

JVET-AG0194

Non-EE2: Reference filtering for inter-prediction

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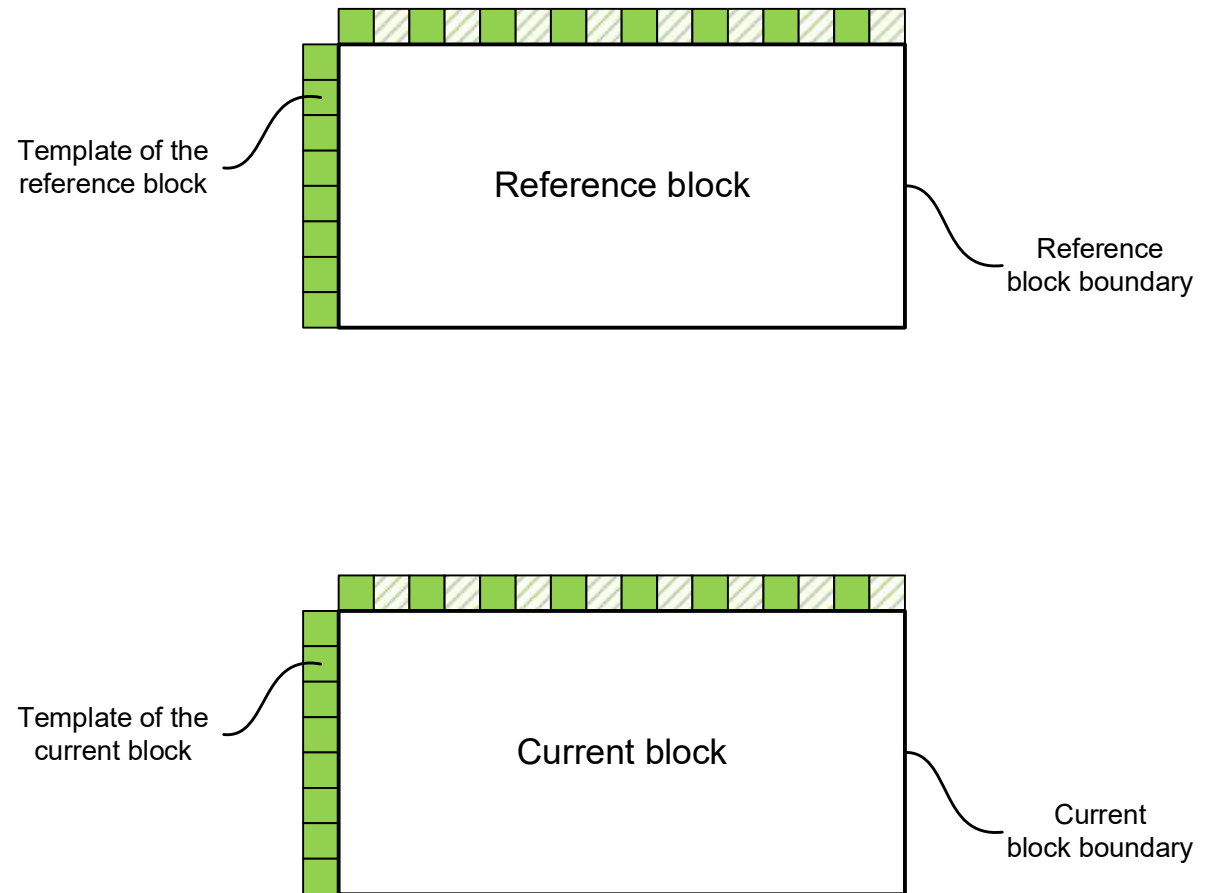
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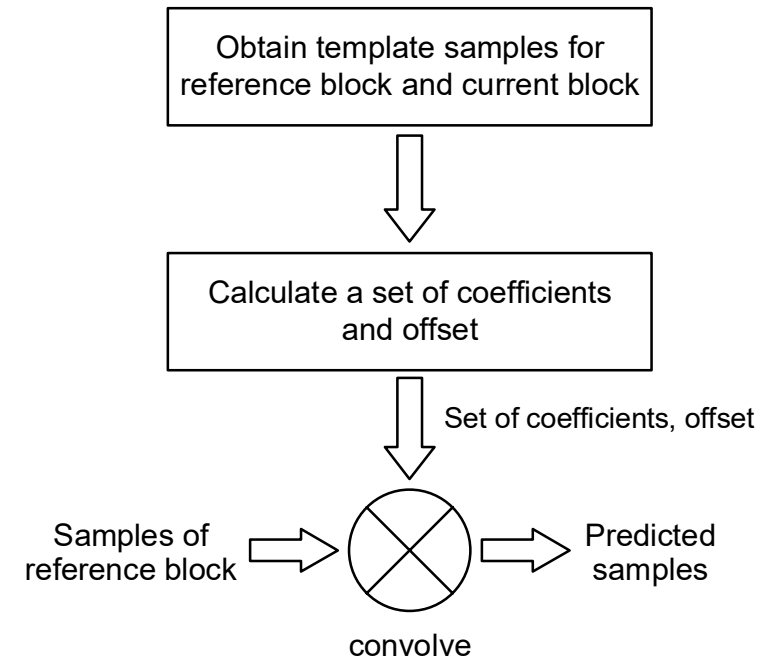
Background

- LIC parameter derivation in ECM-11.0:
 - ✓ **2-parametric linear model** is derived using the adjacent line of a block
 - Some samples are decimated
 - ✓ Parameters of the linear model used in LIC:
 - *Scale*
 - *Shift* (set to 5 in ECM-11.0)
 - *Offset*
 - $Pred = ((Scale * Ref) \gg Shift) + Offset$, where **Ref** and **Pred** stand for reference and predicted samples

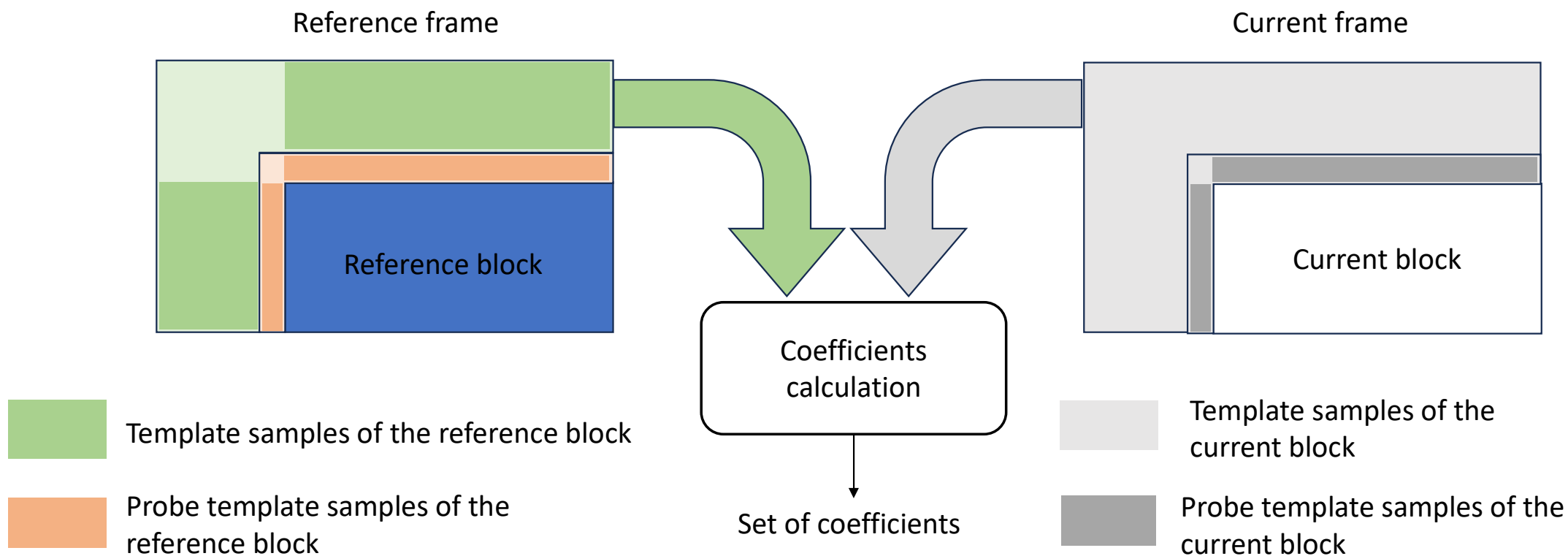


Proposal

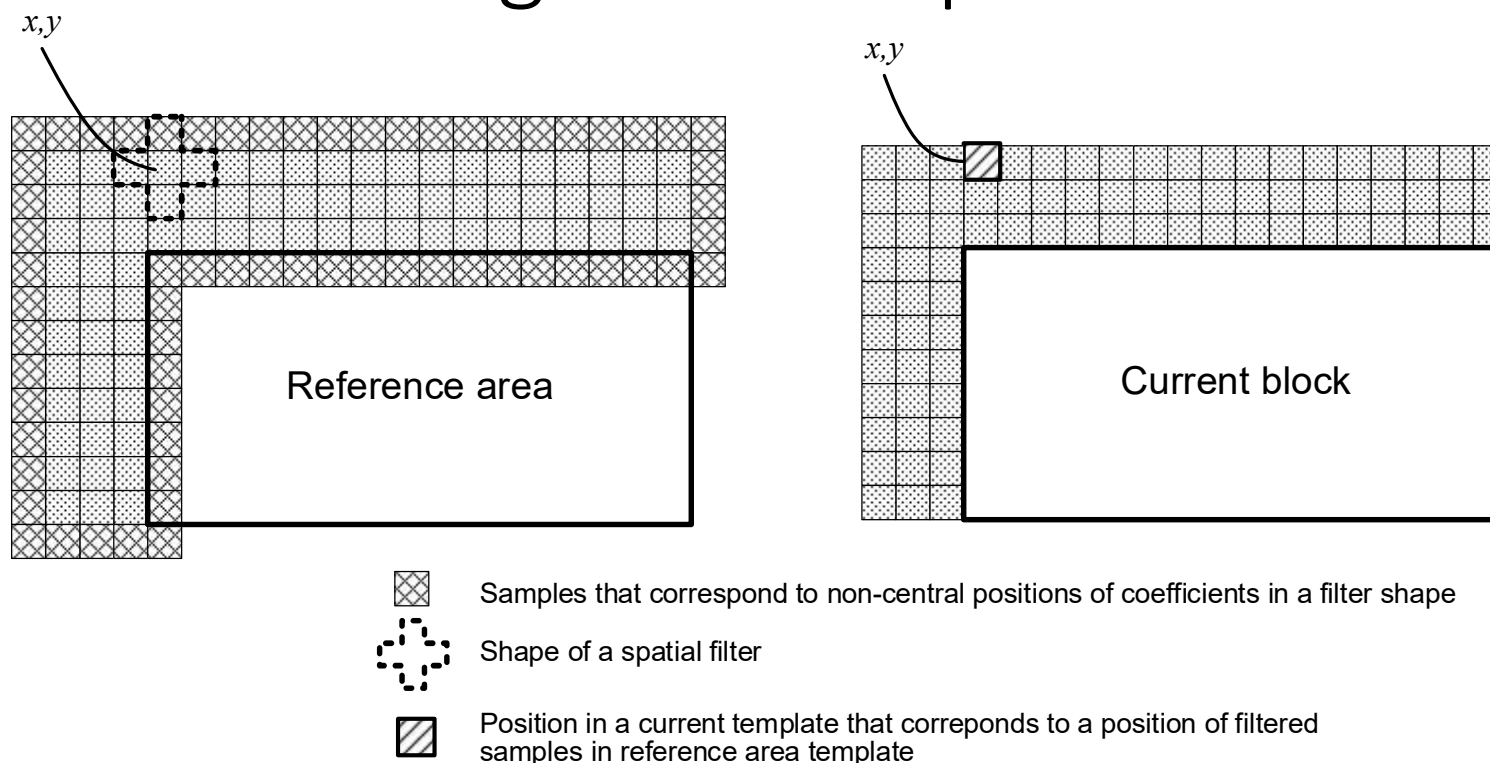
- Extend the set of models applicable to inter-predicted blocks:
 - ✓ In addition to the current 2-parametric LIC model, higher-order models can be used to filter reference blocks to get prediction blocks
 - ✓ Switching between models using
 - a flag
 - TM cost value obtained for a probe line



Proposal: Reference Filtering for Inter Prediction



Reference filtering for inter-prediction



- Filter parameters are derived using template samples in reference area and current block
- Reference area is filtered using the derived filter coefficients when obtaining predicted block
- Several filters with different parameter sets could be applied within the reference area

RFIP: merge mode

- LIC flag derivation for merge candidates with template costs (JVET-AF0128):
 - each merge candidate is checked for SAD/MR-SAD and dSAD(1)/dSAD(s) to determine LIC flag

Current block template

$$\hat{\Delta} = \sum_{ij} (\hat{p}_i - \hat{p}_j)$$

Reference block template

$$\Delta = \sum_{ij} (p_i - p_j)$$

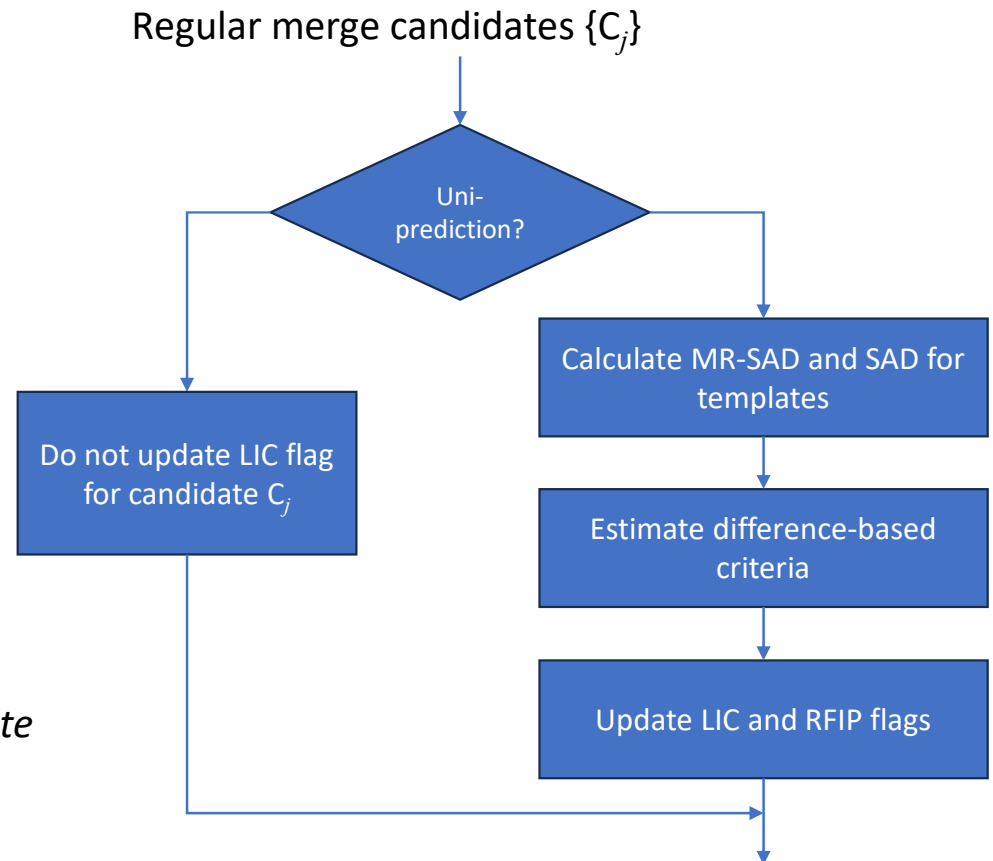
Scale estimation: $s = \hat{\Delta} / \Delta$

$$dSAD(s) = \sum_{ij} |(\underbrace{\hat{p}_i - \hat{p}_j}_{\text{Current block template}}) - s \cdot (\underbrace{p_i - p_j}_{\text{Reference block template}})|$$

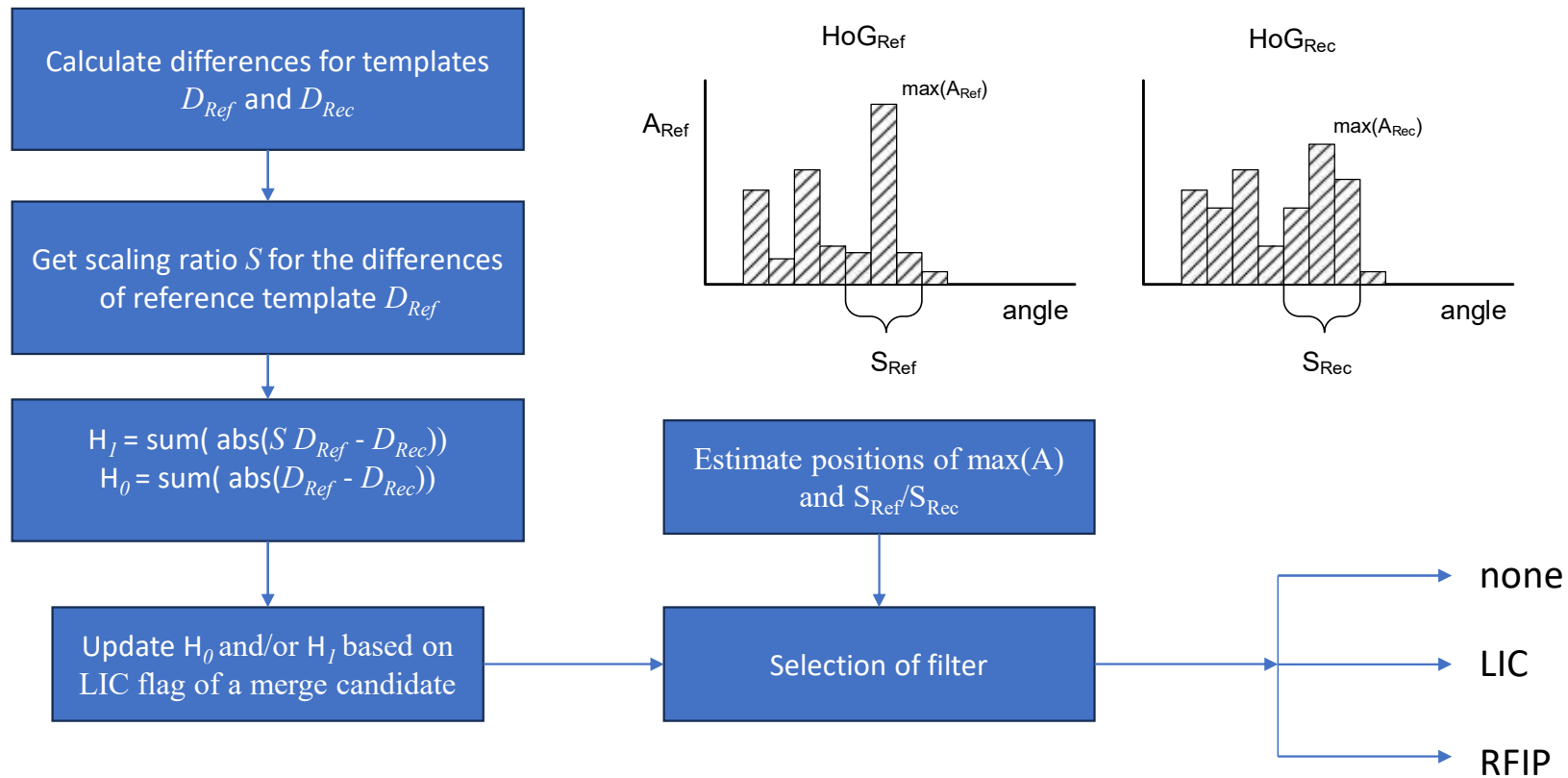
Current block template

Reference block template

- In this method, additional check is introduced to determine whether RFIP is performed for the merge candidate



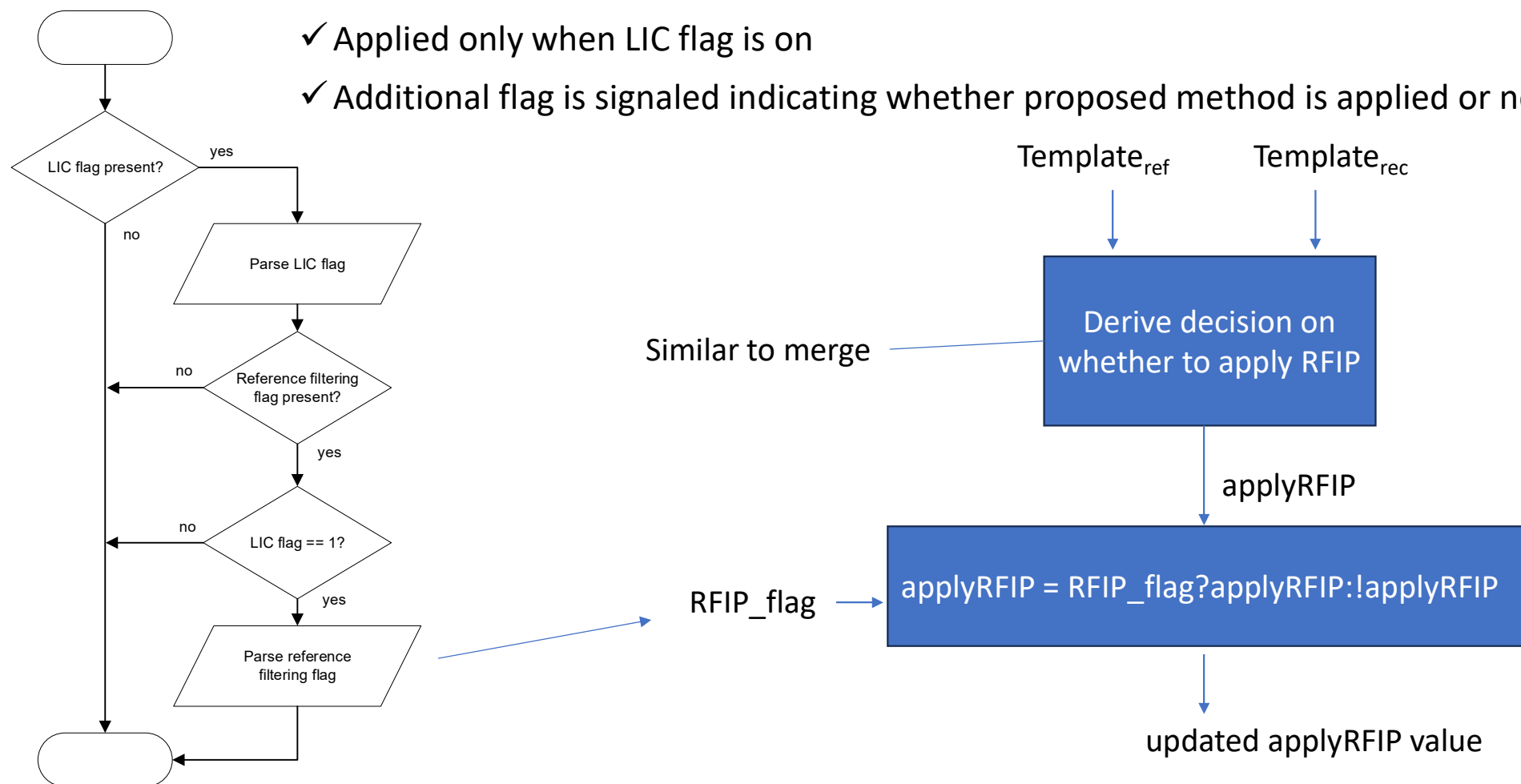
RFIP: merge mode (cont'd)



RFIP: AMVP mode

✓ Applied only when LIC flag is on

✓ Additional flag is signaled indicating whether proposed method is applied or not



Experimental results

Random Access Main 10	Y	U	V
Class A1	-0.13%	0.01%	-0.05%
Class A2	-0.11%	-0.15%	-0.15%
Class B	-0.10%	-0.16%	-0.08%
Class C	-0.10%	-0.11%	-0.04%
Class E			
Overall	-0.11%	-0.11%	-0.08%
Class D	-0.14%	-0.12%	-0.17%

Low Delay B Main 10	Y	U	V
Class A1			
Class A2			
Class B	-0.12%	0.27%	0.51%
Class C	-0.14%	-0.08%	-0.40%
Class E	-0.08%	-0.27%	-0.11%
Overall	-0.12%	0.02%	0.05%
Class D	-0.12%	0.22%	-0.73%

Conclusions

We recommend this proposal for studying in the next round of EE2

THANK YOU