

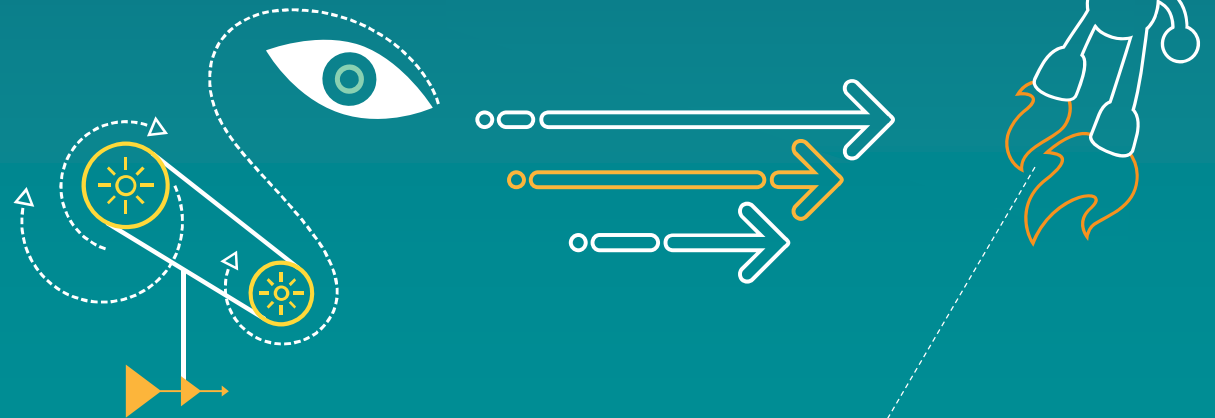
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# Clipping for ACT

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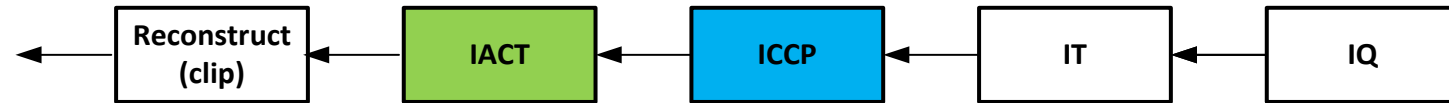
JCTVC-T0132  
Geneva, Switzerland, Feb. 10 - 18, 2015



# Problem statement

- Inverse ACT overflow

- From bug #1321 on CCP overflow
  - ICCP could overflow when extended precision is disabled
  - It was suggested to constrain input of ICCP
- Similar overflow can happen for IACT



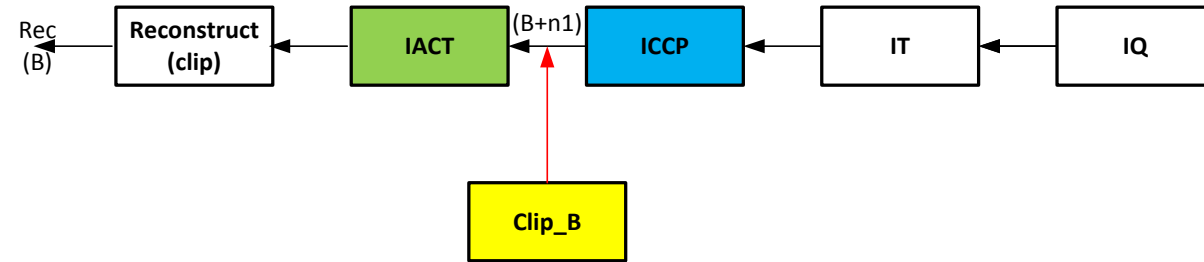
- Storage issue:

- Without bitdepth restriction, 32 bits/pixel is required for intermediate samples
- 3 components available at the same time -> 3xTU-sized storages
- 3xTU-sized storage if w/o clipping at IACT's input :
  - $3 \times 32 \times 32 \times 32b$

# Solutions for ACT overflow

- Clipping at Inverse ACT (IACT)'s input

- Clip IACT's input, so that input to IACT could be
  - 16 bit if the input is less than or equal to 12bit
  - $(B+4)$  bit if the input is more than 12bit



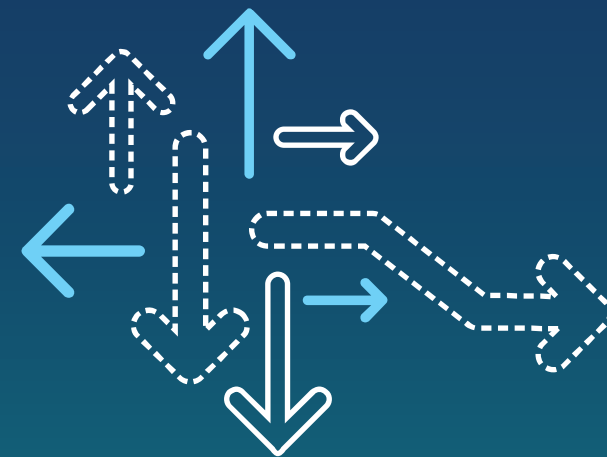
- Bitstream constraint

- To restrict bitstream, so that input to IACT could be limited to
  - 16 bit if the input is less than or equal to 12bit
  - $(B+4)$  bit if the input is more than 12bit

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# Cross-check

Thanks for Microsoft's cross-check



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# Appendix

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# Cross Components Prediction (CCP) & Adaptive Colour Transform (ACT)

## • CCP

### – Forward

$$Y = Y$$

$$\Delta C_g = C_g - (\alpha_{C_g} \times Y) \gg 3$$

$$\Delta C_o = C_o - (\alpha_{C_o} \times Y) \gg 3$$

### – Inverse

$$Y = Y$$

$$C_g = \Delta C_g + (\alpha_{C_g} \times Y) \gg 3$$

$$C_o = \Delta C_o + (\alpha_{C_o} \times Y) \gg 3$$

## • ACT

$$\begin{array}{lcl} & Co & = R - B \\ \text{Forward : } & t & = B + (Co \gg 1) \\ & Cg & = G - t \\ & Y & = t + (Cg \gg 1) \end{array}$$

$$\begin{array}{lcl} & t & = Y - (Cg \gg 1) \\ \text{Backward : } & G & = Cg + t \\ & B & = t - (Co \gg 1) \\ & R & = Co + B \end{array}$$