

Versatile Video Coding (VVC)

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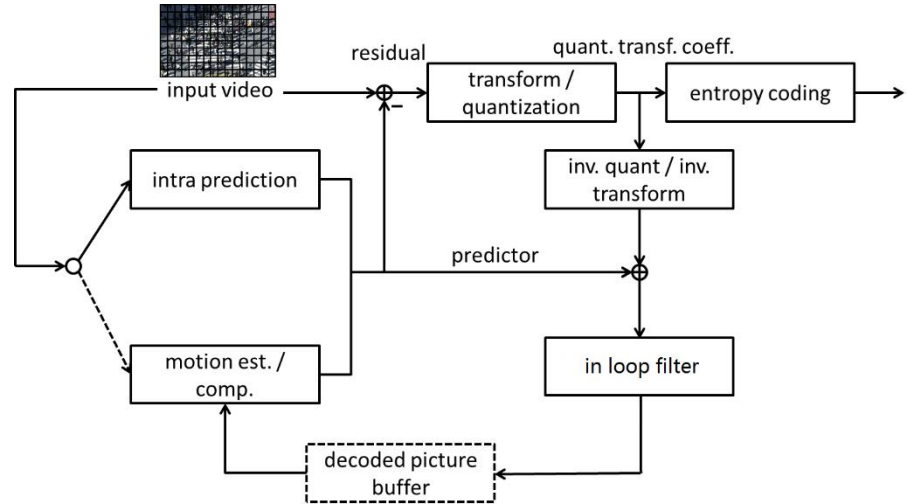
VVC standardisation Timeline

- **Draft 1 and First Test Model (VTM-1.0)**
 - HEVC with some coding tools removed
 - Large coding gain (~15%)
- **From this clean basis**
 - Define Common Test Conditions (CTC)
 - Evaluate proposed coding tools (both efficiency and complexity aspects)
 - Agree on tools addition until sufficient performance is reached
- **Incremental process**
 - Draft 8.0 and VTM 8.0 as of March 2020

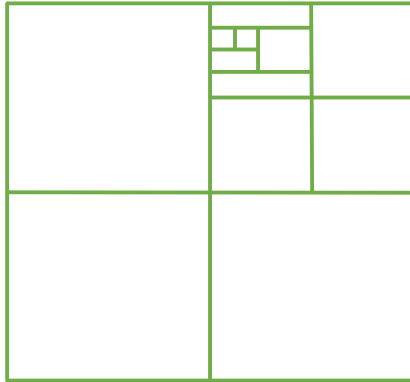


VVC block structure

- Classical block-based hybrid coding architecture
 - Intra-frame prediction
 - Inter-frame prediction
 - Residual transformation and quantization
 - Entropy coding
- Each module has been significantly improved since HEVC



VVC vs. HEVC



Largest Coding Unit:

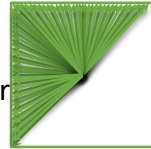
128x128

Split patterns:

- Quad
- Ternary
- Binary

Intra:

- 67 modes
- Advanced tools for reference selection, pixel prediction, etc.

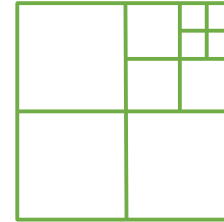


Inter:

- Non-rectangular shapes
- Generalized motion representation

Residual coding:

- Multiple primary transforms
- Secondary transform
- Dependent quantization



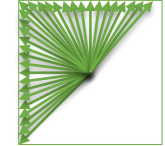
Largest Coding Unit: 64x64

Split patterns:

- Only quad

Intra:

35 modes



Inter:

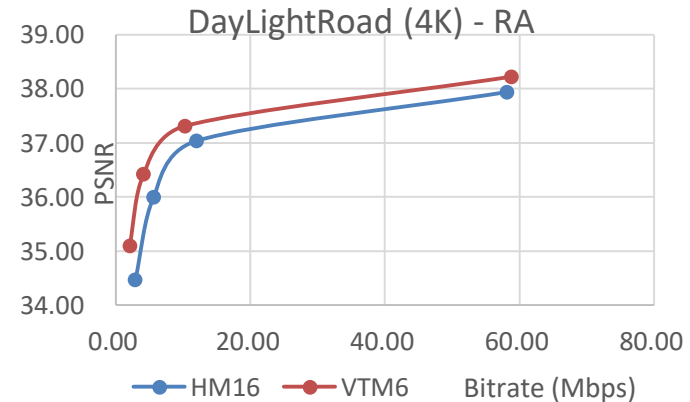
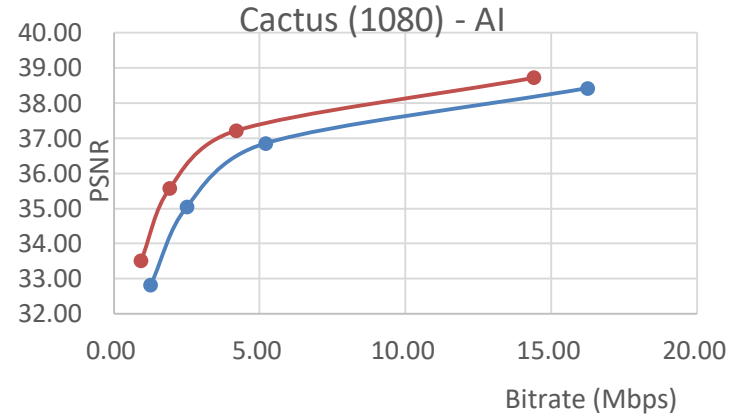
- Rectangular shapes
- Linear motion

Residual coding:

- Single transform
- Residual Quad-Tree

Objective performance: VVC vs. HEVC

	Bitrate saving	Encoder complexity	Decoder Complexity
3840x2160 UHD	-39%	850%	165%
1920x1080 HD	-34%	900%	160%
Lower definitions	-28%	900%	170%



Licensing: avoid HEVC confusion

Leonardo Chiariglione: “MPEG has been developing standards having the best performance as a goal, irrespective of the IPR involved. [...], but the patent pool creation mechanism seems no longer able to deliver results.”

- **Creation of the open industry Media Coding Industry Forum (MC-IF)**
 - Establishing MPEG Standards as well-accepted and widely used standards for the benefit of consumers and industry.
 - Initially focusing on VVC
- **VVC switchable tools strategy**

Leonardo Chiariglione: “We could introduce fractional options in the sense that proposers could indicate that their technologies be assigned to specifically identified profiles with an 'industry licence' [...].”