INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2017-2020

SG15-LS80

STUDY GROUP 15

Original: English

Question(s):	14/15	London, UK, 4-8 December 2017

LS
(ref. TD144-WP3)

Source:	ITU-T Study Group 15
Title:	Liaison statement regarding coordination on IM/DM for OAM (reply to IEEE 802.3WG-LS54 (TD141/WP3))

LIAISON STATEMENT

For action to:	IEEE 802.1, IEEE 802.3
For comment to:	ONF, The MEF Forum
For information to:	
Approval:	Question 14/15 interim meeting (London, UK, 4-8 December 2017)
Deadline:	22 January 2018

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ITU-T Question Q14 is responsible for the management/control aspects of the transport network. One of the important aspects of this work, from a management/control perspective, is the protocol-neutral information modelling for transport network equipment.

To ensure the work of the Q14/15 and the YANG work related to IEEE 802.1 and IEEE 802.3 is aligned and to aid in the discussions to occur during the experts meeting on 27 January 2018, a UML version of .1Qcx has been created.

To account for the continuous evolution of interface data modelling technologies, the ITU-T uses UML to capture the semantics of the transport network equipment constructs. UML also provides a powerful yet simple way to analyse, document and review the complex relationships between the constructs in the model. Generation of the data model in the appropriate interface technology (YANG, JSON, etc.) from the UML model are supported by tooling.

While reviewing the UML representation of the experimental IEEE YANG models, an issue with indexing of the Maintenance Domain (MD) Class was identified. The list key that has been identified for MD (list md) is not capable of supporting ITU-T G.8013/Y.1731 use cases. Because of the terminology differences between IEEE 802.1 Connectivity Fault Management (CFM) and ITU-T G.8013/Y.1731, CFM needs to use MD to provide information about the MEG Level. The current SNMP MIB supporting CFM uses an index for the table key but the current experimental IEEE 802.1Qcx YANG uses md-name and md-name-type for the key. The ITU-T doesn't use MD so the md-name is configured to be null for CFM use-cases. To support ITU-T G.8013/Y.1731 requirements the ability to specify multiple MDs that have a null name is needed. There can be

many MDs that have a null name so having the md-name in the key is an issue. A pointer to the model diagrams and an Eclipse Papyrus readable model is provided below.

- Re-engineered ieee802-dot1ag-cfm YANG module: PapyrusOamOxygenWorkspace_171208.zip
- Re-engineered ieee802-dot1ag-cfm YANG module diagrams: PapyrusOamOxygenWorkspace_171208-diagrams.zip

In the response sent from the Tokyo Interim meeting "*Liaison response to IEEE 802.1 and MEF incoming liaisons on MEF 38.1 and 39.1*", ITU-T Q14/15 agrees that the responsibility for the development of YANG modules should be within the organization that has responsibility for the corresponding data plane protocol (per OpCodes listed in the table below).

OpCode value	OAM PDU type
IEEE 802.1	
1	CCM
3	LBM
2	LBR
5	LTM
4	LTR
6	RFM
7	SFM
0, 8-31, 96-255	Reserved
ITU-T SG15	
32	GNM
32 -1	BNM
33	AIS
35	LCK
37	TST
39	Linear APS
40	Ring APS
41	MCC
41-1	EDM
43	LMM
42	LMR
45	1DM
47	DMM
46	DMR
49	EXM
48	EXR
51	VSM
50	VSR
52	CSF
53	1SL
55	SLM
54	SLR

OpCode value	OAM PDU type
34, 36, 38, 44, 60-63	Reserved
MEF	
56	LLR – Latching Loopback
57	LLM – Latching Loopback
58	SAT – Control Protocol
59	SAT – Control Message
IETF	
64	TRILL - Path Trace Reply
65	TRILL - Path Trace Message
66	TRILL - Multi-destination Tree Verification Reply
67	TRILL - Multi-destination Tree Verification Message
68-95	Reserved

Detailed analysis is provided below to assist integrating IEEE CFM model for CCM and LBM/LBR for use by ITU-T. The table below uses information from ITU-T G.8051 and IEEE 802.1Q-2014.

		G.8051 Source	G.8051 Sink	Related IEEE MIBs
CCM	Enable	CC_Enable	CC_Enable	dot1agCfmMepCciEnabled
	DA	MI_MEL (01-80-C2-00-00-3x)	MI_MEL (01-80-C2-00-00-3x)	dot1agCfmMdMdLevel
	SA	MI_MEP_MAC	MI_MEP_MAC	dot1agCfmMepMacAddress
	MEL	MI_MEL	MI_MEL	dot1agCfmMdMdLevel
	DE	0	0	-
	P	MI_CC_Pri	MI_CC_Pri	dot1agCfmMepCcmLtmPriority
	Period	MI_CC_Period	MI_CC_Period	dot1agCfmMaNetCcmInterval
	SeqNumber	0	0	dot1agCfmMepCciSentCcms
	MEP ID	MI_MEP_ID	MI_PeerMEP_ID[i]	dot1agCfmMepIdentifier dot1agCfmMepDbRMepIdentifier
	MEG ID	MI_MEG_ID	MI_MEG_ID	dot1agCfmMaNetName
Proactive LM (Uses CCM OpCode)	Enable	MI_LMC_Enable	MI_LMC_Enable	-
	1sec		MI_1Second	-
	DEGM		MI_LM_DEGM	-
	M		MI_LM_M	-
	DEGTHR		MI_LM_DEGTHR	-
	TFMIN		MI_LM_TFMIN	-
Defects (Uses CCM OpCode)	DEG		✓cDEG	-
	LOC		✓cLOC[i]	dot1agCfmMepDbRMepState
	UNL		✓cUNL	xconCCMdefect
	MMG		✓cMMG	
	UNM		✓cUNM	-
	UNP		✓cUNP	errorCCMdefect
	UNPr		✓cUNPr	-
	RDI		✓cRDI	someRDIdefect
	svdCCM		MI_GetSvdCCM MI_SvdCCM	dot1agCfmMepErrorCcmLastFailure dot1agCfmMepXconCcmLastFailure

A point of discussion is how to integrate the ITU-T required extensions with the IEEE defined YANG model for CFM.

In the loopback related table below, there are two applications for the loopback OpCode: 1) Discovery and 2) two-way test that have differences between IEEE and ITU-T.

			Series (Common)	Discovery (G.8051)	2way Test (G.8051)	Related MIBs (IEEE)	802.1Q Considerations
Input	Parameters	MI signals	MI_LB_Series	MI_LB_Discover	MI_LB_Test		
		DA	✓DA	01-80-C2-00-00-3x	✓DA	dot1agCfmMepTransmitLbmDestMacAddress	**In the Discovery case add support for**
		SA	✓(MI_MEP_MAC)	✓(MI_MEP_MAC)	✓(MI_MEP_MAC)	dot1agCfmMepMacAddress	-
		MEL	✓(MI_MEL)	✓(MI_MEL)	✓(MI_MEL)	dot1agCfmMdMdLevel	-
		DE	✓DE	0	✓DE	dot1agCfmMepTransmitLbmVlanDropEnable	-
		P	✓P	✓P	✓P	dot1agCfmMepTransmitLbmVlanPriority	-
		# of frames	✓N	1	∞	dot1agCfmMepTransmitLbmMessages	-
		Pattern Length	✓Length (for Data TLV)	No TLV	✓Pattern ✓Length (for Test TLV)	dot1agCfmMepTransmitLbmDataTlv	**In the Discovery case, allow No TLV In the 2way Test case, need a Test TLV**
		Period	✓Period	-	✓Period	-	**Support period configuration**
		Transaction ID	(No MI)	(No MI)	(No MI)	dot1agCfmMepNextLbmTransId	ITU-T will ignore
		Terminate	-	-	✓(MI_LB_Test_Terminate)	-	**Need ability to terminate a test**
Output	Parameters	MI signals	MI_LB_Series_Result	MI_LB_Discover_Result	MI_LB_Test_Result		
		MACs: MACs that have responded with a valid LBR		✓		-	**In the Discovery case, Need a Responded MAC lists**
		Sent: total number of LBM frames sent			✓	dot1agCfmMepNextLbmTransId dot1agCfmMepTransmitLbmSeqNumber	**No specific counter available, need the total number of LBM frames sent**
		REC: total number of received LBR frames	✓		✓	dot1agCfmMepLbrIn dot1agCfmMepLbrInOutOfOrder	**No specific counter available, need the total number of received LBR frames**
		CRC: number of LBR frames where the CRC in the pattern failed			✓	-	**For 2way test case, need a Test TLV**
		BER: number of LBR frames where there was a bit error in the pattern			✓	-	**For 2way test case, need a Test TLV**
		OO: number of LBR frames that were received out of order	✓		✓	dot1agCfmMepLbrInOutOfOrder	-

The table below provides information about the LinkTrace OpCode.

			Linktrace	Related MIBs
Input	Parameters	MI signals	MI_LT	
		DA	01-80-C2-00-00-3y	dot1agCfmMdMdLevel
		SA	✓(MI_MEP_MAC)	dot1agCfmMepMacAddress
		MEL	✓(MI_MEL)	dot1agCfmMdMdLevel
		DE	0	-
		P	✓P	dot1agCfmMepCcmLtmPriority
		TTL	✓TTL	dot1agCfmMepTransmitLtmTtl
		Target MAC	✓TA	dot1agCfmMepTransmitLtmTargetMacAddress
		Flags	(No MI)	dot1agCfmMepTransmitLtmFlags
		Transaction ID	(No MI)	dot1agCfmMepLtmNextSeqNumber
		Egress Identifier TLV	(No MI)	dot1agCfmMepTransmitLtmEgressIdentifier
Output	Parameters	MI signals	MI_LT_Result	
		Results (SA)	✓	dot1agCfmLtrNextEgressIdentifier
		Results (TTL)	✓	dot1agCfmLtrTtl
		Results (TLV)	✓	MIBs for Various TLVs

Following is the upcoming meeting schedule:

- Joint IEEE 802 and ITU-T Study Group 15 workshop "Building Tomorrow's Networks" held in Geneva, 27 January 2018

- o This workshop intends to offer a platform for all involved stakeholders and aims to focus on topics such as optical interfaces, mobile fronthaul, 5G mobile transport, passive optical network (PON), management and YANG modelling.
  - o https://www.itu.int/md/T17-TSB-CIR-0054/en
- ITU-T Q14/15 Rapporteur Group Meeting held in Geneva, 28 January 2018
  - o Q14/15 interim meeting inviting experts from IEEE 802.1 and IEEE 802.3 YANG projects to discuss mechanisms to ensure alignment of the IEEE YANG work
  - o https://www.itu.int/net/itu-t/lists/rgmdetails.aspx?id=9088&Group=15
- Study Group 15 (Networks, Technologies and Infrastructures for Transport, Access and Home) Plenary held in Geneva, 29 January - 9 February 2018
  - o https://www.itu.int/md/T17-SG15-COL-0002/en

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