

On Line Buffer Removal for CU Split Flag and Skip Flag Context Model

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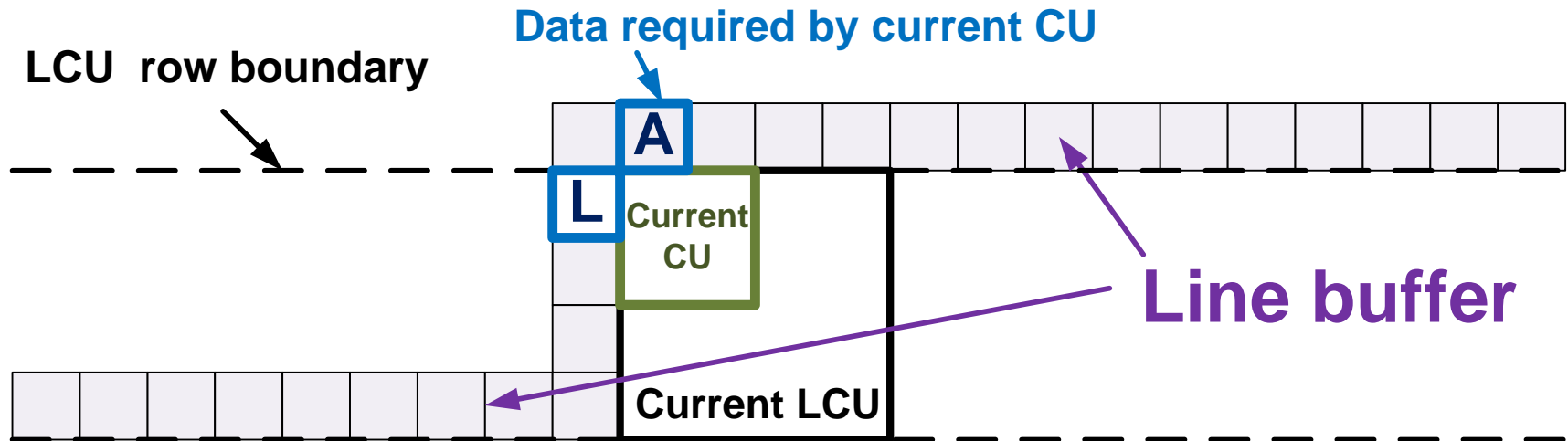
Overall Summary

- A joint solution of G769, G200 and G829
- Modifications of context modeling of split_flag and skip_flag to remove all the line buffers in CABAC
 - Only the data in current LCU row are used for the context modeling for split_flag and skip_flag
 - No additional context is required
- Bit rate increase is less than 0.12%

	HE-AI	HE-RA	HE-LDB
Avg. bit rate	0.00%	0.05%	0.12%

Line Buffers for CABAC

- Context formations of split_flag and skip_flag in HM-4.0:
 - split_flag : $ctxIdx = isSplit(A) + isSplit(L)$
 - skip_flag : $ctxIdx = isSkip(A) + isSkip(L)$
- The context formations of split_flag and skip_flag need the data of left block and upper block
 - Need to store the data of CU_depth and skip_flag in line buffers



Proposed Context Modeling

- Only the data in current LCU row are used for the context modeling
- Split_flag
 - Use the depth of left block and current block
 - $ctxIdx = isSplit(A) + (CU_Size > 16)$
- Skip_flag
 - Use the data of the left block if the upper block belongs to the upper LCU
 - $ctxIdx = isSkip(L) + (is_blk_idx_y == 0) ? isSkip(L) : isSkip(A)$
- **Line buffer-free CABAC is achieved**

Results – Combined Split_fag and Skip_flag

- 0.01/0.05/0.12% loss in HE-AI, HE-RA and HE-LD

	All Intra HE			Random Access HE			Low delay B HE		
	Y	U	V	Y	U	V	Y	U	V
Class A	-0.02%	-0.06%	-0.04%	-0.03%	-0.31%	-0.03%			
Class B	0.01%	-0.02%	-0.04%	0.06%	0.06%	0.00%	0.11%	0.16%	-0.17%
Class C	0.00%	-0.04%	-0.09%	0.11%	0.04%	0.01%	0.09%	0.02%	-0.04%
Class D	0.02%	-0.04%	-0.04%	0.07%	0.20%	0.08%	0.02%	0.23%	-0.12%
Class E	0.05%	-0.03%	-0.04%				0.31%	-0.35%	0.97%
Overall	0.01%	-0.04%	-0.05%	0.05%	0.00%	0.01%	0.12%	0.05%	0.09%
	0.01%	-0.03%	-0.05%	0.05%	-0.02%	0.02%	0.12%	0.07%	0.11%
Enc Time[%]	100%			100%			100%		
Dec Time[%]	100%			99%			99%		

Conclusions

- A joint solution of G769, G200 and G829
- Two modifications of context modeling of split_flag and split_flag
 - Only the data in current LCU row are used for the context modeling
 - **Line buffer-free CABAC**
 - No additional context model is required
- 0.01/0.05/0.12% loss in HE-AI, HE-RA and HE-LD