X.msr-rpr in TD 2132 Rev.4 from ITU-T Question.7, Presentation to IEEE 802.17 Interim meeting (Atlanta, Jan. 13-17, 2003)

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Market Summary

- Long Haul: Less demand at this moment
- Access: Ethernet, DSL, WLAN….
- Metro: New opportunity and Open!
  - Data, TDM and Video converge
  - Way of Multi-Service over RPR
  - Standard Required

Requirements (1)

(1)Circuit emulation, connected to T1/E1 of PBX and Node B, Ethernet, FR,ISDN

(2)Tributary based protection with 1+1, 1:1, 1:N mode within 50ms

(3)Automatic Topology Discovery (RPR does)

(4)Combination of data, TDM(E1/T1) and video

(5)Topology: two-fiber ring, Link with ADM, Broadcast Networks

Requirements (2)

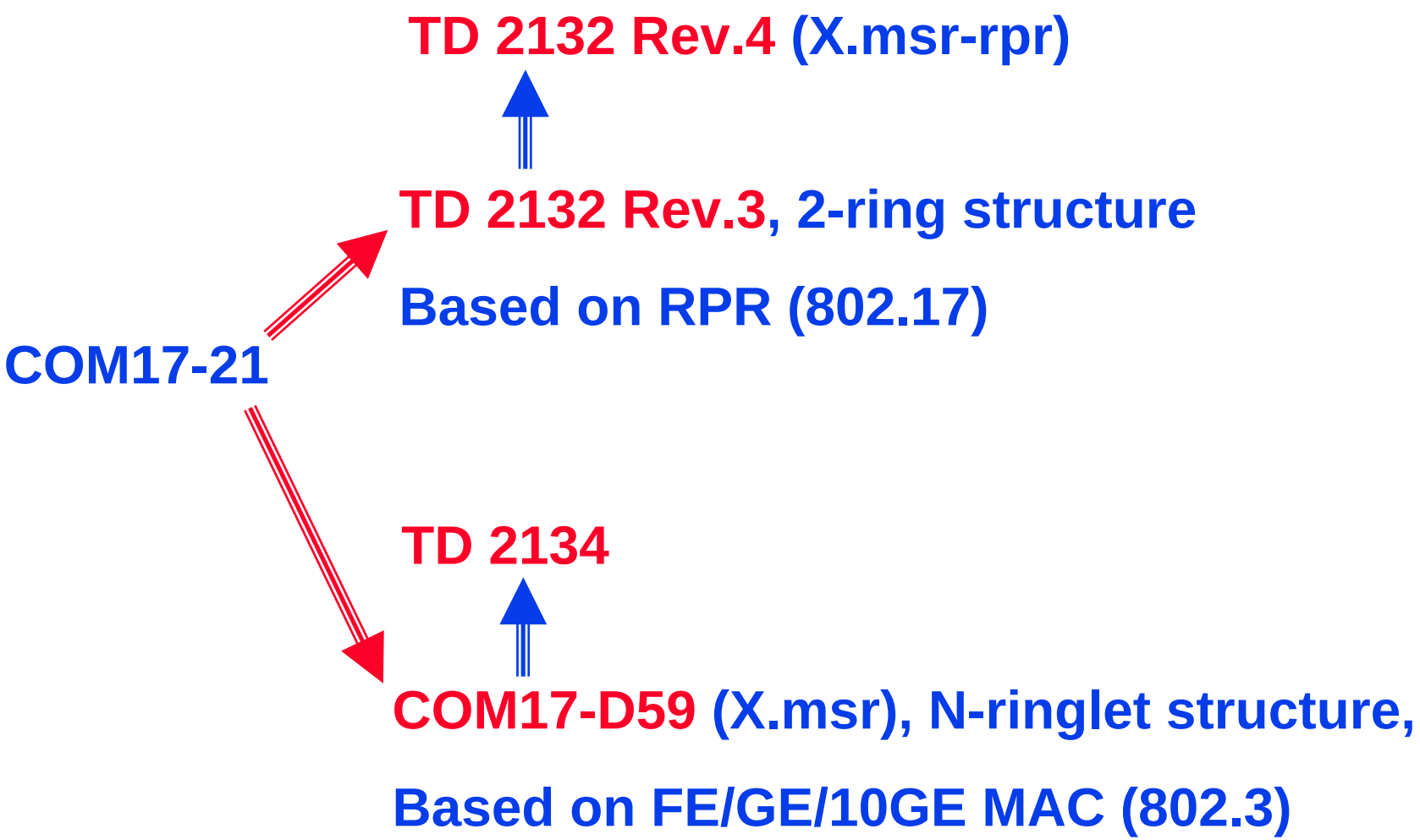
(6)BW limitation of Tributary based

(7)Tributary merging

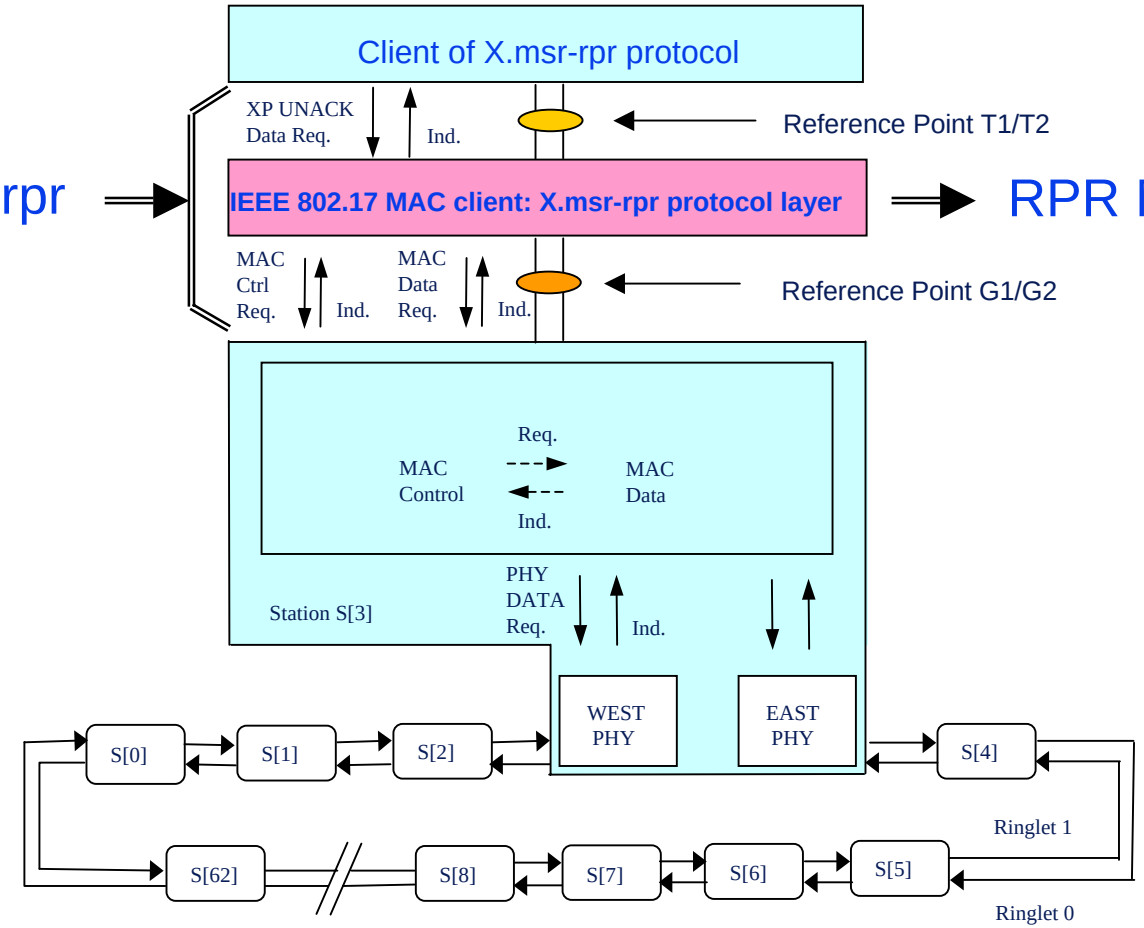
(8)Line-speed filtering of Tributary based

(9)Duplicate of Tributary

(10)Multi-point and multi-location accessing, centralized accounting


TD 2132 Rev.4 (X.msr-rpr)
TD 2132 Rev.3, 2-ring structure
Based on RPR (802.17)
COM17-21
TD 2134
COM17-D59 (X.msr), N-ringlet structure,
Based on FE/GE/10GE MAC (802.3)

Scope of X.msr-rpr



RPR MAC Client

The Scope of X.msr-rpr based on RPR as RPR MAC Client

X.msr-rpr highlights (1)

(1) Way of Pre-plan and Provisioning

(2) Fairness A0 provisioned traffic (and subsequently no fairness)

(3) Tributary (Service) based 1+1, 1:1 and 1:N protection within 50 ms

(4) Tributary (Service) based BW management with symmetry and asymmetry

(5) Tributary based multicast

(6) Line-speed filtering based on tributary

X.msr-rpr highlights (2)

(7) Tx and Rx of Data done by RPR, Topology Discovery done by RPR

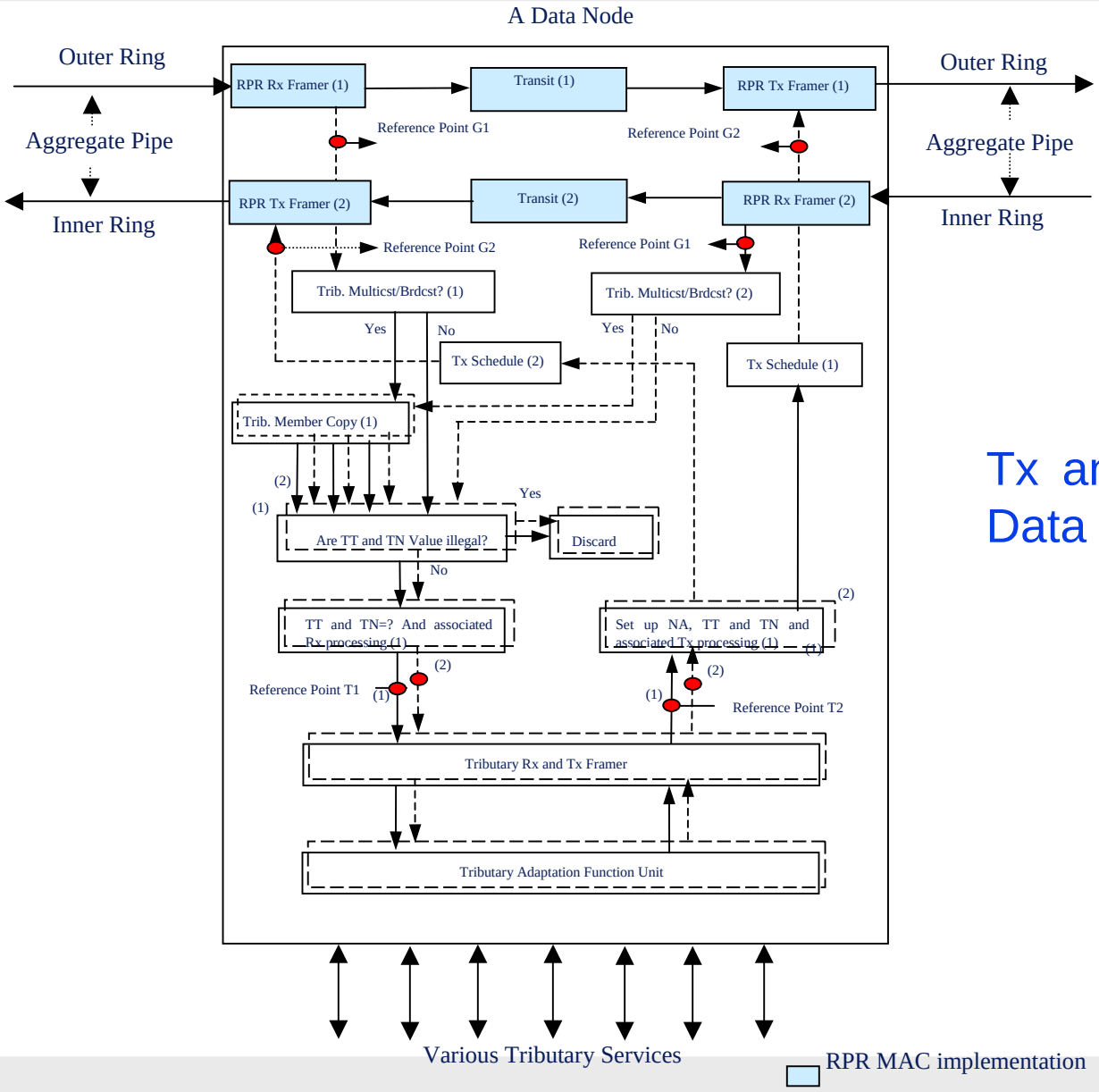
(8) Local Node address

(9) FSN for Performance Monitoring

(10) Tributary Type and Tributary Number

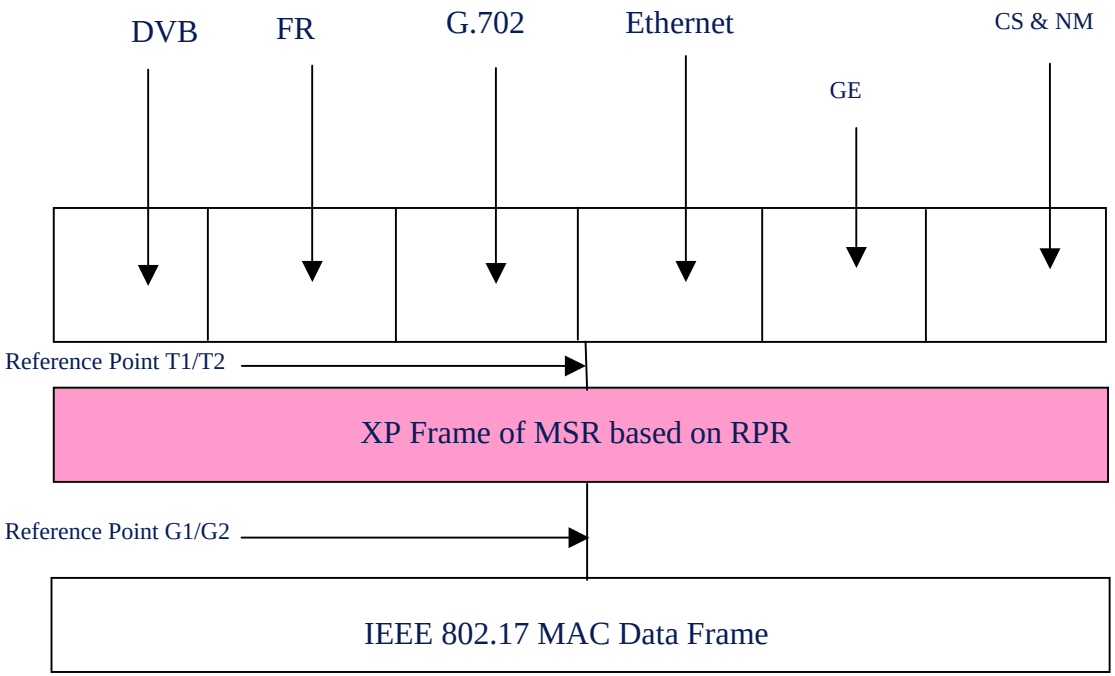
(11) Interface to RPR MAC, Interface to Client of X.msr-rpr protocol by reference points

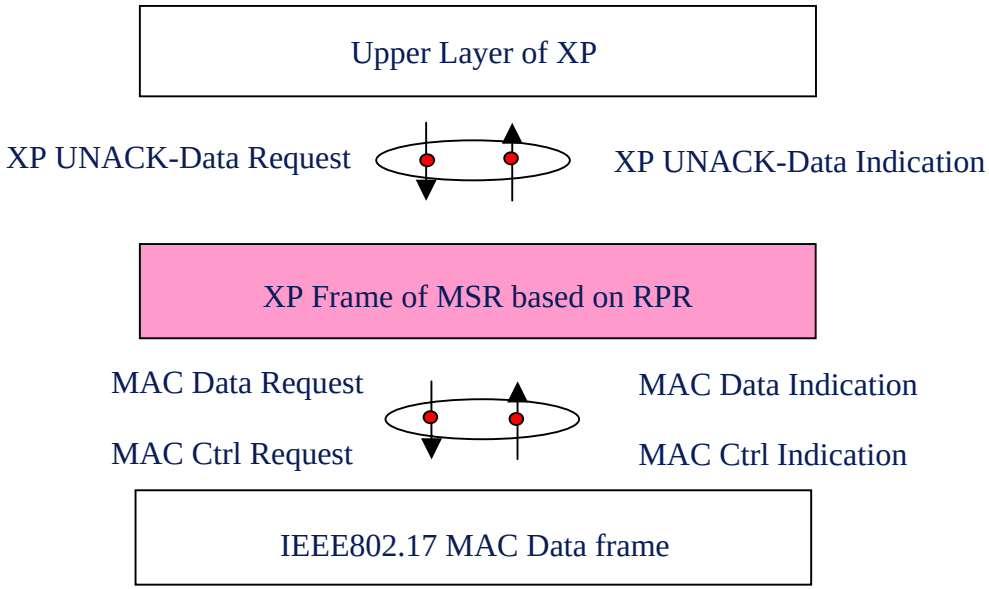
(12) Link and Broadcast Topology



Tx and Rx diagram of a Data Node

ITU-T SG17, Question 7--- IP related lower layer protocols and service mechanisms



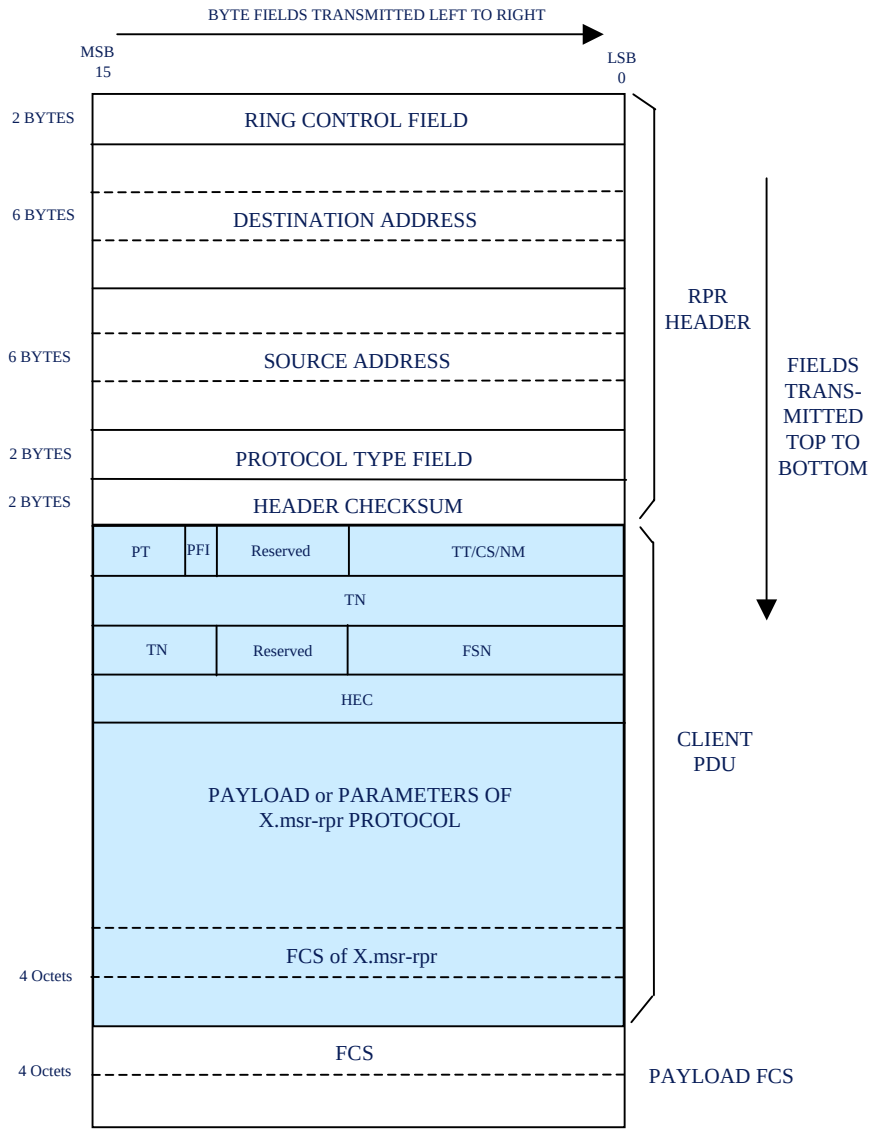


Interface to RPR MAC, Interface to Client of X.msr-rpr protocol by reference points

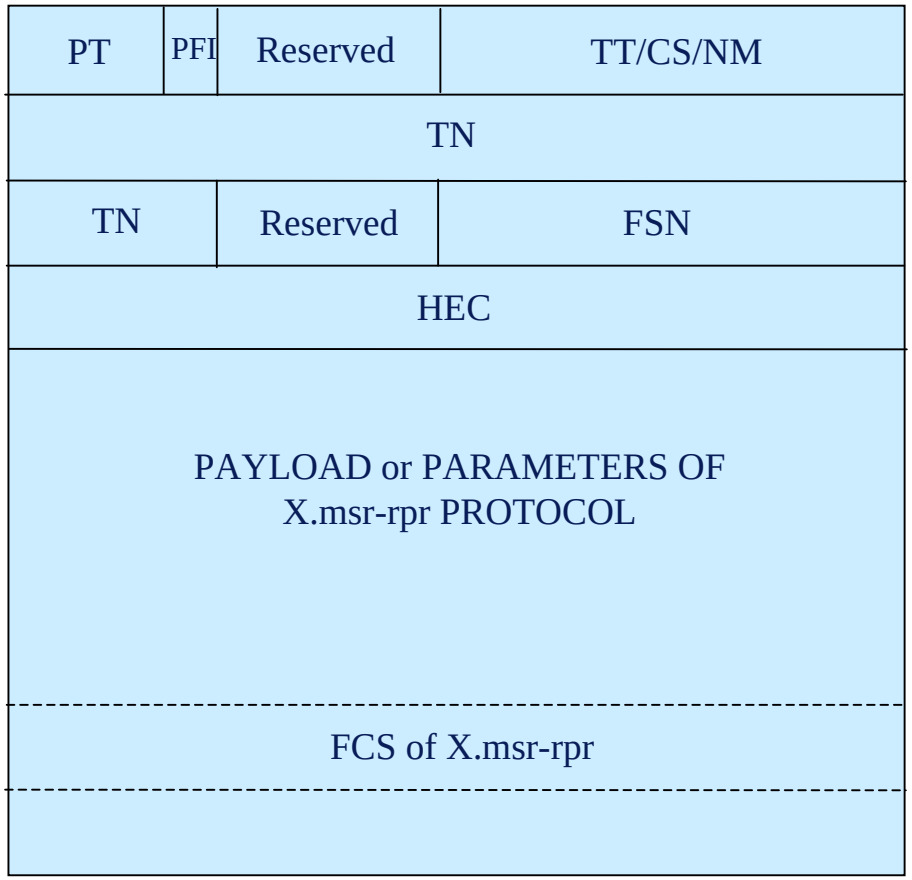
RPR Header

X.msr-rpr protocol

RPR FCS



Frame Format



PT:Payload Type

PFI:Payload FCS Indicator

Reserved Field:

TT/CS/NM:Tributary type, Control signalling,Network management

TN:Tributary number

Reserved Field:

FSN:Frame sequence number

HEC:Header CRC

Tributary Based Protection (TBP)

- T_etbp (timer) & N_etbp (retransmission counter)
- Event before action: No MAC frame is received or fault report from MAC by MA_Data Indication or MA_Control Indication occurs with one or more opcodes
- Periodic Error-Hello to the corresponding protected Tributary
- Recovered if the periodic Error-Hello is stopped

Tributary Based Multicast (TBM)

- **At ringlet level**: get data frame from aggregate pipe, send to a Source Tributary (ST)
- **Within a node**: duplicate data frame from ST to all member within a membership within a node

Performance Monitoring of Tributary

- Frame Sequence Number (FSN)
- Modulo N_fsn=64, from 0 to 63 for example
- Check the received number at the receive side
- If packet loss or FCS error, reflect results to OAM
- Way of every 15-minute and 24-hour

Supported Topologies

- Two-fibre ring
- Link
- Link with add and drop
- Broadcast network
- Other

Interface to RPR MAC (1/4)

MA_DATA.request {

destinationAddress,

sourceAddress [optional],

mSDU,

serviceClass,

ringletID [optional],

macProtection [optional],

markFE [optional] **}**

Interface to RPR MAC (2/4)

MA_DATA.indication {

destinationAddress,

sourceAddress [optional],

mSDU,

receptionStatus,

ringletID,

serviceClass,

fairnessEligible **}**

Interface to RPR MAC (3/4)

MA_control.request {

opcode,

request_operand_list }

Table 5.2—Control request opcodes

Opcode name	Meaning	Operands	Specified in
OamEcho Req	Request to transmit echo request frame	echo request parameters	12.3.1
OamFlushReq	Request to transmit flush frame	flush parameters	12.3.2
all others	TBD	—	—

Interface to RPR MAC (4/4)

MA_control.indication {

opcode,

indication_operand_list }

Table 5.3—Control indication opcodes

Opcode name	Meaning	Operands	Specified in
OamEchoInd	Receipt of echo reply frame	echo payload and parameters	12.3.1
OamFlushInd	Receipt of flush frame	flush payload and parameters	12.3.2
TopoChange	Topology change	topology and status database	10.2.6
ProtChange	Protection change	topology and status database	10.2.6
sendA	sendA change	true/false, ringletID	6.6.2
sendB	sendB change	true/false, ringletID	6.6.2
sendC	sendC change	TTL_to_congestion, ringletID	6.6.2
ScFcmInd	Receipt of SC-FCM	allowed_rate, allowed_rate_congested, TTL_to_congestion, ringletID	9.6.4
McFcmInd	Receipt of MC-FCM	sourceAddress, TTL, fairnessMessageType, controlValue, ringletID	9.6.4
all others	TBD	—	—

The optional *ringletID* parameter and the optional *MACProtection* of MA_DATA.Request

The values of ringletID are: *ringlet0,ringlet1,defaultRinglet*

The values of MACProtection are: *protected,unprotected*

Parameters of MA_Data Request from Client

Service Class: A,B,C

Implementation type:single-queue,dual-queue

Transit queue:primary,secondary

Initial Topology Database **parameter**

Table 10.1—Topology and status database example

hop count for ringlet 0	hop count for ringlet 1	local MAC	west neighbor's MAC	east neighbor's MAC	former west neighbor's MAC	former east neighbor's MAC	west receive link availability	east receive link availability	station capabilities	west transmit link reserved subclassA0 bandwidth	east transmit link reserved subclassA0 bandwidth	reachability, ringlet 0	reachability, ringlet 1
0	0	00-10-A4-97-A8-DE	00-10-A4-97-A8-EF	00-10-A4-97-A8-BD	00-10-A4-97-A8-GH	00-10-A4-97-A8-BD	IDLE	IDLE	JC=0 WC=1	50	40	N/A	N/A
1	3	00-10-A4-97-A8-EF	00-10-A4-97-A8-AC	00-10-A4-97-A8-DE	N/A	N/A	IDLE	IDLE	JC=1 WC=1	100	80	Data	Data
2	2	00-10-A4-97-A8-AC	00-10-A4-97-A8-BD	00-10-A4-97-A8-EF	N/A	N/A	IDLE	IDLE	JC=1 WC=1	150	120	Data	Data
3	1	00-10-A4-97-A8-BD	00-10-A4-97-A8-DE	00-10-A4-97-A8-AC	N/A	N/A	IDLE	IDLE	JC=1 WC=0	200	160	Data	Data

Manual Protection Switch **opcode ?**

Wrapper disable **opcode ?**

Protection disable **opcode ?**

Steering disable **opcode ?**

Fairness disable (or fairness A0) **opcode ?**

Possible change to be concerned

From: Way of Pre-plan and Provisioning

To: Plug & Play only,

or both pre-plan and plug/play

From: Local address

To: Global MAC address

It is kindly requested to assign an unique Ethertype value to X.msr-rpr !!

Thank you