PERFORMANCE BENCHMARKING OF RVC BASED MULTIMEDIA SPECIFICATIONS

Junaid Jameel Ahmad1,3, Shujun Li2, Marco Mattavelli3
(Junaid.Ahmad.Marco.Mattavelli)@epfl.ch, Shujun.Li@surrey.ac.uk
1 University of Konstanz, Germany, 2 University of Surrey, UK, 3 École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

Quick Questions and Answers

1. What is RVC (Reconfigurable Video Coding)?
A dataflow programming framework standardized by ISO/IEC since 2009.

2. What is an RVC specification?
An implementation-agnostic description of a system specified by RVC.

3. What have you done in this work?
We report performance benchmarking results of RVC-based C implementations of an H.264/AVC intra codec and a JPEG codec and four multimedia security systems working with them.

4. How did you benchmark the performance of the RVC systems?
By presenting a side-by-side comparison of the RVC-based implementations against non-RVC reference implementations.

5. What are the main results you observed?
• RVC-based implementations are faster.
• RVC-based decoding implementations are comparable to JM ones.
• RVC implementations suffer more encryption/decryption overhead.

Development Environment: Eclipse + Open RVC-CAL Compiler

2. Benchmarked Systems

- RVC-based C implementations: specified manually in RVC by the RVC community and C code automatically generated from the RVC specifications by ORCC’s CAL2C backend.
- Non-RVC C implementations: JM (for H.264/AVC) and IJG (for JPEG), C code manually written/optimized/maintained.

3. Experimental Results

3.1 Run-time performance on a single-core machine

3.2 Performance gain on a dual-core machine

Performance gain of H.264/AVC implementations:
• Encoding implementations: 159% – 173%.
• Decoding implementations: 110% – 119%.

Performance gain of JPEG implementations:
• Encoding implementations: 142% – 164%.
• Decoding implementations: 127% – 148%.