

JVET-AD0377

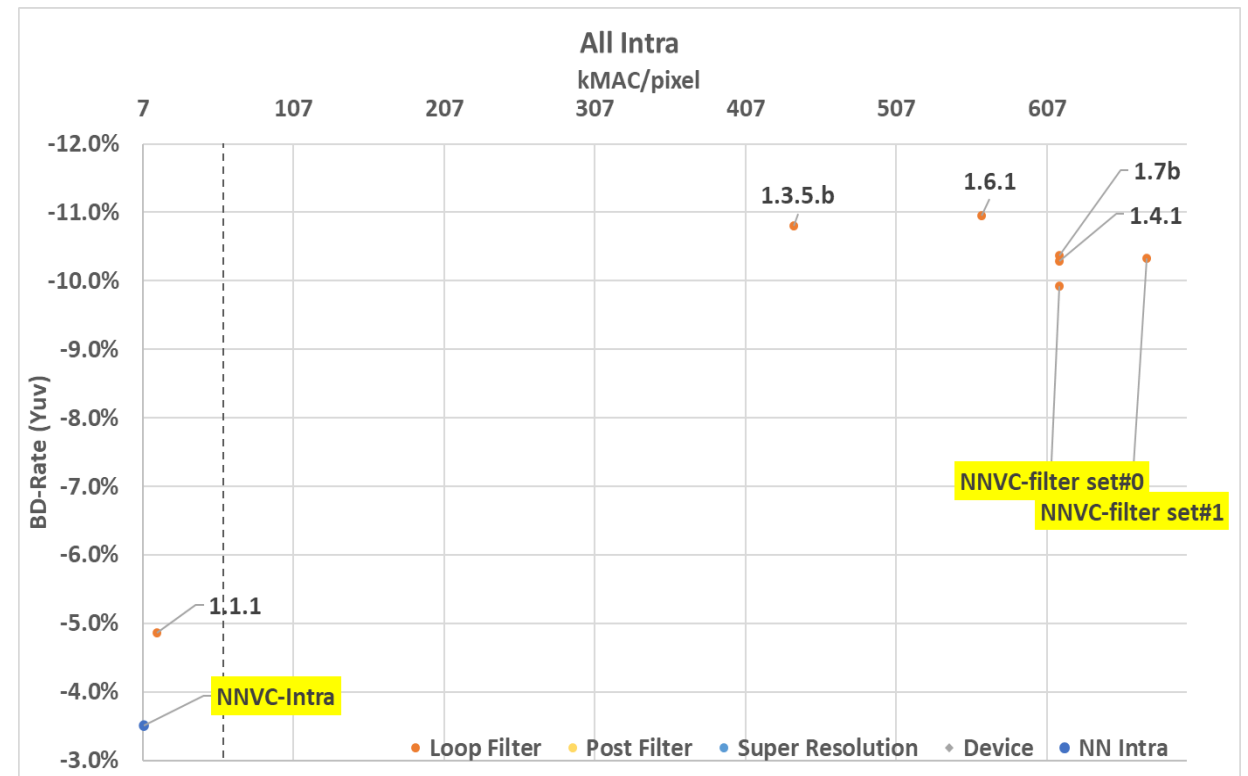
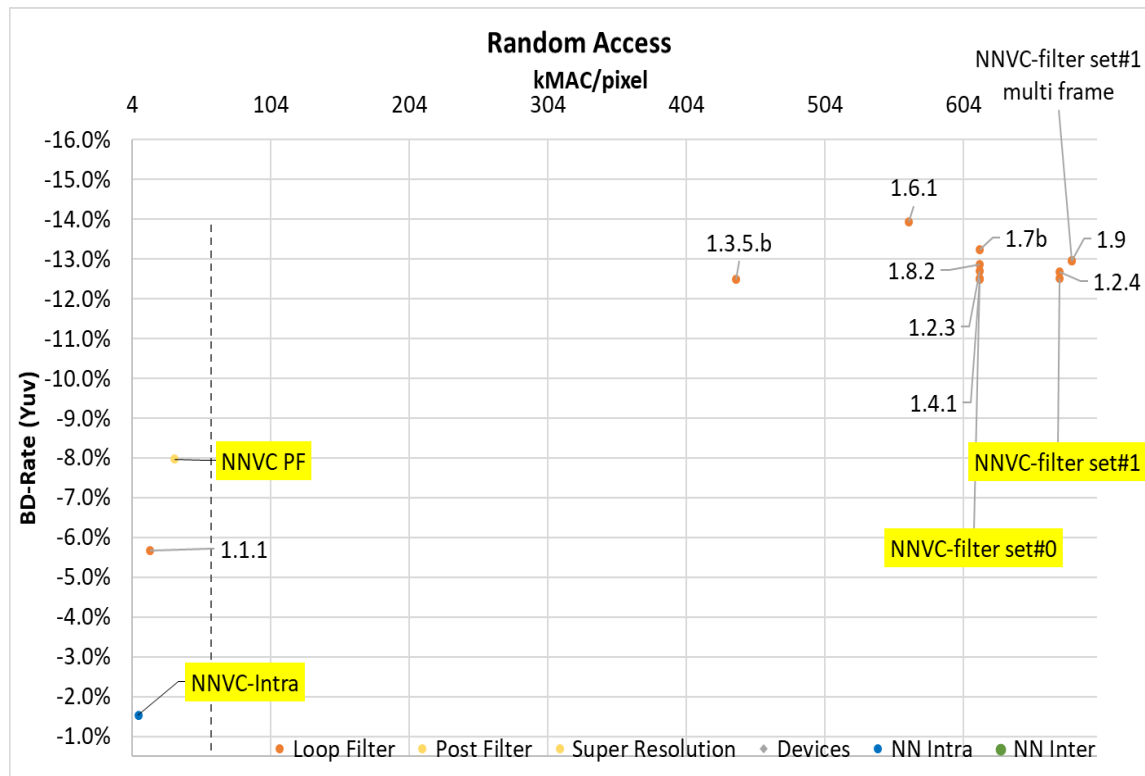
TMuC for NNVC High Performance Tier

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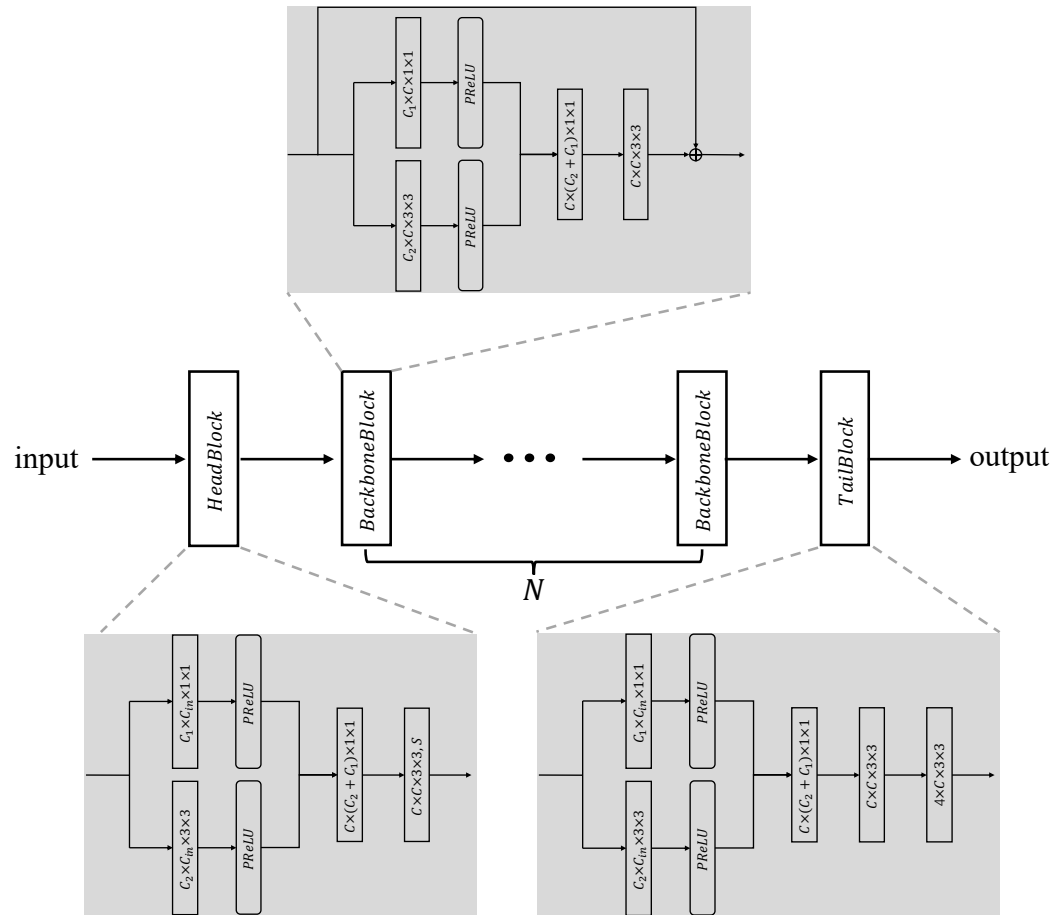
Samuel Eadie, Yun Li, Dmytro Rusanovskyy, Marta Karczewicz (Qualcomm)

Filter architecture tests & NNVC-4.0 tools

- Short list:
 - X-checked, Int16 SADL, selected by proponents or best subtest.
 - Combined YUV metrics: bd-rate $(6Y+U+V)/8$, complexity: YUV 4:2:0 kMAC/pixel



EE1-1.6 test description



- **EE1-1.6: architecture unification:**

- {Wide activation, slice type} of Filter Set #0
- Large receptive field of Filter Set #1
- Training from scratch
- Training fully compatible with data dumper/loader in NNVC
- Training fully crosschecked
- Fully integerized, SADL implementation

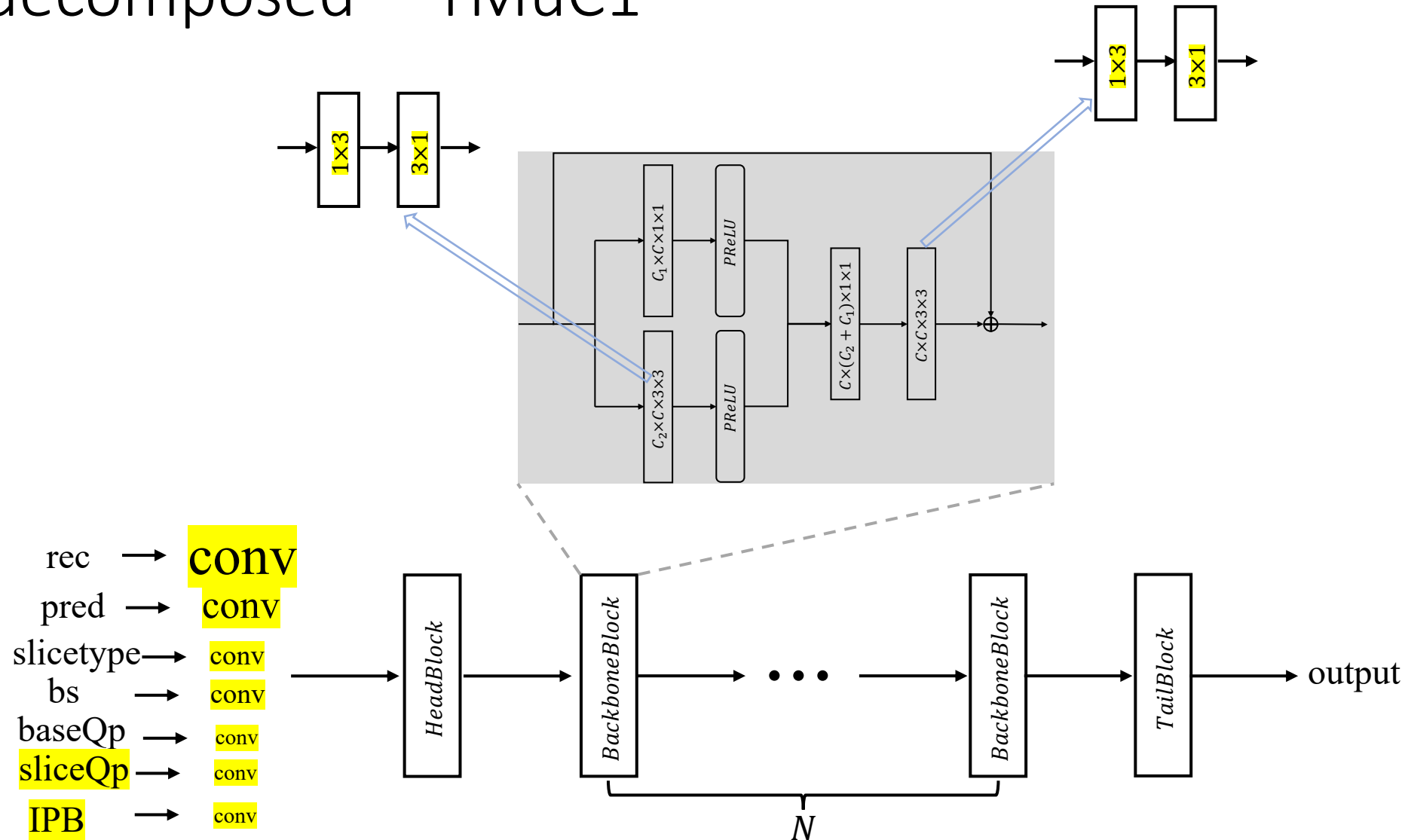
Propose to build TMuC on top of SOTA – EE1-1.6 to

- i) increase possibility of achieving stable result in next meeting
- ii) minimizing the efforts on adjustment/calibration/finetuning/harmonization of numerous tricky and interacted aspects (learning rate, channel numbers, layers, optimizer, training logic)
- iii) guaranteed improved results over SOTA

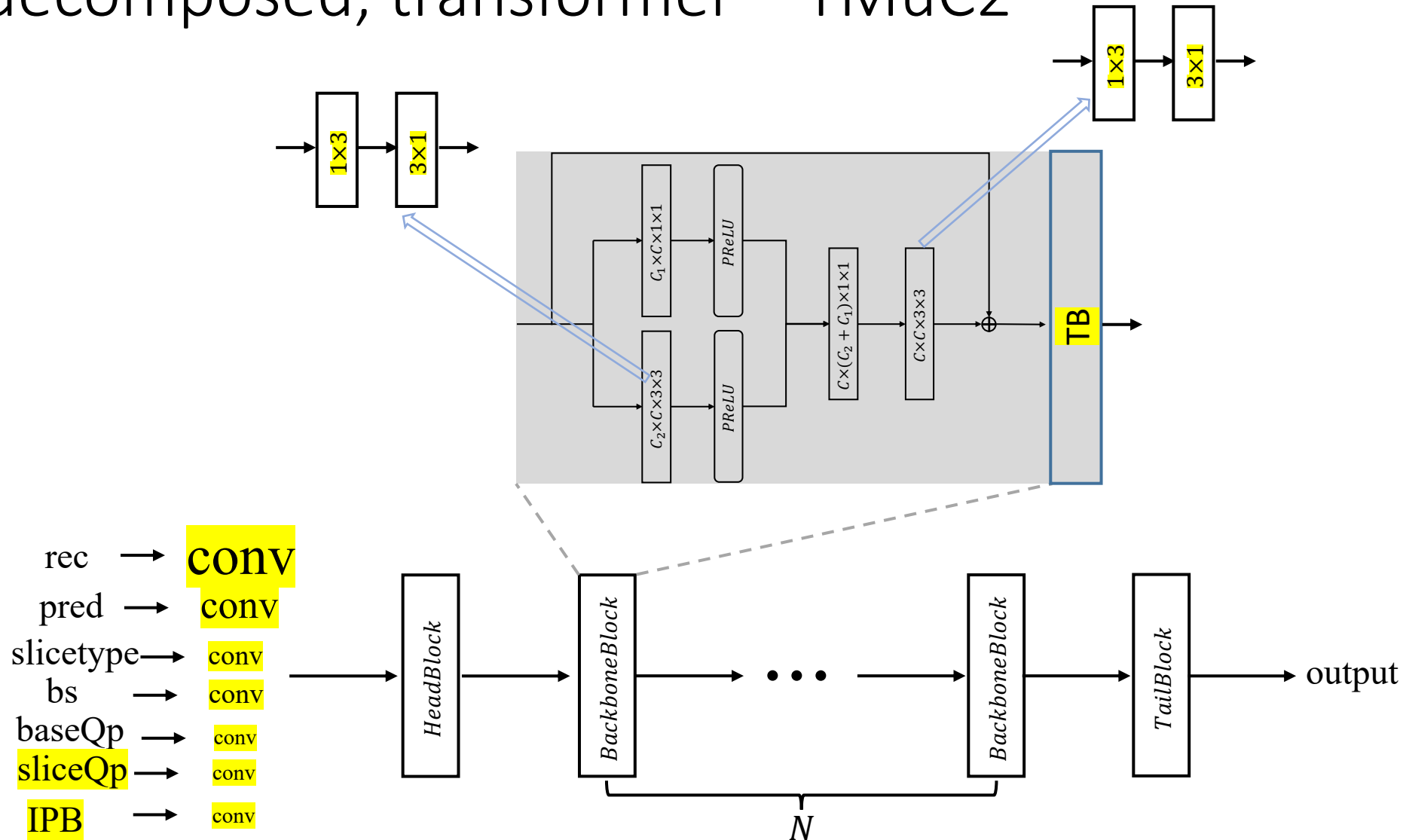
NN Filter network structure of TMuC

[illegible]

sliceQP, IPB, conv for sideinfo, Channels# variable, conv
decomposed -- TMuC1



sliceQP, IPB, conv for sideinfo, Channels# variable, conv decomposed, transformer – TMuC2



NN Filter interface aspects

	Pre-processing and post-processing of luma	Pre-processing and post-processing of chroma	Enable DBF/SAO	Blending with the DBF/SAO	Combination with SAO	Slice-level/Block-level blending with adaptive scale factor	Slice-level/Block-level blending with fixed scale factor	Separate adaptive scale factor for U and V	Base QP adjustment	Encoder-only Optimization	Temporal filter	Adaptive inference granularity	Model selection	configurable inference size	configurable block extension size	configuration QP params number	block-level QP adaptation
EE1-1.6	×	×	DBF only	DBF	×	✓	×	×	✓ (-5, -10, +5)	✓	✓	✓	×	✓	✓	✓	✓
TMuC1	×	×	DBF, SAO	DBF	✓	✓	✓	✓	✓ (-5, -10, +5)	✓	✓	✓	×	✓	✓	✓	✓
TMuC2	×	×	DBF, SAO	DBF	✓	✓	✓	✓	✓ (-5, -10, +5)	✓	✓	✓	×	✓	✓	✓	✓

Development plan

~~1. Verify the additional gain of each new element~~

~~————— 1.1 network architecture~~

~~————— 1.2 interface~~

2. Integrate all beneficial new elements

2.1 network architecture

2.2 interface