



ACI-SE M11

Day 2 Operations

Agenda

- **APIC (root/iShell)**
 - Uses/Access and Navigation
- **APIC CLI**
- **ACI CLI - Switch Troubleshooting (CLI)**
 - Uses/Access and Navigation
- **APIC - GUI Tools**
 - Counters
 - SPAN

APIC C-Series Platform Level

- UCS C220 M3 Hardware

- RAID setup

- http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/c/sw/raid/configuration/guide/RAID_GUIDE/MegaRAID.html#wp1111419

- TPM

- UCS C220 M3 CIMC Knowledge – setup and config

- http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/c/hw/C220/install/C220/install.html - wp1369176

- vPC setup with VIC

CLI access to APIC

APIC ssh access (iShell)

3 uses

- Direct Configuration
- Shell Scripts
- Python API

You enter in at this directory
/home/admin

```
login as: admin
Application Policy Infrastructure Controller
admin@172.23.3.135's password:
admin@tsi-apic1:~>
```

SSH to the APIC

admin/ins3965!

```
admin@tsi-apic1:~> ls
aci debug mit
```

You start to see the
same structure as the
APIC GUI

```
admin@tsi-apic1:~> cd aci
admin@tsi-apic1:aci> ls
admin fabric I4-I7-services system tenants vm-networking
```

```
admin@tsi-apic1:~> cd debug
admin@tsi-apic1:debug> ls
leaf1 leaf2 spine2 tsi-apic1
```

```
admin@tsi-apic1:~> cd mit
admin@tsi-apic1:mit> ls
comp dbgs expcont fwrepo topology uni
```

APIC CLI user guide under development

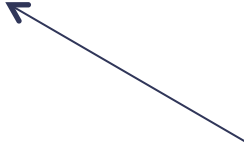
http://mishield-bld.insieme.local/documentation/pdf/APIC_Command_Reference.pdf

APIC iShell Navigagtion

From / :

```
admin@tsi-apic1: />
```

```
aci bin cgroup controller data dev download etc home lib lib64 mgmt proc sbin sys tmp usr var
```

 We will be looking at aci as example of structure

Example – Fabric Discovery of Switch Devices

```
admin@tsi-apic1:~> cd aci
admin@tsi-apic1:aci> ls
admin fabric I4-I7-services system tenants vm-networking
admin@tsi-apic1:aci> cd fabric/
admin@tsi-apic1:fabric> ls
access-policies fabric-policies inventory
admin@tsi-apic1:fabric> cd inventory/
admin@tsi-apic1:inventory> ls
fabric-membership pod-1 unmanaged-switches unreachable-nodes
admin@tsi-apic1:inventory> cd fabric-membership/
admin@tsi-apic1:fabric-membership> ls
client-FGE17420181 client-SAL17267Z9U client-SAL1732B57N node-policies summary.info
admin@tsi-apic1:fabric-membership> cat summary.info
fabric-membership:
serial-number node-id node-name model      role ip          decomissioned supported-model
-----
SAL17267Z9U   17   leaf1   N9K-C9396PX leaf  10.0.16.127/32 no          yes
SAL1732B57N   18   leaf2   N9K-C9396PX leaf  10.0.16.125/32 no          yes
FGE17420181   20   spine2  N9K-C9508   spine 10.0.16.126/32 no          yes
```

Example – Events form Spine Discovery

/home/admin/aci/fabric/inventory/fabric-membership/client-FGE17420181/history/events

```
admin@tsi-apic1:events> ls  
event-history.info
```

```
admin@tsi-apic1:events> cat event-history.info  
Code      Cause          Creation Time      Description  
-----  
E4198839 denied-ip-address 2014-02-  
20T05:34:05.583+00:00 Client FGE17420181 hwAddr: 00:00:00:00:00:00 IP Address request has been denied  
E4198838 assigned-ip-address 2014-02-  
20T05:35:16.618+00:00 ID: FGE17420181 hwAddr: 00:00:00:00:00:00 IP address request is succeeded with IP Address 10.0.16.126/32
```


APIC iShell CLI

For help →ESC ESC

admin@tsi-apic1:admin>

config	Show running configuration	moprint	MO display format
controller	Controller configuration	moset	Set mo properties
diagnostics	Display diagnostics tests for equipment groups	moshow	Show mo for the given rn path
dn	Display the current dn	mostats	Show statistics command
faults	Display faults	passwd	Change user password
firmware	Add/List/Upgrade firmware	records	Display records
health	Display health info	reload	Reload a node
loglevel	Read/Write loglevels	services	I4-I7 services
man	Show man page help	svcping	Ping a service device
moconfig	Configuration commands	techsupport	Tech Support collection
mocreate	Create an Mo	trafficmap	Display the traffic map between two fabric nodes
modelete	Delete an Mo	version	Display version info
mofind	MO find		

APIC iShell

Sample command structure

controller [{ **--commission** | **--decommission** }] [**--name** *node-name*] [**--targetnode** *node-id*]

Short Form	Long Form	Function
-c	--commission	Commissions (creates) a node.
-d	--decommission	Decommissions a specified node.
-n	--name	Specifies a target node or range of nodes by name.
	<i>node-name</i>	The node name.
-t	--targetnode	Specifies a target node range of nodes by node ID.
	<i>node-id</i>	The node ID.

Example

The following example shows how to use the **controller** command:

```
admin@apic1:> controller -d -t 1 decommission node 1
```

Password Administration

```
admin@tsi-apic1:aci> passwd  
Changing password for user admin.  
(current) password:  
New password:  
Retype new password:  
Password for user admin is changed successfully.
```

Managed Object creation for a Tech support

- Techsupport

```
cd /aci/admin/import-export/export-policies/techsupport
```

```
mocreate <name-of-export-policy>
```

```
cd <name-of-export-policy>
```

```
moset compression gzip
```

```
moconfig commit
```

```
moset export-destination <name-of-export-dest>
```

```
moconfig commit
```

```
cat mo
```

CLI- on demand techsupport

```
admin@tsi-apic1:admin> techsupport -n  
<Node name(s)> Name (e.g. apic1) or Name list (e.g. apic1, leaf1)  
admin@tsi-apic1:~> techsupport -n leaf1
```

Triggered on demand tech support successfully, available at: /data/techsupport on an IFC.

```
admin@tsi-apic1:techsupport> ls  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-23_1390494214_0x101_observer_elem_log.4316.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-26_1390494374_0x101_observer_elem_log.25755.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-26_1390494377_0x101_observer_elem_log.25782.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-26_1390494378_0x101_observer_elem_log.25824.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-26_1390494380_0x101_observer_elem_log.25879.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-30_1390494627_0x101_observer_elem_log.25916.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-01-23T16-30_1390494627_0x101_observer_elem_log.25943.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-43_1392212600_0x101_observer_elem_log.4320.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-45_1392212753_0x101_observer_elem_log.27274.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-45_1392212755_0x101_observer_elem_log.27313.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-46_1392212757_0x101_observer_elem_log.27343.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-46_1392212760_0x101_observer_elem_log.27390.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-50_1392213010_0x101_observer_elem_log.27435.tar.gz  
dbgexp_coreexp-default_leaf-1_sysid-17_2014-02-12T13-50_1392213011_0x101_observer_elem_log.27474.tar.gz  
dbgexp_coreexp-default_leaf1_sysid-17_2014-02-20T02-14_1392862499_0x101_coop_log.5286.tar.gz
```

Examples – Firmware listing , TrafficMap

```
admin@tsi-apic1:~> firmware list
```

Name	Type	Major-Version	Minor-Version	Size(Bytes)	Download-Date
ifabric-k9-catalog-1.0.0-654a.bin	catalog	1.0	(0.654a)	7469	2014-02-20T05:29:28.343+00:00

```
admin@tsi-apic1:techsupport> trafficmap -d 17 -s 18
```

Src	Dst	Transit	Tx-Pkts	Rx-Pkts	Dropped-Pkts	Excess-Pkts	Drop Pkts %	Excess Pkts %
18	17	20	0	0	0	0	0	0

Switch CLI Access

CLI Available at the Switch

- AAA via TACACS+, Radius and LDAP is supported when logging into switch CLI.
- Configuration mode is not supported at switch prompt. There are two scenarios where administrators would log into switch :
- From APIC, admin can remote login to switch
- Login directly via serial console port on the switch front panel or management IP connectivity via out of band or inband

For majority of use cases, admin should utilize APIC.

Switch Access

ssh to IP address port 1025

User=root

Password=root

You enter at /root

```
root@leaf1:~# pwd
```

```
/root
```

Back up 1 director to / and you see structure


```
root@leaf1:~# cd ..
```

```
root@leaf1:/# ls
```

```
! bootflash    cgroup  debug  firmware isan    local    media modflash proc  sbin    tmp     var  volatile
aci bootflash-remote controller debugfs home    isanboot log      mgmt  nfsroot rd    securedata usb1-remote vdc_2 www
bin cfg0        data    dev    ifc    lc    logflash  mnt  nginx  recovery slot0  usb2-remote vdc_3
boot cfg1      data_store etc    init   lib    logflash-remote mod-2 nxos  root  sys    usr    vdc_4
```

Switch images & network config files

```
root@leaf1:/# cd bootflash
root@leaf1:/bootflash# ls
20140110_001710_poap_6185_init.log  auto-k  cp-image  gold_file  mem_log.txt  mysetup.sh  startup-cfg
LBT-708-RAM  auto-s  diag_bootup  isim.conf  mem_log.txt.old.gz  scripts  act_util  bcm_sdk.log
diag_tor_cmpl_startup  lost+found  mts.log  show_tech_info
```



```
root@leaf1:/bootflash# cat isim.conf
ISIM_BASE_MAC=00:BA:5E:81:00:00
ISIM_CARD_INDEX=21022
ISIM_CARD_NAME=PLACID
ISIM_CARD_TYPE=TOR
ISIM_CHASSIS_MODEL=LEAF-48
ISIM_CHASSIS_SERNO=SAL17267Z9U
ISIM_DEFAULT_GATEWAY=172.23.3.1
ISIM_DEFAULT_INTERFACE=eth0
ISIM_INXOS_PE=IFC
ISIM_MGMT_INTERFACE=eth0
ISIM_MGMT_IP=172.23.3.145
ISIM_MGMT_NETMASK=255.255.255.0
ISIM_SLOT_ID=0
```

VSH access

- vsh takes you to well-known cli

```
root@leaf1:/bootflash# vsh
Cisco NX-OS Software
Copyright (c) 2002-2020, Cisco Systems, Inc. All rights
reserved.
NX-OS/Titanium software ("NX-OS/Titanium Software")
```

```
leaf1# ?
```

Switch CLI

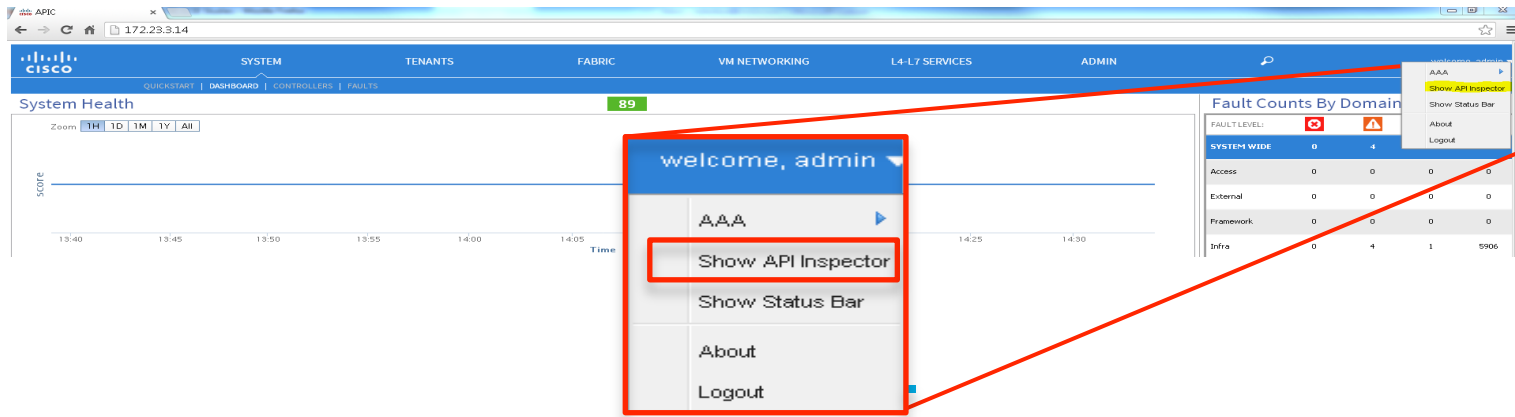
- Standard show commands
- Standard debugs
- Standard show FEX and attach Mod commands
- Access to logs and supportability commands

```
leaf1# sh lldp neighbors
Capability codes:
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID      Local Intf    Hold-time    Capability    Port ID
tsi-apic1     Eth1/1       120          90e2.ba4b.fad4
spine2        Eth1/59      120         BR           Eth8/1
Total entries displayed: 2
```

APIC - Troubleshooting

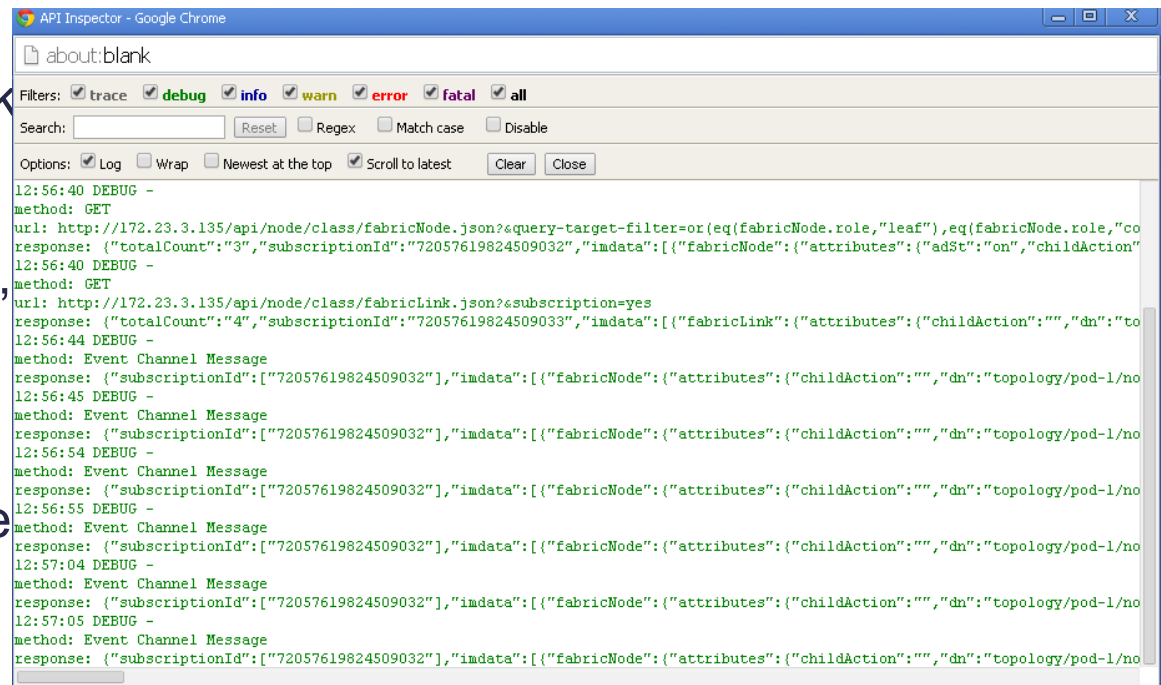
API Inspector

- Captures the API calls (GET, DELETE, POST) made from the GUI to the APIC
- To access click on “welcome, admin” link – top right of GUI



ACI Inspector

- Ability to monitor and track all communications from APIC GUI to APIC
- You will see regular “GET” messages, each time the GUI refreshes information
- All regular API calls will be filtered as DEBUG



```
API Inspector - Google Chrome
about:blank
Filters: trace debug info warn error fatal all
Search: [ ] [Reset] [Regex] [Match case] [Disable]
Options: [x] Log [ ] Wrap [ ] Newest at the top [x] Scroll to latest [Clear] [Close]
12:56:40 DEBUG -
method: GET
url: http://172.23.3.135/api/node/class/fabricNode.json?&query-target-filter=or(eq(fabricNode.role,"leaf"),eq(fabricNode.role,"co
response: {"totalCount":"3","subscriptionId":"72057619824509032","imdata":[{"fabricNode":{"attributes":{"adSt":"on","childAction"
12:56:40 DEBUG -
method: GET
url: http://172.23.3.135/api/node/class/fabricLink.json?&subscription=yes
response: {"totalCount":"4","subscriptionId":"72057619824509033","imdata":[{"fabricLink":{"attributes":{"childAction":"","dn":"to
12:56:44 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
12:56:45 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
12:56:54 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
12:56:55 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
12:57:04 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
12:57:05 DEBUG -
method: Event Channel Message
response: {"subscriptionId":["72057619824509032"],"imdata":[{"fabricNode":{"attributes":{"childAction":"","dn":"topology/pod-1/no
```

API Inspector

- Each action you perform in the GUI will result in a POST API call which can be captured with the API Inspector

The screenshot displays the AAA GUI interface for creating a local user. The process is shown in three steps: STEP 1 > USER IDENTITY, STEP 2 > SECURITY, and STEP 3 > ROLES. The 'CREATE LOCAL USER' window is overlaid on the main GUI, which shows a navigation tree on the left with 'Local Users' selected. The 'CREATE LOCAL USER' window has a 'Create Local User' button highlighted. The API Inspector window at the bottom shows the captured API call for the 'POST' method to the endpoint `http://172.23.3.14/api/node/mo/uni/userext/user-testuser.json`. The payload is a JSON object representing the user creation request.

```
Filters:  trace  debug  info  warn  error  fatal  all
Search: POST [Reset] [Regex] [Match case] [Disable]
[Next] [Previous] [Filter] [Highlight all]
Options:  Log  Wrap  Newest at the top  Scroll to latest [Clear] [Close]
17:54:36 DEB - Request error
17:54:56 DEB -
method: GET
url: http://172.23.3.14/api/node/class/aaaRole.json?subscription=yes
response: {"totalCount":"10","subscriptionId":"72057752968495115","imdata":[{"aaaRole":{"attributes":{"childAction":"","descr":"","dn":"uni/userext/role-aaa","intId":"none","lcOwn":"local
17:55:00 DEB -
method: Event Channel Message
response: {"subscriptionId":["72057752968495111","72057752968495112"],"imdata":[{"aaaUser":{"attributes":{"accountStatus":"active","childAction":"","clearPwdHistory":"no","descr":"","dn":
17:55:00 DEB -
method: POST
url: http://172.23.3.14/api/node/mo/uni/userext/user-testuser.json
payload({"aaaUser":{"attributes":{"dn":"uni/userext/user-testuser","name":"testuser","pwd":"Cael23rtp","firstName":"Test","lastName":"User","rn":"user-testuser","status":"created"},"child
response: {"imdata":[]}]
17:55:10 DEB -
```


Uses with Visore

- APIC Object Store Browser
- Tool for verifying XML
- Letting you browse the XML schema as if it were html.
- This is like the real-time electronic version of the XML API book

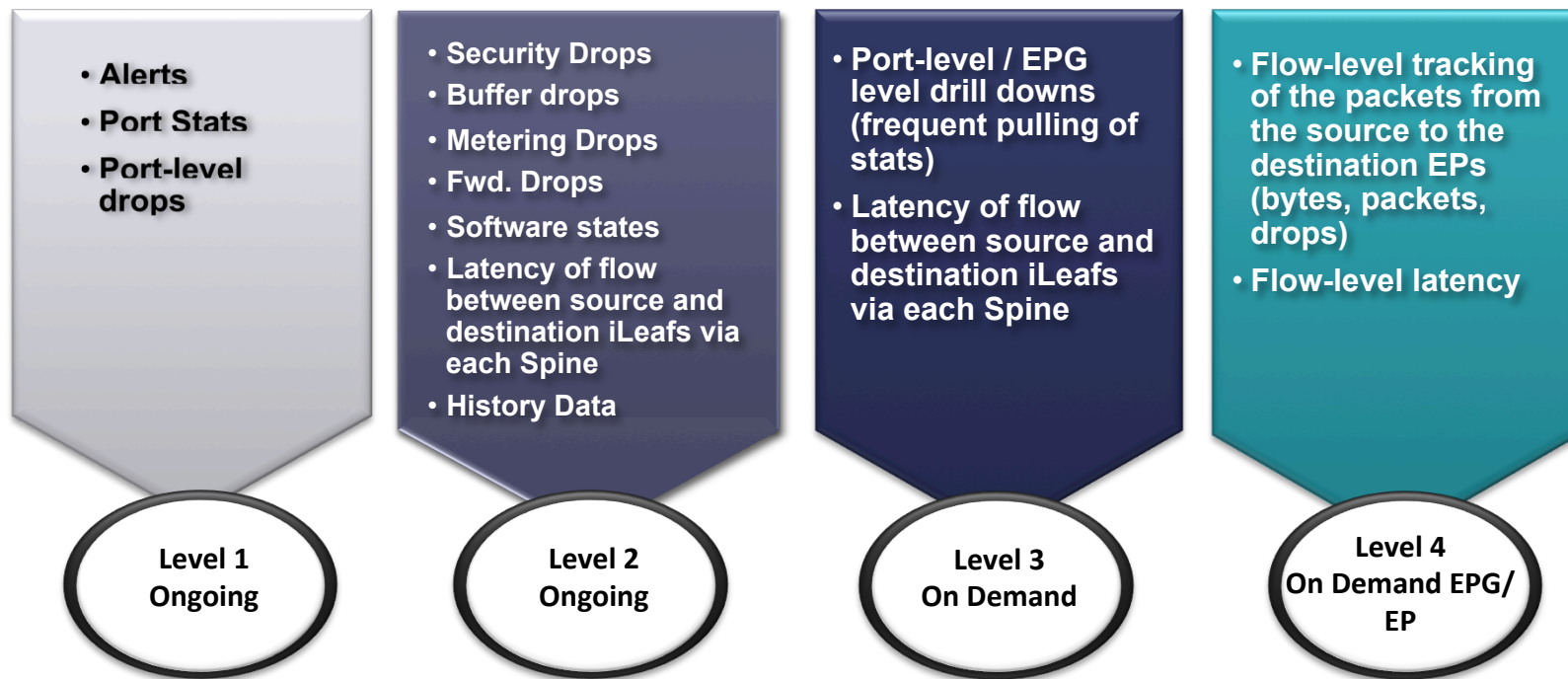
The screenshot shows the APIC Object Store Browser interface. At the top, there is a search filter section with fields for 'Class or DN', 'Property', 'Op' (set to '=='), 'Val1', and 'Val2'. Below the filter is a 'Run Query' button. The main content area displays search results. On the left, there are two tables of objects. The first table is titled 'pollUni' and shows 38 total objects. The second table is titled 'dhcpClient' and shows 1 total object. On the right, there is a detailed view of a single object titled 'fabricOverallHealthLw', showing 1 total object. This view includes various attributes such as 'childAction', 'cnt', 'dn', 'healthAvg', 'healthLast', 'healthMax', 'healthMin', 'healthSpct', 'healthThr', 'healthTr', 'healthTrBase', 'healthTtl', 'lastCollOffset', 'modTs', 'repIntvEnd', 'repIntvStart', and 'status'.

pollUni	
childAction	
dn	uri < > ! H
lcOwn	local
modTs	2014-02-20T05:29:17.182+00:00
monPolDn	
name	
repITs	never
status	
uid	0

dhcpClient	
childAction	
clientEvent	assigned
decommissioned	no
dn	client-SAL17267Z9U < > ! H
fabricId	1
fwVer	any

fabricOverallHealthLw	
childAction	
cnt	2
dn	topology/CDfabricOverallHealthLw < > ! H
healthAvg	89
healthLast	89
healthMax	89
healthMin	89
healthSpct	0
healthThr	
healthTr	0
healthTrBase	86
healthTtl	178
lastCollOffset	172797
modTs	never
repIntvEnd	2014-02-24T16:04:09.800+00:00
repIntvStart	2014-02-22T16:04:12.039+00:00
status	

Fabric Troubleshooting Levels



APIC Controller Cluster

Controllers

- Controllers
 - tsi-apic1 (Node1)
 - Cluster
 - Interfaces
 - Fans
 - Sensors
 - Processes
 - Controller Policies

```
admin@tsi-apic1: /> controller
operational-cluster-size           : 1
differences-between-local-time-and-unified-cluster-time : 0
administrative-cluster-size        : 3

controllers:
id  name      ip        cluster-admin-state  cluster-operational-  health-state  up-time      system-current-time
--  ---      -
1   tsi-apic1  10.0.0.1  in-service           available           fully-fit     04:00:02:03.000  2014-02-24T05:30:18.385+00:00
```

PROPERTIES

Administrative Cluster Size: **3**
 Operational Cluster Size: **1**
 Differences Between Local Time and Unified Cluster Time: **0**

CONTROLLERS

Commission Decommission

ID	NAME	IP	CLUSTER ADMIN STATE	CLUSTER OPERATIONAL STATE	HEALTH STATE	UP TIME	SYSTEM CURRENT TIME
1	tsi-apic1	10.0.0.1	In Service	Available	Fully Fit	3 days, 23 hours, 34 mi...	2014-02-24 05:02:44

Checking Cluster Health



Cluster



Cluster management interface showing properties and a table of controllers.

PROPERTIES

- Administrative Cluster Size: 3
- Operational Cluster Size: 3
- Differences Between Local Time and Unified Cluster Time: 0

CONTROLLERS

Commission Decommission

ID	NAME	IP	CLUSTER ADMIN STATE	CLUSTER OPERATIONAL STATE	HEALTH STATE	UP TIME	SYSTEM CURRENT TIME
1	apic1	10.0.0.1	In Service	Available	Fully Fit	4 days, 14 hours, 13 mi...	2014-02-24 10:29:52
2		10.0.0.2	In Service	Unavailable	Data Layer Synchroniza...		
3		10.0.0.3	In Service	Unavailable	Unknown Now		

APIC Physical Interface Health

Environmental functions of Controllers

Controllers



- Controllers
 - apic1 (Node1)
 - Cluster
 - Interfaces
 - Fans
 - Sensors
 - Processes
 - apic2 (Node2)
 - Cluster
 - Interfaces
 - Fans
 - Sensors
 - Processes
 - apic3 (Node3)
 - Cluster
 - Interfaces
 - Fans
 - Sensors
 - Processes
 - Controller Policies

Interfaces

PHYSICAL INTERFACES			
NAME	MTU	MAC	STATE
eth1-2	1284	4C:4E:35:44:AE:90	up
eth3-2	1284	90:E2:BA:45:9E:30	up
AGGREGATED INTERFACES			
NAME	MTU	MAC	ASSOCIATED PHYSICAL INTERFACES
bond1	1284	4C:4E:35:44:AE:90	
L3 MANAGEMENT INTERFACES			
NAME	MTU	MAC	ENCAP
bond0.4094	1280	90:E2:BA:45:9E:30	vlan-4094
bond1	9216	00:00:00:00:00:00	unknown

System Faults

GETTING STARTED | DASHBOARD | CONTROLLERS | FAULTS



F1311
configuration-failed
2014-02-20T05:29:30.321+00:00
2014-02-20T05:31:36.451+00:00
uni/tn-mgmt/mgmt-default/inb-default
Raised
Epg default configuration failed due to not-associated-with-any-zone

FAULT PROPERTIES

GENERAL HISTORY

ACTIONS

PROPERTIES

Severity: **minor**

Last Transition: **2014-02-20T05:31:36.451+00:00**

Lifecycle: **Raised**

Acknowledged: **false**

Affected Object: **uni/tn-mgmt/mgmt-default/inb-default**

Description: **Epg default configuration failed due to not-associated-with-any-zone**

Type: **Config**

Cause: **configuration-failed**

Created: **2014-02-20T05:29:30.321+00:00**

Code: **F1311**


Number of Occurrences: **1**

Original Severity: **minor**

Previous Severity: **minor**




Highest Severity: **minor**

ACTIONS

 Acknowledge Fault

WILL CHANGE TO YES

Fault Counts By Domain

FAULT LEVEL:				
SYSTEM WIDE	0	8	9	159
Access	0	0	0	148
External	0	0	0	0
Framework	0	0	0	0
Infra	0	8	7	11
Management	0	0	0	0
Security	0	0	0	0
Tenant	0	0	2	0

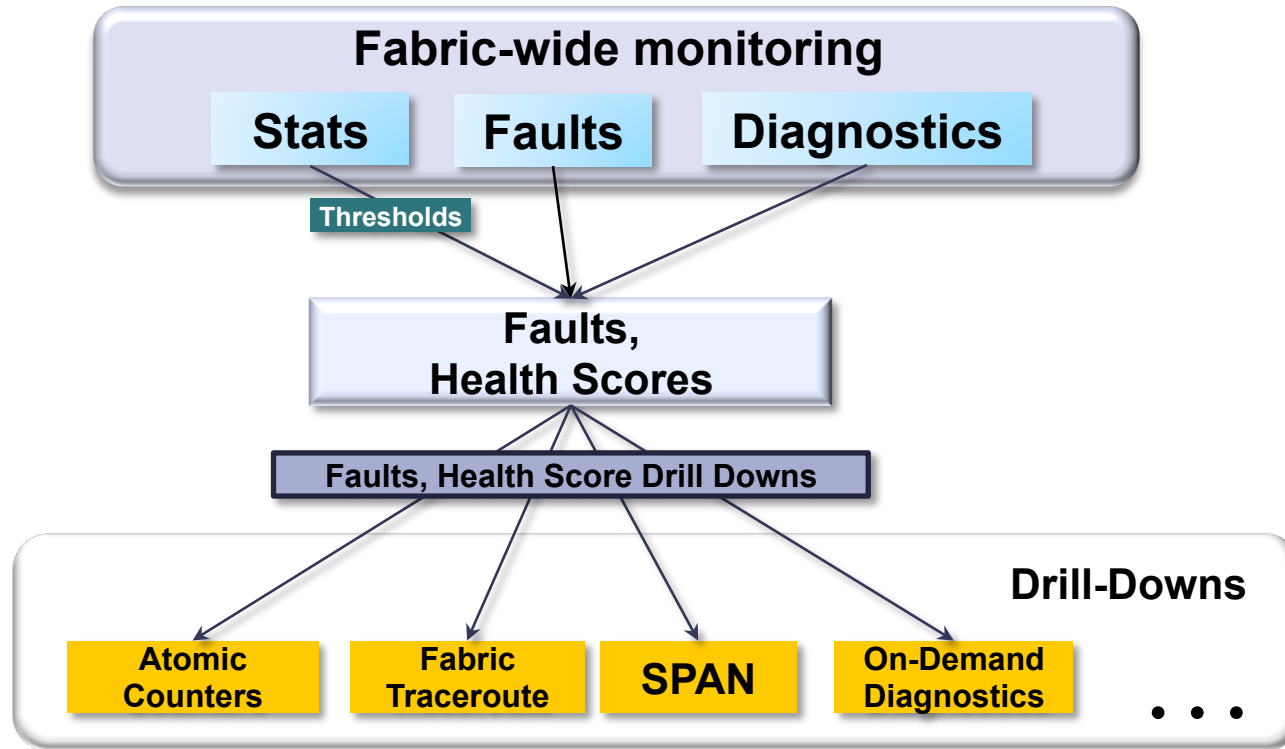
Troubleshooting - Tools

- Periodic diagnostics tests on equipment
- Faults, Events, Health Scores
- ToR Leaf to ToR Leaf Traffic & drops; ToR Leaf to ToR Leaf Latency (post FCS)

On-Demand Tools

- Tenant
 - App Comp.-level SPAN, copy service
 - EP-to-EP level Insieme-traceroute
- Fabric
 - Fabric Port level SPANs
 - TEP to TEP traceroute
 - On-demand diag. tests
- Protocol-specific fabric stats
- App Comp.-level drop stats

Top down Troubleshooting

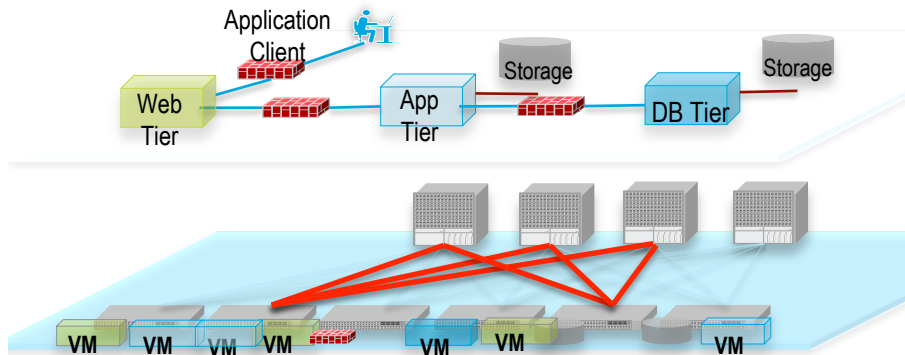


Overlay & Multipath Visibility



Use Case – Traditional troubleshooting does not cover multipath topology. SDN overlay technologies do not coordinate physical & virtual events.

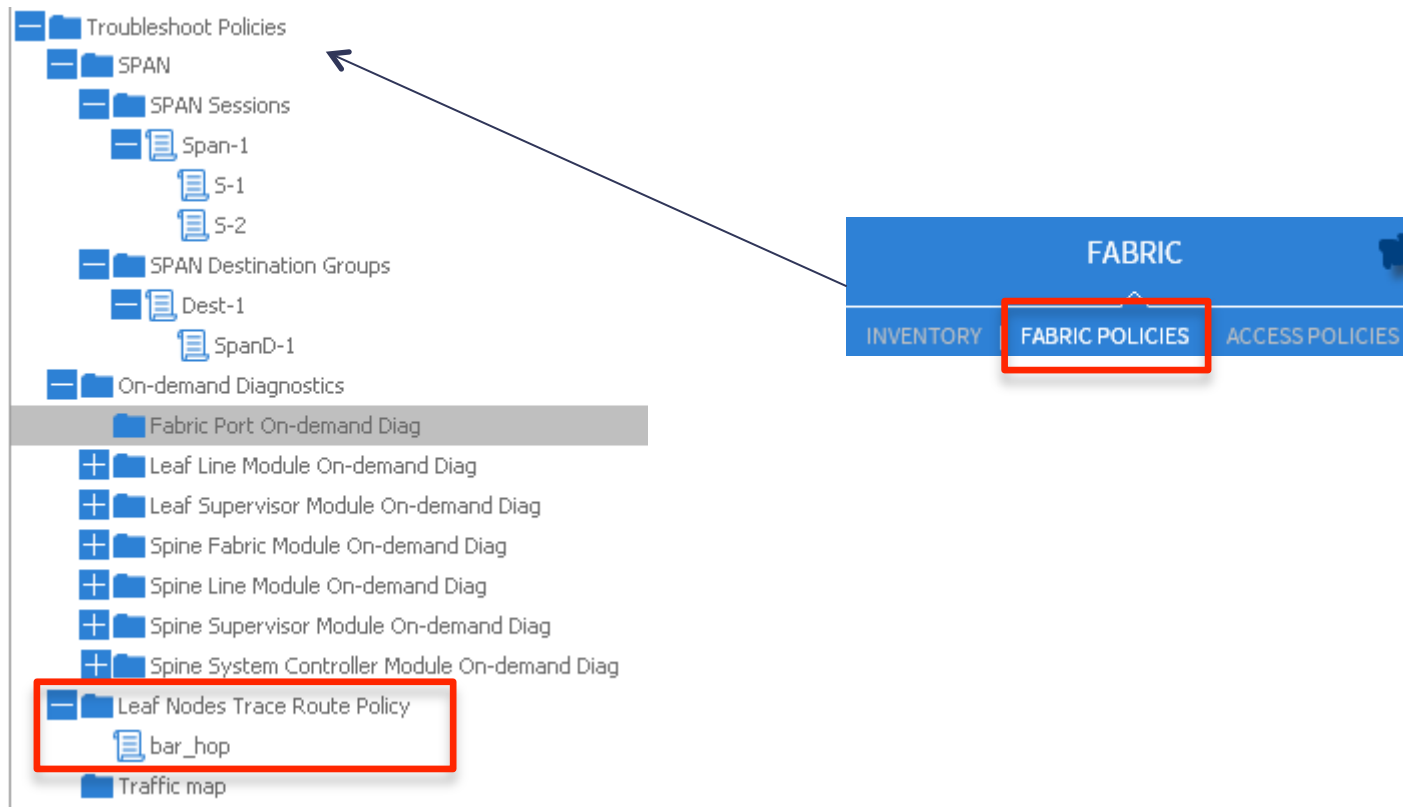
Current Operation – Inaccurate tool results when using Traceroute in multipath as well as in the overlay. The overlay does not accurately represent hops and the physical network does coordinate physical and logical events



ACI Solution: Enhanced Traceroute & Integrated Overlay

- Completely tenant visibility between physical and virtual
- Trace-route accurately reflected when in the overlay

Troubleshooting Policies - Fabric



Traceroute

TRACEROUTE BETWEEN LEAF NODES

Define traceroute

Name:

Description:

Probe Packet Size:

State:

Source Nodes:

Select	Id	DN
<input checked="" type="checkbox"/>	17	topology/pod-1/node-17/sys
<input type="checkbox"/>	18	topology/pod-1/node-18/sys

Destination Nodes:

Select	Id	DN
<input type="checkbox"/>	17	topology/pod-1/node-17/sys
<input checked="" type="checkbox"/>	18	topology/pod-1/node-18/sys

Traceroute Results

POLICY OPERATIONAL FAULTS HISTORY

SUMMARY DESTINATION NODES SOURCE NODES

Name	State	Source IP	Destination IP	Start Time	Finish Time	VRF	Interface ID	IP
From 17 to 18	completed	10.0.16.127	10.0.16.125	2014-02-25T18:13:23.778+00...	never			
Path Group 0								
Path 0								
Node 0							eth8/1	10.0.16.126
Node 1							eth1/49	10.0.16.125

Traceroute a ToR Node

POLICY OPERATIONAL FAULTS HISTORY

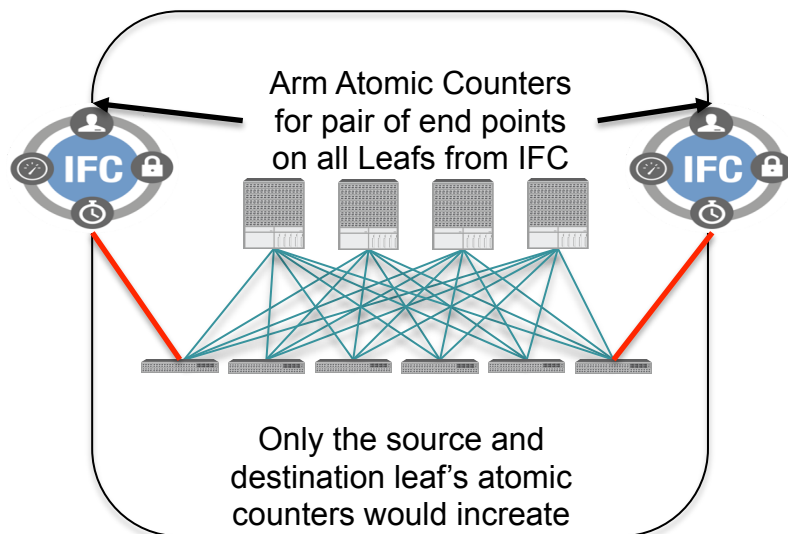
SUMMARY DESTINATION NODES SOURCE NODES

HEALTH		FAULT COUNT	
HEALTH SCORE	N.A.	FAULT COUNT	0 0 0 0
STATS		STATUS	
TOTAL TRANSMITTED (BYTES)	0	LAST 24 HRS	LAST EVENT TIME
TOTAL RECEIVED (BYTES)	0	USER INITIATED CHANGES	4 TUE FEB 25 2014 10:18:07 GMT-0600 (CENTRAL STANDARD TIME)
TOTAL DROPPED (PACKETS)	0	EVENTS	0
		FAULTS	0

Atomic Counters

Use Case – Use-case: Detect misrouting in the fabric for application traffic, quickly debugging and isolate application connectivity issues.

Current Operation – Since there are no drops in the network it is very hard to detect misrouted traffic especially in a large fabric



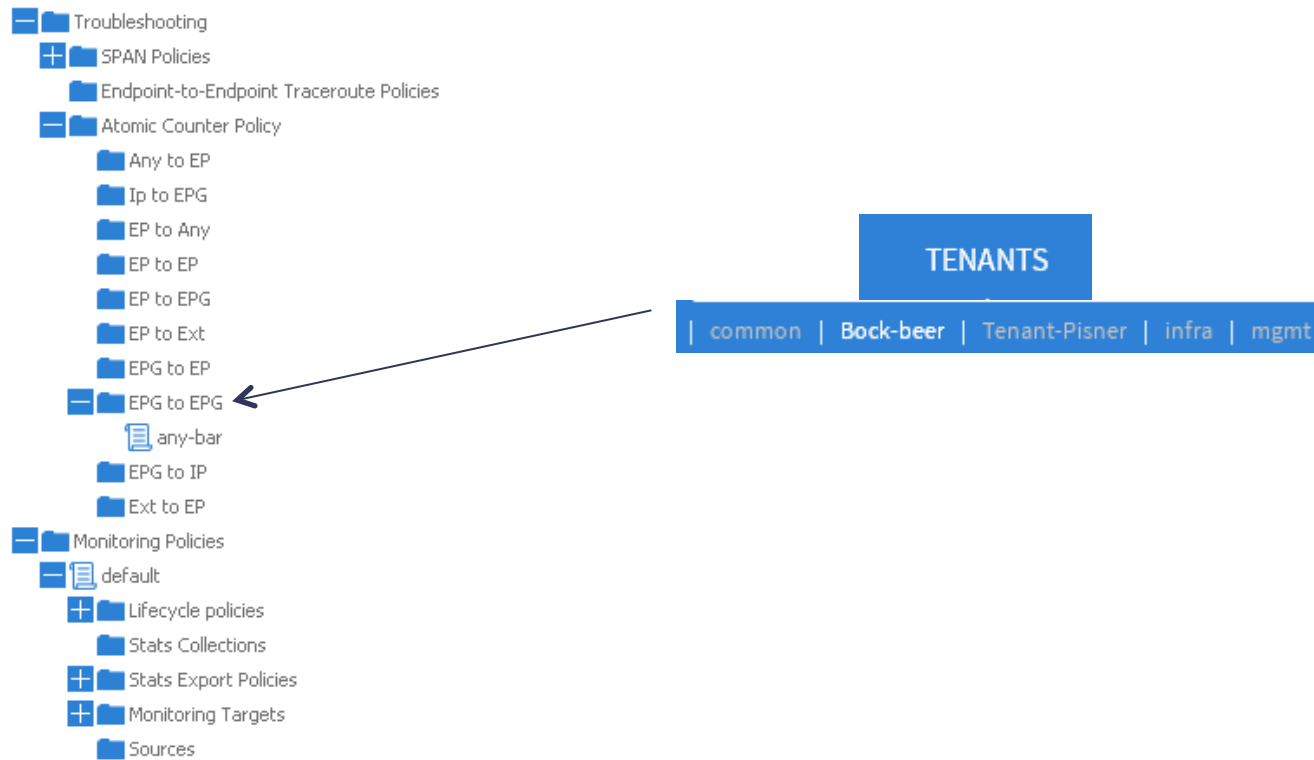
ACI Solution: Use atomic counters to trace packet in the fabric

- Enable atomic counters on all leafs to trace packets from EP1 to EP2, for example
- Done at APIC
- If there are non-zero counters in any leaf other than source and destination leafs then drill down to those leafs
- Check forwarding and routing entries for the destination end-point

Atomic Counters - Paths

- Traffic from iLeaf to iLeaf (TEP to TEP)
 - Drops, Admits, Excess
 - Short term (last 30s) and long term (5mins, 15mins, etc.)
 - Broken down to per-Spine granularity
 - On-going

Troubleshooting Policies - Tennant



Atomic Counters

EPG-to-EPG any-bar



POLICY OPERATIONAL FAULTS HISTORY

Name: **any-bar**

Drill down:

Description:

Administrative State: Enabled Disabled

Source EPG:

Select	Name	Description
<input checked="" type="checkbox"/>	brewery_EPG	
<input type="checkbox"/>	drunk_EPG	
<input type="checkbox"/>	home_EPG	

Destination EPG:

Select	Name	Description
<input type="checkbox"/>	brewery_EPG	
<input checked="" type="checkbox"/>	drunk_EPG	
<input type="checkbox"/>	home_EPG	

Filters:

Select	Name
<input type="checkbox"/>	App_filter
<input type="checkbox"/>	default
<input checked="" type="checkbox"/>	final_pour
<input type="checkbox"/>	hops
<input type="checkbox"/>	xx
<input type="checkbox"/>	xyz

EPG-to-EPG any-bar



POLICY OPERATIONAL FAULTS HISTORY

SUMMARY TRAFFIC

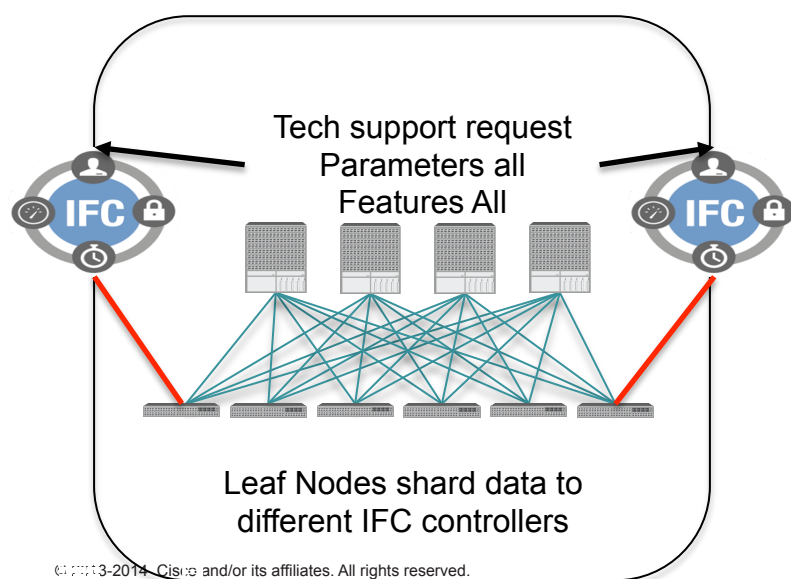
EPG-to-EPG Counter any-bar Traffic

SOURCE	DESTINATIC	LAST COLLECTION (30 SECONDS)				TOT				PERCENTAGE			
		TRANSMIT PKG	ADMITTED PKG	DROPPED PKG	EXCESS PKG	TRANSMIT PKG	ADMITTED PKG	DROPPED PKG	EXCESS PKG	DROP PKG %	EXCESS PKG %	TOT DROP PKG %	TOT EXCESS PKG %
No items have been found. Select Actions to create a new item.													

Coordinated Technical Support

Use Case - Correlate trouble events for application or tenants distributed over multiple network edges in the data center

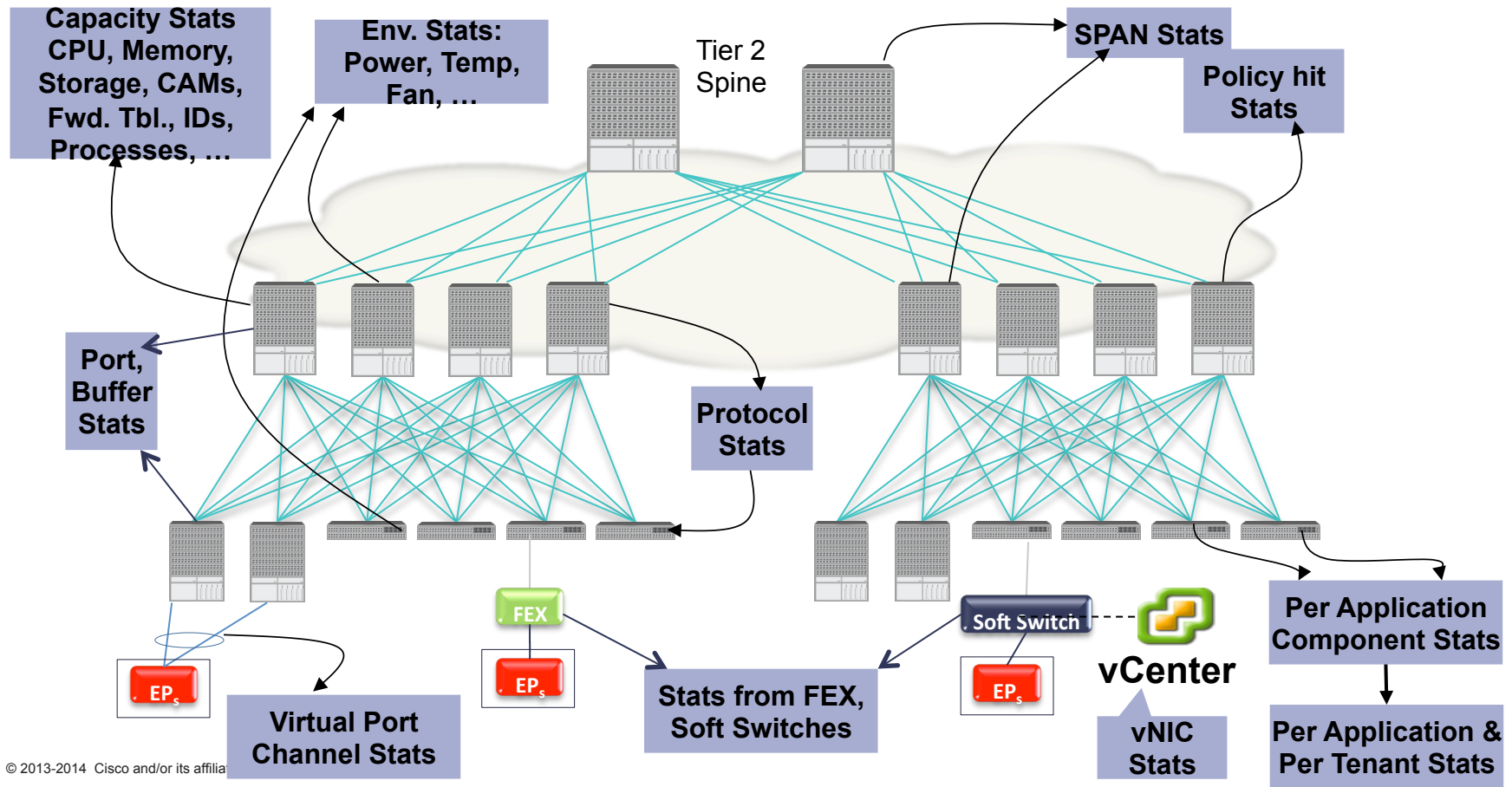
Current Operation – Per box approach, separate queries, and manual coordination of events limits problem isolation and visibility



Insieme Solution: Centralized Automation

- One interface to collect tech-supports from any subset of fabric components and features
- Periodic
- On-demand
- Exportable

Statistics Collections



Troubleshooting – Techsupport files

ADMIN

AAA | SCHEDULERS | HISTORICAL RECORD POLICIES | FIRMWARE | EXTERNAL DATA COLLECTORS | IMPORT/EXPORT

Import/Export

- Quick Start
- Import Policies
- Export Policies
- TechSupport
- TAC-case1004

TechSupport Export Policy - TAC-case1004

PROPERTIES

Name: **TAC-case1004**

State: untriggered triggered

Export Destination: CTRLR

Scheduler: weekly-fri

Data Container: select an option

CREATE REMOTE LOCATION

Define Remote Location

Name: Tech_Srv1

Description: optional

Host: 10.1.1.10

Protocol: scp ftp sftp tftp

Remote Path: /

Remote Port: 22

Username: mfrase

Password:

Confirm Password:

Management EPG: default (epg-default)

Multi-Node SPAN

Spanning traffic (a) Ports, (b) To / from an EPG

APIC not in Path

Current Operation – One has to find out all the leafs on which endpoints of the application group are connected to. Then one has to connect to each of the leaves and enable span. When an endpoint moves to a new leaf, span configuration need to be manually adjusted

ACIP as a co-ordinator

- Use APIC to program span policies at the appropriate places.
- APIC keeps track of all the members of each Application Group and where they are connected to
- If any member moves, APIC automatically pushes the policy to the new leaf

SPAN

- **Infrastructure:** Traffic to/from access ports
 - Local (same leaf)
 - Remote (ERSPAN)
- **Fabric:** Traffic to/from fabric ports
 - ERSPAN
- **Tenant:** Traffic to/from EPGs
 - ERSPAN

SPAN - Infrastructure



Access Polices under Fabric

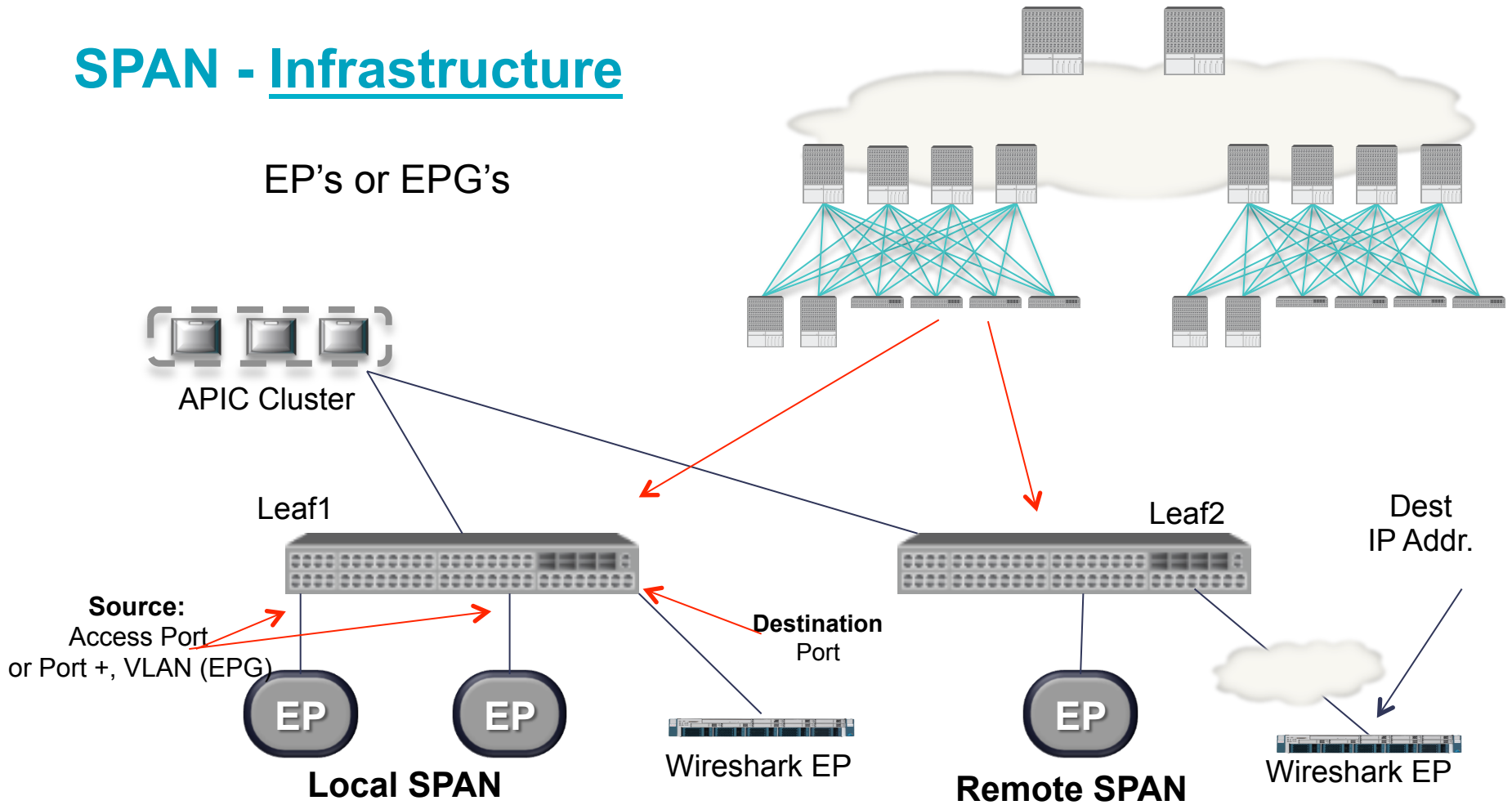
Group of Destinations can be created

Source = Access port
Port – on leaf
Direct Port channel (vpc)
Port Channel

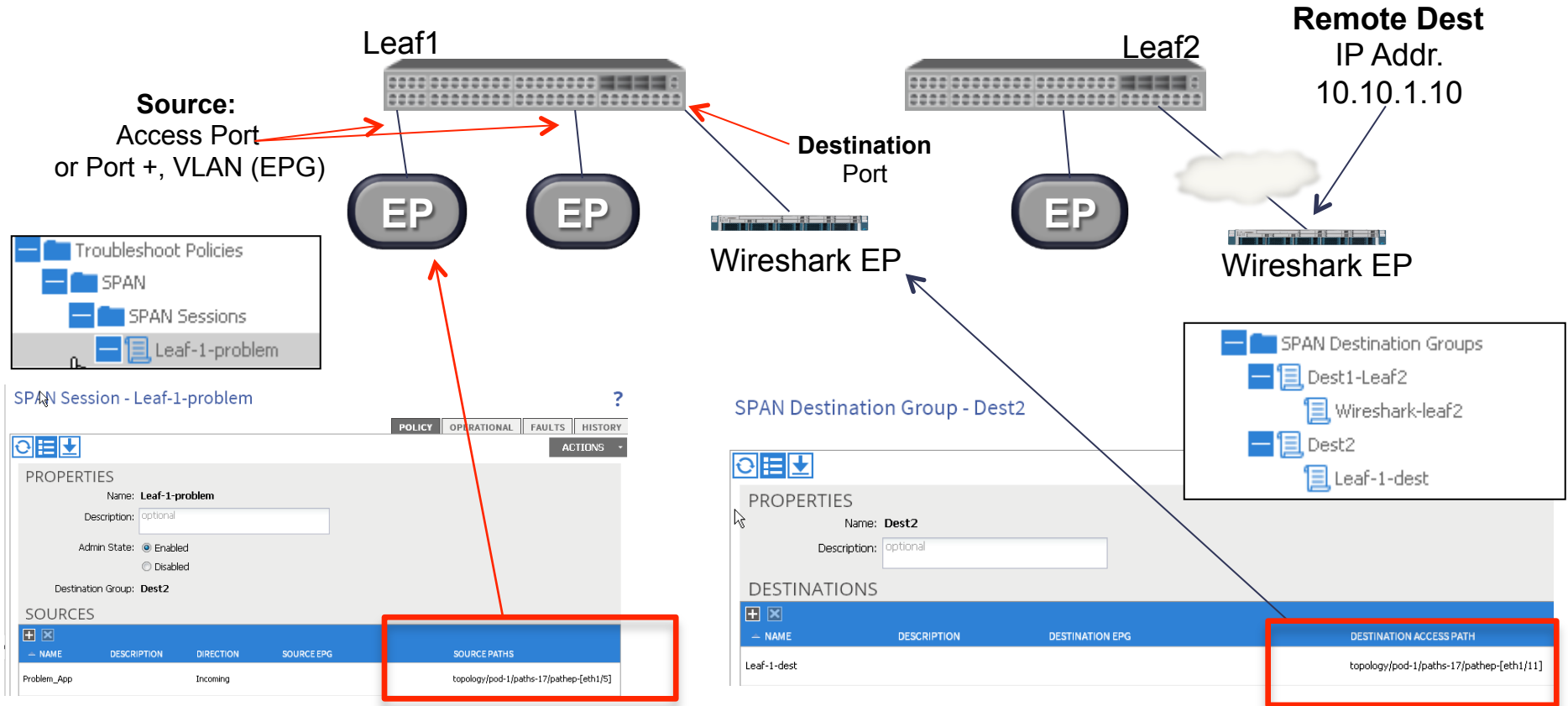
EPG's are across the Fabric ,
Source & Dest should be on same
Tenant so data does not go out
side same Tenant

Source and destination groups
created independent
Destinations can be outside Tenant
but a provider should create a Dest
for each Tennant

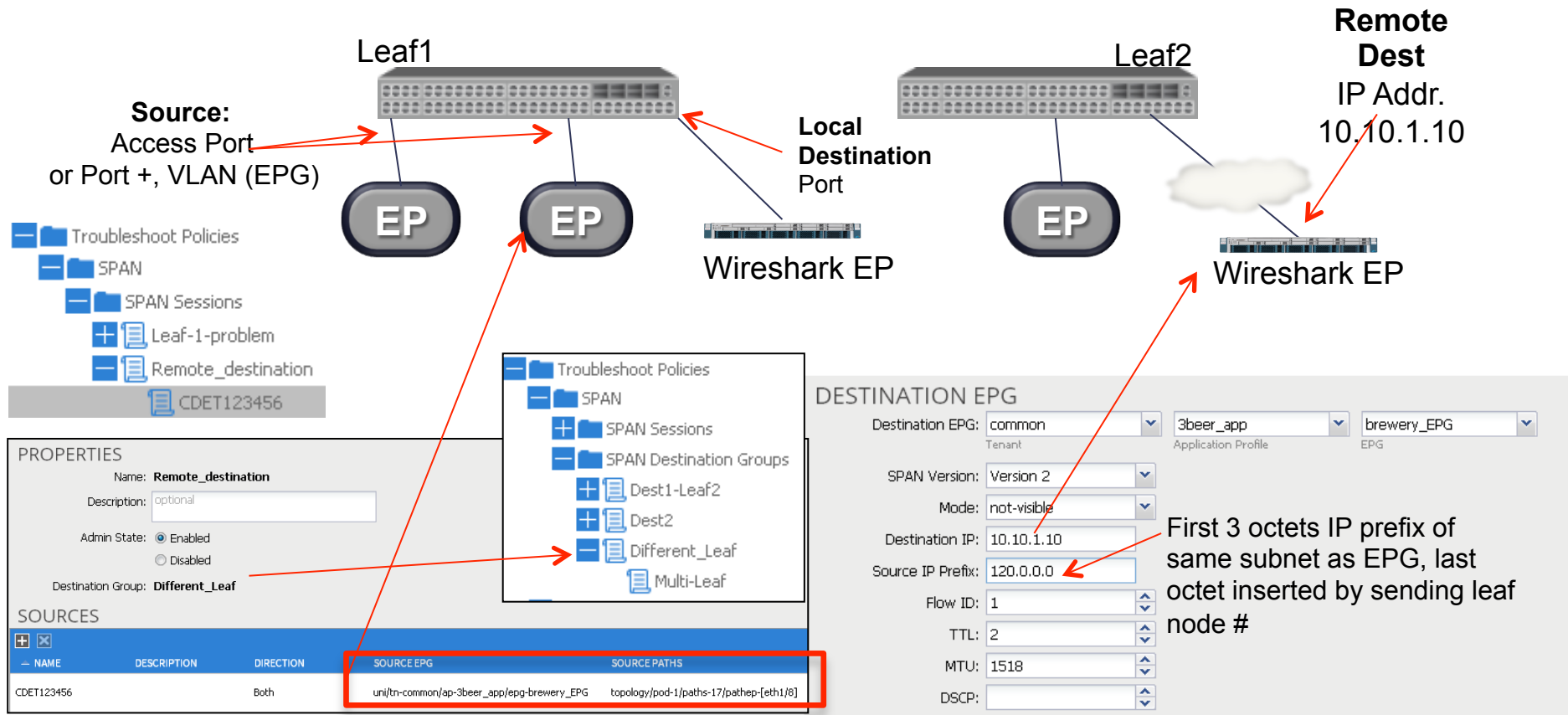
SPAN - Infrastructure



Infrastructure – Access SPAN (same leaf)

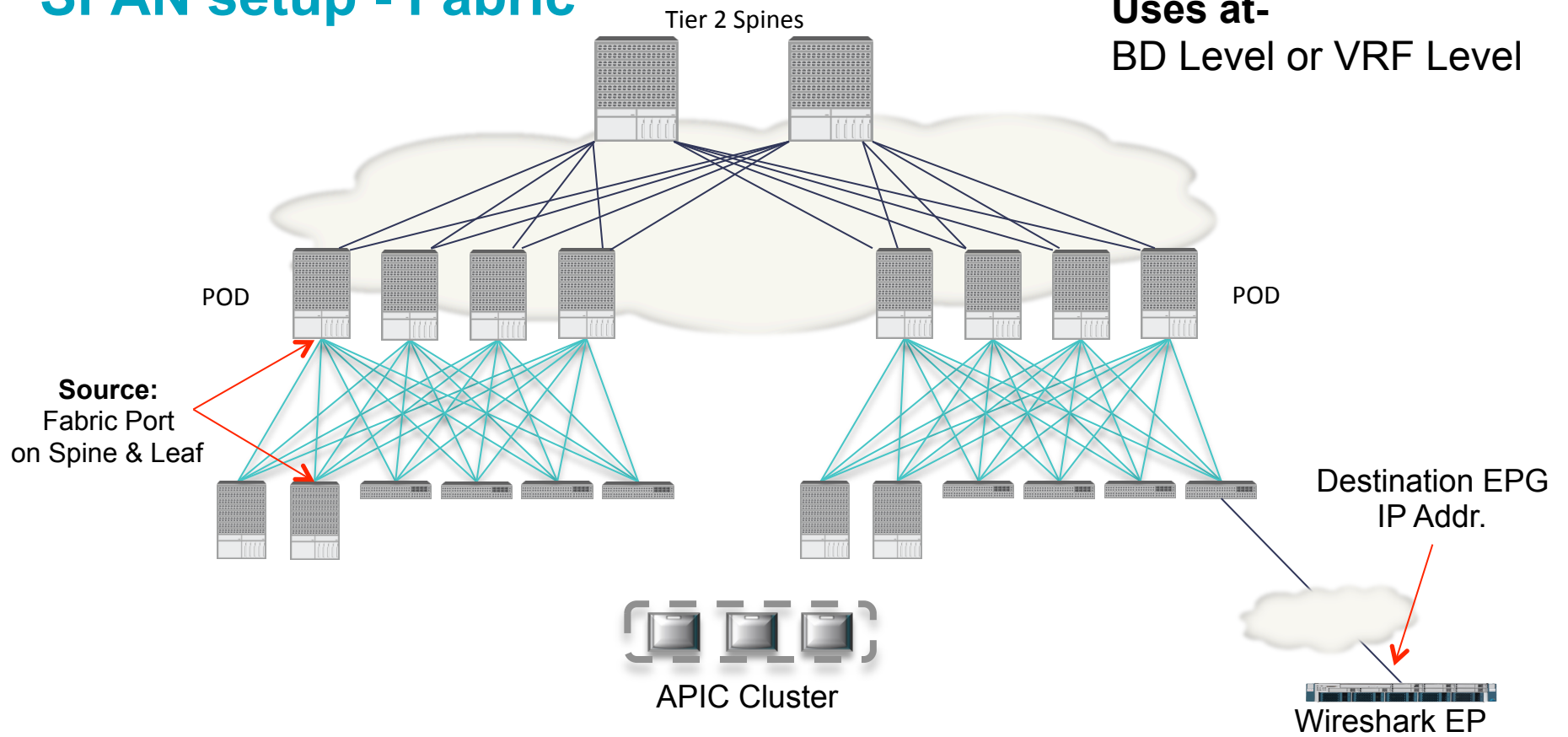


Infrastructure – Remote SPAN (different leaf)

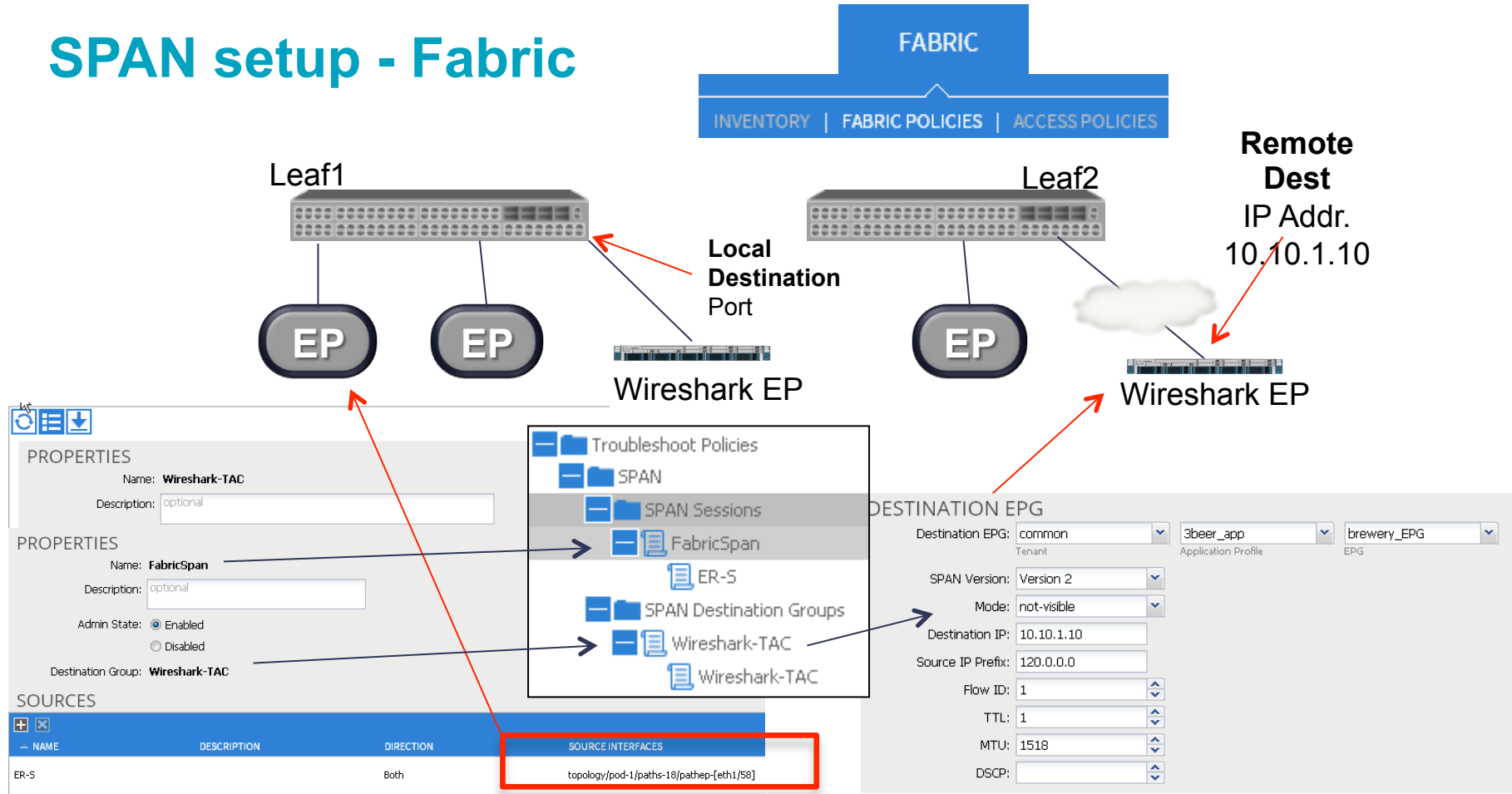


SPAN setup - Fabric

Uses at-
BD Level or VRF Level

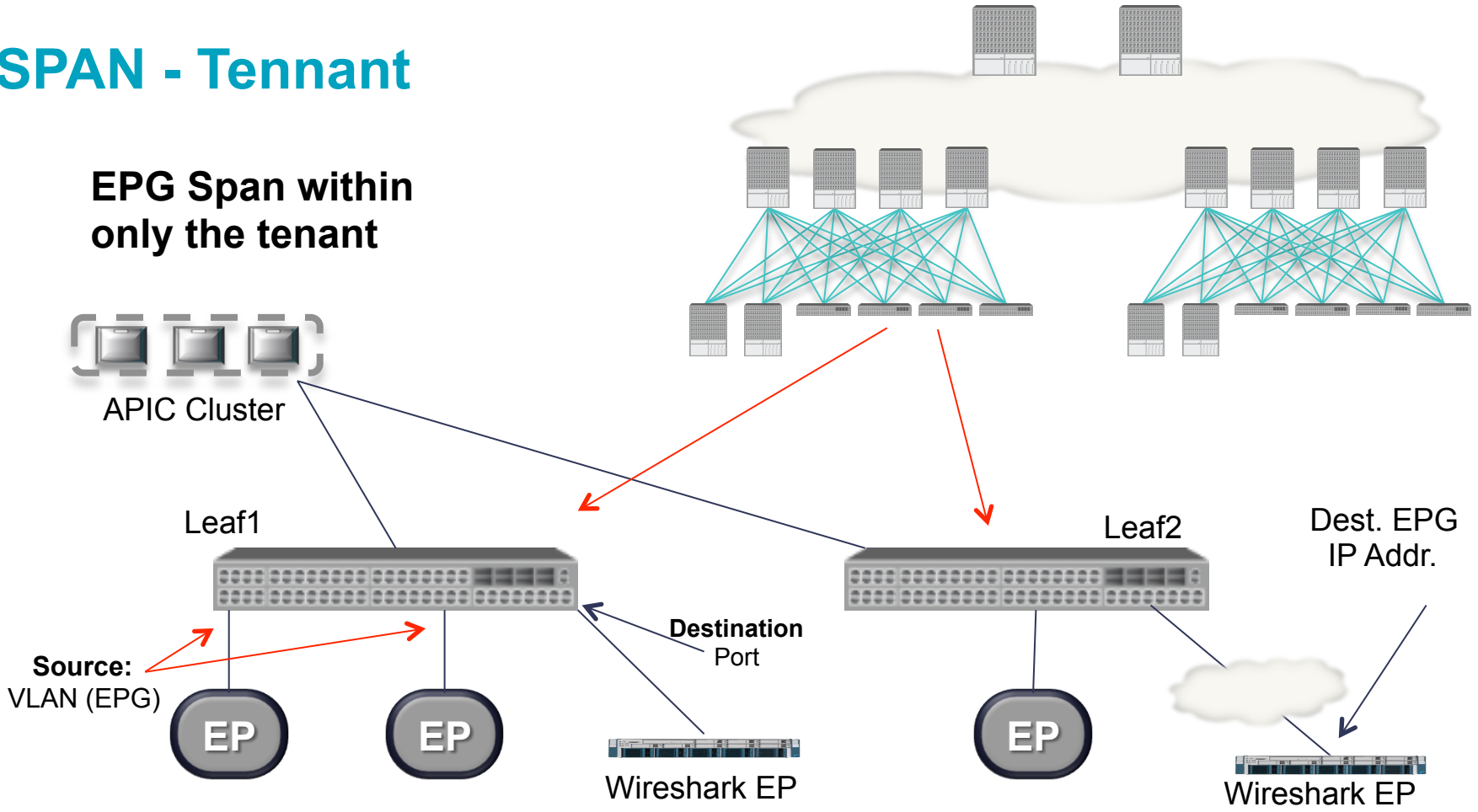


SPAN setup - Fabric



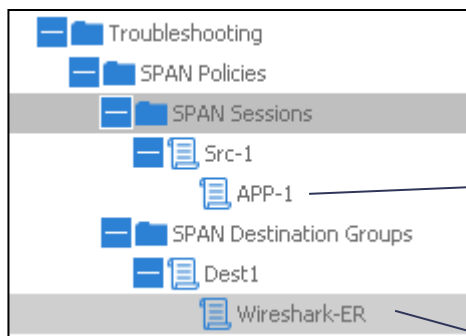
SPAN - Tennant

EPG Span within only the tenant



SPAN - Tenant

Separate SPAN under each Tenant



TENANTS

common | AcmeHoster | Coke | infra | mgmt

ERSPAN Source - APP-1

ERSPAN Source - APP-1

PROPERTIES

Name: **APP-1**

Description: optional

Direction: Both

Source EPG: common/Web_Portal/application_servers

SPAN Destination - Wireshark-ER

SPAN Destination - Wireshark-ER

PROPERTIES

Name: **Wireshark-ER**

Description: optional

DESTINATION EPG

Destination EPG: Coke | Application Profile: www.Coke.com | EPG: APP

SPAN Version: Version 2

Mode: not-visible

Destination IP: 10.2.2.1

Source IP Prefix: 140.0.0.0

Flow ID: 1

TTL: 1

MTU: 1518

DSCP:

Thank you.

