Policy Based Automation Auto-vlan

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Version Information.

Version	Comments	Date	Author
0.1	Initial content	31 st Aug 2020	Vijay

Feature overview.

The PBA Auto-vlan feature enables cnMatrix switch to dynamically learn the vlan id's advertised by cnPilot Ap's as part of LLDP control packet. The received LLDP control packets are first authenticated by cnMatrix and then parses the received vlan ids and allows them on the directly connected interface.

This feature is intended to support zero-touch detection of cnPilot access point on cnMatrix switch and dynamically configure the port on which the LLDP packet is received. The support for PBA Auto-vlan feature starts from cnPilot firmware version 4.1 and cnMatrix firmware release 3.1.1-r3

Functional Details about the PBA Auto-vlan.

New Cambium vendor-specific LLDP TLVs is introduced to support "pushing vlan ids from Cambium cnPilot to cnMatrix switch.

The PBA TLVs are implemented as an extension to the LLDP standard, using its flexible extension mechanism.

They are implemented as vendor-specific (Cambium OUI: 58-C1-7A) TLVs using TLV type 127 as described in the 802.1ab (LLDP) standard.

Two new TLVs have been defined:

PBA Authentication TLV – used by cnMatrix switch to export current authentication-related data and settings for use by attached cnPilot devices

PBA Device Settings TLV – used by cnPilot devices leveraging PBA to export required PBA device settings like the vlan id's to cnMatrix.

By default, the cnMatrix regularly generates LLDP authentication TLV on all the ports. The below criteria decide whether the LLDP PBA Authentication TLV is included in the LLDP packet generated by cnMatrix switch or not.

- Enable/Disable Port operational status
- Enabled/Disabled PBA authentication TLV setting on the port . On port execute "no lldp pba-tlv-select authentication"
- Enabled/Disabled Auto-Attach policy globally. Execute "no auto-attach". TLV transmission is stopped on all ports when PBA is disabled globally.

Upon receipt of this LLDP authentication tlv, cnPilot AP responds by sending Device setting tlv (which basically includes the list of vlan ids allowed on the trunk interface of the AP). The expectation is the native vlan on the AP's ethernet interface to be untagged. However, when AP Ethernet is in Trunk Mode with Native VLAN Tagged, then Native VLAN ID must be present in 'Allowed vlans on the interface so that it is allowed by the switch on the port.

On cnPilot AP, PBA device setting TLV is included in LLDP packet if the ethernet port is in trunk mode. It is not generated if it is in Access mode. LLDP is enabled by default globally on the cnPilot AP. The cnMatrix switch authenticates the received LLDP

packet from the cnPilot AP . From the device setting tlv, the switch reads the component (VLAN list, state flags) and creates a dynamic policy that is applied to the port on which the tlv was received.

The policy remains in effect until the LLDP port status changes (e.g., downstream neighbor LLDP data expires, PBA disabled on the port, link-down event), the policy data being pushed by the downstream neighbor changes (e.g., the VLAN list is updated) or a higher precedence PBA is determined to be applicable to the port.

Functional Details about PBA TLV extension.

Cambium PBA Authentication tlv

- This is Proprietary tlv generated by cnMatrix to convey authentication related data and setting. If this tlv is included in the LLDP packet, then it notifies the cnPilot devices that PBA based data path configuration is supported by the cnMatrix. If the tlv is absent, then this feature is not supported.
- The PBA Authentication TLV exports current authentication-related settings and data that is required to support
 secure communication between the device generating authenticated PBA TLVs and cnMatrix. It sends the following
 information in the tlv.
 - o Source mac address: mac address of the device generating the tlv
 - Authentication state flag:
 - Flag = 1 : indicates PBA authentication is enabled. The device setting the received on this port in ingress direction will be authenticated before processing. If the authentication fails, the packet will be dropped, and no policy will be applied.
 - Flag= 0 : indicates the LLDP packed will not authenticated when processing the tlv.
 - Authentication challenge:
- The cnPilot uses this information when connecting to cnMatrix to leverage PBA functionality and automatically configure datapath characteristics (e.g., VLAN settings) in a secure communication mode.

Cambium PBA Device setting tlv

- This proprietary tlv is generated by the cnPilot Ap's to update PBA enabled uplink switch about the interface configuration requirement.
- It is only generated following the receipt of a PBA Authentication TLV on the interface.
- PBA Device Settings TLV data integrity and source validation is supported using the HMAC-SHA256 message authentication algorithm. The HMAC-SHA256 generated digest size is 32 octets and the PBA Device Settings TLV includes a field to support the digest exchange between source and destination parties. Symmetric (shared) private keys are used for digest generation.
- The Digest is computed by passing the below data to the HMAC-SHA256.
 - o Authentication challenge value: received from most recent incoming lldp packet from switch
 - \circ Source mac address: MAC address of the device formulating the PBA Device Settings TLV
 - Destination mac address: derived from the Source MAC address from the most recently received PBA Authentication TLV
 - Port-id: derived from the value of the LLDP standard (mandatory) Port ID TLV exported by the upstream cnMatrix device
- This data, along with the message authentication key, is passed through the standard HMAC-SHA256 algorithm to produce the associated message digest. The digest is then placed in the HMAC-SHA256 Digest field in the TLV prior to transmission. Upon receipt, the digest is again computed, and the resulting digest is compared against the received digest. If the received digest is the same as the newly computed digest, the TLV is considered authentic and processing can commence. If the comparison fails, the TLV is discarded and processing is terminated.
- PBA Device Settings TLV authentication can be bypassed to support Cambium devices that do not support the required authentication procedure. Disabling PBA message authentication means that PBA Device Settings TLV authentication is not performed.
- The primary use of the PBA Device Settings TLV is to pass desired VLAN settings from the source to the destination device to facilitate automatic configuration of datapath settings. This effectively pushes policy action data from the source downstream device to the destination upstream device. Settings are applied to the port through which the TLV was received (i.e., the ingress port). The following VLAN settings can be specified.

- Native VLAN native vlan is always send as "0". This is to avoid cnMatrix from updating the port based on received tlv from cnPilot.
- VLAN List identifies a list of VLANs that are to be created and applied to the ingress port of the switch. The VLAN list specified is either comma separated or range (5-10). A maximum of 20 VLANs may be specified on the ethernet port.

Toplogy diagram



LLDP Work Flow.



LLDP packet capture

LLDP packet originated from cnMatrix switch port (Hybrid mode) It has authentication TLV

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LLDP packet originated from cnPIlot AP. It has the device setting TLV.

No. Time	Source	Destination	Protocol	Length Cli	ient MAC Info			
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4782 16:49:40.045981	CambiumN_ed:fd:63	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
4783 16:49:40.045981	CambiumN_ed:fd:67	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc +	Cambium Networks cnMatrix
4860 16:49:56.128928	CambiumN_6e:de:26	LLDP_Multicast	LLDP	165	TTL =	180 SysName	= E425-6EDE26 SysDesc = cr	Pilot E425
4904 16:50:10.165389	CambiumN_ed:fd:68	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
4905 16:50:10.165390	CambiumN_ed:fd:63	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
4906 16:50:10.165390	CambiumN_ed:fd:67	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
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8183 16:50:40.342342	CambiumN_ed:fd:68	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
8184 16:50:40.342685	CambiumN_ed:fd:63	LLDP_Multicast	LLDP	175	TTL =	120 SysName	= cloud-cnMatrix SysDesc =	Cambium Networks cnMatrix
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> Capabilities				0000	31 35 32 2	c 31 35 33 2		156 157 159 150
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	100 = TLV Length: 4							
Port Description	eth1							
Cambium Networks Li	imited - Unknown (2)							
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0 0101 1	000 = TLV Length: 8	3						
Organization Uni	que Code: 58:c1:7a	(Cambium Networks Limi						
Unknown Subtype:	2							
Unknown Subtype	Content: 012edfad89.	a8e28a824f57cbbe7352cd5111a	5fd3002fed5					
~ End of LLDPDU								
0000 000	= TLV Type: End	of LLDPDU (0)						
	000 = TLV Length: 0							

Configuration on cnMatrix switch

By default, Auto-Attach policy is enabled by default on cnMatrix Switch.

[Type here]

Basic Settings	Interfaces	Rules	Actions	Policies	Scripts		
Auto Atta Settings	ich Basic						
					Auto Attach Global Status	Enabled	~
					String Comparison	Ignore-Ca	ase 🗸
					Update Port Description	PBA Polic	cy Name 🗸 🗸
					Restricted MAC Match	Enabled	✓
					Default Auto Attach Settings	Disabled	~
						Apply	

Configuration on cnPilot Access point.

LLDP is enabled by default on cnPilot AP.

Cambium Networks	cnPilot E425 - E425-6EDE26				
Lttl Dashboard		Please configure the Country o	f operation under Configure->System		
🙆 Monitor 🗸	Configure / System				
🕏 Configure 🗸	System				
₽ System		Name	E425-6EDE26		Hostname of the device (max 64 characters)
7 Radio		Location			Location where this device is placed (max 64 chara Contact information for the device (max 64 characte
🗢 WLAN		Country-Code		~	For appropriate regulatory configuration
A Network		Placement	Indoor Outdoor Configure the AP placement details		
Services		LED	Whether the device LEDs should be ON during operation Whether the AP should transmit LLDP packets		
≢ Operations					

.

Stats command on cnMatrix switch

P Traffic Information Interface Frames Frames Received Frames Secarded Unrecognized Tots PO Description Gi0/1 798 0 389 47 47 0 5 0 solution-lab- solution.eab- solu		Traine	Statistics	Errors										
Interface Frames Entities Frames Received Frames Frames Frames Frames Frames Discarded Total TLVs POU Length Discarded Description Gi01 798 0 389 47 47 0 5 0 solution-lab- switch.cambiumnetwo Gi02 798 0 389 47 47 0 5 0 solution-lab- switch.cambiumnetwo Gi03 798 0 389 47 47 0 5 0 Gi04 798 0 389 47 47 0 5 0 Gi05 798 0 389 47 47 0 5 0 Gi06 798 0 389 47 47 0 5 0 Gi0/in 798 0 389 47 47 0 5 0 Gi0/in 798	DP	Tra	affic Inform	nation —										
Gi0/1 798 0 389 47 47 0 5 0 solution-lab-sublumetwo Gi0/2 798 0 389 47 47 0 5 0 solution-lab-sublumetwo Gi0/3 798 0 389 47 47 0 5 0 Gi0/3 798 0 389 47 47 0 5 0 Gi0/4 798 0 389 47 47 0 5 0 Gi0/5 798 0 389 47 47 0 5 0 XV2-2484686 Gi0/6 798 0 389 47 47 0 5 0 #CamblumAuto_I6 Gi0/7 798 0 389 47 47 0 5 0 #CamblumAuto_I6 Gi0/7 798 0 389 47 47 0 5 0 #CamblumAuto_I6 Gi0/7 798 0 389 47 47 0 5<		_			Interface	Frames Transmitted	Entries Aged	Frames Received	Received Error Frames	Frames Discarded	Unrecognized TLVs	Total TLVs Discarded	PDU Length Error Drops	Description
Gi02 798 0 389 47 47 0 5 0 Gi03 798 0 389 47 47 0 5 0 Gi04 798 0 389 47 47 0 5 0 Gi04 798 0 389 47 47 0 5 0 Gi05 798 0 389 47 47 0 5 0 Gi05 798 0 389 47 47 0 5 0 XV2-2484686 Gi06 798 0 389 47 47 0 5 0 #CambiumAuto_16 Gi07 798 0 389 47 47 0 5 0 #CambiumAuto_16 Gi07 798 0 389 47 47 0 5 0 #CambiumAuto_16 Gi07 798 0 389 47 47 0 5 0 #CambiumAuto_18 Gi07 798 0 <t< td=""><td></td><td>_</td><td></td><td></td><td>Gi0/1</td><td>798</td><td>0</td><td>389</td><td>47</td><td>47</td><td>0</td><td>5</td><td>0</td><td>solution-lab- switch.cambiumnetwo</td></t<>		_			Gi0/1	798	0	389	47	47	0	5	0	solution-lab- switch.cambiumnetwo
G0/3 798 0 389 47 47 0 5 0 G0/4 798 0 389 47 47 0 5 0 G0/6 798 0 389 47 47 0 5 0 G0/6 798 0 389 47 47 0 5 0 XV2-248666 G0/6 798 0 389 47 47 0 5 0 #CambumAuto_Its G0/7 798 0 389 47 47 0 5 0 #CambumAuto_Its G0/7 798 0 389 47 47 0 5 0 #CambumAuto_Its G0/7 798 0 389 47 47 0 5 0 #CambumAuto_Its G0/9 798 0 389 47 47 0 5 0 #CambumAuto_Its G0/10 798 0 389 47 47 0 5 0 #CambumAuto_Its GubiumAuto_					Gi0/2	798	0	389	47	47	0	5	0	
Gi0/4 798 0 389 47 47 0 5 0 Gi0/5 798 0 389 47 47 0 5 0 XV2-2484686 Gi0/5 798 0 389 47 47 0 5 0 XV2-2484686 Gi0/5 798 0 389 47 47 0 5 0 #cambumAuto_If5 Gi0/5 798 0 389 47 47 0 5 0 #cambumAuto_If5 Gi0/6 798 0 389 47 47 0 5 0 #cambumAuto_If5 Gi0/7 798 0 389 47 47 0 5 0 #cambumAuto_If5 Gi0/10 798 0 389 47 47 0 5 0 Gi0/10 798 0 389 47 47 0 5 0 Gi0/10 798 0 389 47 47 0 5 0 Gi0/10					Gi0/3	798	0	389	47	47	0	5	0	
G0/5 798 0 389 47 47 0 5 0 XV2-248686 G0/6 798 0 389 47 47 00 5 0 #CambumAuto_It5 G0/6 798 0 389 47 47 00 5 0 #CambumAuto_It5 G0/6 798 0 389 47 47 0 5 0 #CambumAuto_It5 G0/6 798 0 389 47 47 0 5 0 #CambumAuto_It6 G0/6 798 0 389 47 47 0 5 0 #CambumAuto_It6 G0/7 798 0 389 47 47 0 5 0 #CambumAuto_It6 G0/7 798 0 389 47 47 0 5 0 #CambumAuto_It6 G0/10 798 0 389 47 47 0 5 0 #CambumAuto_It6 G0/10 798 0 389 47 47 <					Gi0/4	798	0	389	47	47	0	5	0	
G0/6 798 0 389 47 47 0 5 0 #CamblumAuto_It5 G0/7 798 0 389 47 47 0 5 0 #CamblumAuto_It5 G0/7 798 0 389 47 47 0 5 0 #CamblumAuto_It5 G0/8 798 0 389 47 47 0 5 0 #CamblumAuto_It6 G0/10 798 0 389 47 47 0 5 0 #CamblumAuto_It6 G0/10 798 0 389 47 47 0 5 0 G0/10 798 0 389 47 47 0 5 0 Clear LLDP Counters					Gi0/5	798	0	389	47	47	0	5	0	XV2-2-484686
Gi07 798 0 389 47 47 0 5 0 #CambiumAuto_If7 Gi08 798 0 389 47 47 0 5 0 #CambiumAuto_If7 Gi09 798 0 389 47 47 0 5 0 #CambiumAuto_If8 Gi09 798 0 389 47 47 0 5 0 Gi010 798 0 389 47 47 0 5 0 Clear LLDP Counters					GI0/6	798	0	389	47	47	0	5	0	#CambiumAuto_If6
Gi0/B 798 0 389 47 47 0 5 0 #CamblumAuto_18 Gi0/9 798 0 389 47 47 0 5 0 Gi0/10 798 0 389 47 47 0 5 0 Gi0/10 798 0 389 47 47 0 5 0 Clear LLDP Counters		_			Gi0/7	798	0	389	47	47	0	5	0	#CambiumAuto_If7
Gi0/9 798 0 389 47 47 0 5 0 Gi0/10 798 0 389 47 47 0 5 0 Clear LLDP Counters					Gi0/8	798	0	389	47	47	0	5	0	#CambiumAuto_If8
Gi0/10 798 0 389 47 47 0 5 0 Ctear LLDP Counters			-		Gi0/9	798	0	389	47	47	0	5	0	
Clear LLDP Counters					Gi0/10	798	0	389	47	47	0	5	0	
		-	•		Gi0/7 Gi0/8 Gi0/9 Gi0/10	798 798 798 798 798	000000000000000000000000000000000000000	389 389 389 389	47 47 47 47 C	47 47 47 47 kear LLDP Co	0 0 0 0 0 0 0 0	5 5 5 5	000000000000000000000000000000000000000	#CambiumAuto_I #CambiumAuto_I

To check the LLDP neighbor's

cloud-cnMatrix# show	w lldp neighbo	PS		
Capability Codes (R) Router, (B) Brid (W) WLAN Access Poir	: dge, (T) Telep nt, (P) Repeat	bhone, (C) DO er, (S) Stat	CSIS Cable Devi ion, (0) Other	ce,
Chassis ID	Local Intf	Hold-time	Capability	Port Id
f8:0b:cb:98:a5:00 XU2-2-484686	Gi0/1 Gi0/5	120 480	B,R B,W,R,S	Gi1/0/22 bc:e6:7c:48:46:86
58:c1:7a:6e:de:26 00:04:56:b1:48:8c 00:04:56:95:98:28	GiØ/7 GiØ/8 GiØ/6	180 180 180	B,W,R B,W,R B,W,R	eth1 eth1 eth1
Total Entries Displa cloud-cnMatrix#	ayed : 5			

To check the vlan's learned from LLDP neighbors

cloud-cnMatrix# cloud-cnMatrix#_show lldp_neighbors_gigabitethernet 0/6_detail Capability Codes : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other >>>> Local Interface : Gi0/6 <<<< Chassis Id SubType Chassis Id Port Id SubType Port Id Port Description : Mac Address : 00:04:56:95:98:28 : Interface Name : eth1 eth1 eth1 410 System Capabilities Supported : B,W,R System Capabilities Enabled : B,W,R Management Addresses : Not Advertised Extended 802.3 TLV Info Extended 802.1 TLV Info -Port VLAN Id : Ø Cambium TLV Info PBA Device Settings TLV Info - Version - Non-Zero Digest - Flags - Souwag MOC Oddroog 1 True 0×00 00:04:56:95:98:28 н Source MAC Address 800,900,1000 Total Entries Displayed : 1 cloud-cnMatrix# cloud-cnMatrix# show lldp neighbors gigabitethernet 0/7 detail Capability Codes : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other >>>> Local Interface : Gi0/7 <<<< Chassis Id SubType Chassis Id Port Id SubType Port Id Port Description Sustem Name : Mac Address : 58:c1:7a:6e:de:26 : Interface Name : eth1 : E455-6EDE26 Time Remaining : 155 Seconds System Capabilities Supported : B,W,R System Capabilities Enabled : B,W,R Management Addresses : Not Advertised Extended 802.3 TLV Info Extended 802.1 TLV Info -Port VLAN Id : 0 Cambium TLV Info PBA Device Settings TLV Info - Version - Non-Zero Digest - Flags : 1 : True : 0x00 : 58:c1:7a:6e:de:26 Source MAC Address 4,155,156,157,158,159,160

Total Entries Displayed : 1

To view the Auto-Attach policy Attached

Cambiur 🌔	m Networks [∞] cnMatrix EX2010	-P										
	Interface Statistics											
RSTP	Auto Attach											
VRST	Interface Statistics											
A	-	Selec	t Port	Policies Applied	Policies Expired	Policy Errors	TLVs Received	TLVs Processed	TLV Authentication Failures	Previous Policy	Clear Statistics	Description
LDP	-	0	Gi0/1	0	0	0	0	0	0		Disabled 🗸	solution-lab- switch.cambiumnetwo
-0	-	0	Gi0/2	0	0	0	0	0	0		Disabled 🗸	·
	_	0	Gi0/3	0	0	0	0	0	0		Disabled 🗸	•
MP Snooping		0	Gi0/4	0	0	0	0	0	0		Disabled V	·
	-	0	Gi0/5	0	0	0	0	0	0		Disabled 🗸	XV2-2-484686
•		Þ	Gi0/6	2	1	0	73	73	0	#CambiumAuto_If6	Disabled V	#CambiumAuto_If6
IP	_	þ	Gi0/7	4	3	0	30	30	0	#CambiumAuto_If7	Disabled V	#CambiumAuto_If7
	-	þ	Gi0/8	1	0	0	79	79	0		Disabled V	#CambiumAuto_If8
ISPF		0	Gi0/9	0	0	0	0	0	0		Disabled V	•
MON		0	Gi0/10	0	0	0	0	0	0		Disabled 🗸	·
olicy Based Automation							Apply		Refresh	Clear All		

cloud-c cloud-c cloud-c	:nMatrix# :nMatrix# :nMatrix# show auto	-attach policy
Policy	Name:	#CambiumAuto_If6
Policy	Precedence:	80
Policy	Status:	enabled
*****	******	*******
Policy	Name:	#CambiumAuto_If7
Policy	Precedence:	80
Policy	Status:	enabled
*****		******
Policy	Name:	#CambiumAuto_If8
Policy	Precedence:	80
Policy	Status:	enabled

To view the policy applied on the interface.

cloud-cnMa cloud-cnMa	atrix# atrix# atrix# show	v auto-atta	ch interfa	ce
	AA	Msg Auth		
Interface	Status	Status	Auth TLV	Active Policy
Gi0/1	enabled	enabled	enabled	
Gi0/2	enabled	enabled	enabled	
Gi0/3	enabled	enabled	enabled	
Gi0/4	enabled	enabled	enabled	
Gi0/5	enabled	enabled	enabled	
Gi0/6	enabled	enabled	enabled	#CambiumAuto_If6
Gi0/7	enabled	enabled	enabled	#CambiumAuto_If7
Gi0/8	enabled	enabled	enabled	#CambiumAuto_If8
Gi0/9	enabled	enabled	enabled	
Gi0/10	enabled	enabled	enabled	

To view the Auto Attach policy applied on the interface from cli.

cloud-cnMatrix# show au	to-attach policy detail
Policy Name:	#CambiumAuto If6
Policy Precedence:	80
Policy Status:	enabled
	01107200
Rule Name:	n/a
Rule Type:	SYSTEM-LLDP-PUSH
Rule Device ID Data:	<pre><cambium auto="" device="" generated="" policy="" pushed=""></cambium></pre>
Action Name:	n/a
Action PVID:	n/a
Action Port Mode:	hybrid
Action VLAN List:	800,900,1000
*****	*****
Policy Name:	#GambiumHuto_117
Policy Precedence:	80
Policy Status:	enabled
Bule Name:	n/a
Rule Tune:	SYSTEM-LLDP-PUSH
Rule Deuice ID Data	Cambium Device Auto Generated Pushed Policu
	toursian bevice nace denerated rashed for for gr
Action Name:	n/a
Action PVID:	n/a
Action Port Mode:	hybrid
Action VLAN List:	150,151,152,153,154,155,156,157,158,159,160
*****	*******
Policy Name:	#CambiumAuto If8
Policy Precedence:	80
Policy Status:	enabled
Rule Name:	n/a
Rule Type:	SYSTEM-LLDP-PUSH
Rule Device ID Data:	<cambium auto="" device="" generated="" policy="" pushed=""></cambium>
Action Name:	n/a
Action PVID:	n/a
Action Port Mode:	hybrid
Action VLAN List:	400,600,700

To view the status of TLV processed or Failed.

cloud-cnMatrix# show auto-attach interface statistics										
Interface	Policies Applied	Policies Expired	Policy Errors	TLUs Received	TLUs Processed	TLV Auth Failures				
Gi0/1	Ø	0	Ø	Ø	0	0				
Gi0/2	9	9	0	Ø	9	9				
Gi0/3	9	9	0	Ø	9	9				
Gi0/4	9	9	0	Ø	9	9				
Gi0/5	9	9	0	Ø	9	9				
Gi0/6	2	1	0	66	66	0				
Gi0/7	4	3	0	23	23	0				
Gi0/8	1	0	0	72	72	0				
Gi0/9	Ø	Ø	Ø	Ø	Ø	Ø				
Gi0/10	9	9	9	Ø	9	6				

To view the policy statics on the port.

cloud-cnMa	trix# show	auto-attach	policy	statist:	ics
Name: #Cam	biumAuto_I	6			
Applied: 1		Expired: 0		Errors:	0
Interface	Applied	Expired	Errors		
 Gi0/1	 И	 ด	 Ю		
Gi0/2	Ø	Ø	Ø		
Gi0/3	Ø	Ø	Ø		
Gi0/4	Ø	Ø	Ø		
Gi0/5	9	Ø	5		
Gi0/6	1	0	5		
Gi0/7	Ø	Ø	Ø		
Gi0/8	9	9	Ø		
Gi0/9	9	0	0		
Gi0/10	5	9	5		
					~~~~~
Name: #Cam	hiumAuto L	f7			
Applied: 1		Expired: 0		Errors:	0
Interface	Applied	Expired	Errors		
Gi0/1	0	Ø	Ø		
Gi0/2	0	Ø	Ø		
Gi0/3	9	9	Ø		
G10/4	9	9	ឲ		
Gi0/5	5	9	ឲ		
G10/6	9	9	ម		
Gi0/7	1	<b>N</b>	8		
G10/8	U O	9	8		
G10/9	0	9	5		
G10/10	5	2	5		
~~~~~~~~~~					~~~~~
Name: #Cam	biumAuto L	F 8			
Applied: 1		Expired: 0		Errors:	Ø
Interface	Applied	Expired	Errors		
Gi0/1	5	9	ទ		
G10/2	ទ	2	ទ		
G10/3	ទ	2	ទ		
G10/4	3	8	2		
G10/5	8	8	5		
G10/6	8	9	5		
G10/7	a -	8	9		
G10/8	1		5		
G10/7 C:0/10	8	8	9		
310/10	2	2	2		
cloud-coMa	trix#				
s rouu china	61 1A#				

To view the LLDP counters globally.

cloud-cnMatrix#	
cloud-cnmatrix#	
cloud-cnMatrix#	
cloud-cnMatrix# show lldp traffic	
Total Frames Out	: 127426
Total Tagged Frames Out	: 0
Total Entries Aged	: 0
Total Frames In	: 64030
Total Frames Received In Error	: 7291
Total Frames Discarded	: 65
Total TLVS Unrecognized	: 0
Total TLVs Discarded	: 7291
Total PDU length error Drops	: 0
Total LLDP-MED Frames Out	: 28830
Total LLDP-MED Frames In	: 7226
Total LLDP-MED Frames Discarded	: 0
Total LLDP-MED TLUs Discarded	: 0
Total Media Canability TLUs Discarded	: Ø
Total Network Policy TLUs Discarded	: 0
Total Inventory TLUs Discarded	: Ñ
Total Location TLUs Discarded	- 0
Total Fy-PowerWiaMDI TLUS Discarded	- 0
Med-Canability ILU Discard Reason	: Not Annlicable
Nu-Policu ILII Discand Reason	: Not Applicable
Inventory TIU Discard Reason	• Not Applicable
Location-ID TLU Discard Reason	• Not Applicable
Ex-Depending MDI TIU Discard Descor	• Not Applicable
Total Daujoa Sattinga Tilla Discardad	- Not appricante
Total Device Settings TLVS Discarded	- 00
TOTAL DEVICE SECTINGS ILVS HUCH FAILS	• 44

To change the Authentication key on cnMatrix and cnPIlot.

If the user wants to change the default shared authentication key, then can use the below cli on cnMatrix and cnPilot . Ensure it is same on both the devices, else the authentication of lldp packet will fail.

On cnPilot



cloud-cnMatrix(config-if)# auto-attach msg-auth-key ? (private-key(32)) Authentication key cloud-cnMatrix(config-if)# auto-attach msg-auth-key