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# Ultra-Lightweight Encapsulation (ULE)

draft-fair-ipdvb-ule-00.txt

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IETF-57 Vienna

IP/MPEG-2

Ultra Lightweight Encapsulation

Conclusions

Questions

Need to support ROHC, IPv6, etc  
Little deployed support for IPv6  
MPE has no type field - need LLC/SNAP

MPE has no source MAC Address  
Need to use LLC/SNAP+Bridging header

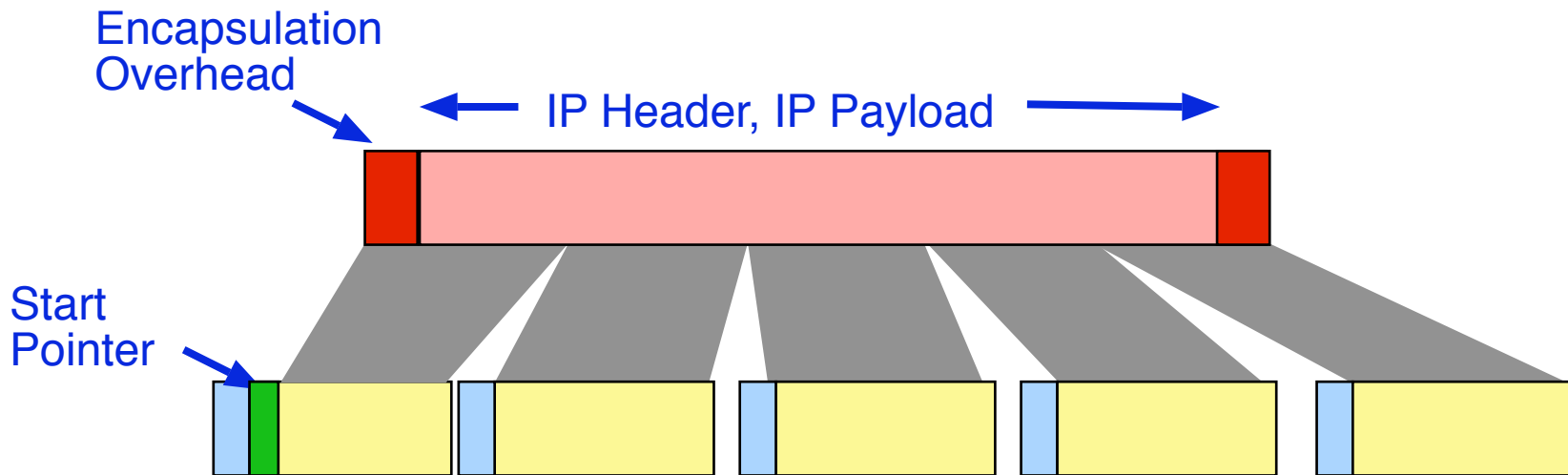
Software Processing of MPE “hard”  
Many fields of various sizes  
Many options

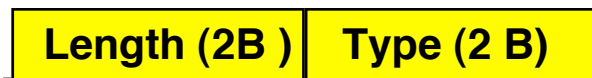
	Number and size of header fields				
	< 1 Byte	1 Byte	2 Byte	12 Bit	4 Byte
<b>MPE</b>	8	11	0	1	1
<b>ULE</b>	0	0	2	0	1

Variable sized IPv4/IPv6 packets

Fixed sized MPEG-2 TS Packet payload 184 B

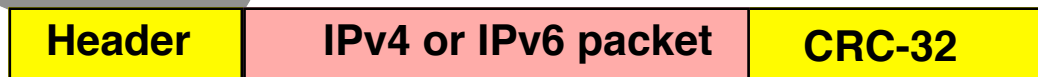
IP packets encapsulated





Length

Size of IP packet  
or 0x00



Type

Allows efficient encapsulation of other protocols



CRC-32

Integrity check

MAC Address(es)

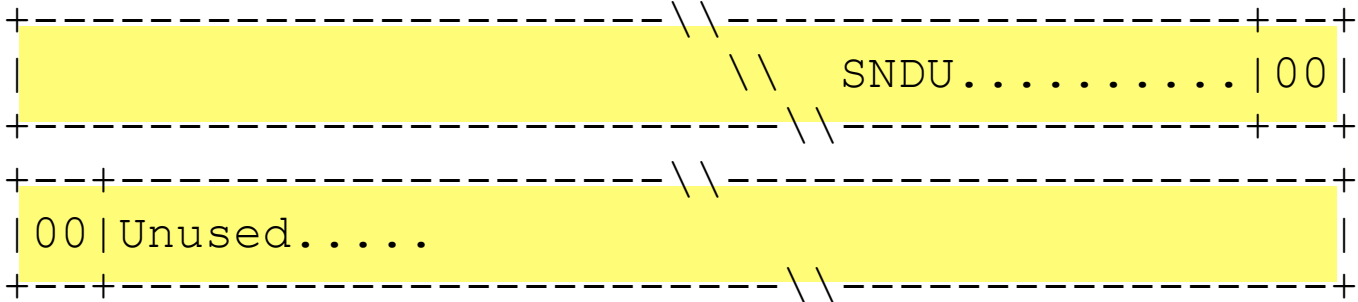
Optional

When PUSI ==1, payload\_pointer has values 0...182

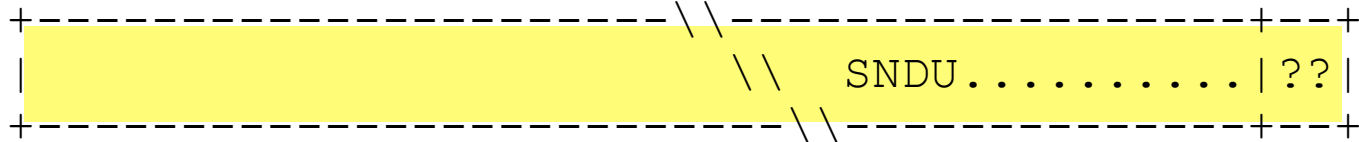
# Implementation Problem ..

## Problem when TS Packet payload is nearly full...

One byte in TS-Packet payload and no pending SNDUs:



One byte in TS-Packet payload and further SNDUs queued:



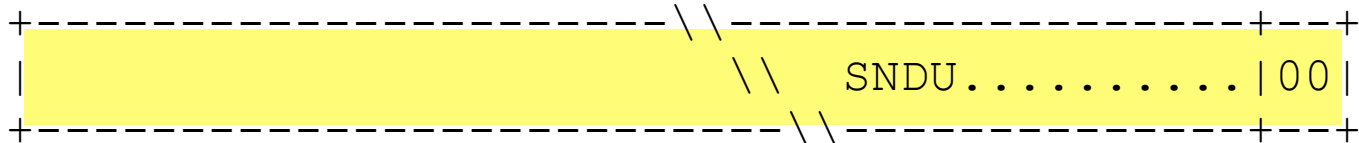
PUSI==0 -- no space for PUSI PTR field!!!

# Proposed Remedy?

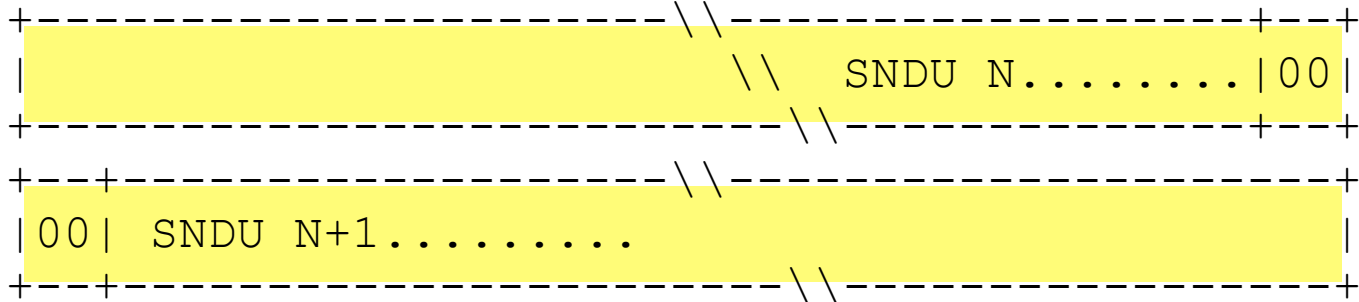
One byte left in a TS-Packet and no pending SNDUs:

New Last-byte padding rule

If payload has 1B left after last SNDU, skip the byte!



One byte left in a TS-Packet and further SNDUs queued:



PUSI==1



# Proposed Remedy?

## New sender rule for filling TS Packets:

No bytes free in payload	PUSI (payload_pointer?)	Action
0	0 or 1	<i>New()</i>
1	0 or 1	Place "0x00" at end & <i>New()</i>
2	0	Place "0x00 00" at end & <i>New()</i>
2	1	Place "0x00 00" at end & <i>New()</i>
		OR
>2	0	Start new SNDU in TS Packet { Set PUSI==1; Insert payload_pointer; Start new SNDU in TS Packet }
>2	1	Start new SNDU in TS Packet

```

New()
{Set PUSI==1;
  Insert payload_pointer = 0;
  Start new SNDU in new TS Packet
}

```

1) Use the “Ethernet Payload Type” field  
Or PPP? Or ...?

2) Should we have a MAC-address option flag(s)?

e.g.:

00 = NO MAC Address - use with end hosts

01 = MAC destination address - any system

10 = MAC Source address only - why?

11 = MAC Source + Destination address - bridging?

Can we take these two bits from the “Length” field?  
i.e. max length = 16 KB?

Can/should Receivers discover the encapsulation?

Do we need to define two encapsulations:

Direct ULE transmission over MPEG-2 Transport.

Simple framing with AF.

Discuss & Decide

Revise ID & Freeze

Implementers required

Submit to IESG as a Standards-Track document

Interoperability testing