



AHG6: ALF with modified padding process

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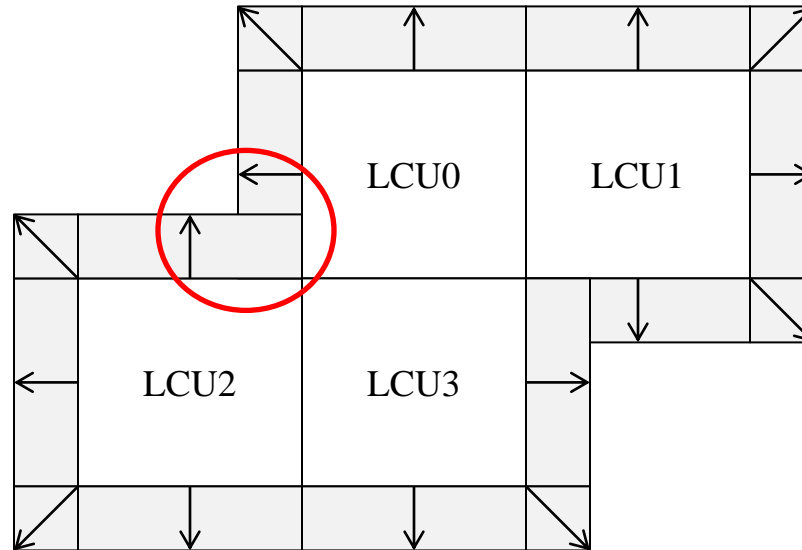


Presented by Yu-Wen Huang
10th JCT-VC Meeting in Stockholm
11-20 July, 2012

Overall Summary

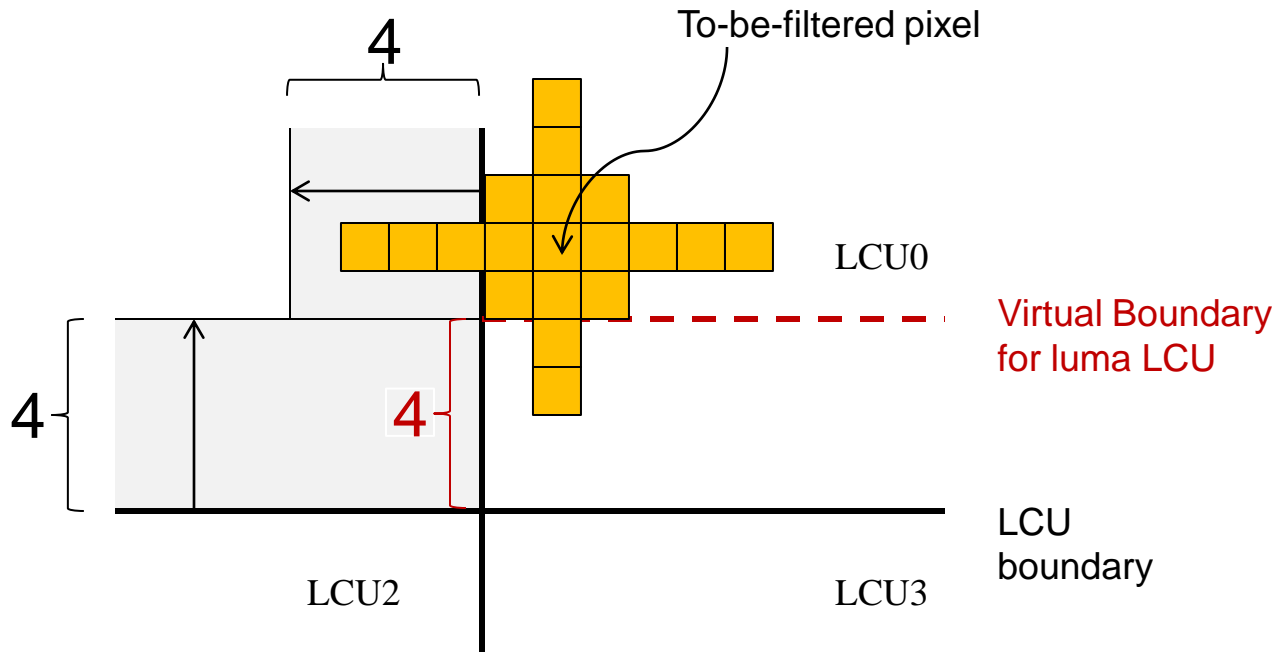
- Padding principle
 - In HM, a later block in processing order has a **higher** priority than a prior block to extend boundary samples when the two blocks have an overlapping to-be-padded area
 - In the proposed method, a later block in processing order has a **lower** priority than a prior block
 - To solve a chroma line buffer issue
 - Only 2 lines in HM are modified; text is simplified.
 - No BD-rate change
- Number of vertically padded samples
 - In HM, the vertical size of the filter footprint has been reduced from 9 to 7, but the number of vertically padded samples is still 4.
 - Propose to reduce the number of vertically padded samples to **3**
 - Only 7 lines in HM are modified.
 - No BD-rate change

HM-7.0: ALF Boundary Padding



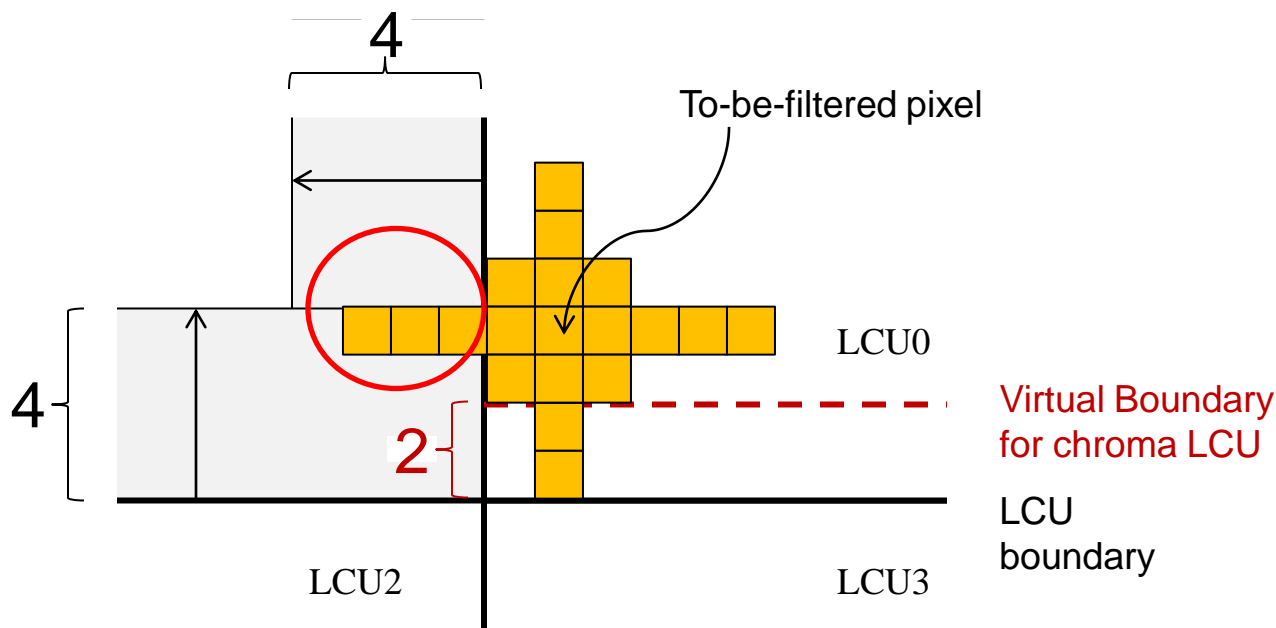
- LCU0, LCU1, LCU2, LCU3: SAO output
- The slice boundary corner pixels (red circle) may cause line buffer problem for LCU-pipelining.

HM-7.0, When luma LCU0 is processed



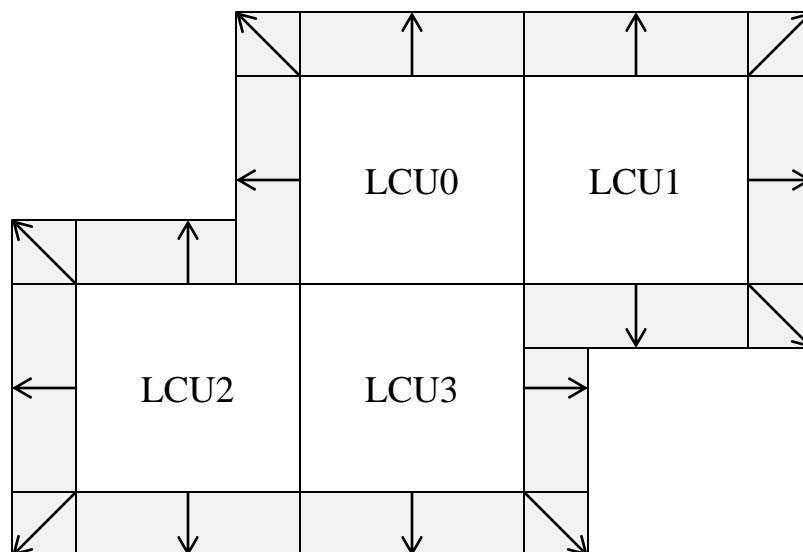
- No problem.
- Those to-be-filtered samples above virtual boundary will not use the padding results derived from LCU2 .

HM-7.0, When chroma LCU0 is processed



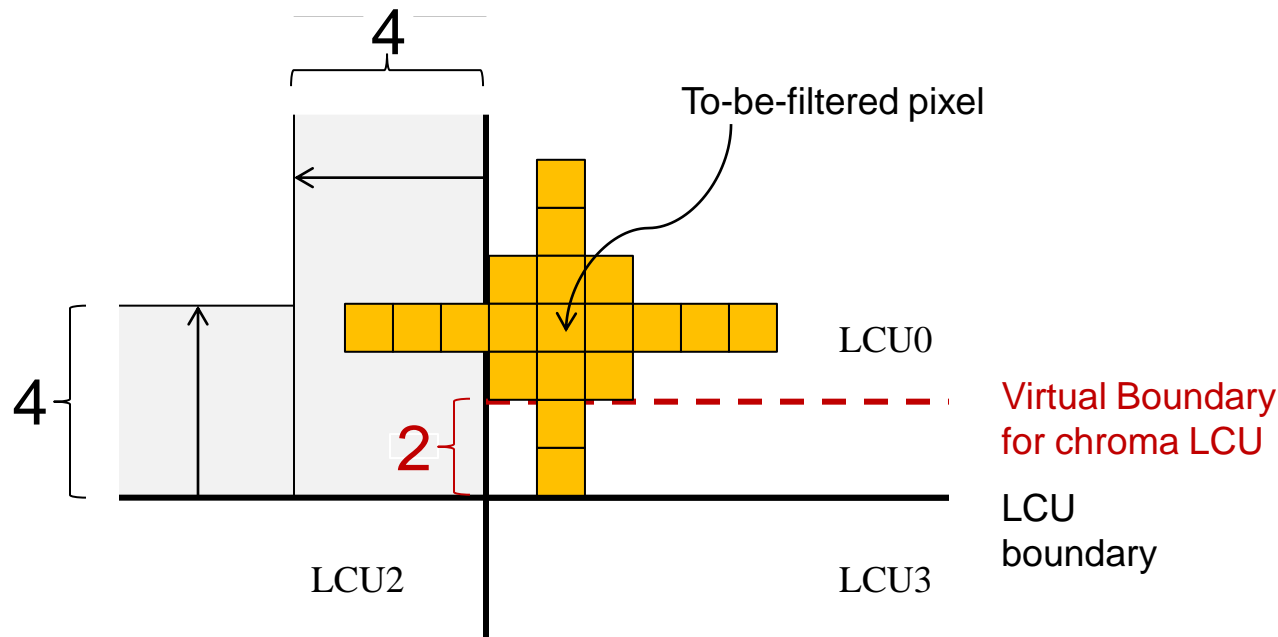
- Problematic
- Some to-be-filtered pixels above virtual boundary need the padding results derived from LCU2 (red circle) which are not ready.

Proposed ALF Boundary Padding



- A later block in processing order has a **lower** priority than a prior block to extend boundary samples when the two blocks have an overlapping to-be-padded area.

When chroma LCU0 is processed



- No problem after applying the proposed padding principle
- Those to-be-filtered samples above virtual boundary will not use the padding results derived from LCU2.

Proposed Number of Padded Samples

- ALF filter shape: Cross9x7+Square3x3
 - Number of horizontally padded samples: 4
 - Number of vertically padded samples: 3

- Cross7x7+Square3x3
 - Number of horizontally padded samples: 3
 - Number of vertically padded samples: 3

- Cross7x5+Square3x3
 - Number of horizontally padded samples: 3
 - Number of vertically padded samples: 2

Conclusion

- Propose to change the padding principle
 - To solve a chroma line buffer issue
 - A later block in processing order has a **lower** priority than a prior block to extend boundary samples when the two blocks have an overlapping to-be-padded area
 - Only 2-line change in HM
 - Simpler text
 - Also applicable for fine granularity slice
 - No BD-rate change
- Propose to reduce the number of vertically padded samples to 3
 - To fit the filter shape
 - No BD-rate change