

MEDIATEK

JVET-L0091

CE4-related: Shared Merge List

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Overall Summary

- The merge estimation region (MER) only supports square block which is not suitable for QTMTT structure
- Proposed to share the same merge list for all leaf CUs of one ancestor node in the CU split tree
 - The merge list is constructed by using the CU shape of the ancestor
 - Facilitate parallel processing

	Over VTM 2.0.1				
	Y	U	V	EncT	DecT
RA	0.09	0.19	0.11	101	102
LB	0.05	0.10	0.05	101	101

Problem Statement

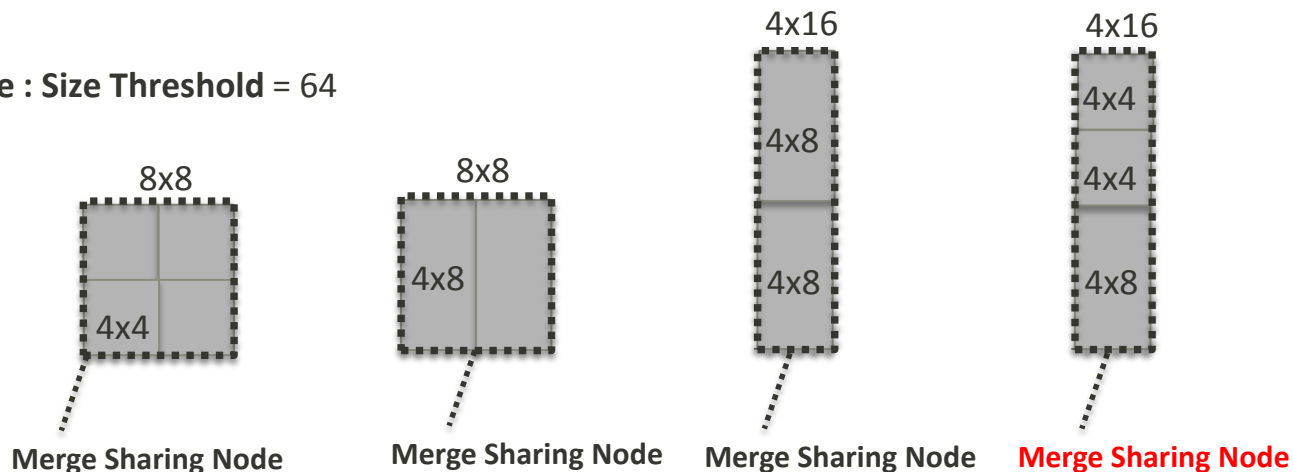
- Since merge mode has data dependency in merge list construction, and the cycle budget is not enough for sequential merge mode encoding
- A parallel-design-friendly algorithm is preferred

Assuming Clock @ 1GHz	8K 60fps decoder	8K 120fps decoder
4x4 CU	8	4
4x8 or 8x4 CU	16	8
8x8 CU	32	16
Assuming Clock @ 500MHz	8K 60fps decoder	8K 120fps decoder
4x4 CU	4	2
4x8 or 8x4 CU	8	4
8x8 CU	16	8

Proposed Method : Shared Merge List

- Share the same merge list for all leaf CUs of one ancestor node in the CU split tree
- The shared merge list is **generated at the merge sharing node** pretending the merge sharing node is a leaf CU
- A size threshold can be defined or signaled

Example : Size Threshold = 64



Proposed Method : Shared Merge List

- Enabling parallel processing for merge estimation and merge candidate list construction
 - Similar to QT/MTT-shape based merge estimation region (MER)
- Shared merge list
 - An improvement compared with QT/MTT-shape based MER
 - Only generating once and reused for all leaf CUs
 - Unified and cost-effective for hardware design

Simulation Results

JVET-L0091

- Share merge list for normal merge mode only
 - Not applied on affine merge

Condition	Size Threshold	Class
$0 < \text{Picture Size} < 2^{17}$	32	D
$2^{17} \leq \text{Picture Size} < 2^{19}$	64	C
$2^{19} \leq \text{Picture Size} < 2^{22}$	128	B, E
$2^{22} \leq \text{Picture Size}$	256	A

	Random Access Main 10				
	Over VTM-2.0.1				
	Y	U	V	EncT	DecT
Class A1	0.04%	0.20%	0.08%	101%	104%
Class A2	0.18%	0.34%	0.35%	101%	101%
Class B	0.06%	0.13%	0.03%	101%	102%
Class C	0.10%	0.15%	0.06%	101%	101%
Overall	0.09%	0.19%	0.11%	101%	102%
Class D	0.01%	0.02%	0.13%	101%	102%
	Low delay B Main10				
	Over VTM-2.0.1				
	Y	U	V	EncT	DecT
Class B	0.06%	-0.11%	-0.15%	101%	101%
Class C	0.12%	0.24%	0.35%	101%	101%
Class E	-0.08%	0.27%	0.00%	101%	102%
Overall	0.05%	0.10%	0.05%	101%	101%
Class D	0.01%	0.06%	-0.11%	101%	102%

Simulation Results

- Further support the affine share merge list

	Random Access Main 10				
	Over VTM-2.0.1				
	Y	U	V	EncT	DecT
Class A1	0.04%	0.22%	0.13%	100%	101%
Class A2	0.17%	0.30%	0.29%	101%	102%
Class B	0.07%	0.12%	0.00%	101%	103%
Class C	0.10%	0.15%	0.06%	101%	101%
Overall	0.09%	0.18%	0.10%	101%	102%
Class D	0.01%	0.02%	0.13%	101%	102%
	Low delay B Main10				
	Over VTM-2.0.1				
	Y	U	V	EncT	DecT
Class B	0.08%	-0.09%	-0.06%	101%	98%
Class C	0.12%	0.24%	0.35%	102%	101%
Class E	-0.04%	0.00%	-0.24%	101%	103%
Overall	0.06%	0.04%	0.03%	101%	100%
Class D	0.01%	0.06%	-0.11%	101%	103%

Conclusions

- Proposed to share the same merge list for all leaf CUs of one ancestor node in the CU split tree
 - The merge list is constructed by using the CU shape of the ancestor
 - Facilitate parallel processing
- Less than 0.1% BD-rate on average