

1 introduction

-

2 Motivation

In science computer simulation has become an important tool. Simulation are becoming more and more advanced which increase the amount of data that are being generated. This data gets stored on harddrive and loaded again when its time to analyze the data. By doing in-situ real-time analysis where the data gets analyzed immediately after being generated. By doing computer simulation this way it may be possible to save time and hardware resources.

3 Hardware

The program have been tested on a server with the following hardware.

Motherboard: Supermicro X11DPU-Z+

CPU: Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz, 32 core

DRAM: Samsung RDIMM, 2666 MT/s.

NVDIMM: Micron Technology NV-DIMM , 2933 MT/s

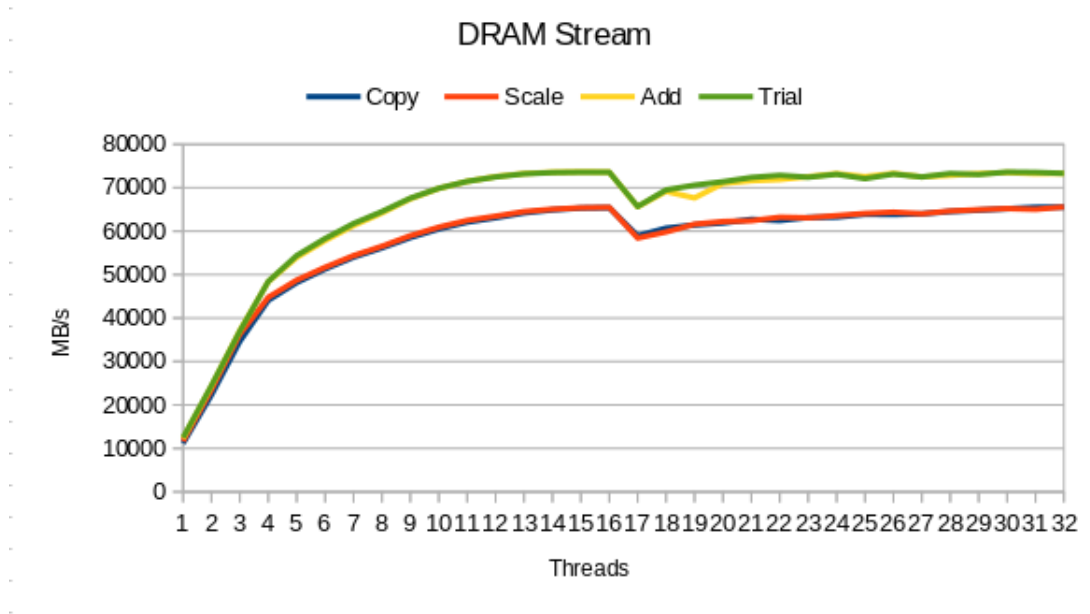
Both CPU have twelve memory slots each. Each CPU have six channels. There are one DRAM and one NVDIMM sharing one channel.

4 Benchmarks

There are four different benchmarks.

4.1 STREAM DRAM

The stream DRAM benchmark measure the memory speed of the DRAM. The benchmark uses the STREAM[**stream**] benchmark without any changes in order to measure how fast the memory speed is. The benchmark tests all with all cores.



4.2 STREAM NVDIMM

The stream NVDIMM benchmark measure the memory speed of the NVDIMM. This benchmark is the same as the STREAM DRAM benchmark mention above. The different is that the memory type have been changed from DRAM to NVDIMM. The original code looks like this.

```
#ifndef STREAM_TYPE
#define STREAM_TYPE double
#endif
```

```
static STREAM_TYPE  a[STREAM_ARRAY_SIZE+OFFSET] ,
                    b[STREAM_ARRAY_SIZE+OFFSET] ,
                    c[STREAM_ARRAY_SIZE+OFFSET] ;
```

It have been changed into this. In addition the PMEMObjpool must be initiated in main method.

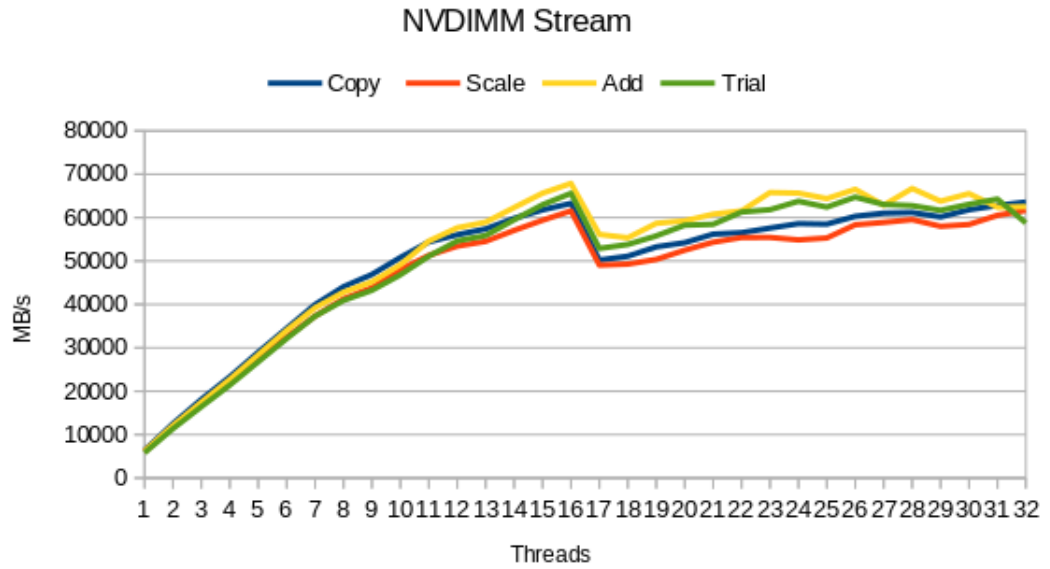
```
PMEMObjpool *pop;
POBJLAYOUT_BEGIN(array);
POBJLAYOUT_TOID(array, double);
POBJLAYOUT_END(array);
TOID(double) a;
TOID(double) b;
TOID(double) c;
```

```

int main()
{
    const char path[] = "/mnt/pmem0-xfss/pool.obj";
    pop = pmemobj_create(path, LAYOUTNAME, 10737418240, 0666);
    if (pop == NULL)
        pop = pmemobj_open(path, LAYOUTNAME);

    if (pop == NULL) {
        perror(path);
        exit(1);
    }
}

```



4.3 benchmark 3

Graph below show the speed of a certain amount of NVDIMM threads while the rest of the threads are from DRAM to DRAM. The test have been conducted by transfer data simultaneously from DRAM-DRAM and NVM-NVM.

4.4 benchmark 4