

CQA Project Report: Milestone–2

“Verification Challenges in Compression and Cryptographic Stacks in Quick Assist Technology”



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1 Introduction

1.1 Milestone-2: Focus and Deliverables

- **Focus**

1. Characterization of QAT performance (with respect to buffer size and buffer content).
2. Exploration of the impact of number of execution instances on achieved compression ratio.

- **Deliverables**

1. A report on the above.
2. Analysis results from experiments performed.

- **Duration:** 12 months.

1.2 Characterization of QAT Performance

The tests mainly involves experimenting and understanding of the QAT performance trends when different parameters are varied. The conducted tests include the following:

1. Different buffer sizes: e.g., 64 bytes, 128 bytes, 1K, 1K +1, 2K, etc.
2. Different buffer content: random data, data with specified patterns.

The first set of experiments involves data compression with different buffer sizes to understand trends in the compression ratio achieved by QAT. This test was done previous to this milestone. We observed that as buffer size increases (till 64K), the compression ratio improves.

The second set of experiments was performed to characterize the dependence of compression ratio on the nature of the data. We tested with random corpus which is randomly generated data using the `rand()` Linux command (part of OpenSSL). We observed that compression ratio for random corpus goes above one, i.e the compressed file size is larger than than the uncompressed file. These two sets of experiments were performed and reported as a part of Milestone-1.

2 Variation of Compression Ratio w.r.t Instance Count

We extended our tests to understand the impact on performance when number of executing instances vary. The maximum number of data compression instances possible is 32. However, as our system had a 4 core processor, we

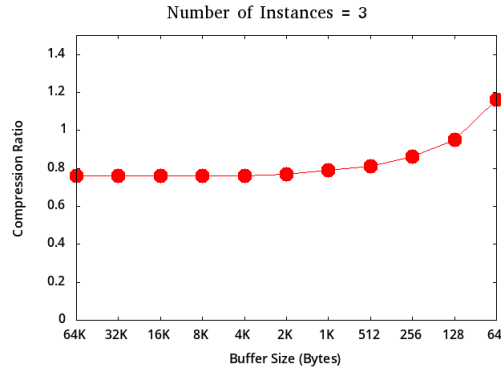


Figure 1: Compression ratio vs. buffer size (no. of instances = 3).

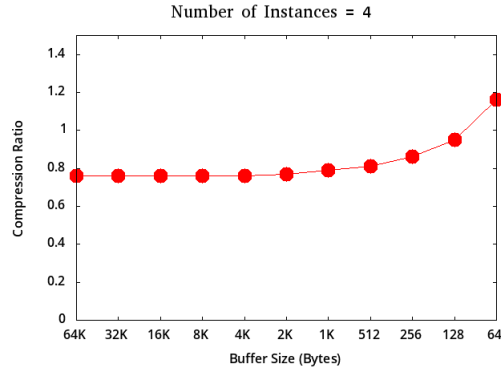


Figure 2: Compression ratio vs. buffer size (no. of instances = 4).

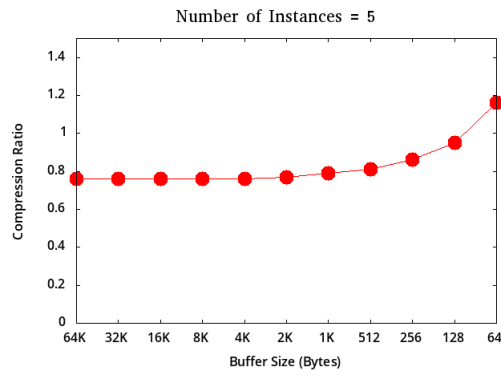


Figure 3: Compression ratio vs. buffer size (no. of instances = 5).

were able to test up to only five instances, and our attempt to initiate higher number of instances failed with the following warning message: “**Warning we have reached core limit resetting core to 0**”. Figs. (1) through (3) show the dependence of compression ratio on buffer size, when the number of instances vary between three and five. From the plots it is evident that there is no change in compression ratio with change in buffer size, when the number of instances vary.

3 Conclusion

QAT maintains the stability in its performance when there is change in instance size.