JCTVC–I0186

On Intra Mode Coding

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Proposal overview
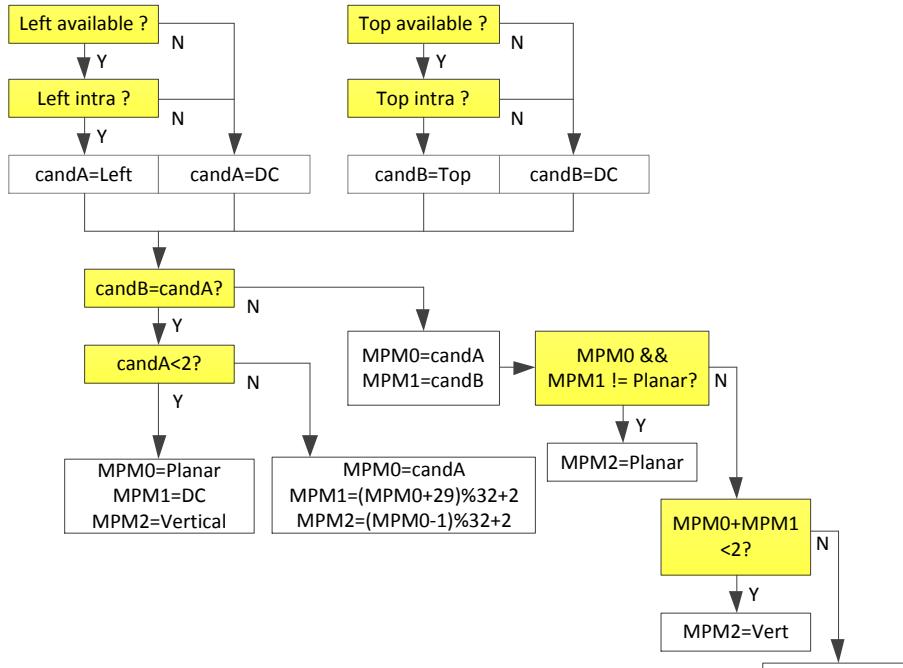
- Stats on intra mode usage (first 25 frames of all sequences, AI-Main, AI-HE10)

|	MPM0	MPM1	MPM2	Planar mode	Planar among the 3 MPMs
Stats HM	35%	18%	13%	20%	90%

- Proposal 1: MPM0 only depends on 1 CU (left)

- Proposal 2: MPM2 is always Planar
  - Includes an encoder modification that also brings gain in HM6
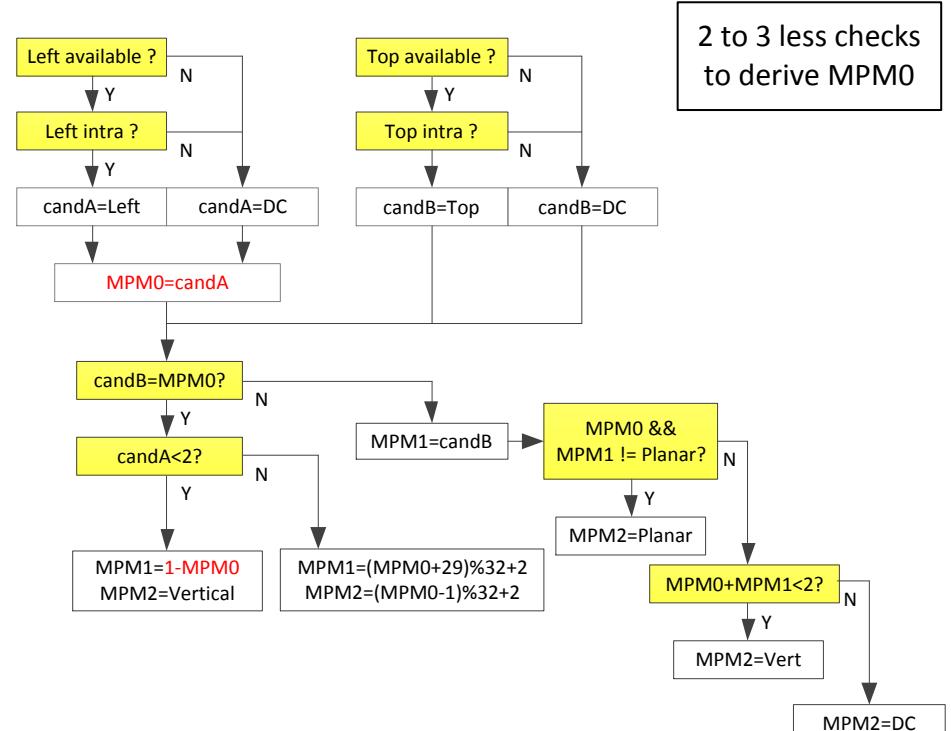
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Proposal 1: MPM0 derived from left CU

- **Rationale: in HM6, MPM0 chosen in avg 35% of time**
- **MPM derivation**
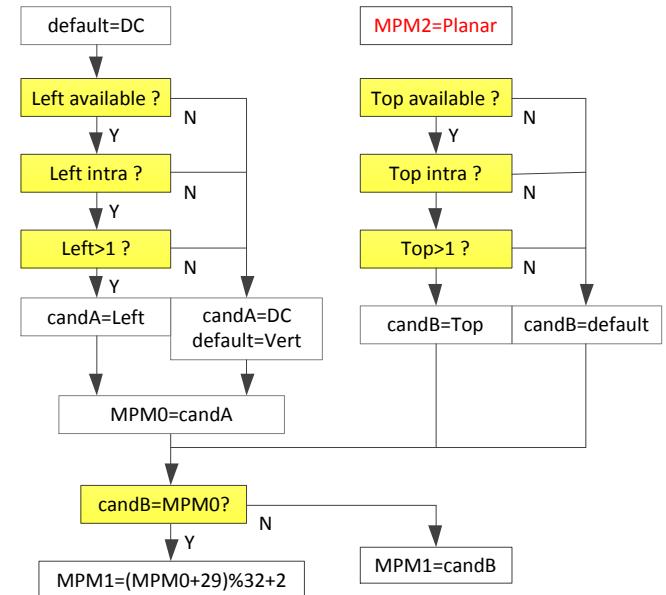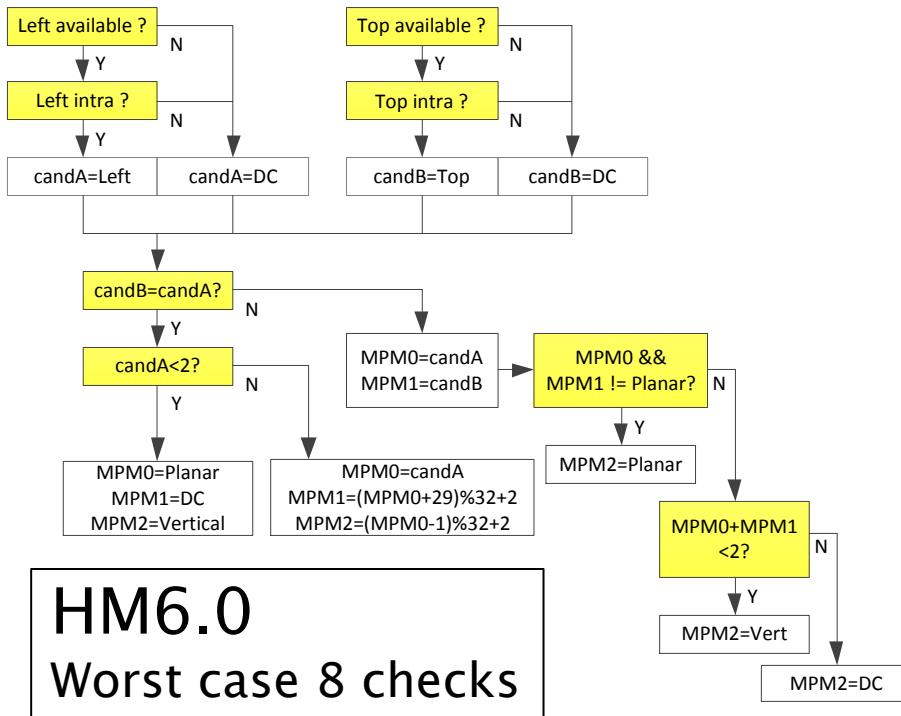
Proposal 1: MPM0 derived from left CU

- No impact on coding efficiency
- Simplified process when MPM0 is chosen

	All Intra Main			All Intra HE10		
	Y	U	V	Y	U	V
Class A	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
Class B	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class C	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class D	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class E	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Overall	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Class F	0.0%	0.0%	-0.1%	0.0%	0.1%	0.0%
Enc Time[%]	100%			100%		
Dec Time[%]	100%			100%		
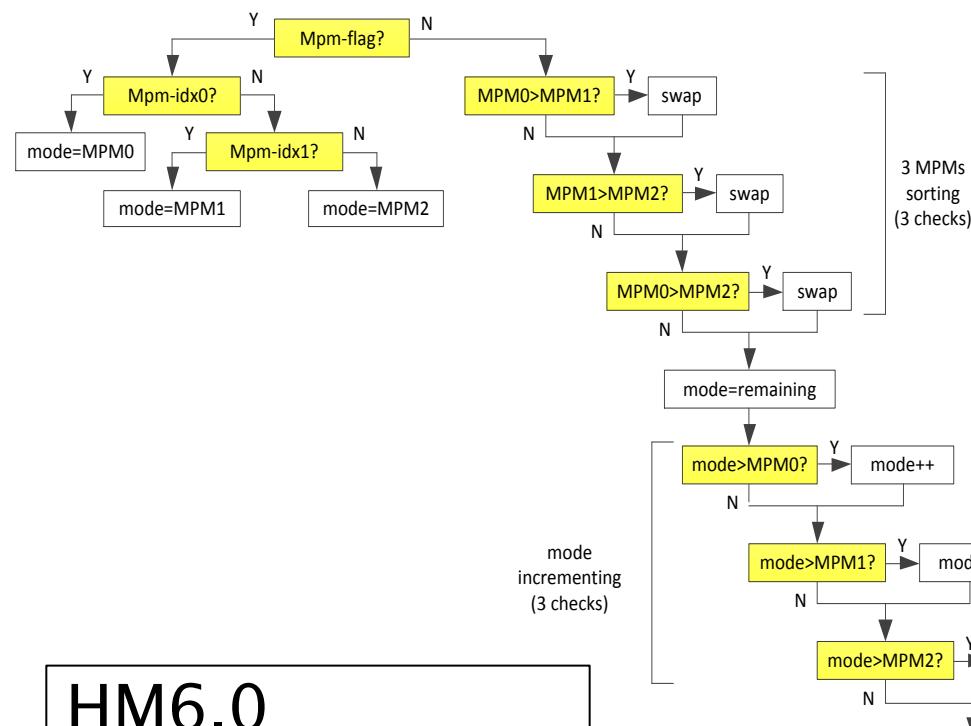
Proposal 2: MPM2 = planar

- **Rationale: in HM6, Planar is among the 3 MPMs in avg 90% of time**

- **MPM derivation**

HM6.0
Worst case 8 checks

Proposal 2
Worst case 7 checks
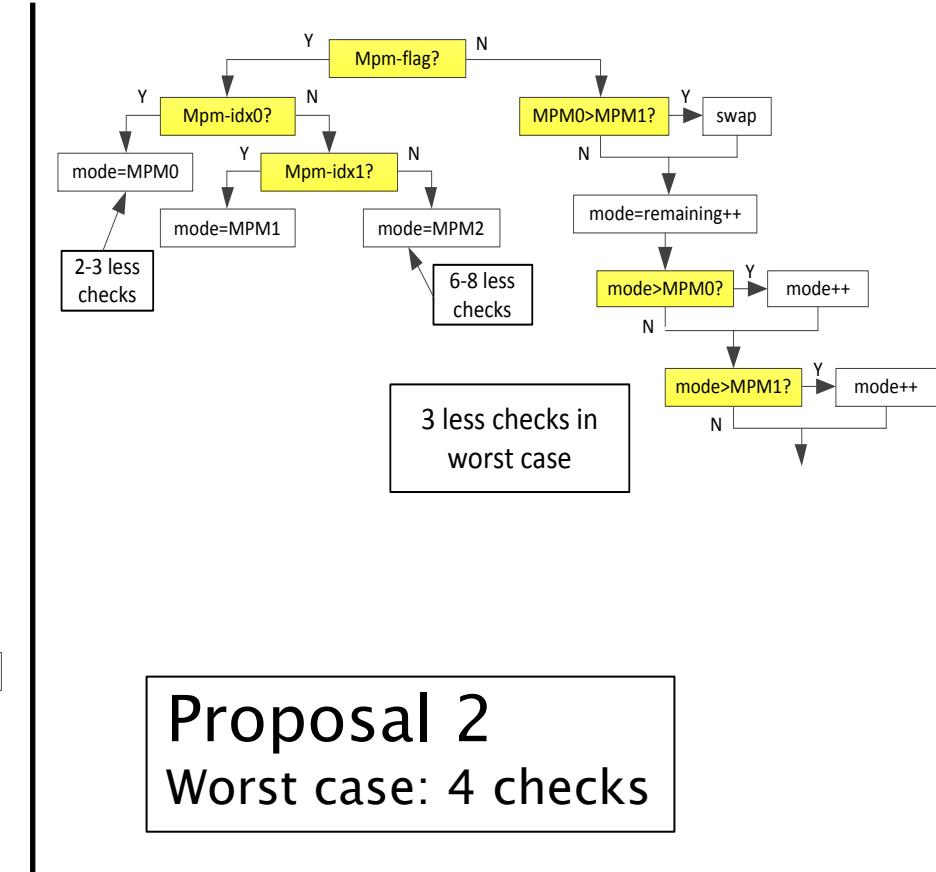
Proposal 2: MPM2 = planar

Decoding tree

HM6.0
Worst case: 7 checks

Proposal 2
Worst case: 4 checks

Proposal 2: MPM2 = planar

■ Encoder modification:

- If MPM2 is not among the candidate modes after the fast HAD-based selection, it replaces the last candidate
- Gain in HM6: 0.1% AIMain and AIHE, no added complexity

	All Intra Main			All Intra HE10		
	Y	U	V	Y	U	V
Class A	-0.1%	0.0%	0.1%	-0.1%	-0.1%	0.0%
Class B	-0.1%	0.0%	0.0%	-0.1%	0.0%	-0.1%
Class C	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%
Class D	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%
Class E	-0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
Overall	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%
	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%
Class F	-0.1%	0.0%	0.0%	-0.1%	0.0%	-0.1%
Enc Time[%]	100%			100%		
Dec Time[%]	100%			100%		

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Proposal 2: MPM2 = planar

■ Results

- Almost no impact on coding efficiency : similar gain as HM6 with encoder modification (0.1% AIMain and AIHE)

	All Intra Main			All Intra HE10		
	Y	U	V	Y	U	V
Class A	-0.1%	-0.1%	-0.2%	-0.1%	-0.2%	-0.1%
Class B	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.0%
Class C	-0.1%	0.0%	0.0%	-0.1%	0.0%	0.0%
Class D	-0.1%	0.0%	-0.1%	-0.1%	0.0%	0.0%
Class E	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%
Overall	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%
	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	0.0%
Class F	-0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%
Enc Time[%]	100%			100%		
Dec Time[%]	100%			99%		

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Proposal 2: MPM2 = planar

■ Simplified design

- 4 less checks in worst case
- MPM2 directly derived, no computation required
- 15 lines removed from CD text

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Summary

- **Goal is to simplify the intra mode coding process**

- **Proposal 1: MPM0 only depends on 1 CU (left)**
  - No impact on coding efficiency
  - Simplified MPM0 derivation, which is chosen in 35% of time

- **Proposal 2: MPM2 is always Planar**
  - Includes an encoder modification that also brings gain in HM6
  - Almost no impact on coding efficiency
  - 4 less checks
  - 15 less lines in CD text

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