



Suggestion on Picture Quality Hierarchy for Low Delay Configurations

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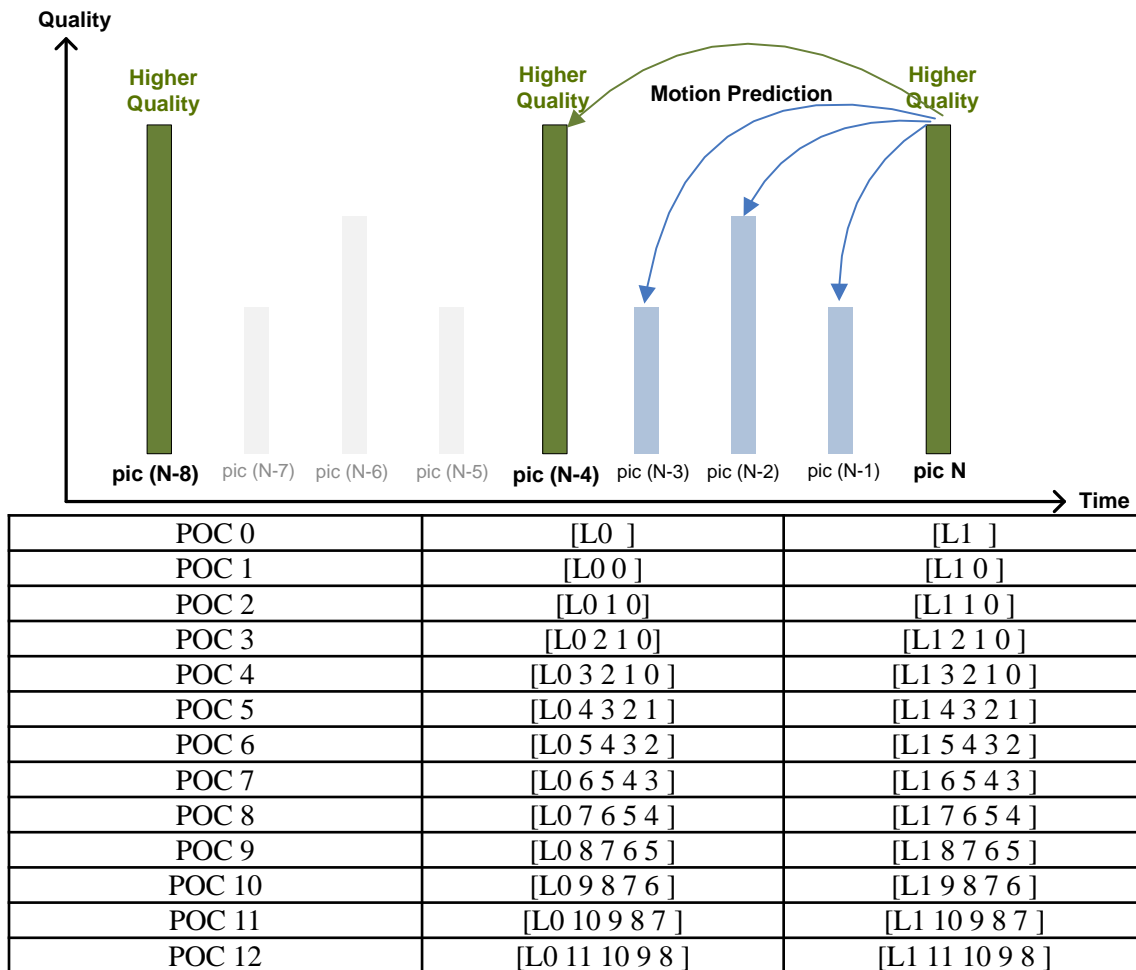


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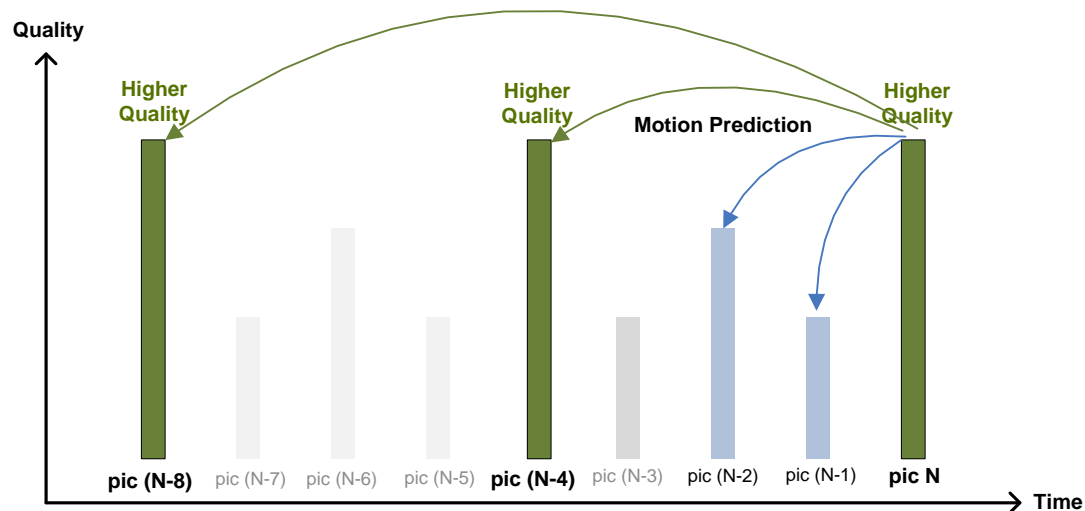
Reference Pictures for Low Delay

■ HM3.0



Reference Pictures for Low Delay

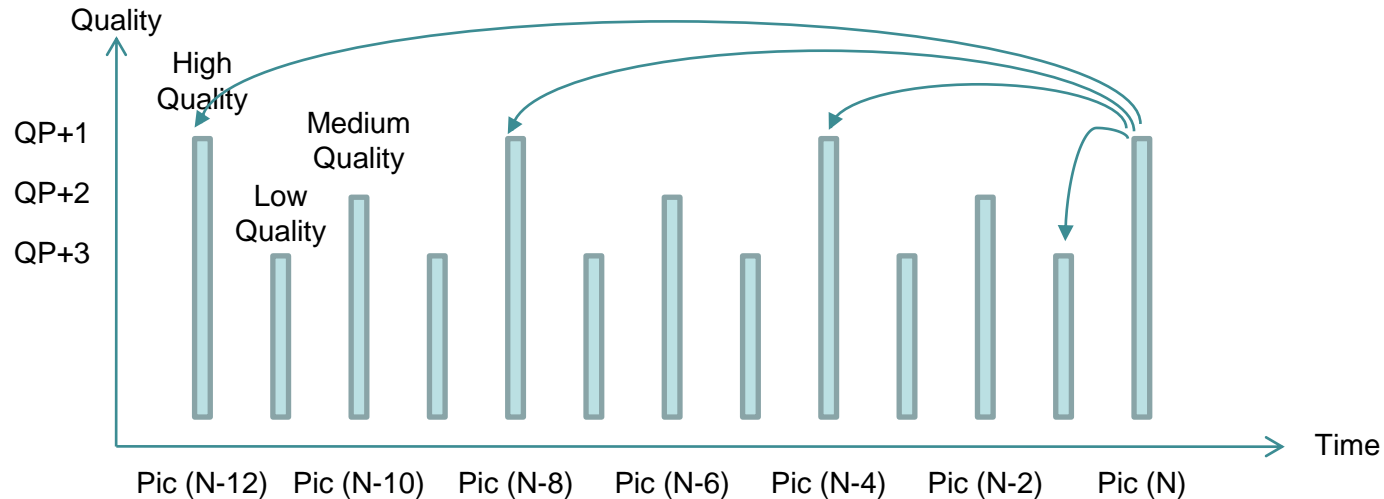
■ JCTVC-F433



POC 0	[L0]	[L1]
POC 1	[L0 0]	[L1 0]
POC 2	[L0 1 0]	[L1 1 0]
POC 3	[L0 2 1 0]	[L1 2 1 0]
POC 4	[L0 3 2 1 0]	[L1 3 2 1 0]
POC 5	[L0 4 3 2 0]	[L1 4 3 2 0]
POC 6	[L0 5 4 3 0]	[L1 5 4 3 0]
POC 7	[L0 6 5 4 0]	[L1 6 5 4 0]
POC 8	[L0 7 6 4 0]	[L1 7 6 4 0]
POC 9	[L0 8 7 4 0]	[L1 8 7 4 0]
POC 10	[L0 9 8 4 0]	[L1 9 8 4 0]
POC 11	[L0 10 9 8 4]	[L1 10 9 8 4]
POC 12	[L0 11 10 8 4]	[L1 11 10 8 4]

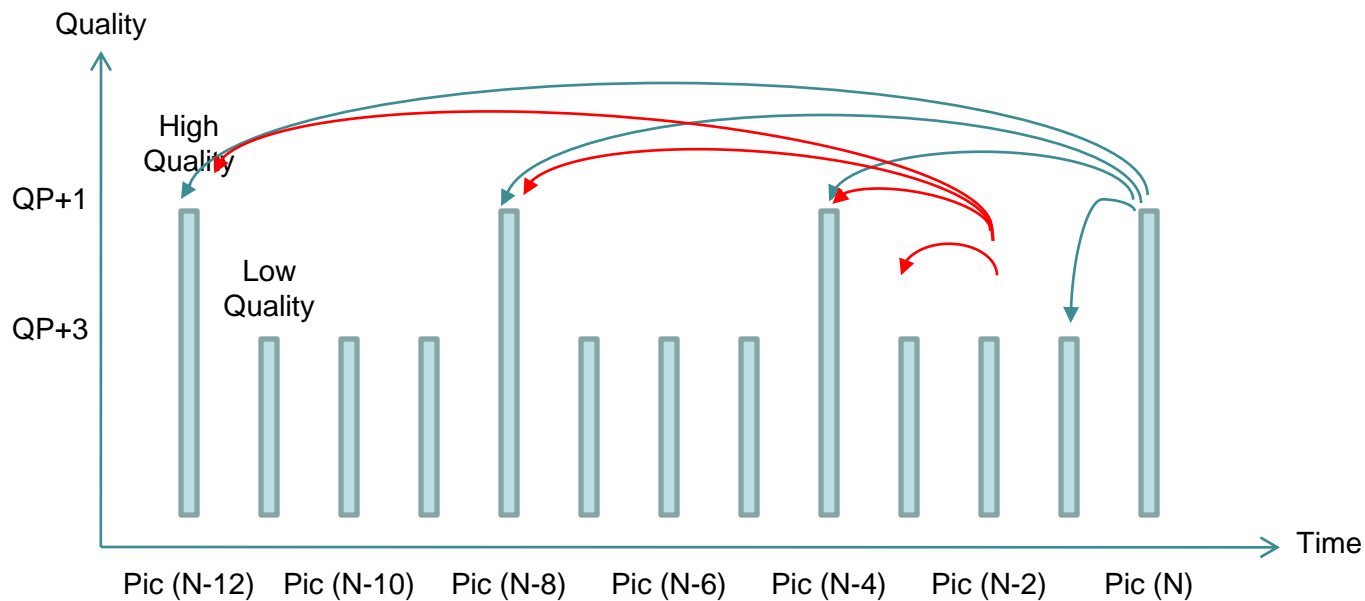
Reference Pictures for Low Delay

- JCTVC-F701 (HM4.0)



POC 0	[L0]	[L1]
POC 1	[L0 0]	[L1 0]
POC 2	[L0 1 0]	[L1 1 0]
POC 3	[L0 2 1 0]	[L1 2 1 0]
POC 4	[L0 3 2 1 0]	[L1 3 2 1 0]
POC 5	[L0 4 3 2 0]	[L1 4 3 2 0]
POC 6	[L0 5 4 3 0]	[L1 5 4 3 0]
POC 7	[L0 6 5 4 0]	[L1 6 5 4 0]
POC 8	[L0 7 6 4 0]	[L1 7 6 4 0]
POC 9	[L0 8 7 4 0]	[L1 8 7 4 0]
POC 10	[L0 9 8 4 0]	[L1 9 8 4 0]
POC 11	[L0 10 8 4 0]	[L1 10 8 4 0]
POC 12	[L0 11 8 4 0]	[L1 11 8 4 0]

Proposed Reference Pictures for Low Delay



Results

	Low delay B			Low delay B LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A						
Class B	0.2	-1.7	-1.8	0.2	-1.4	-1.8
Class C	-0.4	-1.7	-1.7	-0.3	-1.4	-1.7
Class D	-0.3	-1.7	-1.6	-0.3	-1.7	-2.0
Class E	-0.5	-2.1	-1.8	-0.6	-1.4	-2.1
All	-0.2	-1.8	-1.7	-0.2	-1.5	-1.9
Enc Time[%]	99%			99%		
Dec Time[%]	99%			99%		

	Low delay P			Low delay P LoCo		
	Y BD-rate	U BD-rate	V BD-rate	Y BD-rate	U BD-rate	V BD-rate
Class A						
Class B	0.0	-1.6	-1.8	0.2	-1.5	-1.9
Class C	-0.3	-1.9	-1.6	-0.3	-1.6	-1.6
Class D	-0.3	-1.8	-2.2	-0.3	-2.1	-2.3
Class E	-0.6	-2.1	-1.8	-0.6	-2.5	-1.9
All	-0.3	-1.8	-1.9	-0.2	-1.8	-1.9
Enc Time[%]	99%			99%		
Dec Time[%]	99%			99%		

Conclusion

- Propose to modify the picture quality hierarchy for Low Delay settings
 - Replace the multi-level hierarchical scheme by a two-level scheme
- More flexible high quality picture refreshing rate for Low Delay applications
- Consistent coding efficiency gain for both Luma (0.2-0.3%) and Chroma (avg. 1.8%) as in BD-rate reduction.
- Very minor change in software (a couple of lines)
- Recommend to include in the next version HM.

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