

H0667

Slice header element frequency issues

Ambarella

Issues

- Slices can occur every Treeblock (LCU)
- Changes to some elements cause cache thrashing, pipeline stalls and flushing
- high level syntax parsed in CPU not dedicated pipelines
- Some elements in slice header intended for frequent use (1500 byte MTU) have light hardware impact.
- Heavy impact elements rarely modulated throughout frame.

Set analysis

Set	Hardware impact	Teleconf	Broad-cast
Modes (slice_type, Qp)	Light	Dynamic	Dynamic
reference picture management (short_term_ref_pic_set())	Medium?	Static	Static
reference picture list modification	Medium	Dynamic	Static
Slice identifiers	Light	Dynamic	Dynamic
Parameter set identifiers	Light	Static+	Static
Deblocking loop filter control	Heavy	Static	Static
ALF loop filter control	Medium	Dynamic	Static
Motion prediction weights	Light	Static	Static
Wavefront substream pointers	Light	?	Dynamic

Recommendations

- Have a BoG-like detailed discussion between implementers and slice header connoisseurs to reach common understanding.
- Move infrequently changing, medium-to-heavy impact elements into parent header (PPS, APS..)
- Restrict the frequency of those elements wherever they are stuffed
- Limit number of changes per frame to something that is appropriate to Profile & Level, so that entire set can be reasonably cached during whole frame.