JCTVC-I0300
Burst IPCM Coding Signalling

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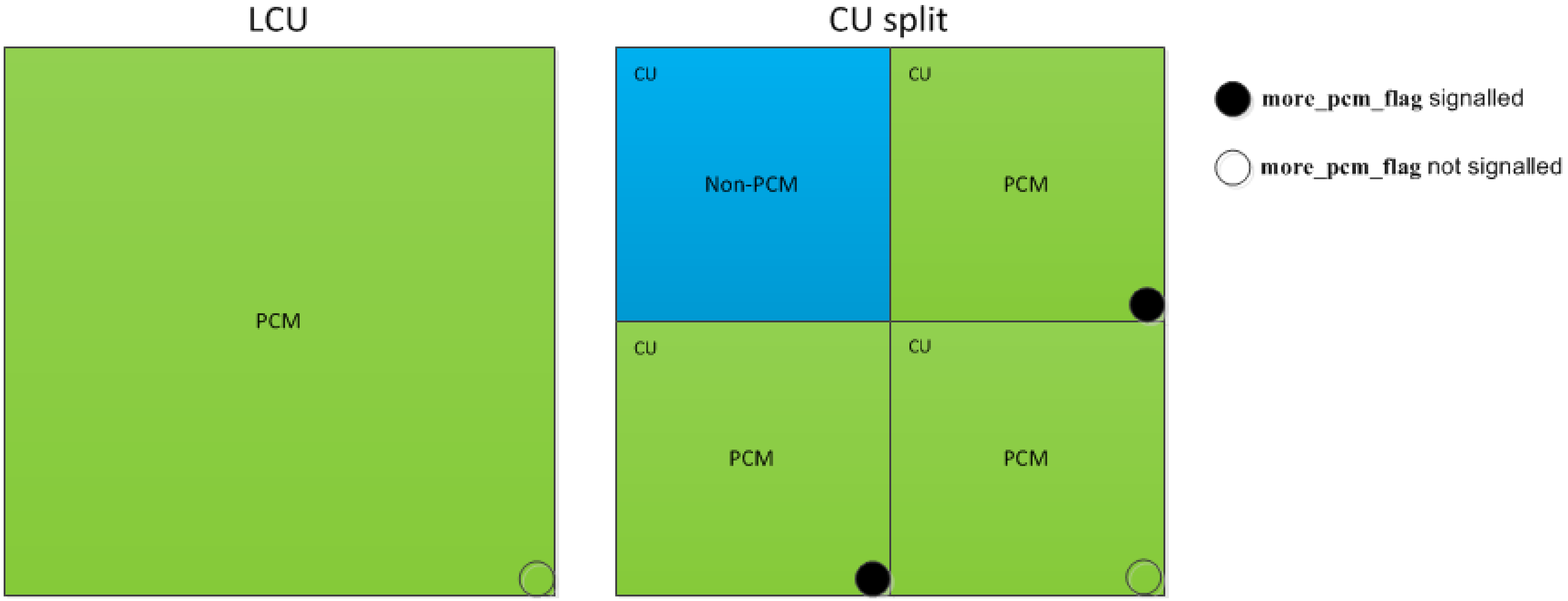
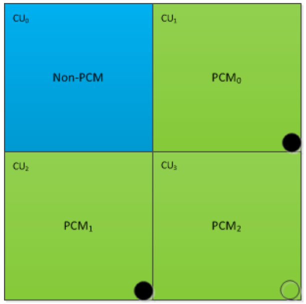
Burst IPCM Method

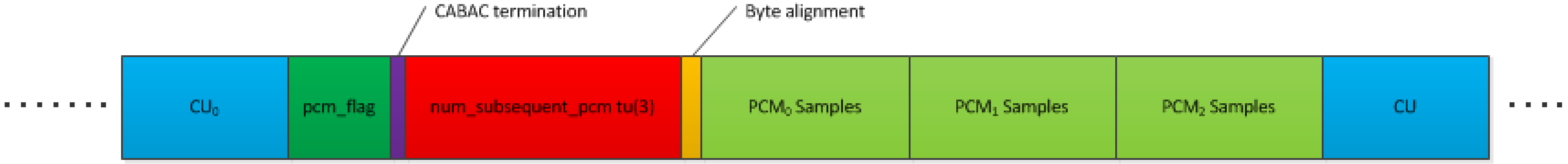
- Current scheme:
  - Signal successive IPCM units without CABAC termination process in between IPCM blocks
  - **num_subsequent_pcm**: Number of subsequent IPCM blocks that successively follow the first IPCM unit in the same layer of a CTB (0-3).
  - Requires look ahead (up to 3 CUs), i.e. buffering.
- Proposed low delay coding method signals the presence of next IPCM block after the first IPCM block by **more_pcm_flag** at a CTB layer without requiring any look ahead.


LCU
PCM
CU split
CU
Non-PCM
CU
PCM
CU
PCM
CU
PCM
● **more_pcm_flag** signalled
○ **more_pcm_flag** not signalled

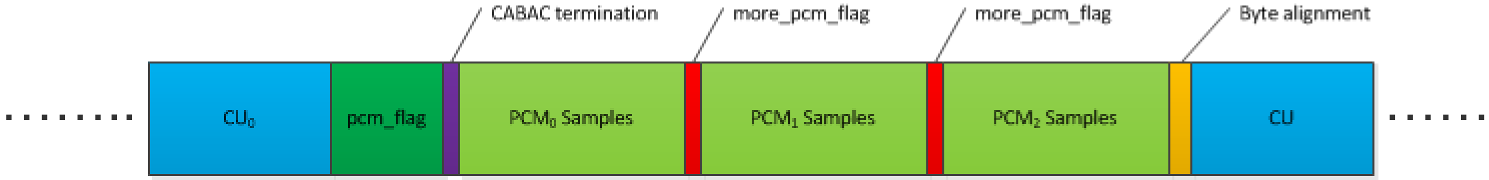
Proposed syntax



- Current syntax



- Proposed syntax



- Effectively interleaves the bits of the tu(3) syntax in between PCM samples

Results: BD Rate (JCTVC-H1200)

	Y	U	V
AI-Main	0.0%	0.0%	0.0%
AI-HE10	0.0%	0.0%	0.0%
RA-Main	0.0%	0.0%	0.0%
RA-HE10	0.0%	0.0%	0.0%
LB-Main	0.0%	0.0%	0.0%
LB-HE10	0.0%	0.0%	0.0%

Anchor: HM 6.1 with IPCM enabled

Additional Results

sandstorms CIF 30fps 33 frames				
		Bitrate (kbps)		
Config	QP	Anchor	Proposal	% change*
AI-main	0	37797.77	37159.11	-1.69%
	4	37797.77	37166.52	-1.67%
	8	37797.77	37160.33	-1.69%
	12	37797.77	37160.33	-1.69%
AI-HE10	0	37798.02	37159.35	-1.69%
	4	37798.02	37166.76	-1.67%
	8	37798.02	37160.58	-1.69%
	12	37797.78	37160.34	-1.69%
RA-Main	0	37798.81	37230.98	-1.50%
	4	37798.81	37226.08	-1.52%
	8	37798.81	37224.84	-1.52%
	12	36328.6	36013.19	-0.87%
RA-HE10	0	37798.82	37230.99	-1.50%
	4	37798.82	37226.09	-1.52%
	8	37798.82	37224.84	-1.52%
	12	36267.12	35961.08	-0.84%
LB-Main	0	37799.58	37309.45	-1.30%
	4	37799.58	37316.87	-1.28%
	8	37799.55	37310.56	-1.29%
	12	37799.53	37304.93	-1.31%
LB-HE10	0	37799.59	37309.47	-1.30%
	4	37799.59	37316.89	-1.28%
	8	37799.57	37310.58	-1.29%
	12	37799.54	37304.95	-1.31%

(*) same PSNR

JCTVC-H0051 synthesized sandstorms sequence

Conclusion

- Low delay IPCM block signalling eliminating look ahead.
- More efficient than the current scheme in HM6.1 (~1.5% bitrate reduction)
- Recommendation
  - Adopt in HM and DIS

WD changes

coding_tree(x0, y0, log2CbSize, cbDepth) {	Descriptor
…….	
pcm_sample(x0, y0, log2CbSize)	
if(!(x0% (1<<(log2CbSize+1))) | | ! (y0% (1<<(log2CbSize+1)))){	
more_pcm_flag	u(1)
NumPCMBlock = more_pcm_flag	
}	
else	
NumPCMBlock = 0	
if (NumPCMBlock = = 0)	
while(!byte_aligned( ))	
pcm_alignment_zero_bit	u(1)

prediction_unit(x0, y0, log2CbSize) {	**Descriptor**
if(skip_flag[x0][y0]) {	
if(MaxNumMergeCand > 1)	
merge_idx[x0 **][** y0 **]**	ae(v)
} else if(PredMode = = MODE_INTRA) {	
if(PartMode = = PART_2Nx2N && pcm_enabled_flag && log2CbSize >= Log2MinIPCMCUSize && log2CbSize <= Log2MaxIPCMCUSize)	
pcm_flag	ae(v)
if(pcm_flag) {	
~~**num_subsequent_pcm**~~	~~tu(3)~~
~~NumPCMBlock = num_subsequent_pcm + 1~~	
~~while(!byte_aligned( ))~~	
~~**pcm_alignment_zero_bit**~~	~~u(v)~~
pcm_sample(x0, y0, log2CbSize)	
if (log2CbSize < Log2MaxCbSize) {	
more_pcm_flag	u(1)
NumPCMBlock = more_pcm_flag	
}	
} else {	
prev_intra_luma_pred_flag[x0 **][** y0 **]**	ae(v)
if(prev_intra_luma_pred_flag[x0][y0])	
…………	

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