



AHG9: Bounding redundant SEI messages

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Introduction

- Current VVC draft text does not constrain the number of redundant SEI messages
 - Small number of redundant copies may be useful to improve the error resilience
 - Unbounded number of redundant copies does not seem to have any practical functionality and increases the burden on decoder implementations
- This contribution proposes a restriction on the number of redundant SEI messages using a bitstream conformance requirement similar to the constraint in the HEVC/H.265 standard.

HEVC/H.265 constraints

- Section D.3.1 (“General SEI payload semantics”)

The list `PicUnitRepConSeiList` is set to consist of the `payloadType` values 0, 1, 2, 6, 9, 15, 16, 17, 19, 22, 23, 45, 47, 56, 128, 129, 131, 132, 133, and 135 to 148, inclusive.

NOTE 3 – `SingleLayerSeiList` consists of the `payloadType` values of the SEI messages specified in Annex D excluding 0 (buffering period), 1 (picture timing), 4 (user data registered by Recommendation ITU-T T.35), 5 (user data unregistered), 130 (decoding unit information) and 133 (scalable nesting). `VclAssociatedSeiList` consists of the `payloadType` values of the SEI messages that, when non-nested and contained in an SEI NAL unit, infer constraints on the NAL unit header of the SEI NAL unit on the basis of the NAL unit header of the associated VCL NAL unit. `PicUnitRepConSeiList` consists of the `payloadType` values of the SEI messages that are subject to the restriction on 8 repetitions per picture unit.

VVC SEI (1 of 2)

VVC payloadType	VVC SEI	HEVC payloadType	Constrained to 8 per picture in HEVC?	Propose to constrain to 8 per picture in VVC
0	buffering_period	0	Yes	Yes
1	pic_timing	1	Yes	Yes
3	filler_payload	3	No	No
4	user_data_registered_itu_t35	4	No	No
5	user_data_unregistered	5	No	No
19	film_grain_characteristics	19	Yes	Yes
45	frame_packing_arrangement	45	Yes	Yes
129	referenced_parameter_sets	129*	Yes	Yes
130	decoding_unit_info	130	Yes (8 per decoding unit)	Yes (8 per decoding unit)
132	decoded_picture_hash	132	Yes	Yes
133	scalable_nesting	133	Yes	Yes
137	mastering_display_colour_volume	137	Yes	Yes
144	content_light_level_info	144	Yes	Yes
145	dependent_rap_indication	145	Yes	Yes
147	alternative_transfer_characteristics	147	Yes	Yes
148	ambient_viewing_environment	148	Yes	Yes

VVC SEI (2 of 2)

149	content_colour_volume	NEW in VVC	N/A	Yes
150	equirectangular_projection	NEW in VVC	N/A	Yes
153	generalized_cubemap_projection	NEW in VVC	N/A	Yes
154	sphere_rotation	NEW in VVC	N/A	Yes
155	regionwise_packing	NEW in VVC	N/A	Yes
156	omni_viewport	NEW in VVC	N/A	Yes
168	frame_field_info	168	No**	Yes
203	subpic_level_info	NEW in VVC	N/A	Yes
204	sample_aspect_ratio_info	NEW in VVC	N/A	Yes

Proposed changes - D.3 “SEI payload semantics”

The list `VclAssociatedSeiList` is set to consist of the `payloadType` values 3, 19, 45, 129, 132, 137, 144, 145, 147 to 150, inclusive, 153 to 156, inclusive, 168, 203, and 204. The list `PicUnitRepConSeiList` is set to consist of the `payloadType` values 0, 1, 19, 45, 129, 132, 133, 137, 144, 145, 147, 148, 149, 150, 153, 154, 155, 156, 168, 203, 204.

NOTE 4 – `VclAssociatedSeiList` consists of the `payloadType` values of the SEI messages that, when non-scalable-nested and contained in an SEI NAL unit, infer constraints on the NAL unit header of the SEI NAL unit on the basis of the NAL unit header of the associated VCL NAL unit. `PicUnitRepConSeiList` consists of the `payloadType` values of the SEI messages that are subject to the restriction on 8 repetitions per picture unit.

It is a requirement of bitstream conformance that the following restrictions apply on repetition of SEI messages:

- For each of the `payloadType` values included in `PicUnitRepConSeiList`, there shall be less than or equal to 8 identical `sei_payload()` syntax structures within a picture unit.
- There shall be less than or equal to 8 identical `sei_payload()` syntax structures with `payloadType` equal to 130 within a decoding unit.



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