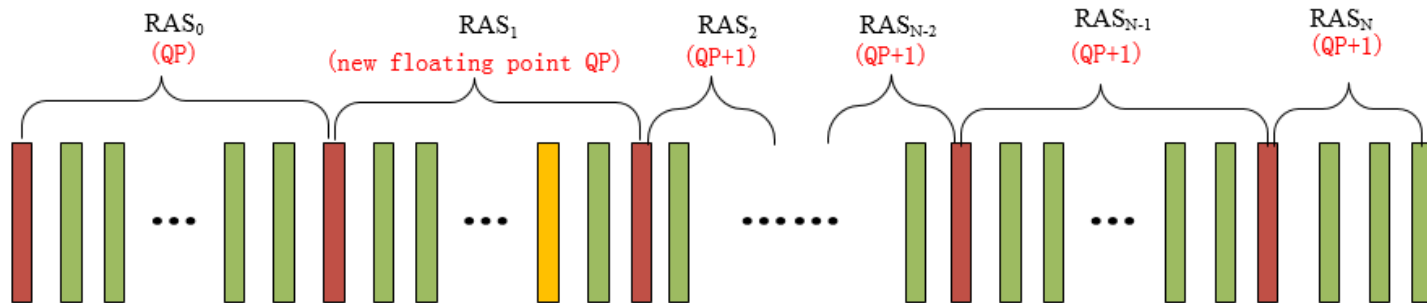# CREATING THE LIVING NETWORK™

JCTVC-AB0043
On internal QP increase for bitrate matching

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Problem statement (1)

- For matching target bitrate, internal QP can be increased by one starting from specified absolute POC

- Example bitrate matching strategy for RA configuration
  1. Encode each Random Access Segment (RAS) in parallel using different integer QP values
  2. Identify base QP as well as RAS where QP increase has to be applied
  3. Re-encode identified RAS using different switching POC values to identify switching POC value that precisely matches target bitrate. Ideally, one should be able to put together the final bitstream by simply concatenating RASs.

Problem statement (2)

- However, in current HM/JEM implementation, QP value for non-I slice is computed as:
  - Step1: Get QP_b
  - Step2: Calculate $QP_1 = QP_b + QPOffset_1$
  - Step3: Calculate $QP_2 = QP_1 + QPOffset_2$, where $QPOffset_2 = a \times QP_1 + b$
  - Step4: Calculate $QP_3 = QP_2 + QPOffset_3$

Temporal level QP adjustments

1 if POC ≥ switching POC, 0 otherwise

- Therefore, as increment operation is performed after all other QP adjustments, for RASs after switching POC, individual frame level QPs may be different between encoding with QP and switching POC (QP_b=QP, $QPOffset_3$=1) and encoding directly with (QP+1) (QP_b=QP+1, $QPOffset_3$=0)

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Proposed solution

- Modify frame level QP setting method for non-I slice as follows:
  - Step1: Get QP_b
  - Step2: Calculate $QP'_1 = QP_b + QPOffset_3$
  - Step3: Calculate $QP'_2 = QP'_1 + QPOffset_1$
  - Step4: Calculate $QP'_3 = QP'_2 + QPOffset_2$, where $QPOffset_2 = a \times QP'_2 + b$
- Starting from QP switching point, base QP is increased by one instead of increasing frame level QP by one
- Frame level QPs for RASs after switching POC will exactly match QPs of encoding with (QP+1) directly

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Conclusion

- Modification to frame level QP computation in JEM/HM code is proposed to facilitate bitrate matching in RA configuration
  - This change will allow direct concatenation of RAS bitstreams with "Parcat" application
- It is suggested to accept this modification in JEM/HM

THANK YOU!

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