



Unified End-Of-Slice Detection for LCEC and CABAC

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Overall Summary

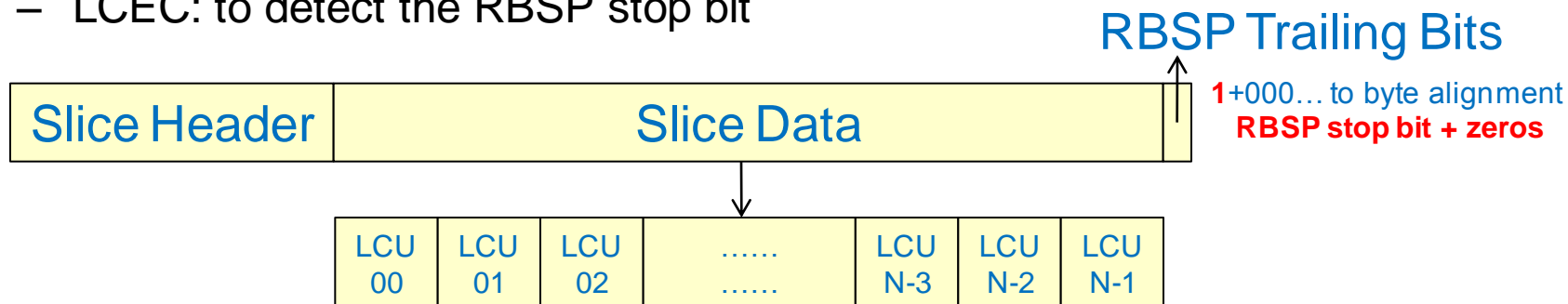
- This contribution proposed a unified procedure of end-of-slice detection for both LCEC and CABAC
- For CABAC encoder
 - Send only one end-of-slice bin after the last LCU in the slice
 - Use two RBSP stop bits as in the current HM software
- For CABAC decoder
 - Look-ahead procedure of finding RBSP trailing bits for end-of-slice detection in LCEC can be fully reused for CABAC
 - End-of-slice bin is decoded only when the RBSP trailing bits are found.
- With this modification, the end-of-slice detection for LCEC and CABAC is unified
 - Can reduce design complexity of supporting both entropy coding modes
- No coding efficiency loss in all cases, 0.1% bit rate reduction for leaf-CU-aligned 1500-byte slices

Outlines

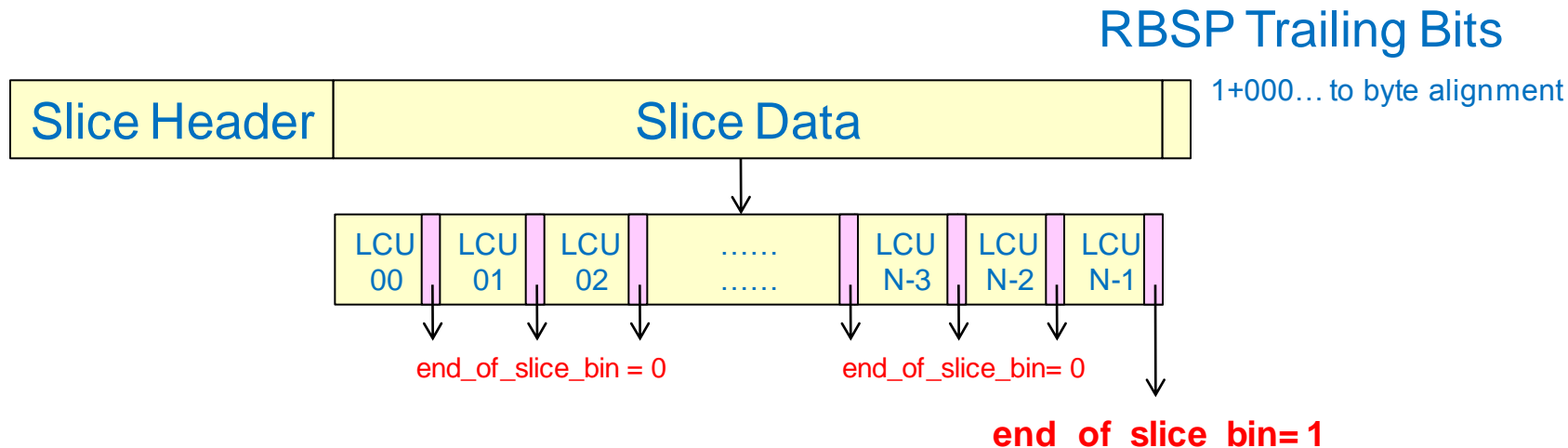
- Introduction
- Proposed unified end-of-slice detection
- Simulation results
- Conclusions

Prior Art: End-Of-Slice (EOS) Detection

- Dependent on the entropy coding mode
 - LCEC: to detect the RBSP stop bit



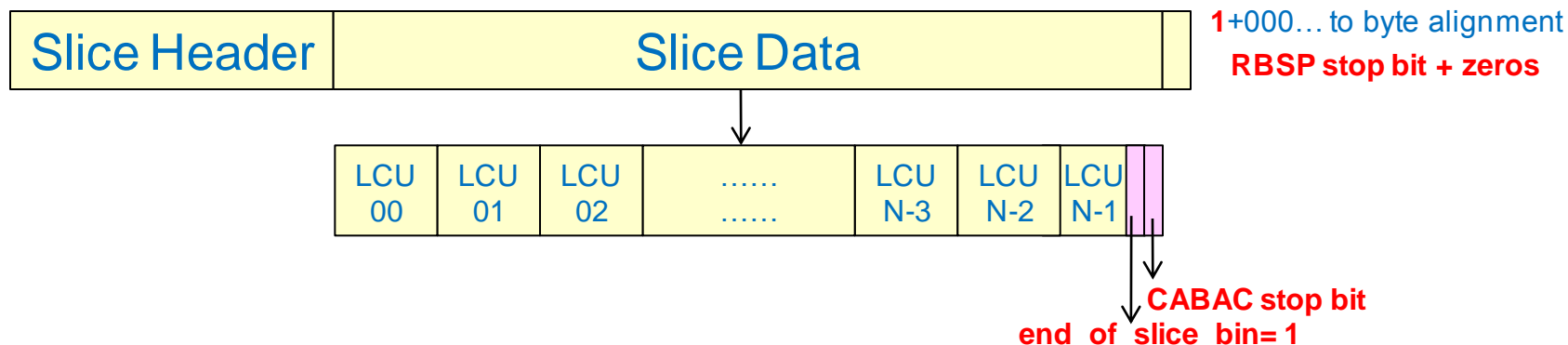
- CABAC: parse an `end_of_slice_bin` after each LCU and see if it is 1



Unified EOS Detection for LCEC & CABAC

- No change for LCEC
- For CABAC encoder
 - Send the end-of-slice bin only for the last LCU, as JCTVC-D383
 - Add CABAC stop bit in addition to the RBSP stop bit, as in the HM
- For CABAC decoder
 - At the end of each LCU, see if the RBSP stop bit is found, as in LCEC
 - If no, end_of_slice_bin = 0
 - If yes, end_of_slice_bin = (Offset >= Range – 2)

RBSP Trailing Bits



Comparison between D383 and E042

- JCTVC-D383
 - One stop bit, as in AVC
 - $\text{ruiBin} = (\text{m_pcTComBitstream} \rightarrow \text{getBitsLeft}() > 0) ? 0 : (\text{m_uiValue} \geq \text{m_uiRange} - 2);$
 - `getBitsLeft()` is a different from the end-of-slice detection in LCEC
- JCTVC-E042 (this proposal)
 - Two stop bits, as in the current HM
 - Only one bit overhead in comparison with D383
 - $\text{ruiBin} = (\text{m_pcTComBitstream} \rightarrow \text{isMoreRBSPData}()) ? 0 : (\text{m_uiValue} \geq \text{m_uiRange} - 2);$
 - `isMoreRBSPData()` is exactly the same as the end-of-slice detection in LCEC

Simulation Results

- Software: MediaTek's implementation based on HM 2.0
- Anchor: JCTVC-D600
- Unified end-of-slice detection for LCU-aligned 1500-byte slices

| BD-rate (%) | HE-AI | LC-AI | HE-RA | LC-RA | HE-LD | LC-LD |
|-------------|-------|-------|-------|-------|-------|-------|
| Current HM | 4.9 | 5.5 | 4.4 | 4.3 | 2.6 | 2.5 |
| MediaTek | 4.9 | 5.5 | 4.4 | 4.3 | 2.6 | 2.5 |

- Unified end-of-slice detection for leaf-CU-aligned 1500-byte slices

| BD-rate (%) | HE-AI | LC-AI | HE-RA | LC-RA | HE-LD | LC-LD |
|-------------|-------|-------|-------|-------|-------|-------|
| JCTVC-D127 | 5.3 | 5.8 | 4.6 | 4.4 | 2.7 | 2.5 |
| MediaTek | 5.3 | 5.8 | 4.5 | 4.4 | 2.6 | 2.5 |

Conclusions

- A unified procedure to detect the end of a slice for both LCEC and CABAC was proposed
 - Only one end-of-slice bin for the last LCU required for CABAC
 - Two stop bits are used for CABAC, as in the current HM
- No coding efficiency loss in all cases
- The key point of this proposal is not improving coding efficiency but unifying the end-of-slice detection for LCEC and CABAC



Thank you

