                192.168.0.2 74 1005 R         installed 10.10.10.100  blue     ipsec
                                192.168.0.2 75 1003 C,R       installed 10.10.10.2    private1 ipsec
                                192.168.0.2 77 1005 Inv,U     installed 10.10.10.100  blue     ipsec
                                192.168.0.2 78 1003 C,R       installed 10.10.10.2    private2 ipsec
```

Spoke 1#show sdwan bfd sessions

```
                        SOURCE TLOC REMOTE TLOC             DST PUBLIC  DST PUBLIC          DETECT
SYSTEM IP SITE ID STATE COLOR       COLOR       SOURCE IP   IP          PORT          ENCAP MULTIPLIER I
-------------------------------------------------------------------------------------------------------
10.10.10.100 100  up blue          blue        10.10.10.1 10.100.100.1 12366       ipsec     7
10.10.10.2   2    up default       default     10.10.10.1 10.12.12.2   12366       ipsec     7
10.10.10.2   2    up blue          blue        10.10.10.1 10.12.12.2   12366       ipsec     7
```

Spoke 1#show sdwan system on-demand remote-system system-ip 10.10.10.2

```
SITE-ID SYSTEM-IP
ON-DEMAND STATUS
 IDLE-TIMEOUT-EXPIRY(sec)
-------------------------------------------------------------------------
2        10.10.10.2 yes      active   41 ------>on-demand tunnel established to Spoke 2 10.10.10.2 due c
```

Scenario 3: No backup routes from hub are learened or installed in spokes

Symptom

- In this case there are no backup routes for prefix 10.2.2.2/32 originated in Spoke 2 in OMP table, only seen on-demand inactive entries. Confirmed that on-demand in spokes and TE in hub are configured

<#root>

```
Spoke 1#show sdwan omp route vpn 10 10.2.2.2/32


Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

AFFINITY
PATH ATTRIBUTE GROUP
TENANT VPN      PREFIX     FROM PEER   ID LABEL STATUS TYPE     TLOC IP   COLOR   ENCAP PREFERENCE NUMB
---------------------------------------------------------------------------------------------------------
```

```
0      10      10.2.2.2/32 192.168.0.1 108 1003
```

U,IA

```
 installed 10.10.10.2 default  ipsec -             None  None -
                           192.168.0.1 113 1003
```

U,IA

```
 installed 10.10.10.2 private1 ipsec -             None  None -
                           192.168.0.1 141 1003
```

U,IA

```
 installed 10.10.10.2 private2 ipsec -             None  None -
                           192.168.0.2 112 1003
```

U,IA

```
 installed 10.10.10.2 default  ipsec -             None  None -
                           192.168.0.2 117 1003
```

U,IA

```
 installed 10.10.10.2 private1 ipsec -             None  None -
                           192.168.0.2 144 1003
```

U,IA

```
 installed 10.10.10.2 private2 ipsec -             None  None -
```

Spoke 1#show sdwan run | inc on-demand
on-demand enable
on-demand idle-timeout 10

Spoke 2#show sdwan run | inc on-demand
on-demand enable
on-demand idle-timeout 10

Hub#show sdwan run | inc TE
service TE vrf global

Troubleshoot

- Check the on-demand centralized policy and confirm if all the spokes are included on the correct site list

<#root>

```
viptela-policy:policy
 control-policy ondemand
    sequence 1
     match route
      site-list Spokes
      prefix-list _AnyIpv4PrefixList
     !
     action accept
      set
       tloc-action backup
       tloc-list hub
      !
     !
    !
  default-action accept
 !
 lists


site-list Spokes
   site-id 1


  !
  tloc-list hub
   tloc 10.10.10.100 color blue encap ipsec
   tloc 10.10.10.100 color default encap ipsec
   tloc 10.10.10.100 color private1 encap ipsec
   tloc 10.10.10.100 color private2 encap ipsec
  !
  prefix-list _AnyIpv4PrefixList
```

```
          ip-prefix 0.0.0.0/0 le 32
         !
        !
       !
       apply-policy
        site-list Spokes
         control-policy ondemand out
        !
```

Solution

- Notice that Spoke 2 site id 2 is missing from the site list spokes in the policy. After including it inside the site list, the backup paths are installed correctly, on-demand tunnel and BFD sessions between spokes comes up when interest traffic is sent.

<#root>

Spokes site list from policy before

lists

site-list Spokes

site-id 1

!

Spokes site list from policy after

lists

site-list Spokes

site-id 1-2

!

Spoke 1#show sdwan omp routes vpn 10 10.2.2.2/32

```
Generating output, this might take time, please wait ...
Code:
C -> chosen
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Rej -> rejected
L -> looped
R -> resolved
S -> stale
```

```
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
BR-R -> border-router reoriginated
TGW-R -> transport-gateway reoriginated

AFFINITY
PATH ATTRIBUTE GROUP
TENANT VPN PREFIX           FROM PEER   ID LABEL STATUS TYPE      TLOC IP      COLOR    ENCAP PREFERENC
-----------------------------------------------------------------------------------------------------

0      10  10.2.2.2/32      192.168.0.1 61 1005 C,I,R   installed 10.10.10.100 blue     ipsec    -


                           192.168.0.1 62 1003 I,U,IA  installed 10.10.10.2   default  ipsec    -
                           192.168.0.1 64 1005 C,R     installed 10.10.10.100 blue     ipsec    -
                           192.168.0.1 65 1003 I,U,IA  installed 10.10.10.2   private1 ipsec    -
                           192.168.0.1 67 1005 Inv,U   installed 10.10.10.100 blue     ipsec    -
                           192.168.0.1 68 1003 I,U,IA  installed 10.10.10.2   private2 ipsec    -
                           192.168.0.2 71 1005 C,R     installed 10.10.10.100 blue     ipsec    -
                           192.168.0.2 72 1003 U,IA    installed 10.10.10.2   default  ipsec    -
                           192.168.0.2 74 1005 C,R     installed 10.10.10.100 blue     ipsec    -
                           192.168.0.2 75 1003 U,IA    installed 10.10.10.2   private1 ipsec    -
                           192.168.0.2 77 1005 Inv,U   installed 10.10.10.100 blue     ipsec    -
                           192.168.0.2 78 1003 U,IA    installed 10.10.10.2   private2 ipsec    -

Spoke 1#show sdwan bfd sessions

SOURCE                     TLOC REMOTE TLOC DST PUBLIC     DST PUBLIC              DETECT        TX
SYSTEM IP    SITE ID STATE COLOR       COLOR    SOURCE IP  IP           PORT ENCAP MULTIPLIER INTERVAL(
-----------------------------------------------------------------------------------------------------
10.10.10.100   100   up    blue         blue    10.10.10.1 10.100.100.1 12366 ipsec  7          1000

10.10.10.2      2    up    default      default 10.10.10.1 10.12.12.2   12366 ipsec  7          1000


10.10.10.2      2    up    blue         blue    10.10.10.1 10.12.12.2   12366 ipsec  7          1000



Spoke 1#show sdwan system on-demand remote-system system-ip 10.10.10.2

SITE-ID SYSTEM-IP

ON-DEMAND STATUS

 IDLE-TIMEOUT-EXPIRY(sec)
-------------------------------------------------------------------------

2       10.10.10.2 yes      active    56 ------>on-demand tunnel established to Spoke 2 10.10.10.2 due c
```

Useful commands

- show sdwan system on-demand
- show sdwan system on-demand remote-system
- show sdwan system on-demand remote-system system-ip <system ip>
- show sdwan run | inc on-demand
- show sdwan run | inc TE
- show sdwan ompo routes vpn <vpn number>