

REDEFINING MOBILITY



# JCT3V-F0123: Further improvements on advanced residual prediction

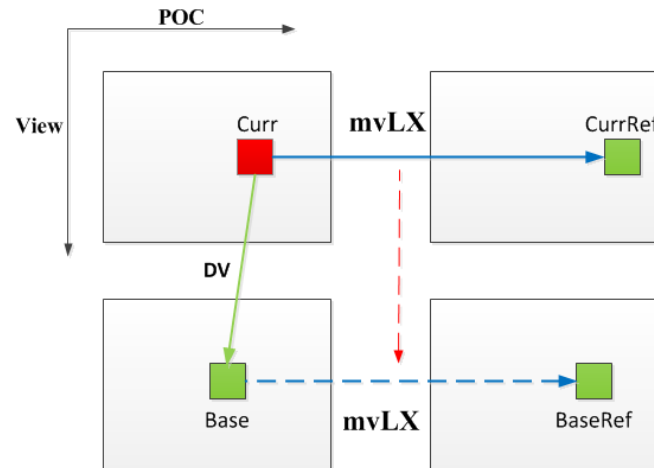
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# Summary

- A follow-up of JCT3V-E0124, with the following main aspects proposed:
  - ARP is extended to inter-view residual
  - Disparity vector refinement for current ARP
  - Joint optimization of signaling illumination compensation flag and ARP weighting factors
  - Extend the PU-level ARP to block-level ARP.
- Proposed method provides an improved coding gain of 0.7% and 0.5% for texture views and synthesized views, respectively.

# Introduction

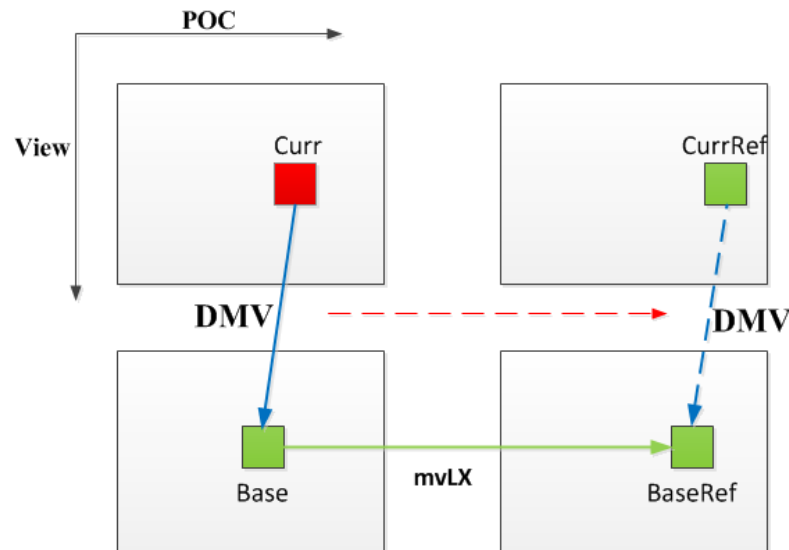
- Advanced residual prediction in 3D-HEVC
  - Applied to temporal residual with the disparity vector (DV) derived from NBDV
  - Residual predictor generation
    - The difference between two reference blocks in a reference view ( $\text{Base} - \text{BaseRef}$ )
  - Temporal motion vector of current block is inherited



- A weighting factor index is signaled in CU-level

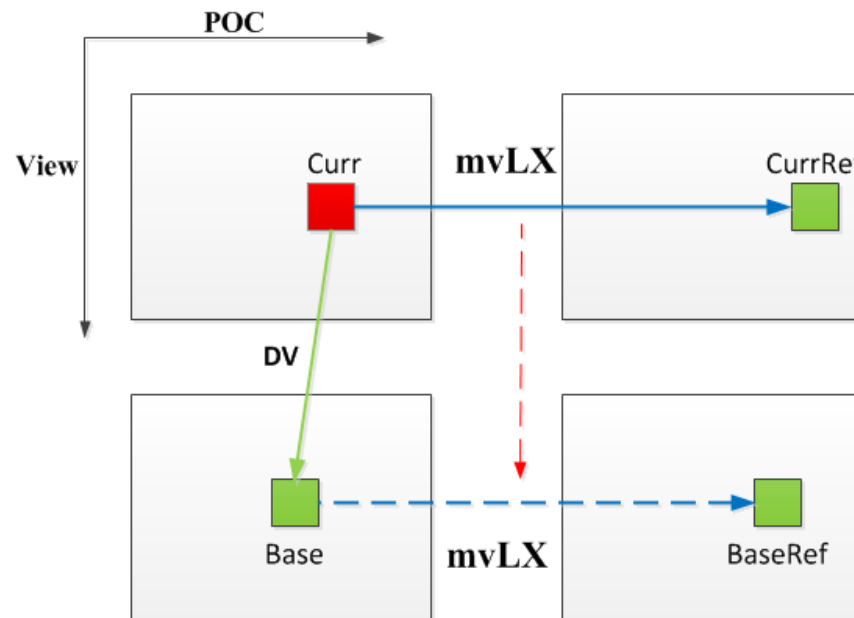
# Proposed method #1

- ARP is extended to inter-view residual
  - Residual predictor generation
    - The difference between two reference blocks in a different access unit ( $\text{CurrRef} - \text{BaseRef}$ )
  - Disparity motion vector of current block is inherited
  - Temporal motion vector ( $\text{mvLX}$ ) of the block covering the center position of Base is utilized.



# Proposed method #2

- DV refinement for current ARP
  - The DV is replaced by a disparity motion vector (DMV) contained by the reference block for residual predictor generation.
  - Only the DMV of the block covering the center position of CurrRef is utilized.



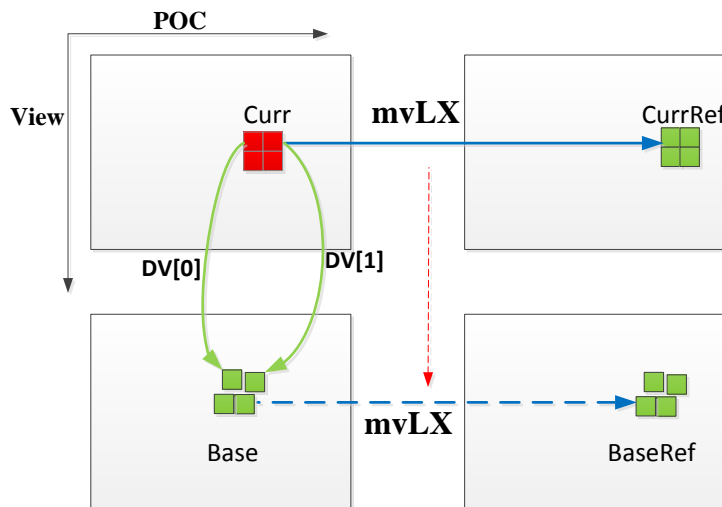
# Proposed method #3

- Joint optimization of IC and ARP weighting factor signaling
  - ic\_flag is not signaled when ARP weighting factor is unequal to 0

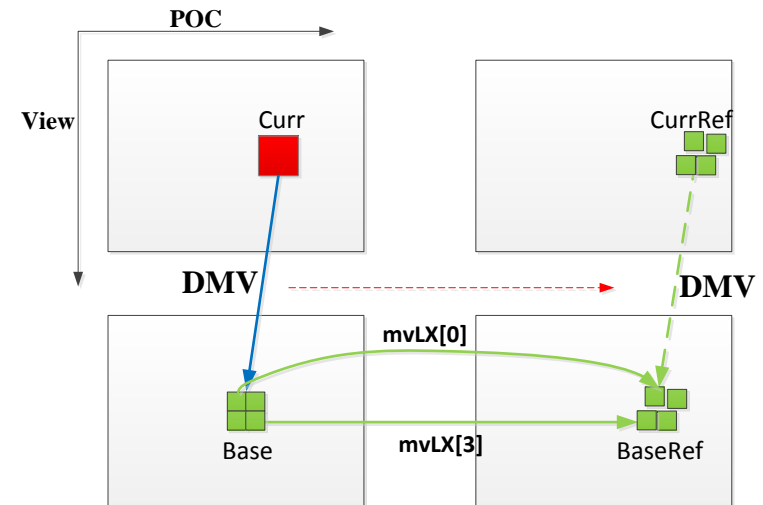
# Proposed method #4

## ■ Block-level ARP

- One PU is split into several 8x8 blocks and for each 8x8 block, the proposed ARP method is applied.
  - When ARP is applied to temporal residual, DV may be different among 8x8 blocks while temporal motion information is kept unchanged.
  - When ARP is applied to temporal residual, temporal motion information may be different among 8x8 blocks while disparity motion information is kept unchanged.



(a)



(b)

**Prediction structure of block-level ARP: (a) temporal residual (b) inter-view residual.**

# Experimental results

- Test conditions
  - CTC, HTM 8.0
- Coding performance

Table 1: Coding gain w.r.t. anchor for 3-view case

	Video 1	Video 2	Video PSNR /video bitrate	Video PSNR /total bitrate	Synth PSNR /total bitrate
Test #1 (Full proposal)	-1.82%	-1.92%	-0.66%	-0.58%	-0.52%
Test #2 (PU-level ARP)	-0.90%	-0.87%	-0.37%	-0.33%	-0.27%
Test #3 (ARP for inter-view residual)	-0.58%	-0.54%	-0.23%	-0.20%	-0.17%

- Thanks to MediaTek and LG for the crosscheck!  
(JCT3V-F0231/F0247)



# Conclusions

- The proposed scheme further improves the performance of ARP by:
  - Enabling it for inter-view residual
  - Refined DV
  - A better way to signal weighting factors and ic\_flag
  - Extension of PU-level ARP to block-level
- Main results
  - The coding efficiency is improved by 0.7% for texture views

# Thank you!