Project Midterm Report

Title: GBDI memory compression implementation and testing

Goals Completed:

We have gone through the background and the required literature for GBDI (Global Base Delta Immediate) Compression. The GBDI algorithm uses base values from across memory blocks using a novel clustering algorithm using a data analysis step in the background using histogram binning. The GBDI algorithm is an expansion of the BDI (Base Delta Immediate) compression algorithm with the data analysis integration for calculating base values. We have implemented the BDI compression algorithm in C and currently we are working on implementing the data analysis step and integrating it with the BDI algorithm.

The code implementation of the BDI algorithm is divided into two parts, first we convert the buffer into an array then using two separate functions we check if the cache line consists of only zero values or only same values respectively. Then in the second step we implement two functions for finding bases, compression, and finding the size of after compression.

Major challenges:

We have finished the implementation of the BDI compression. However, when implementing the entire GBDI algorithm, it is more challenging to understand the data analysis phase, which uses histogram binning, by software algorithm. Current challenge for us is to implement and integrate the histogram binning phase with the BDI algorithm. The authors of the GBDI paper have shown the data analysis phase in detail and we are going to follow that to integrate it in our code.

Future tasks:

We are going to use our already implemented BDI algorithm and integrate the data analysis step to complete the GBDI compression algorithm. After the successful implementation of the algorithm, we are going to use a dataset of memory dumps to evaluate the performance of the GBDI algorithm by measuring and comparing the compression ratio.