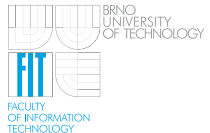


Design and Performance Analysis of Parallel Processing of SRTP Packets

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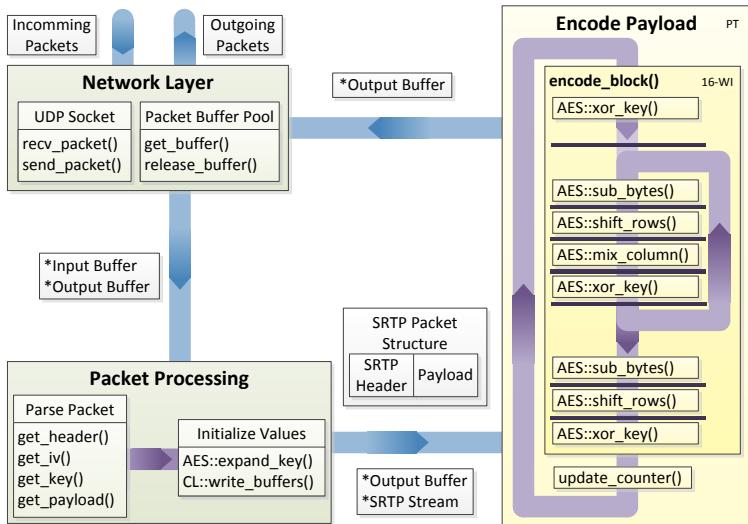


Requirements

- improve concurrent calls on VoIP gateway
- utilize HighPath 4000 softgate's standard hardware
- integrable with current solution

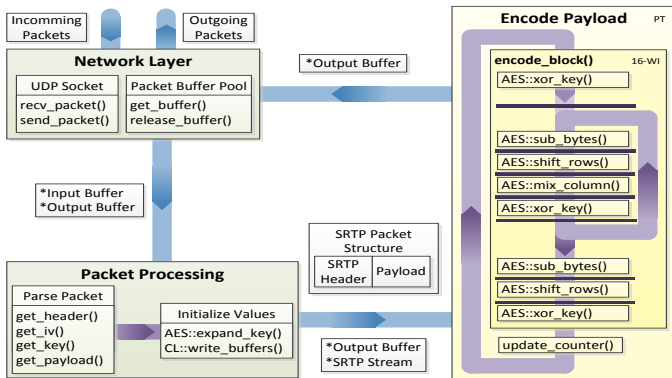
SRTP parsing

- usual size 2 to 10 AES blocks
- careful allocation of resources vs. massive parallelization
- minimize average delay caused by packet processing on gateway



Persistent Thread

- kernel uses at most as many blocks as can be concurrently scheduled
- schedules work through queues, not hardware
- provides "global synchronization"
- work-item's lifetime through the entire execution of kernel



Following graph visualizes distribution of packet delays in *ms* over *number of concurrent calls* using G.711 with sampling period 20ms during test.

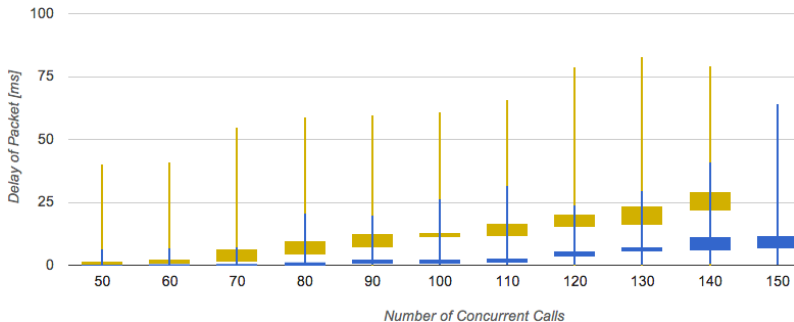


Figure: Comparison of parallel and serial implementation.

Average packet delay caused by SRTP encryption

- dropped to one third during 140 concurrent calls
- at least to half during smaller amount of concurrent calls

Transcoding

- dynamically linked plugins
- common interface

Open Computing Language

- standard for parallel computations
- wide support of HW and SW
- active contributions
- many important vendors (including Apple, AMD, intel)



OpenCL

Compiled and tested using:

- processor – intel core i5 2500k
- operating system – OpenSUSE 12.2
- used languages, frameworks and libraries
 - C/C++ std=c++11 (compiled with gcc 4.7)
 - OpenCL 1.2
 - Boost 1.53.0