



JCTVC-M0044: Layers display info SEI message

Jill Boyce, Danny Hong, Wonkap Jang

Problem

- Useful for decoder to know display resolution of all layers that may be present in the bitstream
- Decoder may choose to display all decoded pictures at the highest possible display resolution expected in the bitstream
 - Upsample decoded pictures of lower resolutions prior to display
 - Avoid changing the display resolution over time

Background

- SVC scalability info SEI message contains display resolution information about scalable layers which is useful to a decoder, but which is not included in the VPS extension
- SHVC design:
 - VPS extension contains profile and level per layer
 - SPS for each layer contains coded resolution and cropping parameters
 - Higher layer may be removed by the middle box for a period of time, unavailable to decoder

Proposal

- New SEI message that contains parameters for display for each layer
 - Conformance cropping window display resolution
 - Sample aspect ratio (optional)
- Conformance restrictions
 - Conformance cropping window width and height equal to calculated values determined by SPS parameters `pic_width_in_luma_samples`, `pic_height_in_luma_samples`, `conf_win_left_offset`, `conf_win_right_offset`, `conf_win_top_offset`, and `conf_win_bottom_offset`
 - When present, sample aspect ratio parameters equal to those in VUI

Proposed syntax

layers_display_info(payloadSize) {	
ldi_sei_active_vps_id	u(4)
for(i = 0; i <= vps_max_layers_minus1 ; i++) {	
conf_win_width_in_luma_samples[i]	u(16)
conf_win_height_in_luma_samples[i]	u(16)
ldi_sei_aspect_ratio_info_present_flag[i]	u(1)
if(ldi_sei_aspect_ratio_info_present_flag[i]) {	
ldi_sei_aspect_ratio_idc[i]	u(8)
if(ldi_sei_aspect_ratio_idc == Extended_SAR) {	
ldi_sei_sar_width[i]	u(16)
ldi_sei_sar_height[i]	u(16)
}	
}	
}	
}	

Proposed persistence

Table D-1 – Persistence scope of SEI messages (informative)

SEI message	Persistence scope
..	
Layers display info	The access unit containing the SEI message and up to but not including the next access unit, in decoding order, that contains a layers display info SEI message

Proposed semantics

Layers display info SEI message semantics

The layers display info SEI message provides display information about layers in the CVS and is interpreted with respect to the active video parameter set. When present, the layers display info SEI message applies to the target access unit set that consists of the current access unit and all the subsequent access units, in decoding order, until the next layers display info SEI message or the end of the CVS, whichever is earlier in decoding order.

ldi_sei_active_vps_id identifies an active VPS that contains layer information. The value of **ldi_sei_active_vps_id** shall be equal to the value of **video_parameter_set_id** of the active VPS for the VCL NAL units of the access unit containing the SEI message.

conf_win_width_in_luma_samples[i] shall be equal to $\text{pic_width_in_luma_samples} - \text{conf_win_left_offset} - \text{conf_win_right_offset}$ in the active SPS of coded pictures with **nuh_layer_id** equal to **layer_id_in_nuh[i]**.

conf_win_height_in_luma_samples[i] shall be equal to $\text{pic_height_in_luma_samples} - \text{conf_win_top_offset} - \text{conf_win_bottom_offset}$ in the active SPS of coded pictures with **nuh_layer_id** equal to **layer_id_in_nuh[i]**.

ldi_sei_aspect_ratio_info_present_flag[i] equal to 1 specifies that **ldi_sei_aspect_ratio_idc[i]** is present. **aspect_ratio_info_present_flag** equal to 0 specifies that **ldi_sei_aspect_ratio_idc[i]** is not present.

ldi_sei_aspect_ratio_idc[i], when present, shall be equal to **aspect_ratio_idc** in the active SPS of coded pictures with **nuh_layer_id** equal to **layer_id_in_nuh[i]**.

ldi_sei_sar_width[i], when present, shall be equal to **sar_width** in the active SPS of coded pictures with **nuh_layer_id** equal to **layer_id_in_nuh[i]**.

ldi_sei_sar_height[i], when present, shall be equal to **sar_height** in the active SPS of coded pictures with **nuh_layer_id** equal to **layer_id_in_nuh[i]**.

Background: SEI scalability info excerpts

scalability_info(payloadSize) {	C	Descriptor
for(i = 0; i <= num_layers_minus1; i++) {		
...		
iroi_division_info_present_flag[i]	5	u(1)
...		
frm_size_info_present_flag[i]	5	u(1)
...		
if(frm_size_info_present_flag[i] iroi_division_info_present_flag[i]) {		
frm_width_in_mbs_minus1[i]	5	ue(v)
frm_height_in_mbs_minus1[i]	5	ue(v)
}		
...		

Conclusion

- Recommend to adopt proposed Layers display info SEI message to SHVC