



Telemetry Deployment for VXLAN EVPN Solution

This document is targeted for users who are planning to deploy the Cisco Nexus 9000 telemetry solution along with their VXLAN EVPN deployment. Users should be familiar with the concept of telemetry and are encouraged to read the [Telemetry Document](#).

Users should also be familiar with the VXLAN EVPN solution.

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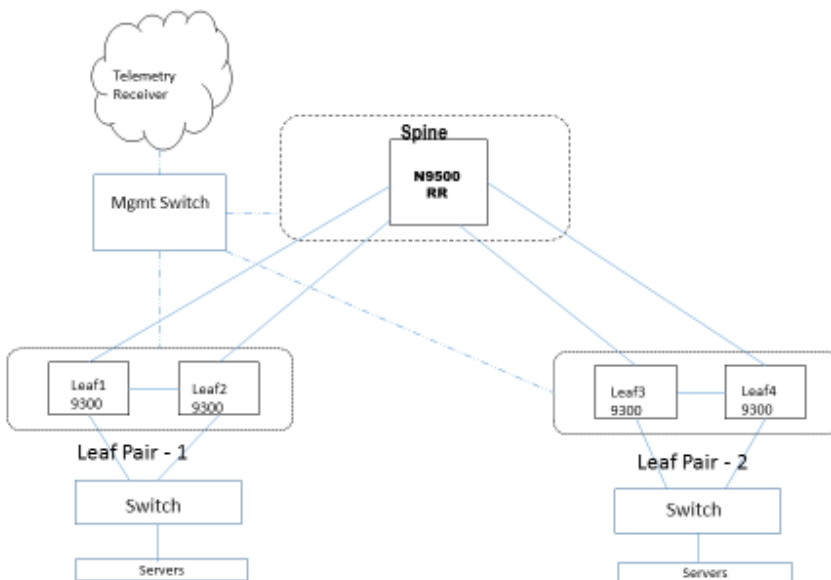
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1. Telemetry Solution Test Topology

This section presents a test topology to describe telemetry usage. In this topology, four Cisco Nexus 9300 switches are connected to a Cisco Nexus 9504 spine switch using ECMP links. The telemetry receiver is started on an external Linux device. There is connectivity from each of the Cisco Nexus devices to the telemetry receiver using the switch management ports. In this vPC setup, hosts are deployed on servers, which are located behind the vPC peers. (IXIA is used to simulate the hosts on the servers. Simulation has been used to scale up to 250 NVE peers, along with route injection.)

Telemetry Solution Test Topology



Cisco NX-OS Release 7.0(3)I6(1) supports two types of protocol/encoding for telemetry usage: GRPC/GPB and HTTP/JSON. Users need to start the corresponding type of receiver on the external device to consume the telemetry data streamed from the switches.

There are two ways to collect telemetry data from the switches. One is DME based, and the other is NX-API based. Cisco NX-OS Release 7.0(3)I5(1) supports DME-based collection and GRPC/GPB protocol/encoding. Cisco NX-OS Release 7.0(3)I6(1) adds support for HTTP/JSON protocol/encoding. DME-based telemetry data collection expects the sensor path to be a valid Distinguished Name (DN) path. DME-based data collection supports both cadence-based and event-based telemetry.

Cisco NX-OS Release 7.0(3)I6(1) also supports NX-API-based collection with cadence-based telemetry. NX-API-based telemetry is simple to use and similar to using Cisco NX-OS **show** commands.

If the amount of data streamed from a single **show** command exceeds 25 MB, users should use DME-based telemetry. For components that do not have managed objects (MOs), users can rely on NX-API-based telemetry.

We recommend that first-time telemetry users start with NX-API-based collection and eventually move to DME-based collection.

This table provides the scale numbers for which the telemetry solution was validated using Cisco NX-OS Release 7.0(3)I6(1).

Profile : VXLAN EVPN		
Feature	Target Scale	
	N9500	N9300
Platform	N9K-SUP-A	N9K-C9396PX
VXLAN VTEPs	0	1
VXLAN L2 VNIs	0	2000
VXLAN L3 VNIs	0	900
VXLAN multicast groups	128	128
VXLAN overlay MAC addresses		64K
VXLAN overlay IP host routes		64000
OSPF Neighbors	16	4
NVE peers	0	250
BGP sessions	250	1
ACL		2000
CDP Neighbors	16	4

2. Prerequisites on the Switch

Step 1: Enable this configuration on the switch.

```
Leaf3# sh run | inc nxapi
feature nxapi
nxapi use-vrf management
```

Step 2: Verify connectivity to the host where the receiver is up and running. 172.27.247.72 is the Linux host, which is used for the telemetry receiver.

```
Leaf3# ping 172.27.247.72 vrf management
PING 172.27.247.72 (172.27.247.72): 56 data bytes
64 bytes from 172.27.247.72: icmp_seq=0 ttl=62 time=0.765 ms
64 bytes from 172.27.247.72: icmp_seq=1 ttl=62 time=0.627 ms
64 bytes from 172.27.247.72: icmp_seq=2 ttl=62 time=0.68 ms
64 bytes from 172.27.247.72: icmp_seq=3 ttl=62 time=0.627 ms
64 bytes from 172.27.247.72: icmp_seq=4 ttl=62 time=0.632 ms

--- 172.27.247.72 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.627/0.666/0.765 ms
```

Step 3: Verify connectivity from the external host to the switch (provided this is the host where the telemetry receiver will be hosted).

Users must configure a management IP address on the switch, and the switch should be reachable from an external device.

```
Leaf3# sh run int mg0
!Command: show running-config interface mgmt0
!Time: Tue Apr 18 15:01:25 2017
```

```
version 7.0(3)I6(1)
```

```
interface mgmt0
```

```
 vrf member management
```

```
 ip address 172.19.198.124/24
```

Step 4: Verify connectivity from the external host.

```
$ ping 172.19.198.124
```

```
PING 172.19.198.124 (172.19.198.124) 56(84) bytes of data.
```

```
64 bytes from 172.19.198.124: icmp_seq=1 ttl=254 time=0.630 ms
```

```
64 bytes from 172.19.198.124: icmp_seq=2 ttl=254 time=0.589 ms
```

```
64 bytes from 172.19.198.124: icmp_seq=3 ttl=254 time=0.630 ms
```

```
64 bytes from 172.19.198.124: icmp_seq=4 ttl=254 time=0.633 ms
```

```
64 bytes from 172.19.198.124: icmp_seq=5 ttl=254 time=0.597 ms
```

```
^C
```

```
--- 172.19.198.124 ping statistics ---
```

```
5 packets transmitted, 5 received, 0% packet loss, time 3998ms
```

```
rtt min/avg/max/mdev = 0.589/0.615/0.633/0.036 ms
```

3. Use Case 1: Streaming Out Complete Data for Applicable VXLAN EVPN DNs

This use case is cadence based, which implies that the configured sample interval is greater than 0. For event-based telemetry, the configured sample interval must be 0 (zero).

When streaming out large size data, users should make sure that the receiver is capable of handling the received data. For example, if the default open source GRPC receiver can support a data size < 4 MB and the data being streamed out of the switch is > 4 MB, the receiver has to be updated to handle such data.

The configurations in this section stream out all the MOs (self, children) along with the properties associated with the configured sensor paths.

3.1 Switch Configurations

```
Leaf3# sh run telemetry
```

```
!Command: show running-config telemetry
```

```
!Time: Fri Apr 14 10:38:24 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 172.27.247.72 port 60001 protocol gRPC encoding GPB
```

```
sensor-group 1
```

```
path sys/bgp depth unbounded
```

```
path sys/epId-1 depth unbounded
```

```
path sys/bd depth unbounded
```



```
path sys/ospf depth unbounded
path sys/intf depth unbounded
path sys/acl depth unbounded
path sys/ipqos depth unbounded
subscription 1
  dst-grp 1
  snsr-grp 1 sample-interval 100000
```

Use the following **show** command to determine the streaming time along with the sensor paths configured on the switch. We recommend configuring the sample interval based on the following output.

```
Leaf3# sh telemetry control database
```

```
Subscription Database size = 1
```

```
-----
Subscription ID   Data Collector Type
-----
```

```
1                DME
```

```
Sensor Group Database size = 1
```

```
-----
Sensor Group ID  Sensor Group type  Sampling interval(ms)  Linked subscriptions
-----
```

```
1               Timer /DME    100000(Running)      1
```

```
Collection Time in ms (Cur/Min/Max): 64450/64450/67495
```

```
Streaming Time in ms (Cur/Min/Max): 75528/75528/78634
```

Sensor Path Database size = 7

Subscribed Linked Groups Sec Groups Retrieve level Sensor Path : Query Filter

No 1 0 Full sys/bd
No 1 0 Full sys/epld-1
No 1 0 Full sys/ospf
No 1 0 Full sys/intf
No 1 0 Full sys/ipqos
No 1 0 Full sys/acl
No 1 0 Full sys/bgp

Destination group Database size = 1

Destination Group ID Refcount

1 1

Destination Database size = 1

Dst IP Addr Dst Port Encoding Transport Count

172.27.247.72 60001 GPB gRPC 1

Use the following **show** command to determine if the queue is filling up. The queue typically fills up if the configured sample interval is less than the streaming time. For optimal performance results, we recommend that the current size of the queue in the following output starts at 0.

```
Leaf3# sh telemetry pipeline stats
```

Main Statistics:

Timers:

Errors:

Start Fail = 0

Data Collector:

Errors:

Node Create Fail = 0

Event Collector:

Errors:

Node Create Fail = 0 Node Add Fail = 0

Invalid Data = 0

Queue Statistics:

Request Queue:

High Priority Queue:

Info:

Actual Size = 50 Current Size = 0

Max Size = 0 Full Count = 0

Errors:

Enqueue Error = 0 Dequeue Error = 0

Low Priority Queue:

Info:

Actual Size = 50 Current Size = 0

Max Size = 0 Full Count = 0

Errors:

Enqueue Error = 0 Dequeue Error = 0

Data Queue:

High Priority Queue:

Info:

Actual Size = 50 Current Size = 0

Max Size = 0 Full Count = 0

Errors:

Enqueue Error = 0 Dequeue Error = 0

Low Priority Queue:

Info:

Actual Size = 50 Current Size = 0

Max Size = 0 Full Count = 0

Errors:

Enqueue Error = 0 Dequeue Error = 0

Use the following **show** command to determine the transport status with the receiver. If the connection with the receiver is not successful or the connection times out, the status changes to Disconnected.

```
Leaf3# sh telemetry transport
```

Session Id	IP Address	Port	Encoding	Transport	Status
0	172.27.247.72	60001	GPB	gRPC	Connected

The following **show** commands display additional details on the streaming statistics.

```
Leaf3# sh telemetry transport 0
```

```
Session Id:      0
IP Address:Port  172.27.247.72:60001
Encoding:        GPB
Transport:       GRPC
Status:          Connected
Last Connected:  Fri Apr 14 10:25:32.893 PST
Last Disconnected:  Never
Tx Error Count:  0
Leaf3# Error:    None
```

Leaf3# sh telemetry transport 0 error

Session Id: 0

Connection Errors

Connection Error Count: 0

Last Connection Error: Wed Dec 31 17:00:00.000 PST

Transmission Errors

Tx Error Count: 0

Last Tx Error: None

Leaf3# Tx Return Code: OK

Leaf3# sh telemetry transport 0 stats

Session Id: 0

Connection Stats

Connection Count 1

Last Connected: Fri Apr 14 10:25:32.893 PST

Disconnect Count 0

Last Disconnected: Never

Transmission Stats

Transmit Count: 70

Last TX time: Fri Apr 14 10:40:42.460 PST

Min Tx Time: 6 ms

Max Tx Time: 1674 ms

Avg Tx Time: 552 ms

4. Use Case 2: Event-Based Notification When a New BGP Peer Comes Up

This use case covers scenarios when users do not know the IP address of the remote BGP peer. The configurations remain the same irrespective of the number of BGP peers with which BGP peering is formed. If users know the IP address of the BGP peer for which a notification needs to be streamed out, the configuration can be modified to point to the particular BGP peer. (Use Case 3 covers this configuration.)

4.1 Switch Configurations

```
Spine1# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Thu Apr 20 14:50:23 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/bgp depth unbounded
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Existing BGP peering on the device

Spine1# sh bgp session

Total peers 4, established peers 4

ASN 1000

VRF default, local ASN 1000

peers 4, established peers 4, local router-id 7.7.7.7

State: I-Idle, A-Active, O-Open, E-Established, C-Closing, S-Shutdown

Neighbor	ASN	Flaps	LastUpDn	LastRead	LastWrit	St	Port(L/R)	Notif(S/R)
1.1.1.1	1000	0	03:05:52	00:00:05	00:00:34	E	45198/179	0/0
2.2.2.2	1000	0	03:06:29	00:00:06	00:00:34	E	179/26575	0/0
3.3.3.3	1000	0	03:06:31	00:00:24	00:00:34	E	179/34256	0/0
4.4.4.4	1000	0	03:06:40	00:00:27	00:00:34	E	179/54795	0/0

Simulating a new BGP peer join condition

Spine1# sh bgp session

Total peers 5, established peers 5

ASN 1000

VRF default, local ASN 1000

peers 5, established peers 5, local router-id 7.7.7.7

State: I-Idle, A-Active, O-Open, E-Established, C-Closing, S-Shutdown

Neighbor	ASN	Flaps	LastUpDn	LastRead	LastWrit	St	Port(L/R)	Notif(S/R)
1.1.1.1	1000	0	03:14:37	00:00:50	00:00:04	E	45198/179	0/0
2.2.2.2	1000	0	03:15:14	00:00:51	00:00:04	E	179/26575	0/0
3.3.3.3	1000	0	03:15:17	00:00:09	00:00:04	E	179/34256	0/0

4.4.4.4 1000 0 03:15:26|00:00:12|00:00:04 E 179/54795 0/0

17.0.101.1 1000 0 00:00:06|00:00:04|00:00:04 E 179/35282 0/0

4.1.1 Telemetry Receiver Output

This section shows telemetry data received on the receiver when the new BGP peer is learned. The following data shows the IP address of the remote peer, the initial state and the final state, along with other properties of the MO.

```
data      : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'remotePort': u'unspecified',
u'connAttempts': u'na', u'localPort': u'unspecified', u'localIp': u'0.0.0.0', u'maxConnRetryIntvl':
u'60', u'stReason': u'none', u'persistentOnReload': u'false', u'addr': u'17.0.101.1', u'peerIdx':
u'7', u'shutStQual': u'unspecified', u'advCap': u'', u'rcvCap': u'', u'operSt': u'idle', u'connIf':
u'unspecified', u'modTs': u'never', u'connDrop': u'0', u'rn': u'', u'lastFlapTs': u'2017-04-
20T15:07:02.406+00:00', u'updateElapsedTs': u'2017-04-18T17:02:06.088+00:00', u'holdIntvl':
u'180', u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'connEst': u'0',
u'fd': u'4294967295', u'passwdSet': u'disabled', u'prevOperSt': u'connect', u'childAction': u'',
u'status': u'created', u'name': u'', u'type': u'ibgp', u'kaIntvl': u'60', u'flags': u'cap-neg,gr-
enabled', u'rtrId': u'0.0.0.0'}}}], u'subscriptionId': [u'18374686488244781057']}
```

```
data      : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-
default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'remotePort': u'35282', u'connEst': u'1',
u'shutStQual': u'admin-up', u'prevOperSt': u'open-confirm', u'advCap': u'as4,dynamic,dynamic-
gr,dynamic-mp,dynamic-old,dynamic-refresh,gr,l2vpn-evpn,refresh,refresh-old', u'status':
u'modified', u'rcvCap': u'cap,l2vpn-evpn,refresh,refresh-old', u'operSt': u'established',
u'localIp': u'17.0.0.6', u'fd': u'86', u'connIf': u'eth1/35', u'flags': u'cap-neg,direct-connect,gr-
enabled', u'rn': u'', u'localPort': u'179', u'lastFlapTs': u'2017-04-20T15:07:03.156+00:00',
u'rtrId': u'17.0.101.1', u'childAction': u''}}}], u'subscriptionId': [u'18374686488244781057']}
```

5 Use Case 3: Generate Event-Based Notification When a Particular BGP Peer Session Is Established

For this use case, the filter condition needs to be used in the switch configuration.

This use case requires users to apply configurations specific to the BGP peer in which they are interested. By observing the telemetry receiver output from Use Case 2, users can derive the configuration for this use case. The objective is to receive a notification when BGP peering with IP address 17.0.101.1 is established. Users need to specify what they are trying to monitor. The following switch configurations show that a notification is sent when a session is established. Users specify the MO in which they are interested and monitor the particular property (for example, the operSt property of the MO is set to a value of “established”).

5.1 Switch Configurations

```
Spine1# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Mon Apr 24 09:17:10 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1] depth 0 fi
```

```
lter-condition eq(bgpPeerEntry.operSt,"established")
```

```
subscription 1
```

```
dst-grp 1
```

snsr-grp 1 sample-interval 0

Initial state of the switch

Spine1# sh bgp l2vpn evpn sum

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 7.7.7.7, local AS number 1000

BGP table version is 3313598, L2VPN EVPN config peers 5, capable peers 4

7244 network entries and 7244 paths using 1564704 bytes of memory

BGP attribute entries [3639/567684], BGP AS path entries [0/0]

BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	1000	56495	146171	3313598	0	0	3d01h	1803
2.2.2.2	4	1000	66800	70214	3313598	0	0	3d21h	1801
3.3.3.3	4	1000	40175	89241	3313598	0	0	3d21h	1840
4.4.4.4	4	1000	40134	96836	3313598	0	0	3d00h	1800

Spine1# sh telemetry event collector stats

```
-----
```

Collection Count	Latest Collection Time	Sensor Path
0	Not yet collect	sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]

```
-----
```

New BGP peering is established

Spine1# sh bgp l2vpn evpn sum

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 7.7.7.7, local AS number 1000

BGP table version is 3313999, L2VPN EVPN config peers 6, capable peers 5

7644 network entries and 7644 paths using 1651104 bytes of memory

BGP attribute entries [3643/568308], BGP AS path entries [0/0]

BGP community entries [1/32], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	1000	56496	146181	3313999	0	0	3d01h 1803	
2.2.2.2	4	1000	66801	70224	3313999	0	0	3d21h 1801	
3.3.3.3	4	1000	40177	89251	3313999	0	0	3d21h 1840	
4.4.4.4	4	1000	40136	96846	3313999	0	0	3d00h 1800	
17.0.101.1	4	1000	13	3643	3313999	0	0	00:00:11 400	

Spine1# sh telemetry event collector stats

```
-----
```

Collection Count	Latest Collection Time	Sensor Path
1	Mon Apr 24 09:23:12.549 PST	sys/bgp/inst/dom-default/peer-[17.0.0/16]/ent-[17.0.101.1]

```
-----
```

5.1.1 Telemetry Receiver Output

172.19.198.152 - - [24/Apr/2017 09:23:12] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

172.19.198.152 - - [24/Apr/2017 09:23:12] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 1004

Path => sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]

node_id_str : Spine1

collection_id : 33693

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'remotePort': u'45960', u'connEst': u'1', u'shutStQual': u'admin-up', u'prevOperSt': u'open-confirm', u'advCap': u'as4,dynamic,dynamic-gr,dynamic-mp,dynamic-old,dynamic-refresh,gr,l2vpn-evpn,refresh,refresh-old', u'status': u'modified', u'rcvCap': u'cap,l2vpn-evpn,refresh,refresh-old', u'operSt': u'established', u'localIp': u'17.0.0.6', u'fd': u'86', u'connIf': u'eth1/35', u'flags': u'cap-neg,direct-connect,gr-enabled', u'rn': u'', u'localPort': u'179', u'lastFlapTs': u'2017-04-24T09:23:12.531+00:00', u'rtrId': u'17.0.101.1', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047745']}

172.19.198.125 - - [24/Apr/2017 09:23:13] "POST /network/sys%2FepId-1%2Fpeers%2Fdy_peer-17.0.101.1 HTTP/1.0" 200 -

172.19.198.125 - - [24/Apr/2017 09:23:13] "POST /network/sys%2FepId-1%2Fpeers%2Fdy_peer-17.0.101.1 HTTP/1.0" 200 -

>>> URL : /network/sys%2FepId-1%2Fpeers%2Fdy_peer-17.0.101.1

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 507

Path => sys/epld-1/peers/dy_peer-17.0.101.1

node_id_str : Leaf4

collection_id : 3

data_source : DME

data : {u'imdata': [{u'nvoDyPeer': {u'attributes': {u'dn': u'sys/epld-1/peers/dy_peer-17.0.101.1', u'rn': u'', u'upStateTransitionTs': u'2017-04-24T09:23:13.004+00:00', u'state': u'Up'}}}], u'subscriptionId': [u'18374686685813276673']}

172.19.198.152 -- [24/Apr/2017 09:24:14] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

172.19.198.152 -- [24/Apr/2017 09:24:14] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 587

Path => sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]

node_id_str : Spine1

collection_id : 33694

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'status': u'modified', u'rn': u'', u'updateElapsedTs': u'2017-04-24T09:23:14.541+00:00', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047745']}

6 Use Case 4: Specific Property Notification Sent to the Telemetry Receiver

Using the updated option along with the filter condition

In Use Case 3, users receive a notification when new BGP peering is established. The switch sends operSt:established and streams out other properties associated with the MO (for example, the advertising capabilities, local port, and so on). In certain scenarios, users might want to limit the data being sent from the switch. In this particular example, the switch streams out only relevant data that pertains to the operSt of BGP peering. The following switch configurations indicate that users are interested only in the operSt property of the MO.

6.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Mon Apr 24 10:30:08 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7] depth 0 filter-condition  
and(updated(bgpPeerEntry.operSt),eq(bgpPeerEntry.operSt,"established"))
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Leaf4# sh telemetry event collector stats

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----  
0          Not yet collect      sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]
```

Leaf4# sh run bgp

!Command: show running-config bgp

!Time: Mon Apr 24 10:30:31 2017

version 7.0(3)I6(1)

feature bgp

router bgp 1000

router-id 4.4.4.4

address-family ipv4 unicast

address-family l2vpn evpn

neighbor 7.7.7.7

remote-as 1000

update-source loopback1

address-family ipv4 unicast

send-community

send-community extended

address-family l2vpn evpn

send-community

Leaf4# sh bgp l2vpn evpn sum

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 4.4.4.4, local AS number 1000

BGP table version is 1675077, L2VPN EVPN config peers 1, capable peers 0

1800 network entries and 1800 paths using 388800 bytes of memory

BGP attribute entries [900/140400], BGP AS path entries [0/0]

BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
----------	---	----	---------	---------	--------	-----	------	---------	--------------

7.7.7.7	4	1000	41985	20525	0	0	0	00:10:06	Idle
---------	---	------	-------	-------	---	---	---	----------	------

Leaf4# sh bgp l2vpn evpn sum

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 4.4.4.4, local AS number 1000

BGP table version is 1682192, L2VPN EVPN config peers 1, capable peers 1

5408 network entries and 9010 paths using 1167616 bytes of memory

BGP attribute entries [2704/421824], BGP AS path entries [0/0]

BGP community entries [0/0], BGP clusterlist entries [2/8]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
----------	---	----	---------	---------	--------	-----	------	---------	--------------

7.7.7.7	4	1000	44730	21431	1682192	0	0	00:00:15	3604
---------	---	------	-------	-------	---------	---	---	----------	------

Leaf4# sh telemetry event collector stats

Collection Count	Latest Collection Time	Sensor Path
------------------	------------------------	-------------

1	Mon Apr 24 10:43:34.547 PST	sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]
---	-----------------------------	---

6.1.1 Telemetry Receiver Output

172.19.198.125 - - [24/Apr/2017 10:43:34] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B7.7.7.7%5D%2Fent-%5B7.7.7.7%5D HTTP/1.0" 200 -

172.19.198.125 - - [24/Apr/2017 10:43:34] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B7.7.7.7%5D%2Fent-%5B7.7.7.7%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B7.7.7.7%5D%2Fent-%5B7.7.7.7%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 1003

Path => sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]

node_id_str : Leaf4

collection_id : 5

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]', u'remotePort': u'20550', u'connEst': u'2', u'shutStQual': u'admin-up', u'prevOperSt': u'open-confirm', u'advCap': u'as4,dynamic,dynamic-gr,dynamic-mp,dynamic-old,dynamic-refresh,gr,ipv4-ucast,l2vpn-evpn,refresh,refresh-old', u'status': u'modified', u'rcvCap': u'as4,cap,dynamic,dynamic-gr,dynamic-mp,dynamic-old,dynamic-refresh,gr,ipv4-ucast,l2vpn-evpn,refresh,refresh-old', u'operSt': u'established', u'localIp':

u'4.4.4.4', u'fd': u'1887', u'rn': u'', u'localPort': u'179', u'lastFlapTs': u'2017-04-24T10:43:34.532+00:00', u'rtrId': u'7.7.7.7', u'childAction': u''}}}}, u'subscriptionId': [u'18374686685813276679']}]}

7 Use Case 5: Event Notification When BGP Peering with Remote Node Is Lost

7.1 Switch Configurations

```
Spine1# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Mon Apr 24 10:09:13 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1] depth 0
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Spine1# sh bgp l2vpn evpn sum
```

```
BGP summary information for VRF default, address family L2VPN EVPN
```

```
BGP router identifier 7.7.7.7, local AS number 1000
```

```
BGP table version is 3314800, L2VPN EVPN config peers 6, capable peers 5
```

```
7644 network entries and 7644 paths using 1651104 bytes of memory
```

BGP attribute entries [3643/568308], BGP AS path entries [0/0]

BGP community entries [1/32], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	1000	56543	146239	3314800	0	0	3d02h 1803	
2.2.2.2	4	1000	66848	70282	3314800	0	0	3d22h 1801	
3.3.3.3	4	1000	40223	89309	3314800	0	0	3d22h 1840	
4.4.4.4	4	1000	40182	96904	3314800	0	0	3d01h 1800	
17.0.101.1	4	1000	15	3645	3314800	0	0	00:02:10 400	

BGP peering is down

Spine1# sh bgp l2vpn evpn sum

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 7.7.7.7, local AS number 1000

BGP table version is 3315200, L2VPN EVPN config peers 6, capable peers 4

7644 network entries and 7644 paths using 1651104 bytes of memory

BGP attribute entries [3643/568308], BGP AS path entries [0/0]

BGP community entries [1/32], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	1000	56545	146245	3315200	0	0	3d02h 1803	
2.2.2.2	4	1000	66850	70288	3315200	0	0	3d22h 1801	
3.3.3.3	4	1000	40225	89315	3315200	0	0	3d22h 1840	
4.4.4.4	4	1000	40184	96910	3315200	0	0	3d01h 1800	
17.0.101.1	4	1000	16	3646	0	0	0	00:00:15 Idle	

```
Spine1# sh bgp l2vpn evpn sum
```

```
BGP summary information for VRF default, address family L2VPN EVPN
```

```
BGP router identifier 7.7.7.7, local AS number 1000
```

```
BGP table version is 3315200, L2VPN EVPN config peers 5, capable peers 4
```

```
7244 network entries and 7244 paths using 1564704 bytes of memory
```

```
BGP attribute entries [3639/567684], BGP AS path entries [0/0]
```

```
BGP community entries [0/0], BGP clusterlist entries [0/0]
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	1000	56545	146245	3315200	0	0	3d02h 1803	
2.2.2.2	4	1000	66850	70288	3315200	0	0	3d22h 1801	
3.3.3.3	4	1000	40226	89315	3315200	0	0	3d22h 1840	
4.4.4.4	4	1000	40185	96910	3315200	0	0	3d01h 1800	

7.1.1 Telemetry Receiver Output

```
172.19.198.152 - - [24/Apr/2017 10:11:27] "POST /network/sys%2Fbgp%2Finst%2Fdom-  
default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -
```

```
172.19.198.152 - - [24/Apr/2017 10:11:27] "POST /network/sys%2Fbgp%2Finst%2Fdom-  
default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -
```

```
>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-  
%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D
```

```
>>> TM-HTTP-VER : 1.0.0
```

```
>>> TM-HTTP-CNT : 1
```

```
>>> Content-Type : application/json
```

```
>>> Content-Length : 677
```

```
Path => sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]
```

node_id_str : Spine1

collection_id : 33699

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'status': u'modified', u'shutStQual': u'unspecified', u'advCap': u'', u'rcvCap': u'', u'operSt': u'closing', u'connDrop': u'1', u'rn': u'', u'lastFlapTs': u'2017-04-24T10:11:28.297+00:00', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047750']}

172.19.198.152 -- [24/Apr/2017 10:11:32] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

172.19.198.152 -- [24/Apr/2017 10:11:32] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 732

Path => sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]

node_id_str : Spine1

collection_id : 33700

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'remotePort': u'unspecified', u'localPort': u'unspecified', u'status': u'modified', u'operSt': u'idle', u'localIp': u'0.0.0.0', u'flags': u'cap-neg,gr-enabled', u'fd': u'4294967295', u'rn': u'', u'prevOperSt': u'established', u'rtrId': u'0.0.0.0', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047750']}

172.19.198.152 -- [24/Apr/2017 10:12:03] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

172.19.198.152 -- [24/Apr/2017 10:12:03] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 534

Path => [sys/bgp/inst/dom-default/peer-\[17.0.0.0/16\]/ent-\[17.0.101.1\]](#)

node_id_str : Spine1

collection_id : 33701

data_source : DME

data : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'status': u'deleted', u'rn': u'', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047750']}

8 Use Case 6: Event Generation When a New Host Is Learned and NVE Peering Is Established

8.1 Switch Configurations

```
Leaf4# sh run telemetry
```

```
!Command: show running-config telemetry
```

```
!Time: Mon Apr 24 11:01:27 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/epld-1 depth unbounded
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Leaf4# sh nve peer
```

```
Interface Peer-IP      State LearnType Uptime  Router-Mac
```

```
-----
```

```
nve1  12.12.12.12  Up  CP    00:17:45 f8c2.8887.d3a7
```

Leaf4# sh mac address-table vlan 2 address 0210.10bd.1020

Legend:

* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC

age - seconds since last seen,+ - primary entry using vPC Peer-Link,

(T) - True, (F) - False, C - ControlPlane MAC

VLAN	MAC Address	Type	age	Secure	NTFY	Ports
-----+-----+-----+-----+-----+-----						

New host MAC address is learned

Leaf4# sh mac address-table vlan 2 address 0210.10bd.1020

Legend:

* - primary entry, G - Gateway MAC, (R) - Routed MAC, O - Overlay MAC

age - seconds since last seen,+ - primary entry using vPC Peer-Link,

(T) - True, (F) - False, C - ControlPlane MAC

VLAN	MAC Address	Type	age	Secure	NTFY	Ports
-----+-----+-----+-----+-----+-----						
C 2	0210.10bd.1020	dynamic	0	F	F	nve1(17.0.101.1)

New NVE peering is established

Leaf4# sh nve peer

Interface	Peer-IP	State	LearnType	Uptime	Router-Mac

nve1	12.12.12.12	Up	CP	00:20:45	f8c2.8887.d3a7
nve1	17.0.101.1	Up	CP	00:02:33	7056.0001.1101

8.1.1 Telemetry Receiver Output

172.19.198.125 -- [24/Apr/2017 11:01:56] "POST /network/sys%2FepId-1 HTTP/1.0" 200 -

172.19.198.125 -- [24/Apr/2017 11:01:56] "POST /network/sys%2FepId-1 HTTP/1.0" 200 -

>>> URL : /network/sys%2FepId-1

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 597

Path => sys/epId-1

node_id_str : Leaf4

collection_id : 6

data_source : DME

data : {u'imdata': [{u'nvoDyPeer': {u'attributes': {u'dn': u'sys/epId-1/peers/dy_peer-17.0.101.1', u'upStateTransitionTs': u'1969-12-31T17:00:00.000+00:00', u'ip': u'17.0.101.1', u'createTs': u'2017-04-24T11:01:56.897+00:00', u'state': u'Down', u'mac': u'00:00:00:00:00:00', u'firstVNI': u'4002', u'rn': u''}}}], u'subscriptionId': [u'18374686685813276682']}

172.19.198.125 -- [24/Apr/2017 11:01:56] "POST /network/sys%2FepId-1 HTTP/1.0" 200 -

172.19.198.125 -- [24/Apr/2017 11:01:56] "POST /network/sys%2FepId-1 HTTP/1.0" 200 -

>>> URL : /network/sys%2FepId-1

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 482

Path => sys/epId-1

node_id_str : Leaf4

collection_id : 7

data_source : DME

```
data      : {u'imdata': [{u'nvoDyPeer': {u'attributes': {u'dn': u'sys/epId-1/peers/dy_peer-17.0.101.1', u'rn': u'', u'upStateTransitionTs': u'2017-04-24T11:01:57.135+00:00', u'state': u'Up'}}}], u'subscriptionId': [u'18374686685813276682']}
```

172.19.198.152 - - [24/Apr/2017 11:02:57] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

172.19.198.152 - - [24/Apr/2017 11:02:57] "POST /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default%2Fpeer-%5B17.0.0.0%2F16%5D%2Fent-%5B17.0.101.1%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 587

Path => sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]

node_id_str : Spine1

collection_id : 33705

data_source : DME

```
data      : {u'imdata': [{u'bgpPeerEntry': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default/peer-[17.0.0.0/16]/ent-[17.0.101.1]', u'status': u'modified', u'rn': u'', u'updateElapsedTs': u'2017-04-24T11:01:58.642+00:00', u'childAction': u''}}}], u'subscriptionId': [u'18374686715878047750']}
```

Note: If minimal telemetry data output is required, follow the switch configuration pattern as indicated in Use Case 4.

9 Use Case 7: Telemetry Event Notification When a VLAN Goes Down

In this use case, users monitor VLAN 100, and an event notification is sent when VLAN 100 is admin down.

9.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 11:36:15 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
  destination-group 1
```

```
    ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
  sensor-group 1
```

```
    path sys/bd/bd-[vlan-100] depth 0 filter-condition  
and(updated(I2BD.operSt),eq(I2BD.operSt,"down"))
```

```
  subscription 1
```

```
    dst-grp 1
```

```
    snsr-grp 1 sample-interval 0
```

Leaf4# sh telemetry event collector stats

Collection Count	Latest Collection Time	Sensor Path
0	Not yet collect	sys/bd/bd-[vlan-100]

Leaf4# sh vlan id 100

VLAN Name	Status	Ports
100 VLAN0100	active	Po10, Po20, Eth1/5, Eth1/6 Eth1/7, Eth1/8

VLAN Type	Vlan-mode
100 enet	CE

Remote SPAN VLAN

Disabled

Primary	Secondary	Type	Ports
---------	-----------	------	-------

Simulating a condition for VLAN 100 to be admin down

Leaf4# conf t

Enter configuration commands, one per line. End with CNTL/Z.

Leaf4(config)# vlan 100

Leaf4(config-vlan)# sh

Leaf4(config-vlan)# end

Leaf4# sh vlan id 100

VLAN Name	Status	Ports

100 VLAN0100	act/!shut	Po10, Po20, Eth1/5, Eth1/6 Eth1/7, Eth1/8

VLAN Type	Vlan-mode
-----	-----
100 enet	CE

Remote SPAN VLAN

Disabled

Primary	Secondary	Type	Ports
-----	-----	-----	-----

Leaf4# sh telemetry event collector stats

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----  
1 Tue Apr 25 11:37:35.941 PST sys/bd/bd-[vlan-100]
```

9.1.1 Telemetry Receiver Output

172.19.198.125 -- [25/Apr/2017 11:37:35] "POST /network/sys%2Fbd%2Fbd-%5Bvlan-100%5D HTTP/1.0" 200 -

172.19.198.125 -- [25/Apr/2017 11:37:35] "POST /network/sys%2Fbd%2Fbd-%5Bvlan-100%5D HTTP/1.0" 200 -

>>> URL : /network/sys%2Fbd%2Fbd-%5Bvlan-100%5D

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 462

Path => sys/bd/bd-[vlan-100]

node_id_str : Leaf4

collection_id : 124

data_source : DME

data : {u'imdata': [{u'l2BD': {u'attributes': {u'dn': u'sys/bd/bd-[vlan-100]', u'status': u'modified', u'rn': u'', u'operSt': u'down', u'childAction': u''}}}], u'subscriptionId': [u'18374686548374323201']}

10 Use Case 8: Telemetry Event Notification When VRF Is Down

10.1 Switch Configurations

```
Leaf4# sh run telemetry
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 11:40:37 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/bgp/inst/dom-test309 depth 0 filter-condition eq(bgpDom.operSt,"down")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Leaf4# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----  
0 Not yet collect sys/bgp/inst/dom-test309
```

```
Leaf4# sh vrf test309
```

VRF-Name	VRF-ID	State	Reason
test309	236	Up	--

Simulating a condition for the VRF to go down

```
Leaf4(config)# vrf context test309
```

```
Leaf4(config-vrf)# shut
```

```
Leaf4(config-vrf)# end
```

```
Leaf4#
```

```
Leaf4# sh vrf test309
```

VRF-Name	VRF-ID	State	Reason
test309	236	Down	Admin Down Pending

10.1.1 Telemetry Receiver Output

```
172.19.198.125 -- [25/Apr/2017 11:42:02] "POST /network/sys%2Fbgp%2Finst%2Fdom-test309 HTTP/1.0" 200 -
```

```
172.19.198.125 -- [25/Apr/2017 11:42:02] "POST /network/sys%2Fbgp%2Finst%2Fdom-test309 HTTP/1.0" 200 -
```

```
>>> URL      : /network/sys%2Fbgp%2Finst%2Fdom-test309
```

```
>>> TM-HTTP-VER  : 1.0.0
```

```
>>> TM-HTTP-CNT  : 1
```

```
>>> Content-Type : application/json
```

```
>>> Content-Length : 520
```

```
Path => sys/bgp/inst/dom-test309
```

```
node_id_str : Leaf4
```

collection_id : 125

data_source : DME

data : {u'imdata': [{u'bgpDom': {u'attributes': {u'dn': u'sys/bgp/inst/dom-test309',
u'status': u'modified', u'rn': u'', u'operSt': u'down', u'childAction': u''}}}], u'subscriptionId':
[u'18374686548374323202', u'18374686548374323203', u'18374686548374323204']}

11 Use Case 9: Telemetry Event Notification When ACL Packets Exceed a Threshold

The remaining use cases limit the telemetry configurations to the sensor-path configuration under the sensor-group. Many previous examples show other configurations, such as destination-group, subscription, and so on.

These use cases also do not show the output on the telemetry receiver, as it follows a similar pattern.

11.1 Switch Configurations

```
path sys/acl/ipv4/name-test/seq-10 depth 0 filter-condition gt(ipv4aclACE.packets,"25")
```

```
Leaf4# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----
```

```
1 Tue Mar 07 15:18:17.309 PST sys/acl/ipv4/name-test/seq-10
```

```
Leaf4# sh ip access-lists test
```

```
IP access list test
```

```
statistics per-entry
```

```
10 permit ip 20.20.20.102/32 20.20.20.1 0.0.0.255 [match=30]
```

12 Use Case 10: Telemetry Event Notification When an SVI Goes Down

In this use case, SVI 2810 is associated with VRF test309. When users shut down the VRF, the SVI associated with the VRF also goes down, and an event notification is sent.

12.1 Switch Configurations

```
path sys/intf/svi-[vlan2810] depth 0 filter-condition eq(svilf.operSt,"down")
```

```
Leaf2# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----
```

```
0          Not yet collect      sys/intf/svi-[vlan2810]
```

```
Leaf2# sh int vlan2810
```

```
Vlan2810 is up, line protocol is up, autostate enabled
```

```
Hardware is EtherSVI, address is f8c2.8887.d3a7
```

```
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
```

```
reliability 255/255, txload 1/255, rxload 1/255
```

```
Encapsulation ARPA, loopback not set
```

```
Keepalive not supported
```

```
ARP type: ARPA
```

```
Last clearing of "show interface" counters never
```

```
L3 in Switched:
```

```
ucast: 0 pkts, 0 bytes
```

```
Leaf2# conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Leaf2(config)# vrf context test310
```

```
Leaf2(config-vrf)# shut
```

```
Leaf2(config-vrf)# end
```

```
Leaf2# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----
```

```
2 Tue Mar 07 15:33:28.172 PST sys/intf/svi-[vlan2810]
```

```
Leaf2# sh int vlan2810
```

```
Vlan2810 is down (VRF Unusable), line protocol is down, autostate enabled
```

```
Hardware is EtherSVI, address is f8c2.8887.d3a7
```

```
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
```

```
reliability 255/255, txload 1/255, rxload 1/255
```

```
Encapsulation ARPA, loopback not set
```

```
Keepalive not supported
```

```
ARP type: ARPA
```

```
Last clearing of "show interface" counters never
```

```
L3 in Switched:
```

```
ucast: 0 pkts, 0 bytes
```

13 Use Case 11: Telemetry Event Generation When Number of BGP Established Peers Reaches 0

13.1 Switch Configurations

Leaf4# sh run tele

!Command: show running-config telemetry

!Time: Tue Apr 25 13:43:47 2017

version 7.0(3)I6(1)

feature telemetry

telemetry

destination-group 1

ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON

sensor-group 1

path sys/bgp/inst/dom-default depth 0 filter-condition eq(bgpDom.numEstPeers,"0")

subscription 1

dst-grp 1

snsr-grp 1 sample-interval 0

Leaf4# sh telemetry event collector stats

Collection Count Latest Collection Time Sensor Path

0 Not yet collect sys/bgp/inst/dom-default

```
Leaf4# sh bgp l2vpn evpn sum
```

```
BGP summary information for VRF default, address family L2VPN EVPN
```

```
BGP router identifier 4.4.4.4, local AS number 1000
```

```
BGP table version is 761546, L2VPN EVPN config peers 1, capable peers 1
```

```
6398 network entries and 9995 paths using 1305040 bytes of memory
```

```
BGP attribute entries [2703/421668], BGP AS path entries [0/0]
```

```
BGP community entries [1/32], BGP clusterlist entries [3/12]
```

```
Neighbor    V  AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
```

```
7.7.7.7     4 1000 32387 22610 761546  0  0 1d02h 3998
```

Simulating a condition for BGP peering to go down

```
Leaf4# sh bgp l2vpn evpn sum
```

```
BGP summary information for VRF default, address family L2VPN EVPN
```

```
BGP router identifier 4.4.4.4, local AS number 1000
```

```
BGP table version is 768344, L2VPN EVPN config peers 1, capable peers 0
```

```
6398 network entries and 9995 paths using 1305040 bytes of memory
```

```
BGP attribute entries [2703/421668], BGP AS path entries [0/0]
```

```
BGP community entries [1/32], BGP clusterlist entries [3/12]
```

```
Neighbor    V  AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
```

```
7.7.7.7     4 1000 32391 22613    0  0 0 00:00:06 Idle
```


Leaf4# sh telemetry event collector stats

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----
```

```
1 Tue Apr 25 13:46:43.662 PST sys/bgp/inst/dom-default
```

13.1.1 Telemetry Receiver Output

```
172.19.198.125 - - [25/Apr/2017 13:46:43] "POST /network/sys%2Fbgp%2Finst%2Fdom-default  
HTTP/1.0" 200 -
```

```
172.19.198.125 - - [25/Apr/2017 13:46:43] "POST /network/sys%2Fbgp%2Finst%2Fdom-default  
HTTP/1.0" 200 -
```

```
>>> URL : /network/sys%2Fbgp%2Finst%2Fdom-default
```

```
>>> TM-HTTP-VER : 1.0.0
```

```
>>> TM-HTTP-CNT : 1
```

```
>>> Content-Type : application/json
```

```
>>> Content-Length : 474
```

```
Path => sys/bgp/inst/dom-default
```

```
node_id_str : Leaf4
```

```
collection_id : 126
```

```
data_source : DME
```

```
data : {u'imdata': [{u'bgpDom': {u'attributes': {u'dn': u'sys/bgp/inst/dom-default',  
u'status': u'modified', u'rn': u'', u'numEstPeers': u'0', u'childAction': u''}}}], u'subscriptionId':  
[u'18374686552669290501']}
```

14 Use Case 12: Telemetry Event Notification When Number of BGP L2VPN EVPN Routes Goes Below a Threshold

14.1 Switch Configurations

In this use case, the switch sends an event notification when the number of BGP L2VPN EVPN accepted routes equals 3600.

```
Leaf1# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Fri Mar 10 07:00:09 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 65534 protocol gRPC encoding GPB
```

```
sensor-group 1
```

```
path sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]/af-l2vpn-evpn depth 0 filter-  
condition eq(bgpPeerAfEntry.acceptedPaths,"3600")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Leaf1# show bgp l2vpn evpn summary

BGP summary information for VRF default, address family L2VPN EVPN

BGP router identifier 1.1.1.1, local AS number 1000

BGP table version is 2635876, L2VPN EVPN config peers 1, capable peers 1

330217 network entries and 333817 paths using 52126872 bytes of memory

BGP attribute entries [7201/1123356], BGP AS path entries [0/0]

BGP community entries [1/32], BGP clusterlist entries [252/1008]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
----------	---	----	---------	---------	--------	-----	------	---------	--------------

7.7.7.7	4	1000	65718	37408	2635876	0	0	21:08:06	103600
---------	---	------	-------	-------	---------	---	---	----------	--------

Leaf1# show telemetry event collector stats

Collection Count Latest Collection Time Sensor Path

0 Not yet collect sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]/af-l2vpn-evpn

Withdrawing the routes

Leaf1# show telemetry event collector stats

Collection Count Latest Collection Time Sensor Path

1 Fri Mar 10 10:19:55.370 PST sys/bgp/inst/dom-default/peer-[7.7.7.7
]/ent-[7.7.7.7]/af-l2vpn-evpn

14.1.1 Telemetry Receiver Output

Received GBP RPC at: Fri Mar 10 10:19:55 2017

Data size is: 551

header {

 collection_id: 426

 path: sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]/af-l2vpn-evpn

 hostname: Leaf1

 fields {

 name: keys

 value:

 }

 fields {

 name: content

 value:

 subfields {

 name: subscriptionId

 value: 18374686514014584844

 }

 subfields {

 name: imdata

 subfields { name: imdata

 subfields {

name: bgpPeerAfEntry

subfields {

name: attributes

subfields {

name: acceptedPaths

value: 3600

}

subfields {

name: childAction

value:

}

subfields {

name: dn

value: sys/bgp/inst/dom-default/peer-[7.7.7.7]/ent-[7.7.7.7]/af-l2vpn-evpn

}

subfields {

name: memAccPaths

value: 460800

}

15 Use Case 13: Telemetry Event Notification When a Particular NVE Peer Is Up

15.1 Switch Configurations

Leaf4# sh run tele

!Command: show running-config telemetry

!Time: Tue Apr 25 14:06:06 2017

version 7.0(3)I6(1)

feature telemetry

telemetry

destination-group 1

ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON

sensor-group 1

path sys/epld-1/peers/dy_peer-17.0.101.1 depth 0 filter-condition eq(nvoDyPeer.state,"Up")

subscription 1

dst-grp 1

snsr-grp 1 sample-interval 0

Leaf4# sh telemetry event collector stats

Collection Count Latest Collection Time Sensor Path

0 Not yet collect sys/epld-1/peers/dy_peer-17.0.101.1

```
Leaf4# sh nve peer
```

```
Interface Peer-IP      State LearnType Uptime  Router-Mac
-----
nve1  12.12.12.12  Up  CP    00:15:45 f8c2.8887.d3a7
```

Simulating a condition for NVE peering to occur

```
Leaf4# sh nve peer
```

```
Interface Peer-IP      State LearnType Uptime  Router-Mac
-----
nve1  12.12.12.12  Up  CP    00:19:28 f8c2.8887.d3a7
nve1  17.0.101.1  Up  CP    00:00:04 7056.0001.1101
```

```
Leaf4# sh telemetry event collector stats
```

```
-----
Collection Count Latest Collection Time  Sensor Path
-----
```

```
1      Tue Apr 25 14:09:53.250 PST sys/epld-1/peers/dy_peer-17.0.101.1
```

15.1.1 Telemetry Receiver Output

```
172.19.198.125 - - [25/Apr/2017 14:09:53] "POST /network/sys%2Fepld-1%2Fpeers%2Fdy_peer-17.0.101.1 HTTP/1.0" 200 -
```

```
172.19.198.125 - - [25/Apr/2017 14:09:53] "POST /network/sys%2Fepld-1%2Fpeers%2Fdy_peer-17.0.101.1 HTTP/1.0" 200 -
```

>>> URL : /network/sys%2FepId-1%2Fpeers%2Fdy_peer-17.0.101.1

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 509

Path => sys/epId-1/peers/dy_peer-17.0.101.1

node_id_str : Leaf4

collection_id : 127

data_source : DME

data : {u'imdata': [{u'nvoDyPeer': {u'attributes': {u'dn': u'sys/epId-1/peers/dy_peer-17.0.101.1', u'rn': u'', u'upStateTransitionTs': u'2017-04-25T14:09:53.246+00:00', u'state': u'Up'}}}], u'subscriptionId': [u'18374686552669290504']}

16 Use Case 14: Telemetry Event Notification When Any NVE Peer Comes Up

This use case shows configurations when users do not have information about the IP address of the NVE peer. An event notification is sent when any NVE peer comes up.

16.1 Switch Configurations

```
Leaf2# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Mon Mar 20 12:48:48 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 65534 protocol gRPC encoding GPB
```

```
sensor-group 1
```

```
path sys/epld-1/peers depth unbounded
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Leaf2# sh nve peers

Interface	Peer-IP	State	LearnType	Uptime	Router-Mac
-----------	---------	-------	-----------	--------	------------

nve1	34.34.34.34	Up	CP	03:55:07	f8c2.88b5.de85
------	-------------	----	----	----------	----------------

Leaf2# sh telemetry event collector stats

Collection Count	Latest Collection Time	Sensor Path
------------------	------------------------	-------------

0	Not yet collect	sys/epld-1/peers
---	-----------------	------------------

Simulating a condition when multiple NVE peers come up

Leaf2# sh telemetry event collector stats

Collection Count	Latest Collection Time	Sensor Path
------------------	------------------------	-------------

1000	Mon Mar 20 12:59:40.058 PST	sys/epld-1/peers
------	-----------------------------	------------------

17 Use Case 15: Telemetry Event Notification When NVE VNI State Changes

In the case of vPC setup, when the MCT link goes down, all the VNIs configured on the vPC secondary node transition from up to down. The following configurations are applied on the vPC secondary node. Event notifications are sent when the VNI state changes to down.

17.1 Switch Configurations

```
!Command: show running-config telemetry
```

```
!Time: Thu Mar 23 10:50:50 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 6000 protocol HTTP encoding JSON
```

```
ip address 172.27.247.72 port 9001 protocol HTTP encoding JSON
```

```
ip address 172.27.247.72 port 50001 protocol gRPC encoding GPB
```

```
sensor-group 1
```

```
path sys/epld-1/nws depth unbounded
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Leaf4# sh nve vni 4002
```

```
Codes: CP - Control Plane    DP - Data Plane
```

```
      UC - Unconfigured      SA - Suppress ARP
```

```
Interface VNI    Multicast-group  State Mode Type [BD/VRF]  Flags
```

```
-----  
nve1    4002    225.0.0.1    Up  CP  L2 [2]    SA
```

Simulating a condition for MCT link going down and checking the state for a particular VNI

```
Leaf4# sh nve vni 4002
```

```
Codes: CP - Control Plane    DP - Data Plane
```

```
      UC - Unconfigured      SA - Suppress ARP
```

```
Interface VNI    Multicast-group  State Mode Type [BD/VRF]  Flags
```

```
-----  
nve1    4002    225.0.0.1    Down CP  L2 [2]    SA
```

17.1.1 Telemetry Receiver Output

```
172.19.198.125 -- [25/Apr/2017 15:02:16] "POST /network/sys%2FepId-1%2Fnws HTTP/1.0"  
200 -
```

```
172.19.198.125 -- [25/Apr/2017 15:02:16] "POST /network/sys%2FepId-1%2Fnws HTTP/1.0"  
200 -
```

```
>>> URL      : /network/sys%2FepId-1%2Fnws
```

```
>>> TM-HTTP-VER  : 1.0.0
```

```
>>> TM-HTTP-CNT  : 1
```

>>> Content-Type : application/json

>>> Content-Length : 459

Path => sys/epld-1/nws

node_id_str : Leaf4

collection_id : 128

data_source : DME

data : {u'imdata': [{u'nvoNw': {u'attributes': {u'dn': u'sys/epld-1/nws/vni-4002',
u'status': u'modified', u'rn': u'', u'state': u'Down', u'childAction': u''}}}], u'subscriptionId':
[u'18374686552669290507']}

18 Use Case 16: Telemetry Event Notification When Member Link of a Port-Channel Interface Goes Down

In this use case, the port channel is 20. It has two member links.

18.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 15:48:57 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/intf/aggr-[po20]/aggrif depth 0 filter-condition ne(ethpmAggrIf.numActivePorts,"2")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Leaf4# sh telemetry event collector stats

Collection Count	Latest Collection Time	Sensor Path
------------------	------------------------	-------------

0	Not yet collect	sys/intf/aggr-[po20]/aggrif
---	-----------------	-----------------------------

Leaf4# sh port

port-channel port-profile

Leaf4# sh port-channel summary

Flags: D - Down P - Up in port-channel (members)

I - Individual H - Hot-standby (LACP only)

s - Suspended r - Module-removed

b - BFD Session Wait

S - Switched R - Routed

U - Up (port-channel)

p - Up in delay-lacp mode (member)

M - Not in use. Min-links not met

Group	Port-Channel	Type	Protocol	Member Ports
-------	--------------	------	----------	--------------

10	Po10(SU)	Eth	LACP	Eth1/5(P) Eth1/6(P)
----	----------	-----	------	---------------------

20	Po20(SU)	Eth	LACP	Eth1/7(P) Eth1/8(P)
----	----------	-----	------	---------------------

Shutting down one of the member links

```
Leaf4# conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Leaf4(config)# int e1/7
```

```
Leaf4(config-if)# sh
```

```
Leaf4(config-if)# end
```

```
Leaf4# sh port
```

```
port-channel port-profile
```

```
Leaf4# sh port-channel summary
```

```
Flags: D - Down      P - Up in port-channel (members)
```

```
      I - Individual H - Hot-standby (LACP only)
```

```
      s - Suspended  r - Module-removed
```

```
      b - BFD Session Wait
```

```
      S - Switched  R - Routed
```

```
      U - Up (port-channel)
```

```
      p - Up in delay-lacp mode (member)
```

```
      M - Not in use. Min-links not met
```

```
Group Port-   Type   Protocol Member Ports
```

```
Channel
```

```
10 Po10(SU) Eth   LACP   Eth1/5(P) Eth1/6(P)
```

```
20 Po20(SU) Eth   LACP   Eth1/7(D) Eth1/8(P)
```


Leaf4# sh telemetry event collector stats

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----
```

```
1 Tue Apr 25 15:51:19.294 PST sys/intf/aggr-[po20]/aggrif
```

18.1.1 Telemetry Receiver Output

```
172.19.198.125 - - [25/Apr/2017 15:51:19] "POST /network/sys%2Fintf%2Faggr-  
%5Bpo20%5D%2Faggrif HTTP/1.0" 200 -
```

```
172.19.198.125 - - [25/Apr/2017 15:51:19] "POST /network/sys%2Fintf%2Faggr-  
%5Bpo20%5D%2Faggrif HTTP/1.0" 200 -
```

```
>>> URL : /network/sys%2Fintf%2Faggr-%5Bpo20%5D%2Faggrif
```

```
>>> TM-HTTP-VER : 1.0.0
```

```
>>> TM-HTTP-CNT : 1
```

```
>>> Content-Type : application/json
```

```
>>> Content-Length : 709
```

```
Path => sys/intf/aggr-[po20]/aggrif
```

```
node_id_str : Leaf4
```

```
collection_id : 134
```

```
data_source : DME
```

```
data : {u'imdata': [{u'ethpmAggrif': {u'attributes': {u'dn': u'sys/intf/aggr-  
[po20]/aggrif', u'status': u'modified', u'numActivePorts': u'1', u'activeMbrs':  
u'eth1/8, unspecified, unspecified, unspecified, unspecified, unspecified, unspecified, unspecified,  
unspecified, unspecified, unspecified, unspecified, unspecified, unspecified, unspecified,  
, u'numMbrUp': u'1', u'rn': u'', u'childAction': u''}}}], u'subscriptionId':  
[u'18374686552669290510']}
```

19 Use Case 17: Telemetry Event Notification When a Particular VNI Goes Down

19.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 15:57:10 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/epld-1/nws/vni-4002 depth 0 filter-condition eq(nvoNw.state,"Down")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Leaf4# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path
```

```
-----  
0 Not yet collect sys/epld-1/nws/vni-4002
```

Leaf4# sh nve vni 4002

Codes: CP - Control Plane DP - Data Plane

UC - Unconfigured SA - Suppress ARP

Interface	VNI	Multicast-group	State	Mode	Type [BD/VRF]	Flags
-----------	-----	-----------------	-------	------	---------------	-------

nve1	4002	225.0.0.1	Up	CP L2 [2]	SA	
------	------	-----------	----	-----------	----	--

Leaf4# conf t

Enter configuration commands, one per line. End with CNTL/Z.

Leaf4(config)# vlan 2

Leaf4(config-vlan)# sh

Leaf4(config-vlan)# end

Leaf4# sh nve vni 4002

Codes: CP - Control Plane DP - Data Plane

UC - Unconfigured SA - Suppress ARP

Interface	VNI	Multicast-group	State	Mode	Type [BD/VRF]	Flags
-----------	-----	-----------------	-------	------	---------------	-------

nve1	4002	225.0.0.1	Down	CP L2 [2]	SA	
------	------	-----------	------	-----------	----	--

19.1.1 Telemetry Receiver Output

172.19.198.125 - - [25/Apr/2017 15:58:09] "POST /network/sys%2FepId-1%2Fnws%2Fvni-4002 HTTP/1.0" 200 -

172.19.198.125 - - [25/Apr/2017 15:58:09] "POST /network/sys%2FepId-1%2Fnws%2Fvni-4002 HTTP/1.0" 200 -

>>> URL : /network/sys%2FepId-1%2Fnws%2Fvni-4002

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 468

Path => sys/epId-1/nws/vni-4002

node_id_str : Leaf4

collection_id : 136

data_source : DME

data : {u'imdata': [{u'nvoNw': {u'attributes': {u'dn': u'sys/epId-1/nws/vni-4002', u'status': u'modified', u'rn': u'', u'state': u'Down', u'childAction': u''}}}], u'subscriptionId': [u'18374686552669290514']}

20 Use Case 18: Event Notification When Port-Channel Interface Goes Down

20.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 16:15:51 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/intf/aggr-[po20]/aggrif depth 0 filter-condition eq(ethpmAggrIf.operSt,"down")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

```
Leaf4# sh telemetry event collector stats
```

```
-----  
Collection Count Latest Collection Time Sensor Path
```

```
-----  
0 Not yet collect sys/intf/aggr-[po20]/aggrif
```

Leaf4# sh port-channel summary

Flags: D - Down P - Up in port-channel (members)

I - Individual H - Hot-standby (LACP only)

s - Suspended r - Module-removed

b - BFD Session Wait

S - Switched R - Routed

U - Up (port-channel)

p - Up in delay-lacp mode (member)

M - Not in use. Min-links not met

Group	Port-Channel	Type	Protocol	Member Ports
-------	--------------	------	----------	--------------

10	Po10(SU)	Eth	LACP	Eth1/5(P) Eth1/6(P)
----	----------	-----	------	---------------------

20	Po20(SU)	Eth	LACP	Eth1/7(P) Eth1/8(P)
----	----------	-----	------	---------------------

Shutting down the port-channel 20 interface

Port-channel interface (vPC leg) on a vPC secondary goes down if the MCT link goes down.

Users can monitor this scenario.

Leaf4# sh port-channel summary

Flags: D - Down P - Up in port-channel (members)

I - Individual H - Hot-standby (LACP only)

s - Suspended r - Module-removed

b - BFD Session Wait

S - Switched R - Routed

U - Up (port-channel)
p - Up in delay-lacp mode (member)
M - Not in use. Min-links not met

Group	Port-Channel	Type	Protocol	Member	Ports
10	Po10(SU)	Eth	LACP	Eth1/5(P)	Eth1/6(P)
20	Po20(SD)	Eth	LACP	Eth1/7(D)	Eth1/8(D)

20.1.1 Telemetry Receiver Output

172.19.198.125 - - [25/Apr/2017 16:18:38] "POST /network/sys%2Fintf%2Faggr-%5Bpo20%5D%2Faggrif HTTP/1.0" 200 -

172.19.198.125 - - [25/Apr/2017 16:18:38] "POST /network/sys%2Fintf%2Faggr-%5Bpo20%5D%2Faggrif HTTP/1.0" 200 -

>>> URL : /network/sys%2Fintf%2Faggr-%5Bpo20%5D%2Faggrif

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 561

Path => sys/intf/aggr-[po20]/aggrif

node_id_str : Leaf4

collection_id : 139

data_source : DME

data : {u'imdata': [{u'ethpmAggrif': {u'attributes': {u'dn': u'sys/intf/aggr-[po20]/aggrif', u'status': u'modified', u'operStQual': u'admin-down', u'operSt': u'down',

u'lastLinkStChg': u'2017-04-25T16:18:38.290+00:00', u'rn': u'', u'childAction': u''}}}},
u'subscriptionId': [u'18374686552669290517']}]}

21 Use Case 19: Event Notification When a Physical Interface Goes Down

This use case monitors the operational state of interface Ethernet 1/1.

When the interface goes down, a telemetry event notification is sent.

21.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 16:25:35 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
path sys/intf/phys-[eth1/1]/phys depth 0 filter-condition eq(ethpmPhysIf.operSt,"down")
```

```
subscription 1
```

```
dst-grp 1
```

```
snsr-grp 1 sample-interval 0
```

Leaf4# sh telemetry event collector stats

```
-----  
Collection Count Latest Collection Time Sensor Path  
-----  
0           Not yet collect      sys/intf/phys-[eth1/1]/phys
```

Leaf4# sh int e1/1

Ethernet1/1 is up

admin state is up, Dedicated Interface

Hardware: 1000/10000 Ethernet, address: f8c2.88b5.de85 (bia f8c2.88b5.de86)

Internet Address is 47.47.47.4/24

MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, medium is broadcast

full-duplex, 10 Gb/s, media type is 10G

Beacon is turned off

Auto-Negotiation is turned on, FEC mode is Auto

Input flow-control is off, output flow-control is off

Auto-mdix is turned off

Rate mode is dedicated

Switchport monitor is off

EtherType is 0x8100

EEE (efficient-ethernet) : n/a

Last link flapped 1d04h

Last clearing of "show interface" counters never

1 interface resets

Shutting down the interface

```
Leaf4# conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Leaf4(config)# int e1/1
```

```
Leaf4(config-if)# shut
```

```
Leaf4(config-if)# end
```

```
Leaf4# sh int e1/1
```

Ethernet1/1 is down (Administratively down)

admin state is down, Dedicated Interface

Hardware: 1000/10000 Ethernet, address: f8c2.88b5.de85 (bia f8c2.88b5.de86)

Internet Address is 47.47.47.4/24

MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation ARPA, medium is broadcast

auto-duplex, 10 Gb/s, media type is 10G

Beacon is turned off

Auto-Negotiation is turned on, FEC mode is Auto

Input flow-control is off, output flow-control is off

Auto-mdix is turned off

Rate mode is dedicated

Switchport monitor is off

EtherType is 0x8100

EEE (efficient-ethernet) : n/a

Last link flapped 00:00:05

Last clearing of "show interface" counters never

1 interface resets

21.1.1 Telemetry Receiver Output

172.19.198.125 - - [25/Apr/2017 16:48:13] "POST /network/sys%2Fintf%2Fphys-%5Beth1%2F1%5D%2Fphys HTTP/1.0" 200 -

172.19.198.125 - - [25/Apr/2017 16:48:13] "POST /network/sys%2Fintf%2Fphys-%5Beth1%2F1%5D%2Fphys HTTP/1.0" 200 -

>>> URL : /network/sys%2Fintf%2Fphys-%5Beth1%2F1%5D%2Fphys

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 557

Path => sys/intf/phys-[eth1/1]/phys

node_id_str : Leaf4

collection_id : 144

data_source : DME

data : {u'imdata': [{u'ethpmPhysIf': {u'attributes': {u'dn': u'sys/intf/phys-[eth1/1]/phys', u'status': u'modified', u'operBitset': u'4,7,35', u'operSt': u'down', u'lastLinkStChg': u'2017-04-25T16:48:13.779+00:00', u'rn': u'', u'childAction': u''}}}], u'subscriptionId': [u'18374686552669290520']}

22 Use Case 20: Event Generation When a New Host Is Learned and NVE Peering Is Established (Using the NX-API Data Collector Approach)

Using the NX-API collector approach, users can specify the **show** command in the telemetry configuration. Doing so enables the telemetry data for the specific **show** command to be streamed out. Users can use this approach for any path that is not yet DME'ized as well as for DME'ized paths, if they prefer only cadence-based streaming.

To use the NX-API collector approach, the **show** command should be XMLi'zed. The NX-API collector approach supports only cadence-based streaming and not event-based streaming.

Note: While using the cadence-based approach, the sample interval must be greater than 0.

In this example, the sample interval is 10 seconds.

22.1 Switch Configurations

```
Leaf4# sh run tele
```

```
!Command: show running-config telemetry
```

```
!Time: Tue Apr 25 11:11:01 2017
```

```
version 7.0(3)I6(1)
```

```
feature telemetry
```

```
telemetry
```

```
destination-group 1
```

```
ip address 171.70.59.235 port 5000 protocol HTTP encoding JSON
```

```
sensor-group 1
```

```
data-source NX-API
```

```
path "show nve peers" depth 0
```

```
subscription 1
```

dst-grp 1

snsr-grp 1 sample-interval 10000

Leaf4# sh telemetry data collector brief

```
-----
```

Collector Type	Successful	Failed	Skipped
NX-API	0	0	0
DME	0	0	0

```
-----
```

Leaf4# sh nve peer

Interface	Peer-IP	State	LearnType	Uptime	Router-Mac
nve1	12.12.12.12	Up	CP	23:32:03	f8c2.8887.d3a7

New NVE peering is learned

Leaf4# sh nve peers

Interface	Peer-IP	State	LearnType	Uptime	Router-Mac
nve1	12.12.12.12	Up	CP	23:37:46	f8c2.8887.d3a7
nve1	17.0.101.1	Up	CP	00:00:59	7056.0001.1101

22.1.1 Telemetry Receiver Output

172.19.198.125 -- [25/Apr/2017 11:16:01] "POST /network/show%20nve%20peers HTTP/1.0"
200 -

172.19.198.125 -- [25/Apr/2017 11:16:01] "POST /network/show%20nve%20peers HTTP/1.0"
200 -

>>> URL : /network/show%20nve%20peers

>>> TM-HTTP-VER : 1.0.0

>>> TM-HTTP-CNT : 1

>>> Content-Type : application/json

>>> Content-Length : 594

Path => show nve peers

node_id_str : Leaf4

collection_id : 11

data_source : NX-API

data : {u'TABLE_nve_peers': {u'ROW_nve_peers': [{u'uptime': u'23:36:48', u'if-name': u'nve1', u'router-mac': u'f8c2.8887.d3a7', u'peer-state': u'Up', u'peer-ip': u'12.12.12.12', u'learn-type': u'CP'}, {u'uptime': u'00:00:01', u'if-name': u'nve1', u'router-mac': u'7056.0001.1101', u'peer-state': u'Up', u'peer-ip': u'17.0.101.1', u'learn-type': u'CP'}]}}

23 Use Case 21: NX-API-Based Approach to Get Node Inventory Data and Other Data

When using an NX-API-based approach, users need to configure the data source as NX-API. The default data source is DME.

23.1 Switch Configurations

telemetry

destination-group 1

ip address 172.27.247.72 port 60001 protocol gRPC encoding GPB

sensor-group 1

data-source NX-API

path "show system resources" depth 0

path "show version" depth 0

path "show environment power" depth 0

path "show environment fan" depth 0

path "show environment temperature" depth 0

path "show process cpu" depth 0

path "show nve peers" depth 0

path "show nve vni" depth 0

path "show nve vni 4002 counters" depth 0

path "show int nve 1 counters" depth 0

path "show policy-map vlan" depth 0

path "show ip access-list test" depth 0

path "show system internal access-list resource utilization" depth 0

path "show interface counters " depth 0

path "show vlan counters" depth 0


```
subscription 1
  dst-grp 1
  snsr-grp 1 sample-interval 750000
```

Leaf3# sh telemetry control database

Subscription Database size = 1

Subscription ID Data Collector Type

1 NX-API

Sensor Group Database size = 1

Sensor Group ID Sensor Group type Sampling interval(ms) Linked subscriptions

1 Timer /NX-API 750000(Running) 1

Collection Time in ms (Cur/Min/Max): 226052/225273/227374

Streaming Time in ms (Cur/Min/Max): 227127/226264/229132

Sensor Path Database size = 16

Subscribed Linked Groups Sec Groups Retrieve level Sensor Path : Query Filter

No 1 0 Self show environment power

No	1	0	Self	show vlan counters
No	1	0	Self	show policy-map vlan
No	1	0	Self	show process cpu
No	1	0	Self	show environment fan
No	1	0	Self	show environment temperature
No	1	0	Self	show version
No	1	0	Self	show ip access-list test
No	1	0	Self	show system internal access-list resource utilization
No	1	0	Self	show system resources
No	1	0	Self	show nve vni
No	1	0	Self	show interface counters
No	1	0	Self	show int nve 1 counters
No	1	0	Self	show nve vni 4002 counters
No	1	0	Self	show nve peers

Destination group Database size = 1

Destination Group ID Refcount

1 1

Destination Database size = 1

Dst IP Addr Dst Port Encoding Transport Count

172.27.247.72 60002 GPB gRPC 1

Leaf3# sh telemetry data collector br

Collector Type	Successful	Failed	Skipped
DME	0	0	0
NX-API	165	0	0

Leaf3# sh telemetry data collector details

Successful	Failed	Skipped	Sensor Path
11	0	0	show vlan counters
11	0	0	show policy-map vlan
11	0	0	show environment power
11	0	0	show nve vni
11	0	0	show ip access-list test
11	0	0	show process cpu
11	0	0	show version
11	0	0	show environment fan
11	0	0	show nve vni 4002 counters
11	0	0	show interface counters
11	0	0	show environment temperature
11	0	0	show system resources
11	0	0	show nve peers

11	0	0	show int nve 1 counters
11	0	0	show system internal access-list resource utilization

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

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