




1904.2 Management attributes

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- According to 1904.2 Gap analysis from August 3rd TF2 meeting:



1. Define all attributes in 1904.2
 1. Glen to provide proposed list of attributes
2. Add a statement that existing extOAM PDU or NetConf/SNMP can be used to read/write those attributes

Needs additional discussion.

https://www.ieee1904.org/2/meeting_archive/2020/07/tf2_2007_gap_analysis.pdf

What attributes are needed

- Traffic Statistics
- Anything else?

- IEEE 1904.1 SIEPON already provides a large number of attributes.

- IEEE 1904.2 only needs to provide attributes for statistic that is unavailable outside of VLC sublayer

IEEE 1904.1 Pck. A basic attributes

Leaf	Attribute	Defined in
Object group: ONU management		
0x00-02	aFramesTransmittedOK	14.4.2.1.1
0x00-03	aSingleCollisionFrames	14.4.2.1.2
0x00-04	aMultipleCollisionFrames	14.4.2.1.3
0x00-05	aFramesReceivedOK	14.4.2.1.4
0x00-06	aFrameCheckSequenceErrors	14.4.2.1.5
0x00-07	aAlignmentErrors	14.4.2.1.6
0x00-08	aOctetsTransmittedOK	14.4.2.1.7
0x00-09	aFramesWithDeferredXmissions	14.4.2.1.8
0x00-0A	aLateCollisions	14.4.2.1.9
0x00-0B	aFramesAbortedDueToXSColls	14.4.2.1.10
0x00-0C	aFramesLostDueToIntMACXmitError	14.4.2.1.11
0x00-0E	aOctetsReceivedOK	14.4.2.1.12
0x00-0F	aFramesLostDueToIntMACRcvError	14.4.2.1.13
0x00-12	aMulticastFramesXmittedOK	14.4.2.1.14
0x00-13	aBroadcastFramesXmittedOK	14.4.2.1.15
0x00-14	aFramesWithExcessiveDeferral	14.4.2.1.16
0x00-15	aMulticastFramesReceivedOK	14.4.2.1.17
0x00-16	aBroadcastFramesReceivedOK	14.4.2.1.18
0x00-17	aInRangeLengthErrors	14.4.2.1.19
0x00-18	aOutOfRangeLengthField	14.4.2.1.20
0x00-19	aFrameTooLongErrors	14.4.2.1.21
0x00-1A	aMACEnableStatus	14.4.2.1.22
0x00-1D	aReadWriteMACAddress	14.4.2.1.23
Object group: PHY management		
0x00-20	aPhyType	14.4.2.2.1
0x00-23	aSymbolErrorDuringCarrier	14.4.2.2.2
0x00-25	aPhyAdminState	14.4.2.2.3

Leaf	Attribute	Defined in
Object group: MAU management		
0x00-47	aMediaAvailable	14.4.2.3.1
Object group: MAC management		
0x00-5A	aDuplexStatus	14.4.2.4.1
Object group: MAC control management		
0x00-5D	aMACControlFunctionsSupported	14.4.2.5.1
0x00-5E	aMACControlFramesTransmitted	14.4.2.5.2
0x00-5F	aMACControlFramesReceived	14.4.2.5.3
0x00-60	aUnsupportedOpcodesReceived	14.4.2.5.4
0x00-62	aPAUSEMACCtrlFramesTransmitted	14.4.2.5.5
0x00-63	aPAUSEMACCtrlFramesReceived	14.4.2.5.6
Object group: OMP emulation management		
0x01-18	aMPCPMACCtrlFramesTransmitted	14.4.2.6.1
0x01-19	aMPCPMACCtrlFramesReceived	14.4.2.6.2
0x01-20	aMPCPDDiscoveryWindowsSent	14.4.2.6.3
0x01-22	aMPCPDDiscoveryTimeout	14.4.2.6.4
Object group: FEC management		
0x01-24	aFECCorrectedBlocks	14.4.2.7.1
0x01-25	aFECUncorrectableBlocks	14.4.2.7.2
0x01-39	aFECAbility	14.4.2.7.3
0x01-3A	aFECmode	14.4.2.7.4
Object group: OMP emulation management (cont.)		
0x01-3C	aMPCPTxRegAck	14.4.2.6.5
0x01-3E	aMPCPTxRegRequest	14.4.2.6.6
0x01-3F	aMPCPTxReport	14.4.2.6.7
0x01-40	aMPCPRxGate	14.4.2.6.8
0x01-42	aMPCPRxRegister	14.4.2.6.9

IEEE 1904.1 Pck. A ext attributes 1/2

Leaf	Attribute	Defined in
Object group: ONU management		
0x00-02	aOnuId	14.4.3.1.2
0x00-03	aOnuFwVersion	14.4.3.1.3
0x00-04	aOnuInfoChipset	14.4.3.1.4
0x00-05	aOnuInfoDateManufacture	14.4.3.1.5
0x00-06	aOnuInfoManufacturer	14.4.3.1.6
0x00-07	aOnuLlidCount	14.4.3.1.7
0x00-08	aOnuPonPortCount	14.4.3.1.8
0x00-09	aOnuUniPortCount	14.4.3.1.9
0x00-0A	aOnuInfoPacketBuffer	14.4.3.1.10
0x00-0B	aLlidReportThresholds	14.4.3.1.11
0x00-0C	aLlidForwardState	14.4.3.1.12
0x00-0D	aLlidOamFrameRate	14.4.3.1.13
0x00-0E	aOnuManOrgName	14.4.3.1.14
0x00-0F	aOnuCvcCvsValidity	14.4.3.1.15
0x00-10	aOnuUniPortType	14.4.3.1.16
0x00-11	aVendorName	14.4.3.1.17
0x00-12	aModelNumber	14.4.3.1.18
0x00-13	aHardwareVersion	14.4.3.1.19
0x00-14	aLineRateMode	14.4.3.1.20
0x01-0E	aOnuFwFileName	14.4.3.1.21
Object group: Bridging		
0x01-01	aOnuDynMacTableSize	14.4.3.2.1
0x01-02	aOnuDynMacAgeLimit	14.4.3.2.2
0x01-03	aUniDynMacTable	14.4.3.2.3
0x01-04	aUniStatMacTable	14.4.3.2.4
0x01-05	aUniPortAutoNeg	14.4.3.2.5

Leaf	Attribute	Defined in
0x01-06	aUniAdmissionControl	14.4.3.2.6
0x01-07	aUniMinLearnMacCount	14.4.3.2.7
0x01-08	aUniMaxLearnMacCount	14.4.3.2.8
0x01-09	aOnuMaxLearnMacCount	14.4.3.2.9
0x01-0A	aUniLengthDiscard	14.4.3.2.10
0x01-0B	aUniFloodUnknown	14.4.3.2.11
0x01-0C	aUniLocalSwitching	14.4.3.2.12
0x01-0F	aUniMacTableFull	14.4.3.2.13
0x01-10	aOnuMulticastLlid	14.4.3.2.14
0x01-12	aOnuMaxFrameSizeCapability	14.4.3.2.15
0x01-13	aUniMaxFrameSizeLimit	14.4.3.2.16
0x01-14	aOnuPortConfig	14.4.3.2.17
0x01-15	aQueueConfig	14.4.3.2.18
Object group: Statistics and counters		
0x02-01	aCountRxFramesGreen	14.4.3.3.1
0x02-02	aCountTxFramesGreen	14.4.3.3.2
0x02-03	aCountRxFrames2Short	14.4.3.3.3
0x02-04	aCountRxFrames64	14.4.3.3.4
0x02-05	aCountRxFrames65to127	14.4.3.3.5
0x02-06	aCountRxFrames128to255	14.4.3.3.6
0x02-07	aCountRxFrames256to511	14.4.3.3.7
0x02-08	aCountRxFrames512to1023	14.4.3.3.8
0x02-09	aCountRxFrames1024to1518	14.4.3.3.9
0x02-0A	aCountRxFrames1519	14.4.3.3.10
0x02-0B	aCountTxFrames64	14.4.3.3.11
0x02-0C	aCountTxFrames65to127	14.4.3.3.12
0x02-0D	aCountTxFrames128to255	14.4.3.3.13
0x02-0E	aCountTxFrames256to511	14.4.3.3.14

IEEE 1904.1 Pck. A ext attributes 2/2

Leaf	Attribute	Defined in
0x02-0F	aCountTxFrames512to1023	14.4.3.3.15
0x02-10	aCountTxFrames1024to1518	14.4.3.3.16
0x02-11	aCountTxFrames1519	14.4.3.3.17
0x02-12	aQueueDelayThr	14.4.3.3.18
0x02-13	aQueueDelayValue	14.4.3.3.19
0x02-14	aCountFramesDropped	14.4.3.3.20
0x02-15	aCountOctetsDropped	14.4.3.3.21
0x02-16	aCountOctetsDelayed	14.4.3.3.22
0x02-17	aCountUsOctetsUnused	14.4.3.3.23
0x02-1D	aPonOptMonitTemp	14.4.3.3.24
0x02-1E	aPonOptMonitVcc	14.4.3.3.25
0x02-1F	aPonOptMonitBias	14.4.3.3.26
0x02-20	aPonOptMonitTxPower	14.4.3.3.27
0x02-21	aPonOptMonitRxPower	14.4.3.3.28
0x02-22	aCounterRxFramesY	14.4.3.3.29
0x02-23	aCounterTxFramesY	14.4.3.3.30
0x02-24	aCounterTxOctetsG	14.4.3.3.31
0x02-25	aCounterRxOctetsY	14.4.3.3.32
0x02-26	aCounterRxOctetsG	14.4.3.3.33
0x02-27	aCounterTxOctetsY	14.4.3.3.34
0x02-28	aCounterTxFramesL2Unicast	14.4.3.3.35
0x02-29	aCounterTxFramesL2Multicast	14.4.3.3.36
0x02-2A	aCounterTxFramesL2Broadcast	14.4.3.3.37
0x02-2B	aCounterRxFramesL2Unicast	14.4.3.3.38
0x02-2C	aCounterRxFramesL2Multicast	14.4.3.3.39
0x02-2D	aCounterRxFramesL2Broadcast	14.4.3.3.40
0x02-2E	aOnuCounterNumber	14.4.3.3.41
0x02-2F	aCounterRxFramesL2CP	14.4.3.3.42

Leaf	Attribute	Defined in
0x02-30	aCounterRxOctetsL2CP	14.4.3.3.43
0x02-31	aCounterTxFramesL2CP	14.4.3.3.44
0x02-32	aCounterTxOctetsL2CP	14.4.3.3.45
0x02-33	aCounterDiscardFramesL2CP	14.4.3.3.46
0x02-34	aCounterDiscardOctetsL2CP	14.4.3.3.47
0x02-35	aCounterL2TxErrors	14.4.3.3.48
0x02-36	aCounterL2RxErrors	14.4.3.3.49
0x02-37	aCountFramesOverLimitDroppedUni	14.4.3.3.50
0x02-38	aCountOctetsOverLimitDroppedUni	14.4.3.3.51
Object group: Alarms		
0x03-01	aAlarmPortStatThr	14.4.3.4.1
0x03-02	aAlarmLlidStatThr	14.4.3.4.2
0x03-03	aAlarmStatusControl	14.4.3.4.3
Object group: Encryption		
0x04-01	aEncryptionKeyExpiration	14.4.3.5.1
0x04-02	aEncryptionMode	14.4.3.5.2
Object group: Frame processing		
0x05-01	aRuleSetConfig	14.4.3.6.1
0x05-02	aRuleCustomField	14.4.3.6.2
0x05-03	aRuleTpidCAAlter	14.4.3.6.3
0x05-04	aRuleTpidSAlter	14.4.3.6.4
0x05-06	aRuleTpidIAAlter	14.4.3.6.6
0x05-07	aRuleTpidBAlter	14.4.3.6.7
Object group: Service-level agreements		
0x06-01	aRateLimitBroadcast	14.4.3.7.1
0x06-04	aQueueCIR	14.4.3.7.2
0x06-05	aFecMode	14.4.3.7.3
...

What attributes are needed

1. Ideal and most detailed statistic would be to count matched frames/bytes per CTE rule + frames/bytes not matched by any rule
 - Technical difficulties
 - How to identify a rule?
 - How to carry rule ID in the Get_Request OAMPDU (which by definition only takes Variable Descriptors)?
2. A much less useful method is to count VLCPDUs by subtype
 - Rx / Tx (2x)
 - Frames / Bytes (2x)
 - Subtypes (7x)
 - Total = $2 \times 2 \times 7 = 28$ attributes
 - This kind of statistics won't distinguish tunnels that have the same subtypes but different DA or SA.
 - Every new Subtype would require an addition of 4 new attributes
 - Depending on where in the VLC sublayer we count, the values would be different because some VLCPDUs are converted into xPDUs and vice versa.

- ❑ Add 15-bit RuleID to rule structure
 - RuleID is assigned by device that receives a new rule and is reported to VLC Manager in a Response VLCPDU
 - RuleIDs are unique per port
 - RuleIDs are permanent for the lifetime of a rule

- ❑ Define VLC statistic attributes similar to how Programmable Counters are defined in 1904.1:
 - Branch = 0xA8
 - There are many unused branch values to choose from
 - Only 14 out of 255 are used:
0x03, 0x04, 0x07, 0x09, 0x37, 0xC7, 0xC9, 0xB6, 0xB7, 0xB9, 0xD6, 0xD7, 0xD8, and 0xD9
 - Leaf =
 - Bits 14:0 = RuleID (0x00-00 means “Not matched by any rule”)
 - Bit 15 = 0:Counter of Frames; 1:Counter of Bytes

Table 14-345—Programmable counters defined in branch 0xD8

Leaf	Attribute	Defined in
Object group: ONU management		
0x00-00	aCounterGeneral0	14.4.6.1
...	...	
0x7F-FF	aCounterGeneral32767	

Table to be added to Subclause 8.2

Table 8-5 – VLC counter attributes defined in branch 0xA8

Leaf	Attribute	Defined in
0x00-00	aVlcCounterFramesUnmatched	8.2.x.1
0x00-01	aVlcCounterFramesMatchedByRule1	8.2.x.2
...	...	
0x7F-FF	aVlcCounterFramesMatchedByRule32767	
0x10-00	aVlcCounterBytesUnmatched	8.2.x.3
0x10-01	aVlcCounterBytesMatchedByRule1	8.2.x.4
...	...	
0xFF-FF	aVlcCounterBytesMatchedByRule32767	

8.2.x.2 Attribute *aVlcCounterMatchedByRuleN* (0xA8/0x00-01 to 0xA8/0x7F-FF)

This attribute represents the current number of frames matched by a rule with *RuleID* equal to *N*, in a port identified by the Object Context TLV.

Attribute *aVlcCounterMatchedByRuleN*:

Syntax: Counter, Resettable, Wrap-around

Range: 0x00 to 0xFF-FF-FF-FF-FF-FF-FF-FF

Remote access: Read/Write

Description: This attribute indicates current number of frames matched by the rule with the RuleID = *N* at the port identified by the Object Context TLV. On write of any value to this attribute, the counter shall reset to the value of 0x00.

The *aVlcCounterMatchedByRuleN* attribute is associated with a port. In a EPON ONU or OLT, this can be a UNI/NNI port, or an LLID. The Variable Container TLV for the *aVlcCounterMatchedByRuleN* attribute shall be as specified in Table 8-x.

Table 8-x – VLC counter of frames matched by rule N TLV (0xA8/0x00-01 to 0xA8/0x7F-FF)

Size (octets)	Field (name)	Value	Notes
1	Branch	0xA8	VLC attribute branch identified
2	Leaf	<i>N</i>	Leaf identifier. <i>aVlcCounterMatchedByRule0</i> through <i>aVlcCounterMatchedByRule32767</i> are represented by Leaf values ranging from 0x00-00 through 0x7F-FF.
1	Length	8	The size of TLV fields following the <i>Length</i> field
8	VlcCounterMatchedByRuleN	Varies	Value of <i>aVlcCounterMatchedByRuleN</i> attribute



Thank You