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G.874
Amendment 2
(10/2012)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

Digital networks – Optical transport networks

Management aspects of optical transport network elements
Amendment 2

Recommendation ITU-T G.874 (2010) – Amendment 2

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Recommendation ITU-T G.874

Management aspects of optical transport network elements

Amendment 2

Summary

Amendment 2 to Recommendation ITU-T G.874 contains management enhancement for the optical transport network (OTN) network element (NE) having optical channels that support optical system standard applications (defined in ITU-T Recommendations, e.g., ITU-T G.695, ITU-T G.698.2 and ITU-T G.959.1) and/or proprietary applications.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.874	2001-11-29	15
2.0	ITU-T G.874	2008-03-29	15
3.0	ITU-T G.874	2010-07-29	15
3.1	ITU-T G.874 (2010) Cor. 1	2011-06-06	15
3.2	ITU-T G.874 (2010) Amd. 1	2012-04-06	15
3.3	ITU-T G.874 (2010) Amd. 2	2012-10-29	15

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Amendment 2

1) Scope

This amendment contains management enhancement for the OTN NE having optical channels that support optical system standard applications (defined in ITU-T Recommendations, e.g., [ITU-T G.695], [ITU-T G.698.2] and [ITU-T G.959.1]) and/or proprietary applications.

2) References

None.

3) Updates to Recommendation ITU-T G.874

3.1) Updates to clause 2, "References"

Add the following new references in clause 2 of ITU-T G.874:

[ITU-T G.695]   Recommendation ITU-T G.695 (2010), *Optical interfaces for coarse wavelength division multiplexing applications.*

[ITU-T G.698.2]   Recommendation ITU-T G.698.2 (2009), *Amplified multichannel dense wavelength division multiplexing applications with single channel optical interfaces.*

[ITU-T G.959.1]   Recommendation ITU-T G.959.1 (2012), *Optical transport networks physical layer interfaces.*

3.2) Updates to clause 4, "Abbreviations and acronyms"

Add the following new abbreviations in clause 4 of ITU-T G.874:

CWDM   Coarse Wavelength Division Multiplexing

DWDM   Dense Wavelength Division Multiplexing

MPI   Main Path Interface

PM   Performance Management

WDM   Wavelength Division Multiplexing

3.3) Updates to clause 8, "Configuration management"

Add the following new clause in ITU-T G.874 clause 8 "Configuration management":

8.15   Application identifier management

This clause specifies management requirements for the OTN NE having optical channels that support optical system standard applications (defined in ITU-T Recommendations, e.g., [ITU-T G.695], [ITU-T G.698.2] and [ITU-T G.959.1]) and proprietary applications.

[ITU-T G.695], [ITU-T G.698.2] and [ITU-T G.959.1] provide optical parameter values of physical layer interfaces for the CWDM system, DWDM system and non-WDM system, respectively. The

applications specified in these Recommendations are defined using optical interface parameters at the S (or MPI-S) reference point, at the R (or MPI-R) reference point, as well as for the optical link between the reference points.

The specifications of the optical interface parameters in the above ITU-T Recommendations are organized according to sets of application codes. Revised Recommendation [ITU-T G.872] has generalized the application code to application identifier so that proprietary (i.e., non-standard) applications can be handled.

For the OTN NE having optical channels that support standards and/or proprietary applications, there is a need to provision/report on the supported set of application identifiers and to select a specific one from the set to ensure application identifier compatibility among the transmitter, the receiver and the link.

Note that an application identifier does not specify the actual nominal central frequency or actual nominal central wavelength, though it does specify the range of the nominal central frequency/wavelength. In the cases of DWDM and CWDM, in addition to the application identifier, the nominal central frequency or nominal central wavelength needs to be specified as well.

[ITU-T G.872] has introduced some new terms to better describe the media aspects of optical networking. In particular, the media path that interconnects an OCh source with an OCh sink is called a network media channel. A black link is an instance of a network media channel.

For the OCh trail termination in an OTN-compliant NE supporting standard and/or proprietary application identifiers, the OTN NE EMF shall support the following management functions:

– Provisioning the supportable application identifiers for the OCh trail termination.

– Retrieving the supportable application identifiers from the OCh trail termination.

– Notifying the changes of the supportable application identifiers of the OCh trail termination.

– Selecting the application identifier to be used for the OCh trail termination.

– Retrieving the selected application identifier from the OCh trail termination.

– Notifying the changes of the selected application identifier of the OCh trail termination.

– If the selected application identifier defines a tributary to a DWDM system, provisioning the nominal central frequency of the OCh_TT.

– If the selected application identifier defines a tributary to a DWDM system, retrieving the nominal central frequency of the OCh_TT.

– If the selected application identifier defines a tributary to a DWDM system, notifying the changes in the nominal central frequency of the OCh_TT.

– If the selected application identifier defines a tributary to a CWDM system, provisioning the nominal central wavelength of the OCh_TT.

– If the selected application identifier defines a tributary to a CWDM system, retrieving the nominal central wavelength of the OCh_TT.

– If the selected application identifier defines a tributary to a CWDM system, notifying the changes in the nominal central wavelength of the OCh_TT.

Valid ITU-T standard application identifiers are specified in ITU-T Recommendations, e.g., [ITU-T G.695], [ITU-T G.698.2] and [ITU-T G.959.1]. In the management interface, when an ITU-T standard application code is referred to, the values and value ranges of the optical parameters as specified in the corresponding ITU-T Recommendation for that application code are assumed.

Note that an operable OCh trail is formed from an OCh_TT source, a network media channel and an OCh_TT sink, all of which share a common application identifier.

3.4)   Update clause 10.2, "Performance management functions"

Update ITU-T G.874 clause 10.2 "Performance management functions" as shown below:

10.2   Performance management functions

See [ITU-T G.7710] for generic requirements of performance management functions.

OTN NE provides the following performance management (PM) information.

<p align="center">Table 10-1 – PM management information</p>

PM management information	OTN function	<u>PM current data and history data collected in EMF</u>
OTSn_TT_Sk_MI_pN_DS-P OTSn_TT_Sk_MI_pN_DS-O OTSn_TT_Sk_MI_pF_DS-P OTSn_TT_Sk_MI_pF_DS-O	OTSn_TT_Sk	<u>OTSn_TTP_Sk:</u> <u>nES, nSES, fES, fSES,</u> <u>{UAS|nUAS, fUAS}(Note 3)</u>
OMSn_TT_Sk_MI_pN_DS-P OMSn_TT_Sk_MI_pN_DS-O OMSn_TT_Sk_MI_pF_DS-P OMSn_TT_Sk_MI_pF_DS-O	OMSn_TT_Sk	<u>OMSn_TTP_Sk:</u> <u>nES, nSES, fES, fSES,</u> <u>{UAS|nUAS, fUAS}</u>
OPSn_TT_Sk_MI_pN_DS-P	OPSn_TT_Sk	<u>OPSn_TTP_Sk:</u> <u>nES, nSES, nUAS</u>
OPSM/OTUk-a_A_Sk_MI_pFECcorrErr	OPSM/OTUk-a_A_Sk	<u>OTUk_CTP_Sk:</u> <u>CD/HD: #FECcorrErr</u> <u>where #FECcorrErr = count of FEC-corrected Errors</u>
OCh/OTUk-a_A_Sk_MI_pFECcorrErr	OCh/OTUk-a_A_Sk	
OCh/OTUk-v_A_Sk_MI_pFECcorrErr	OCh/OTUk-v_A_Sk	
OCh/OTUkV_A_Sk_MI_pFECcorrErr (Note 1)	OCh/OTUkV_A_Sk	
OTUk_TT_Sk_MI_pN_EBC OTUk_TT_Sk_MI_pN_DS OTUk_TT_Sk_MI_pF_EBC OTUk_TT_Sk_MI_pF_DS OTUk_TT_Sk_MI_pBIAE OTUk_TT_Sk_MI_pIAE	OTUk_TT_Sk	<u>OTUk_TTP_Sk:</u> <u>nES, nSES, fES, fSES,</u> <u>{UAS|nUAS, fUAS},</u> <u>nBBE, fBBE,</u> <u>#BIAE, #IAE</u> <u>where</u> <u>#BIAE = count of BIAE,</u> <u>#IAE = count of IAE</u>
OTUkV_TT_Sk_MI_pN_EBC OTUkV_TT_Sk_MI_pN_DS OTUkV_TT_Sk_MI_pF_EBC OTUkV_TT_Sk_MI_pF_DS OTUkV_TT_Sk_MI_pBIAE (Note 2) OTUkV_TT_Sk_MI_pIAE (Note 2)	OTUkV_TT_Sk	

Table 10-1 – PM management information

PM management information	OTN function	PM current data and history data collected in EMF
ODUkP_TT_Sk_MI_pN_EBC ODUkP_TT_Sk_MI_pN_DS ODUkP_TT_Sk_MI_pF_EBC ODUkP_TT_Sk_MI_pF_DS ODUkP_TT_Sk_MI_pN_delay	ODUkP_TT_Sk	ODUkP_TTP_Sk: nES, nSES, fES, fSES, {UAS|nUAS, fUAS}, nBBE, fBBE, nDelay where nDelay is sum of pN_Delay. See clause 14.2.1 of [ITU-T G.798] for pN_Delay
ODUkP/CBRx_A_So_MI_ pN_PCS_BIP	ODUkP/CBRx_A_So	CBRx or generic client layer CTP_So: Sum of pN_PCS_BIP
ODUkP/CBRx_A_Sk_MI_ pN_PCS_BIP	ODUkP/CBRx_A_Sk	CBRx or generic client layer CTP_Sk: Sum of pN_PCS_BIP
ODUkP/PRBS_A_Sk_MI_pN_TSE	ODUkP/PRBS_A_Sk	PRBS or generic client layer CTP_Sk: Sum of pN_TSE
ODUkP/ETH_A_Sk_MI_pFCSErrors	ODUkP/ETH_A_Sk	ETH or generic client layer CTP_Sk: Sum of pFCSErrors
ODUkT_TT_Sk_MI_pN_EBC ODUkT_TT_Sk_MI_pN_DS ODUkT_TT_Sk_MI_pF_EBC ODUkT_TT_Sk_MI_pF_DS ODUkT_TT_Sk_MI_pN_delay ODUkT_TT_Sk_MI_pBIAE ODUkT_TT_Sk_MI_pIAE	ODUkT_TT_Sk	ODUkT_TTP_Sk: nES, nSES, fES, fSES, {UAS|nUAS, fUAS}, nBBE, fBBE, nDelay, #BIAE, #IAE where nDelay is sum of pN_Delay, #BIAE = count of BIAE, #IAE = count of IAE
ODUkTm_TT_Sk_MI_pN_EBC ODUkTm_TT_Sk_MI_pN_DS ODUkTm_TT_Sk_MI_pF_EBC ODUkTm_TT_Sk_MI_pF_DS ODUkTm_TT_Sk_MI_pBIAE ODUkTm_TT_Sk_MI_pIAE	ODUkTm_TT_Sk	ODUkTm_TTP_Sk: nES, nSES, fES, fSES, {UAS|nUAS, fUAS}, nBBE, fBBE, #BIAE, #IAE where #BIAE = count of BIAE, #IAE = count of IAE
ODUkP-X-L/PRBS_A_Sk_MI_pN_TSE	ODUkP-X-L/PRBS_A_Sk	PRBS or generic client layer CTP_Sk: Sum of pN_TSE
OSx_TT_Sk_MI_pN_DS	OSx_TT_Sk	OSx_TTP_Sk: nES, nSES, nUAS
NOTE 1 – If the function performs FEC. NOTE 2 – In case of frame-synchronous mapping of ODUk client signal. NOTE 3 – {UAS|nUAS, fUAS} means bidirectional UAS or unidirectional "nUAS and fUAS".		

The EMF shall support the following functions:

– collecting OTN layer-specific current PM data as specified in Table 10-1 above;

– collecting OTN layer-specific history PM data as specified in Table 10-1 above;

– resetting of the OTN layer-specific current PM data registers;

– reporting OTN layer-specific current PM data at the maturity of the monitoring time interval;

– on-demand retrieval of the collected OTN layer-specific PM data;

– setting of the threshold of the monitored OTN layer-specific PM data collection;

– reporting of threshold crossing for the collected OTN layer-specific current PM data;

– notifying on the change of the threshold of the monitored OTN layer-specific PM data collection.

– notifying of the PM management information.

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