



REDEFINING MOBILITY



JCT3V-G0024: CE4 summary report

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Proposal List

- 4 CE proposals
- 3 CE related proposals (JCT3V-G0076 has been reviewed in CE1)

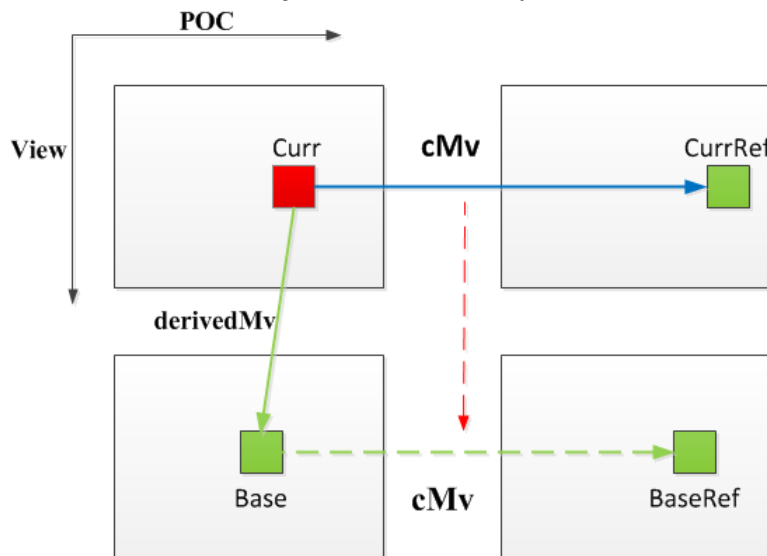
Category	Proposal	Crosscheck report
CE proposal	<u>JCT3V-G0158</u>	<u>JCT3V-G0223</u>
	<u>JCT3V-G0064</u>	<u>JCT3V-G0167</u> <u>JCT3V-G0222</u>
	<u>JCT3V-G0121</u>	<u>JCT3V-G0226</u> <u>JCT3V-F0247</u> <u>JCT3V-G0220</u>
	<u>JCT3V-G0072</u>	<u>JCT3V-G0075</u>
CE related proposal	<u>JCT3V-G0033</u>	<u>JCT3V-G0041</u>
	<u>JCT3V-G0095</u>	<u>JCT3V-G0187</u>
	<u>JCT3V-G0076</u>	<u>JCT3V-G0154</u>

Proposed methods

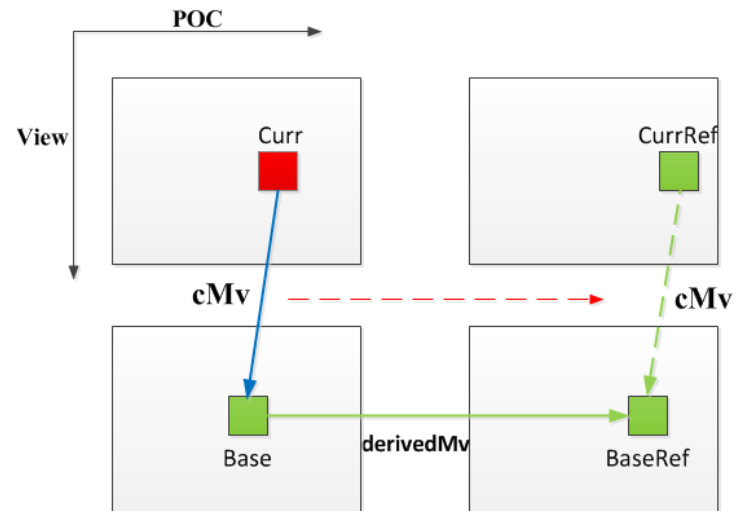
- Topics in CE 4
 - Subset A: complexity reduction
 - Subset B: coding performance
 - Subset C: Interaction with other tools
- CE-related topics
 - Subset A: complexity reduction
 - Subset B: coding performance

Introduction

- Advanced residual prediction (ARP) in 3D-HEVC
 - Residual: same as conventional inter mode
 - Residual predictor generation
 - The difference between two reference blocks other than the reference block used in the conventional inter-mode
 - For temporal ARP: $(\text{Base} - \text{BaseRef})$; For inter-view ARP: $(\text{CurrRef} - \text{BaseRef})$



(a) Temporal ARP



(b) Inter-view ARP

Fig. 1 Prediction structure

- A weighting factor index is signaled in CU-level

Proposed methods

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 - Subset A: complexity reduction
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Subset A. Complexity reduction

- Simplification of inter-view ARP in **JCT3V-G0158 (#1)**
 - The temporal motion information used in inter-view ARP is derived using the same way as shifted temporal inter-view merging candidate derivation process.
 - The disparity vector from DoNBDV process is updated to the coded disparity motion vector associated with current block.
 - Residual: $\text{Curr} - \text{CurrRef}$
 - Residual predictor: $\text{Base} - \text{BaseRef}$

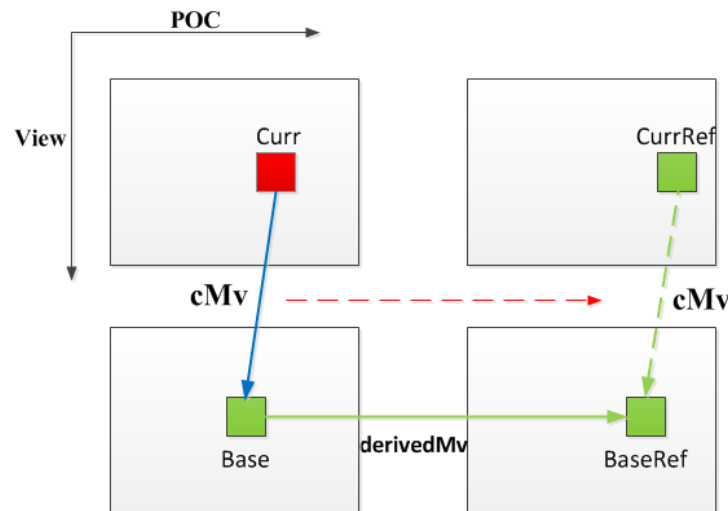


Fig 2. Inter-view ARP

Subset B. Coding efficiency

- **Motion vector candidate lists for ARP (MV-Cand ARP) in JCT3V-G0064 (#1)**
 - Main concept: multiple choices of derivdMv
 - A disparity/temporal MV candidate list is derived for temporal/inter-view ARP.
 - The best candidate index is selected according to RDO criterion and signaled in the bitstream.
 - MV candidate list construction
 - Spatial neighbouring blocks are the top and left blocks of current block while temporal neighbouring blocks are those used in NBDV or the TMVP process.
 - For temporal ARP, the DoNBDV results of current block and spatial neighbouring blocks may be included.
 - A new MV candidate is appended into the list only if it is not equal to first candidate already in the list.

Subset B. Coding efficiency

- Block-level advanced residual prediction in **JCT3V-G0121 (#1)**
 - For temporal ARP, the default derivedMv may be updated to the disparity MV from corresponding 8x8 block within *CurrRef*.
 - For inter-view ARP, the default derivedMv may be updated to the temporal MV from corresponding 8x8 block within *Base*.

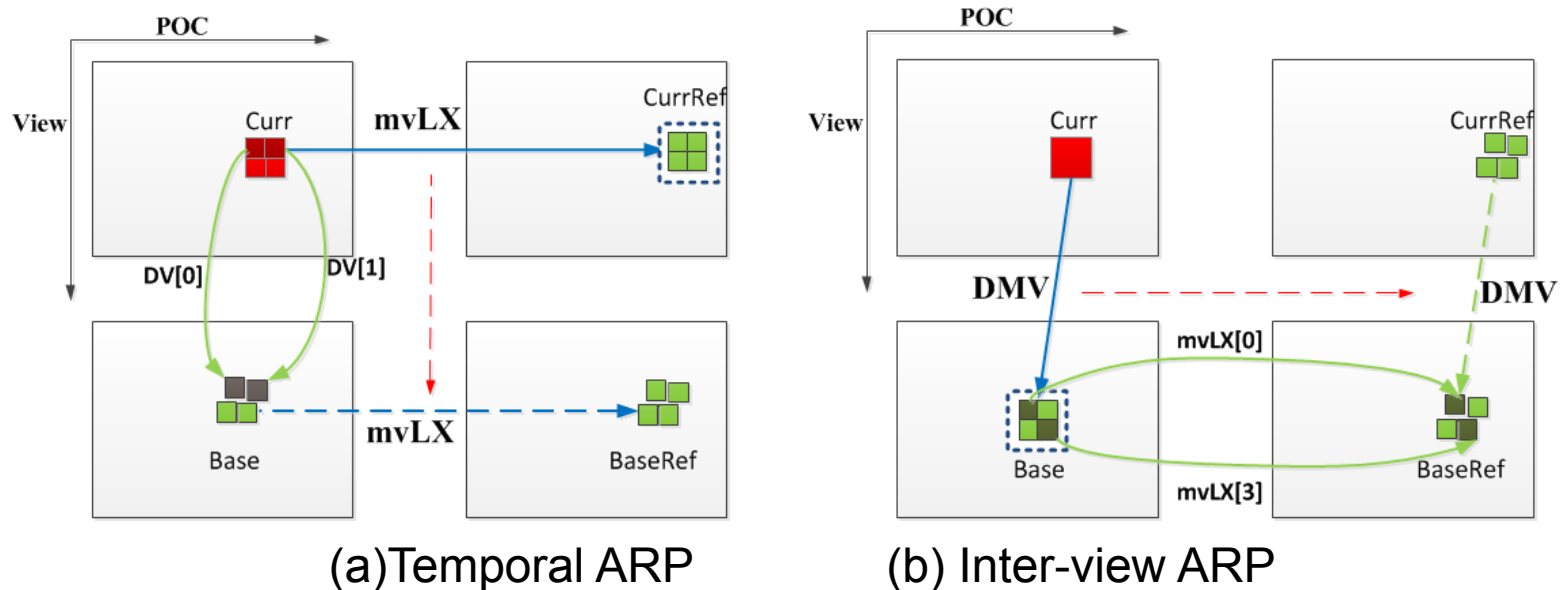


Figure 2. Prediction structure of block-level ARP.

- The residual of chroma components is not coded if the current PU is coded with ARP;

Subset C. Interaction with other coding tools

- Disable IC when APR is applied: JCT3V-G0121(#2) and JCT3V-G0072(#1)
- Disable ARP when IC is applied: JCT3V-G0072(#2)

Simulation results

■ Simulation results reported in CE proposals

* using a different platform

** coding results of BVSP off case missing

Table 1: Summary of CE results compared to 3D-HTM

Topics	Proposals	Simulation Results						
		Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / total bitrate	Synth PSNR / total bitrate	Enc. time	Dec. time
Simplified Inter-view ARP *	<u>JCT3V-G0158</u>	0.3%	0.3%	0.1%	0.1%	0.1%	101%	102%
MV-Cand ARP with 3 weighting factors**	<u>JCT3V-G0064</u>	-0.4%	-0.4%	-0.2%	-0.2%	-0.1%	110%	99%
MV-Cand ARP with 2 weighting factors**	<u>JCT3V-G0064</u>	-0.5%	-0.5%	-0.2%	-0.2%	-0.1%	103%	100%
Block-level ARP	<u>JCT3V-G0121</u>	-0.5%	-0.7%	-0.2%	-0.2%	-0.2%	104%	102%
disable IC when ARP is enabled	<u>JCT3V-G0072</u>	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	98%	99%
	<u>JCT3V-G0121</u>	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	98%	100%
disable ARP when IC is enabled	<u>JCT3V-G0072</u>	-0.1%	-0.1%	0.0%	0.0%	0.0%	98%	99%

Proposed methods

- Topics in CE 4
 - Subset A: complexity reduction
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 - Subset C: Interaction with other tools
- CE-related topics
 - Subset A: complexity reduction
 - Subset B: coding performance

Subset A. Complexity reduction

- Simplification of inter-view ARP in **JCT3V-G0158**
 - Removal of the constraint of DV-MCP: in NBDV derivation process, the DV-MCP information of spatial neighbouring blocks are always checked even they are not coded as skip mode.
 - Combination of inter-view and temporal ARP: The DVs from NBDV and DoNBDV processes are both updated to the disparity motion vector associated with current block, if available. The updated disparity vectors are used in ARP process.
- Disable ARP for 4x4 chroma blocks in **JCT3V-G0033**

Subset B. Coding efficiency

- Aligned Temporal DV (ATDV) in JCT3V-G0064 (#2)
 - On top of ADVD, a new DV candidate, i.e., ATDV, is obtained from the aligned block, which is located by a scaled MV to the collocated picture.
 - Two collocated pictures are utilized, which are also used in the NBDV derivation.
 - ATDV is checked before DV candidates from neighbouring blocks when it is used.

Subset B. Coding efficiency

- An alternative disparity vector derivation method for ARP in JCT3V-G0095
 - Two candidates, including both disparity vectors from NBDV process and the from DoNBDV process may be utilized by ARP.
 - The best candidate is signalled in the bitstream.

Simulation results

■ Coding performance of CE related techniques

Table 2: Summary of CE related results compared to 3D-HTM

Topics	Proposals	Simulation Results						
		Video 1	Video 2	Video PSNR / Video bitrate	Video PSNR / total bitrate	Synth PSNR / total bitrate	Enc. time	Dec. time
Simplified Inter-view ARP + DV-MCP	<u>JCT3V-G0158</u> *	0.3%	0.2%	0.1%	0.1%	0.1%	101%	101%
Simplified Inter-view and temporal ARP + DV-MCP	<u>JCT3V-G0158</u> **	0.3%	0.2%	0.1%	0.1%	0.1%	101%	102%
ARP Removal for 4x4 chroma blocks	<u>JCT3V-G0033</u>	0.1%	0.1%	0.0%	0.0%	0.0%	100%	100%
MV-Cand ARP + ATDV with 2 weighting factors	<u>JCT3V-G0064</u>	-0.7%	-0.7%	-0.2%	-0.2%	-0.2%	103%	98%
NBDV and DoNBDV adaptation	<u>JCT3V-G0095</u> **	-0.3%	-0.3%	-0.1%	-0.1%	-0.1%	100%	100%

Thank you!