

JCTVC-G442

Improvement to chroma TU specification

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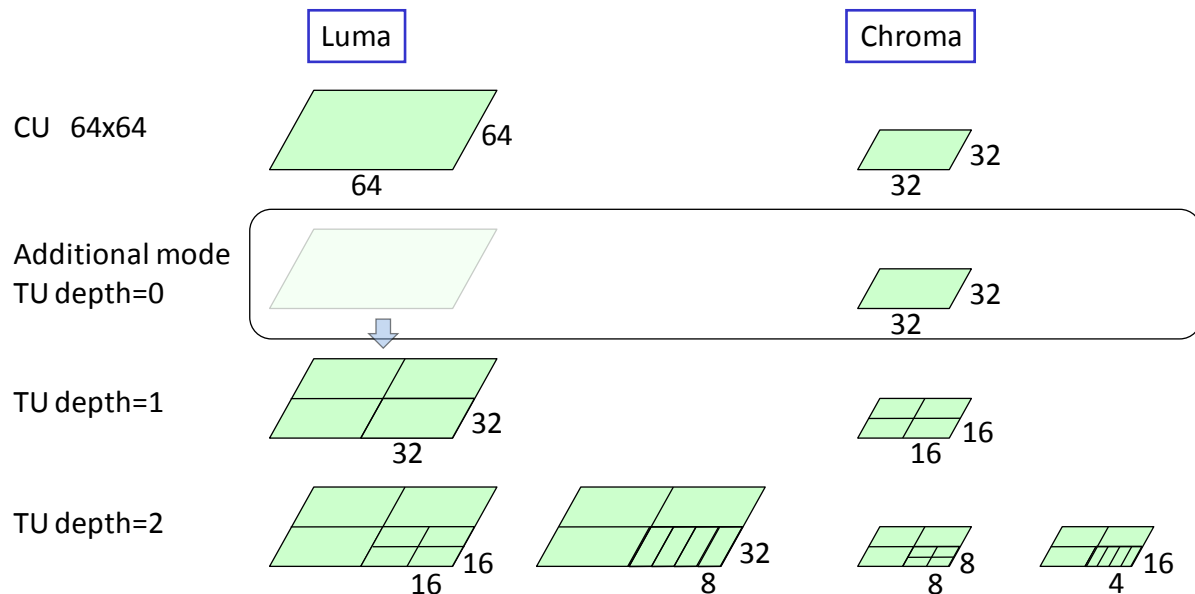
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NHK

- Propose an improvement to chroma TU specification
 - Up to the size of 32x32 TU can be used for chroma
 - Fixed chroma TU depth up to 1 depending on PU type
 - TU depth = 0 for CU with 2Nx2N PU
 - TU depth = 1 for the rest
- Test results
 - Averaged Chroma BD-rate gain $(BDU+BDV)/2$:
 - 2.0%, 2.1%, 1.0% for AI-HE, RA-HE, LB-HE
 - 2.9%, 2.0%, 0.9% for AI-LC, RA-LC, LB-LC
 - Averaged overall BD-rate gain $(6*BDY+BDU+BDV)/8$:
 - 0.6%, 0.6%, 0.3% for AI-HE, RA-HE, LB-HE
 - 0.9%, 0.7%, 0.4% for AI-LC, RA-LC, LB-LC
 - Encoding run-time decreased by 2-3%
- Propose the scheme to be adopted to HM-5/WD-5

Proposed method 1

- Introduction of 32x32 TU for chroma
 - When luma TU is forced to be split at 64x64 CU
 - In other CUs, TU split for chroma works the same as in HM-4



Simulation Results (1)

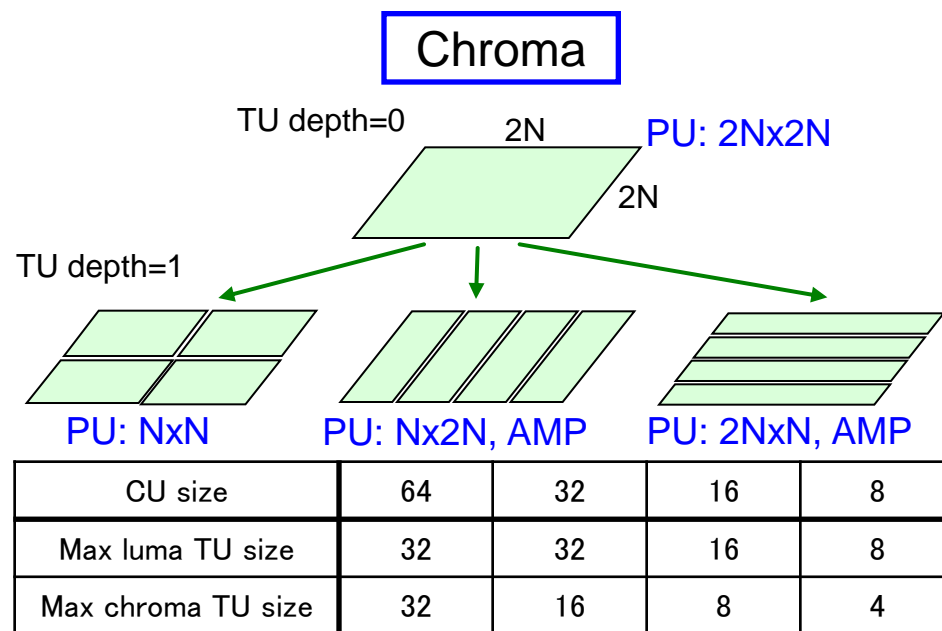
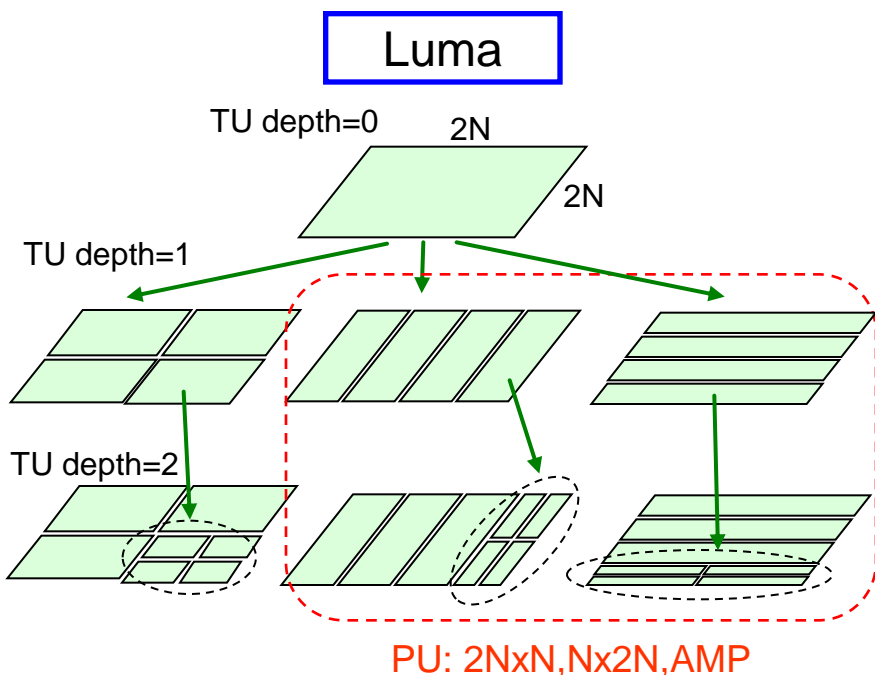
- Anchor: HM4.0 default condition
- Tested: Proposed method 1 implemented on HM4.0

Average BD-rate					
	Y	U	V	enc time	dec time
AI / HE	0.0%	-0.8%	-0.8%	101%	99%
RA / HE	0.0%	-1.0%	-1.0%	103%	99%
LD / HE	0.1%	-1.2%	-1.0%	102%	100%
AI / LC	0.0%	-0.4%	-0.4%	100%	100%
RA / LC	0.0%	-0.5%	-0.5%	102%	101%
LD / LC	0.0%	-0.3%	-0.5%	101%	98%

0.3-1.2% BD-rate gain for chroma

Proposed method 2

- Introduce a different TU split decision for chroma
 - Depends on PU type
 - Independent from luma TU split
 - Chroma TU depth is
 - set to 0 for $2N \times 2N$ PU
 - set to 1 for rectangular PU and $N \times N$ PU



Simulation Results (2)

- Anchor: HM4.0 default condition
- Tested: Proposed method 2 implemented on HM4.0

Average BD-rate					
	Y	U	V	enc time	dec time
AI / HE	-0.1%	-2.1%	-1.9%	101%	100%
RA / HE	-0.1%	-2.1%	-2.1%	97%	100%
LD / HE	0.0%	-1.0%	-1.0%	98%	101%
AI / LC	-0.2%	-2.9%	-3.0%	99%	100%
RA / LC	-0.2%	-2.1%	-2.0%	97%	101%
LD / LC	-0.2%	-0.8%	-1.1%	97%	101%

0.8-3.0% BD-rate gains for chroma with reduced enc time

Conclusions

- The proposed scheme (method 2) uses
 - Up to the size of 32x32 TU for chroma
 - Fixed chroma TU depth up to 1 depending on PU type
 - TU depth = 0 for CU with 2Nx2N PU
 - TU depth = 1 for the rest
- Test results
 - 0.3-0.9% averaged total BD-rate gain
 - Encoding run-time decreased by 2-3%
- Propose the scheme to be adopted to HM-5/WD-5