

**Errata ID:** TIPAG-001

**Status:** Reported (Verification in Progress)

**Type:** Technical

Reported By: Nathan Buckles

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Cisco Verifier : Nathan Buckles

Date Verified: 2011-04-11

non-Cisco Verifier : <name>

Date Verified: <date>

Section 4.2.10 of the TIP protocol specification says:

A bitmask indicating whether the previous 112 RTP packets relative to the packet identified by the PID field have been received or not. The  $i$ 'th least significant bit of the PPA refers to the packet with RTP sequence number  $(\text{PID} - i) \bmod 2^{16}$ . A bit value of 0 indicates no packet reception, a bit value of 1 indicates reception.

.

and later says

The  $i$ 'th least significant bit of the PPA refers to the packet with RTP sequence number  $(\text{PID} - i) \bmod 2^{16}$ .

It should say:

See following red-line text.

Notes:

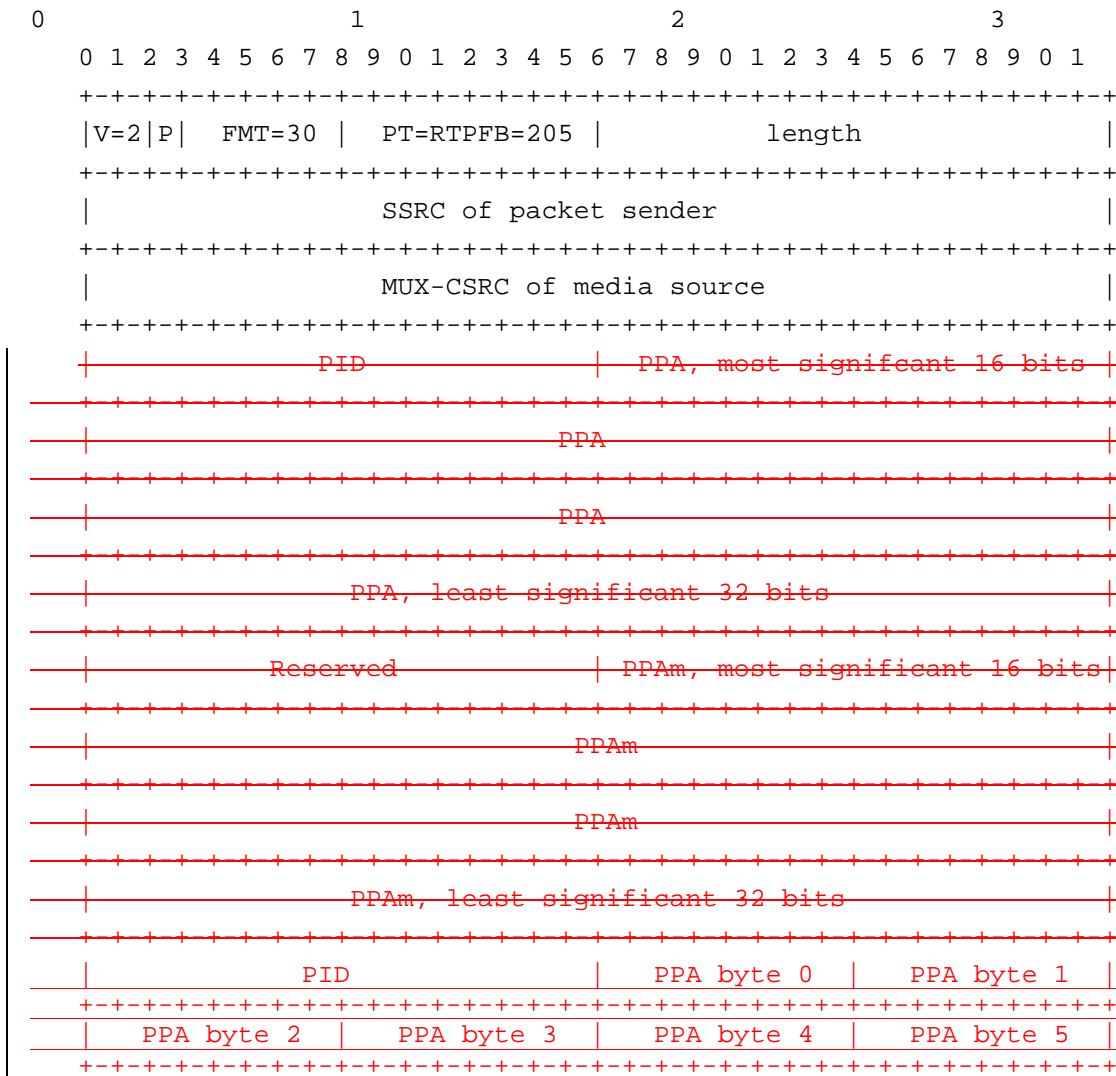
The specification transferred to IMTC by Cisco has mistakes in how the installed base of Cisco TelePresence Systems (CTS) calculates PPA fields in the RCTP RTPFB packet. These packets are used by receivers to indicate reception or loss of specific RTP packets.

## 4.2.10 RTP Feedback

Depending on the capabilities of the encoder to adjust to packet loss, TIP devices may use an RTP profile such as [8] that allows for timely receiver feedback on specific packet reception or loss. Use of this profile is indicated in the RTCP APP MUXCTRL packet discussed in section 4.2.1 by setting the profile field value to '2' signaling the RTP/AVPF profile.

When used, TIP devices will generate transport layer feedback messages (RTCP packet type RTPFB). The FMT parameter of these messages types is set to private value 30, and a custom feedback control information (FCI) block is used.

### RTCP RTPFB packet format with custom FCI



PPA byte 6	PPA byte 7	PPA byte 8	PPA byte 9
PPA byte 10	PPA byte 11	PPA byte 12	PPA byte 13
Reserved	PPAm byte 0	PPAm byte 1	
PPAm byte 2	PPAm byte 3	PPAm byte 4	PPAm byte 5
PPAm byte 6	PPAm byte 7	PPAm byte 8	PPAm byte 9
PPAm byte 10	PPAm byte 11	PPAm byte 12	PPAm byte 13

### RTCP RTPFB fields:

See [8].

### FCI fields:

packet ID (PID): 16 bits

The RTP sequence number of the media SSRC that is being acknowledged as received.

previous packet acknowledgements (PPA): 112 bits

A bitmask indicating whether the previous 112 RTP packets relative to the packet identified by the PID field have been received or not. The position of the packet with the RTP sequence number X, where  $0 < \text{PID} - X < 113$  can be found using the following formulas:

$$\text{PPA byte position} = (112 + X - \text{PID}) / 8$$

$$\text{PPA bit position} = (112 + X - \text{PID}) \% 8$$

All variables should be unsigned 16 bit numbers to allow for proper sequence number wrap-around handling. Note that the byte and bit positions are 0 based. A bit value of 0 indicates no packet reception, a bit value of 1 indicates reception.  
~~A bitmask indicating whether the previous 112 RTP packets relative to the packet identified by the PID field have been received or not. The i'th least significant bit of the PPA refers to the packet with RTP sequence number  $(\text{PID} - i)$  modulo  $2^{16}$ . A bit value of 0 indicates no packet reception, a bit value of 1 indicates reception.~~

The length of this bit field is designed to provide adequate redundancy against loss of the feedback packets themselves up to the expected maximum bitrate of a typical session.

previous packet acknowledgements mask (PPAm): 112 bits

A bitmask indicating which of the 112 bits in the PPA field are valid. The RTP sequence number to bit mapping is the same as the PPA field. The i'th least significant bit of the PPA refers to the packet with RTP sequence number  $(\text{PID} - i)$  modulo  $2^{16}$ . A bit value of 0 indicates the corresponding PPA bit is invalid, a bit value of 1 indicated it is valid. Invalid PPA bit values should be ignored by the receiver as they do not indicate an ACK or a NACK.

The PPAm field is optional; its presence should be detected by the length of the RTPFB packet.

The primary purpose of the PPAm field is to allow RTPFB packets to be sent out of order without implicitly indicating reception or no reception for the previous packets in the PPA bitfield. A PPAm bit set to zero indicates that the corresponding PPA bit CAN NOT be used to establish whether the associated packet has been received or not.

TIP only supports the feedback profile for video streams. The TIP RTCP RTPFB packets should be generated by the receiver at the time that a video frame is consumed. For a typical implementation of feedback, this is when the packets corresponding to a video frame are dequeued from the receiver's jitter buffer. The number of RTPFB packets generated should have a one-to-one correspondence with the received video frame rate. Note however that the PPA field will correspond to both the current video frame, and a number of previous video frames. This is intentional, and provides for retransmission of the ACK/NAK data to protect against loss of the RTPFB packets themselves.

Note that each of the TIP specific RTCP RTPFB messages SHOULD be sent within compound RTCP packets as per [4] and [8]. The simplest way to accomplish this is to prepend an "empty" receiver report (RR) and session description (SDS with CNAME) before the APP packet.

**RTCP Packet with empty RR, SDES CNAME and TIP RTPFB**



