XII. BOEHM RESULTS

Figure 10 presents the impact of SPML on BoehmGC itself (the tracker), for applications histogram, kmeans, pca and wordcount of the Phoenix benchmark suite, and the benchmark GCBench. Depending on the application, BoehmGC can perform from 2 (e.g., for histogram) to 14 (e.g., for GCBench) cycles of garbage collection according to the allocation intensity of the workload. Figure 10 plots for each workload (in logarithmic scale), the time of the first cycle, intermediate cycles (i.e., all other cycles except the first one) and, complete garbage collection (i.e., all cycles that occur during the garbage). As we see on figure 10, SPML improves the time of BoehmGC for all collection cycles except from the first one. This is because when using SPML mechanism, the garbage collector performs the reverse mapping during the first cycle. During following cycles, it just reuses the addresses collected during the first cycle, while when using the soft dirty bit feature, it needs to go through the process pagemap at every cycle. Concerning the complete garbage collection time, figure 10 shows that the reverse mapping of SPML mechanism induces an overhead on BoehmGC that can vary from 11% (for wordcount) to 71% (for kmeans). Nevertheless, we also observe an improvement of the complete garbage collection time for the benchmark histogram, that is about 18%.
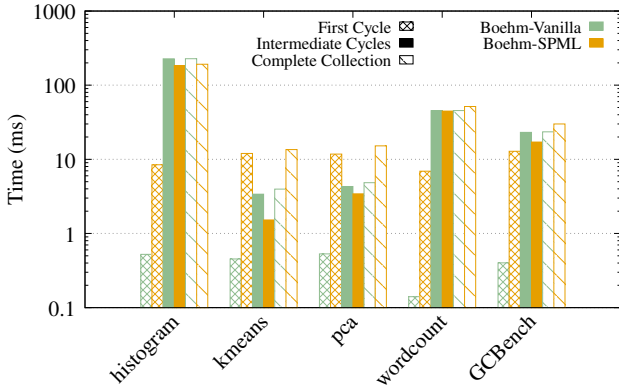

Figure 11: Boehm results on tracked.

Figure 10: Boehm results on tracker. Results are presented in logarithm scale.

Figure 11 evaluates the impact of SPML on applications that use BoehmGC (Boehm-SPML). We can see that SPML increases the overhead of Boehm-Vanilla (BoehmGC using dirty bit mechanism) on all applications due to reverse mapping. Nonetheless, we also observe that for the benchmark histogram for which SPML improves the time of the garbage collection (see figure 10), the overhead on application is almost the same (about 0.5% of difference) for both Boehm-Vanilla and Bohem-SPML. The overhead of Boehm-SPML on applications vary linearly with the time of the reverse mapping as shown on figure 12, fluctuating between 10% (for wordcount where the reverse mapping takes about 6.7 ms) to 105% (for pca with about 12 ms of reverse mapping).
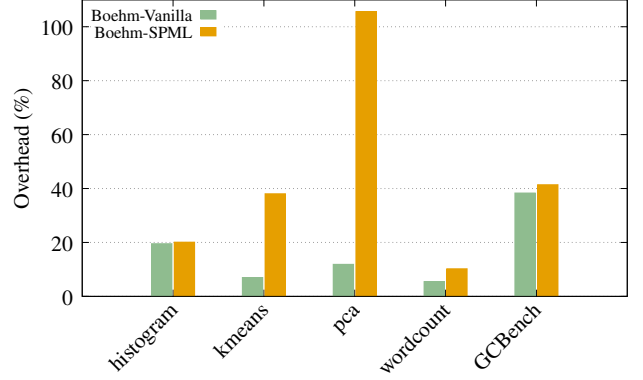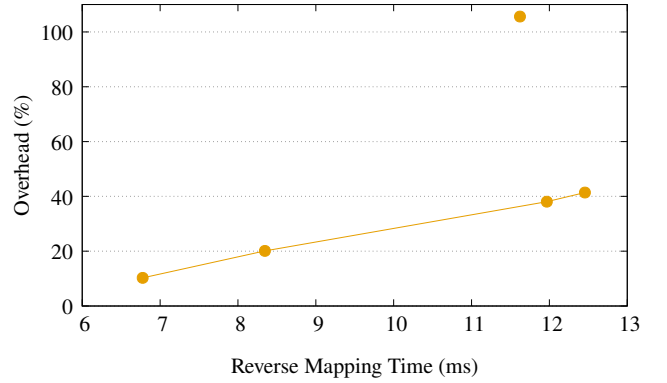

Figure 12: Overhead of Boehm-SPML depending on the time of the reverse mapping.