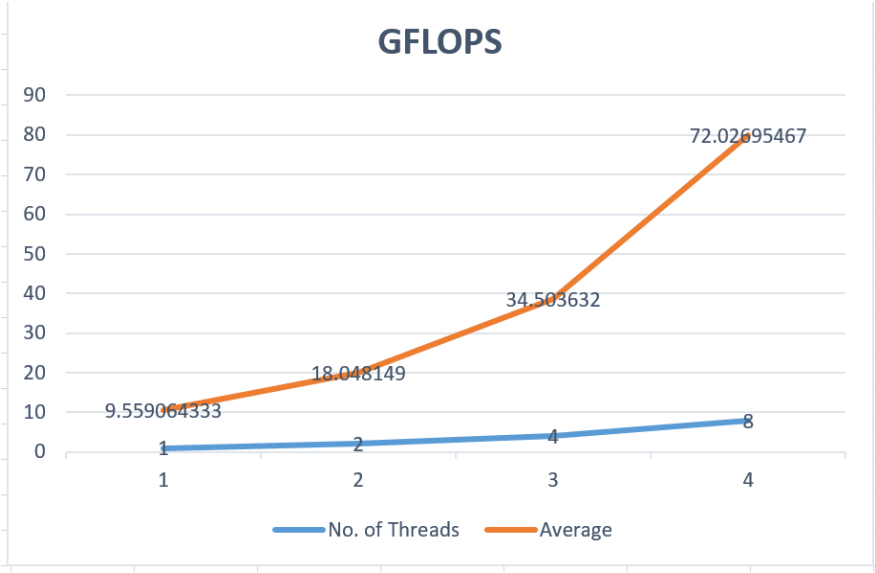
1. CPU Benchmark

- The GFLOPS & IOPS are calculated for different levels of concurrency:

  Tested on KVM Open Stack Instance:

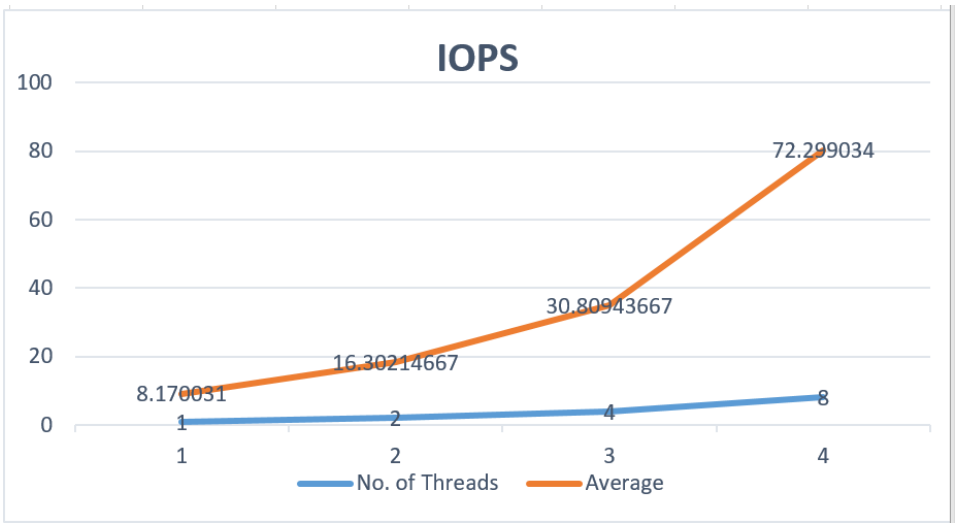
  GFLOPS – with regular operations.

OpenStack - CPU Benchmark					
GFLOPS					
No. of Threads	Test 1	Test 2	Test 3	Average	Standard Deviation
1	9.756098	9.661836	9.259259	9.559064333	0.263882094
2	18.518519	18.604651	17.021277	18.048149	0.890339406
4	33.898305	33.898305	35.714286	34.503632	1.048457119
8	72.39819	69.264069	74.418605	72.02695467	2.597243173



  IOPS – with regular operations

IOPS					
No. of Threads	Test 1	Test 2	Test 3	Average	Standard Deviation
1	7.843137	8.368201	8.298755	8.170031	0.285220007
2	16.260163	15.625	17.021277	16.30214667	0.699084642
4	30.888031	29.411765	32.128514	30.80943667	1.360078705
8	68.669528	72.39819	75.829384	72.299034	3.580957752



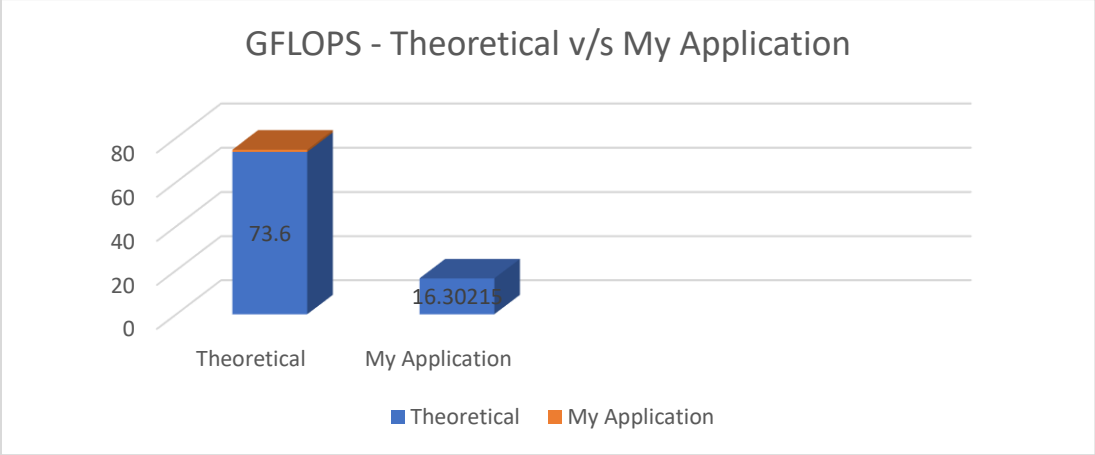
Theoretical Performance = No. of cores * CPU frequency*No. of threads*IPC

= 2 * 2.30 * 1 * 16

= 73.6

- Assumed IPC of 8 based on Internet sources for Intel Xeon Processor

	GFLOPS
Theoretical	73.6
My Application	16.30215

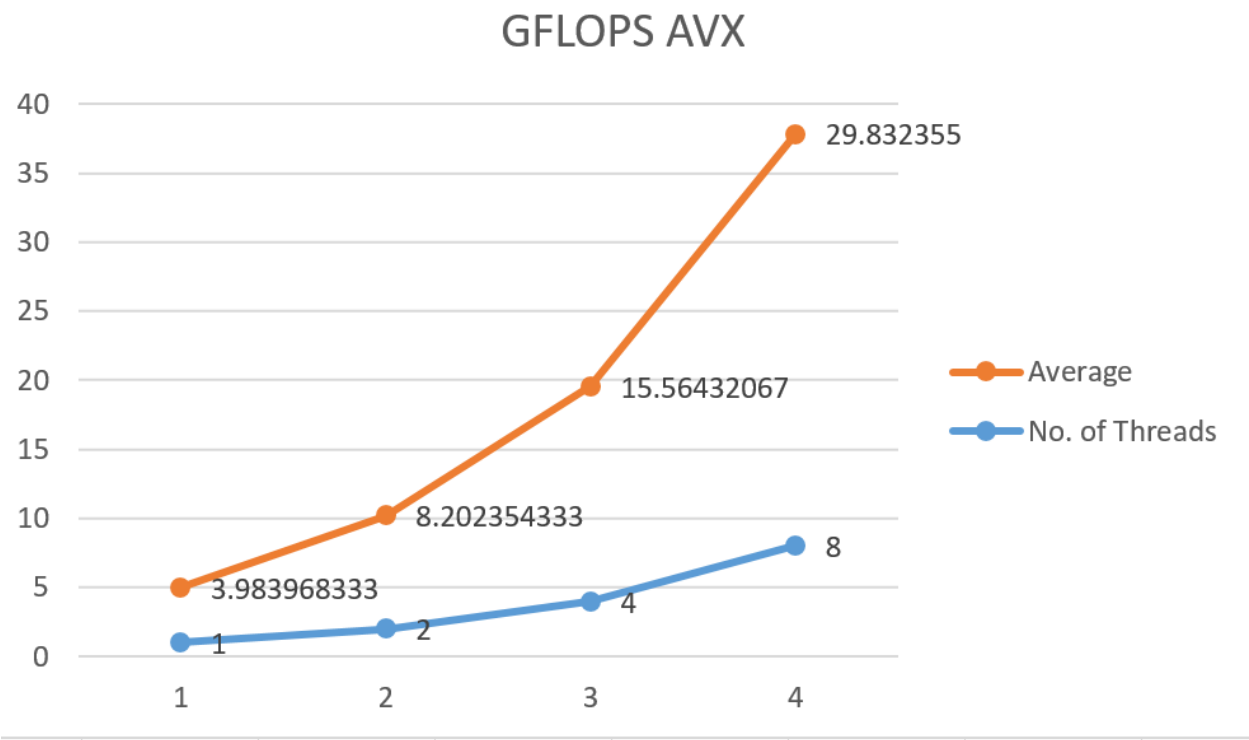


- **GFLOPS** achieved **23%** of Theoretical values of GFLOPS
- **GFLOPS** achieved **24%** of Linpack Benchmarking tool GFLOPS

AVX Instructions : Tested on Bare Metal instance

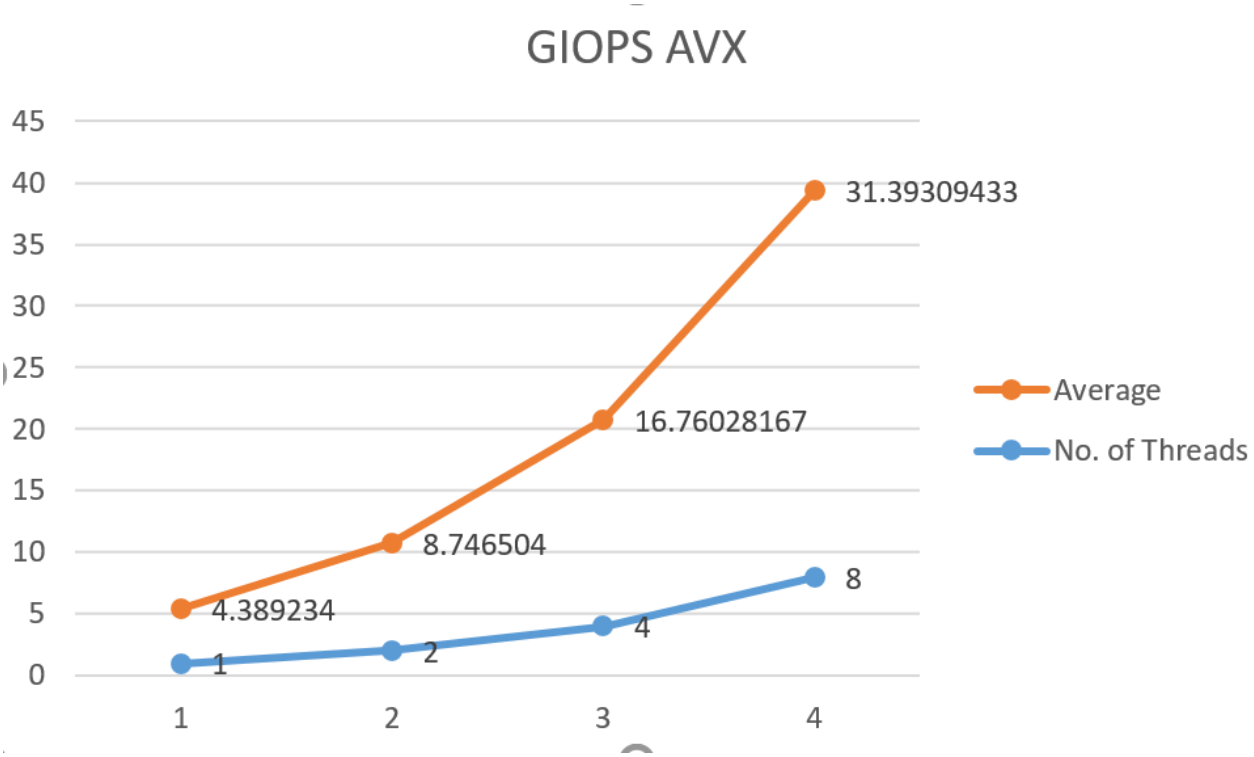
GFLOPS – with AVX Instructions

GFLOPS using AVX Instructions					
No. of Threads	Test 1	Test 2	Test 3	Average	Standard Deviation
1	4.098361	3.738318	4.115226	3.983968333	0.212906486
2	8.213552	8.179959	8.213552	8.202354333	0.019394928
4	15.533981	15.533981	15.625	15.56432067	0.052549844
8	29.850746	29.739777	29.906542	29.832355	0.084890005



IOPS – with AVX Instructions

GIOPS using AVX Instructions					
No. of Threads	Test 1	Test 2	Test 3	Average	Standard Deviation
1	4.395604	4.366812	4.405286	4.389234	0.020012367
2	8.77193	8.695652	8.77193	8.746504	0.044039124
4	16.806723	16.842105	16.632017	16.76028167	0.112480398
8	31.372549	31.434185	31.372549	31.39309433	0.035585561



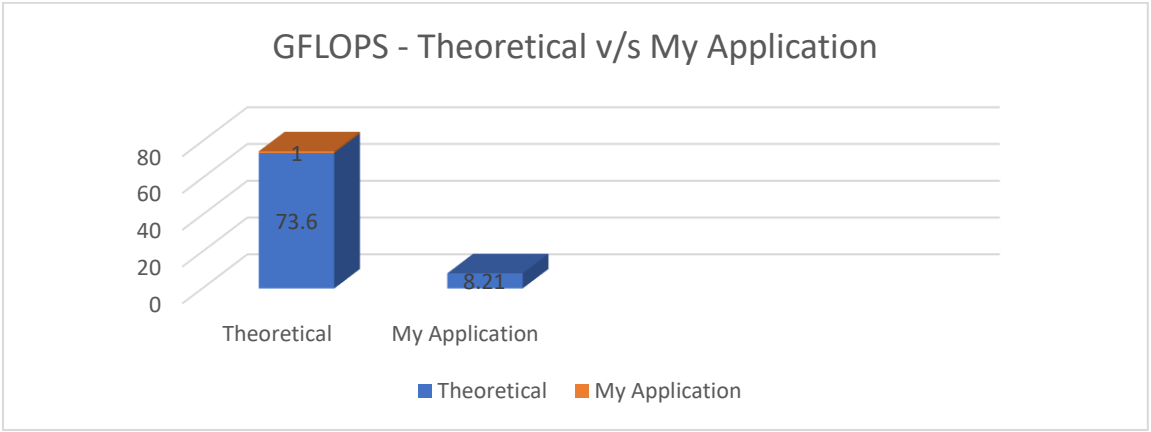
Theoretical Performance = No. of cores * CPU frequency*No. of threads*IPC

= 2 * 2.30 * 1 * 16

= 73.6

- Assumed IPC of 8 based on Internet sources for Intel Xeon Processor

	GFLOPS
Theoretical	73.6
My Application	8.20



- **GFLOPS** achieved **11%** of Theoretical values of GFLOPS
- **GFLOPS** achieved(8threads) **24.85%** of Linpack Benchmarking tool GFLOPS(24 threads)

Linpack Benchmark output – Bare Metal

C:\Windows\System32\cmd.exe - ssh -i cloud.key cc@129.114.109.230

```
Number of trials to run: 10
Data alignment value (in Kbytes): 10
Current date/time: Sun Oct  8 19:47:54 2017

CPU frequency:    3.099 GHz
Number of CPUs: 2
Number of cores: 24
Number of threads: 24

Parameters are set to:

Number of tests: 1
Number of equations to solve (problem size) : 1000
Leading dimension of array                  : 1000
Number of trials to run                     : 10
Data alignment value (in Kbytes)            : 10

Maximum memory requested that can be used=8030240, at the size=1000

=================== Timing linear equation system solver ===================

Size   LDA    Align. Time(s)    GFlops   Residual     Residual(norm) Check
1000   1000   10     0.010      66.8555  9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      125.4350 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      128.2219 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.007      100.0198 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      124.8402 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      125.1967 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      123.8140 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      134.5209 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      135.5257 9.298812e-13 3.171134e-02   pass
1000   1000   10     0.005      139.2343 9.298812e-13 3.171134e-02   pass

Performance Summary (GFlops)

Size   LDA    Align.  Average  Maximal
1000   1000   10      120.3664 139.2343

Residual checks PASSED

End of tests
```

Linpack Benchmark Open Stack

```
CPU frequency:    3.089 GHz
Number of CPUs: 2
Number of cores: 2
Number of threads: 2

Parameters are set to:

Number of tests: 15
Number of equations to solve (problem size) : 1000  2000  5000  10000 15000 18000 20000 22000 25000 26000 27000 30000 35000 40000 45000
Leading dimension of array                  : 1000  2000  5008  10000 15000 18008 20016 22008 25000 26000 27000 30000 35000 40000 45000
Number of trials to run                     : 4     2     2     2     2     2     2     2     2     2     1     1     1     1     1
Data alignment value (in Kbytes)            : 4     4     4     4     4     4     4     4     4     4     4     1     1     1     1

Maximum memory requested that can be used=3202964416, at the size=20000

================== Timing linear equation system solver ==================

Size   LDA    Align. Time(s)    GFlops   Residual     Residual(norm) Check
1000   1000   4      0.022      29.7489  9.394430e-13 3.203742e-02   pass
1000   1000   4      0.015      43.8587  9.394430e-13 3.203742e-02   pass
1000   1000   4      0.014      47.5642  9.394430e-13 3.203742e-02   pass
1000   1000   4      0.012      54.2088  9.394430e-13 3.203742e-02   pass
2000   2000   4      0.103      52.0376  4.085732e-12 3.554086e-02   pass
2000   2000   4      0.086      62.1631  4.085732e-12 3.554086e-02   pass
5000   5008   4      1.219      68.3893  2.262585e-11 3.154992e-02   pass
5000   5008   4      1.195      69.7582  2.262585e-11 3.154992e-02   pass
10000  10000  4      9.121      73.1158  9.187981e-11 3.239775e-02   pass
10000  10000  4      9.410      70.8644  9.187981e-11 3.239775e-02   pass
15000  15000  4      31.079     72.4115  2.219450e-10 3.495671e-02   pass
15000  15000  4      30.741     73.2070  2.219450e-10 3.495671e-02   pass
18000  18008  4      54.569     71.2612  2.886628e-10 3.161212e-02   pass
18000  18008  4      53.421     72.7928  2.886628e-10 3.161212e-02   pass
20000  20016  4      73.910     72.1703  3.669736e-10 3.248520e-02   pass
20000  20016  4      73.526     72.5475  3.669736e-10 3.248520e-02   pass

Performance Summary (GFlops)

Size   LDA    Align.  Average  Maximal
1000   1000   4       43.8451  54.2088
2000   2000   4       57.1003  62.1631
5000   5008   4       69.0738  69.7582
10000  10000  4       71.9901  73.1158
15000  15000  4       72.8092  73.2070
18000  18008  4       72.0270  72.7928
20000  20016  4       72.3589  72.5475

Residual checks PASSED

End of tests
```

2. Memory Benchmark

Tested on Bare Metal instance since resources were insufficient, execution was terminating.

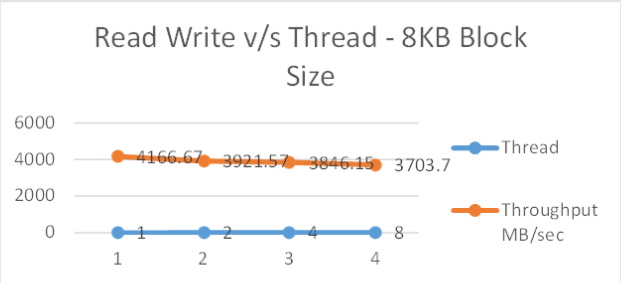
Throughput:

1. Read & Write to Memory

Read Write to memory

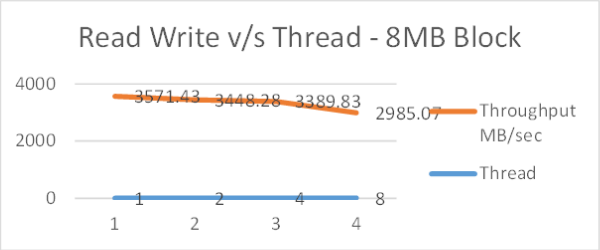
Block Size = 8KB

Thread	Throughput MB/sec
1	4166.67
2	3921.57
4	3846.15
8	3703.7



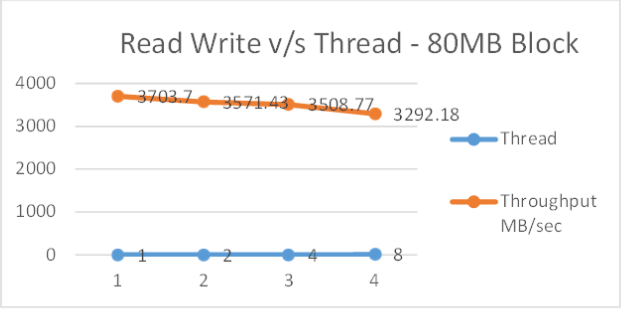
Block Size = 8MB

Thread	Throughput MB/sec
1	3571.43
2	3448.28
4	3389.83
8	2985.07



Block Size = 80MB

Thread	Throughput MB/sec
1	3703.7
2	3571.43
4	3508.77
8	3292.18

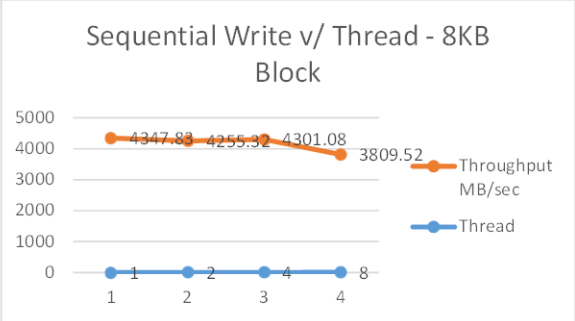


2. Sequential Write

Sequential Write

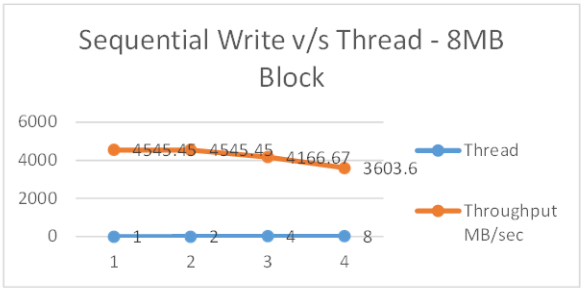
Block Size = 8KB

Thread	Throughput MB/sec
1	4347.83
2	4255.32
4	4301.08
8	3809.52



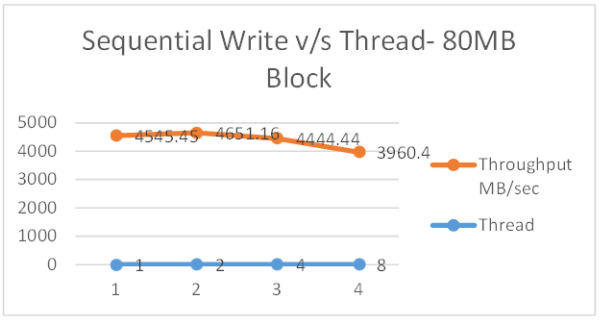
Block Size = 8MB

Thread	Throughput MB/sec
1	4545.45
2	4545.45
4	4166.67
8	3603.6



Block Size = 80MB

Thread	Throughput MB/sec
1	4545.45
2	4651.16
4	4444.44
8	3960.4

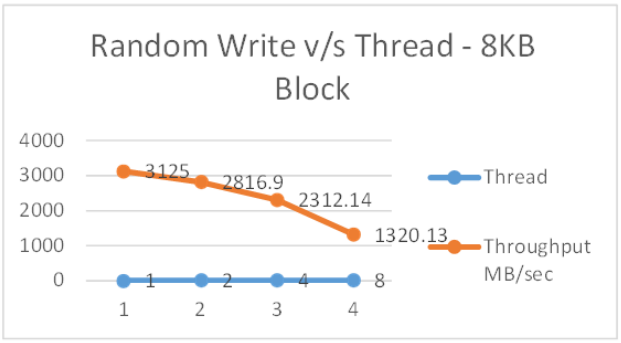


3. Random Write

Random Write

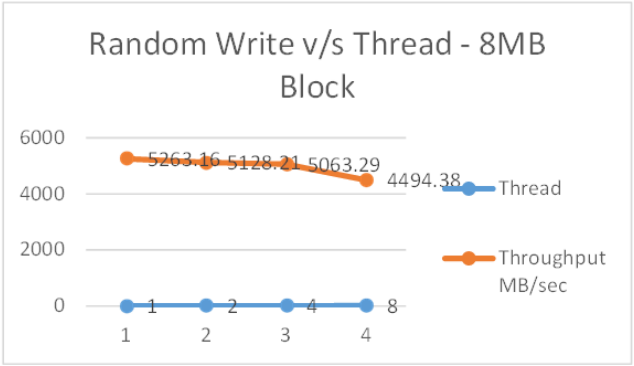
Block Size = 8KB

Thread	Throughput MB/sec
1	3125
2	2816.9
4	2312.14
8	1320.13



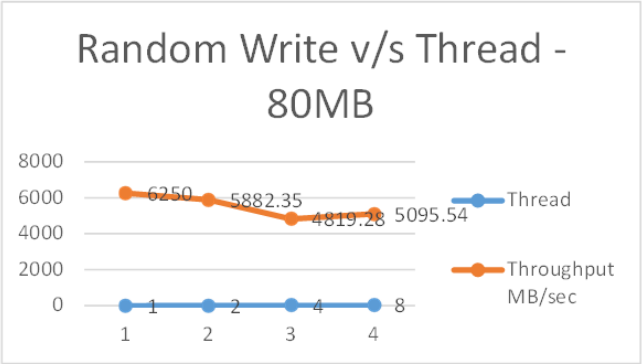
Block Size = 8MB

Thread	Throughput MB/sec
1	5263.16
2	5128.21
4	5063.29
8	4494.38



Block Size = 80MB

Thread	Throughput MB/sec
1	6250
2	5882.35
4	4819.28
8	5095.54



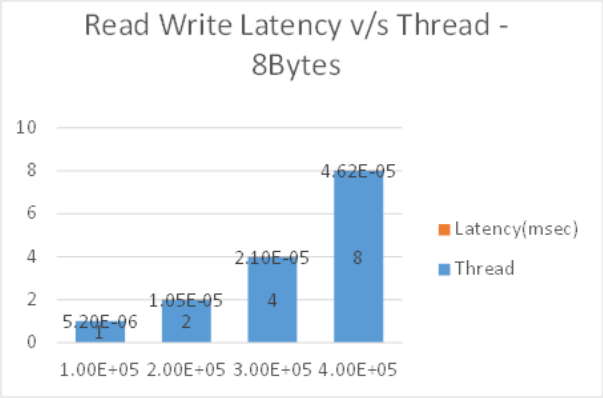
Latency

Latency is calculated with respect to 8 Bytes Block Size on concurrent threads 1,2,4,8

Read + Write

Block Size = 8 bytes

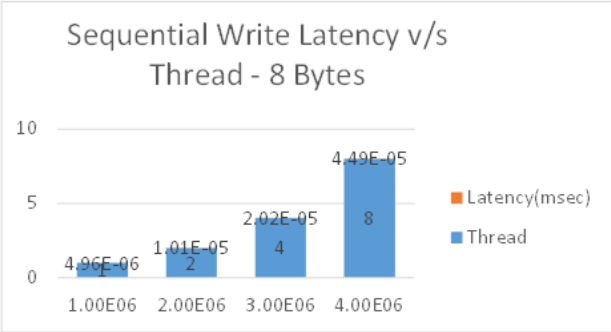
Thread	Latency(msec)
1	5.20E-06
2	1.05E-05
4	2.10E-05
8	4.62E-05



Sequential Write

Block Size = 8byte

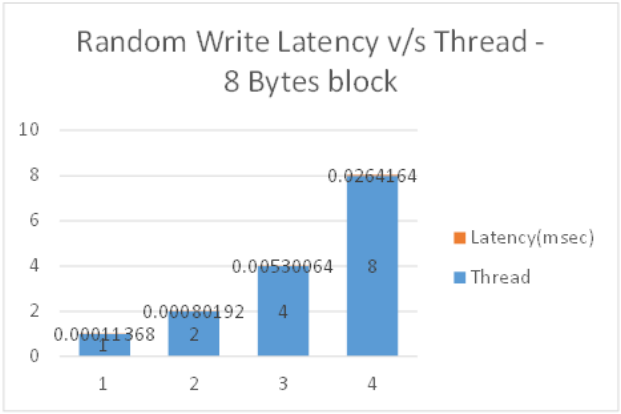
Thread	Latency(msec)
1	4.96E-06
2	1.01E-05
4	2.02E-05
8	4.49E-05



Random Write

Block Size = 8byte

Thread	Latency(msec)
1	0.00011368
2	0.00080192
4	0.00530064
8	0.0264164



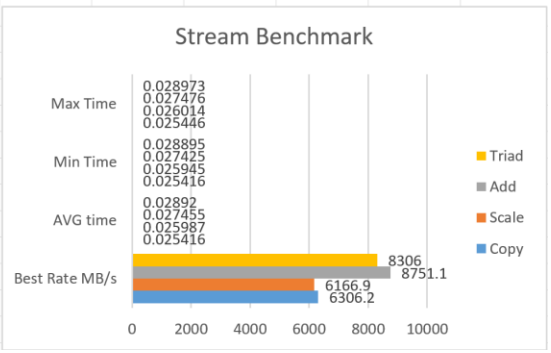
Stream Benchmark

Command Prompt - ssh -i cloud.key cc@129.114.108.8

```
[cc@sharvari ~]$ gcc stream.c
[cc@sharvari ~]$ ./a.out
-------------------------------------------------------------
STREAM version $Revision: 5.10 $
-------------------------------------------------------------
This system uses 8 bytes per array element.
-------------------------------------------------------------
Array size = 10000000 (elements), Offset = 0 (elements)
Memory per array = 76.3 MiB (= 0.1 GiB).
Total memory required = 228.9 MiB (= 0.2 GiB).
Each kernel will be executed 10 times.
 The *best* time for each kernel (excluding the first iteration)
 will be used to compute the reported bandwidth.
-------------------------------------------------------------
Your clock granularity/precision appears to be 1 microseconds.
Each test below will take on the order of 24894 microseconds.
   (= 24894 clock ticks)
Increase the size of the arrays if this shows that
you are not getting at least 20 clock ticks per test.
-------------------------------------------------------------
WARNING -- The above is only a rough guideline.
For best results, please be sure you know the
precision of your system timer.
-------------------------------------------------------------
Function    Best Rate MB/s  Avg time     Min time     Max time
Copy:           6306.2     0.025416     0.025372     0.025446
Scale:          6166.9     0.025987     0.025945     0.026014
Add:            8751.1     0.027455     0.027425     0.027476
Triad:          8306.0     0.028920     0.028895     0.028973
-------------------------------------------------------------
Solution Validates: avg error less than 1.000000e-13 on all three arrays
-------------------------------------------------------------
[cc@sharvari ~]$
```

Stream Benchmark

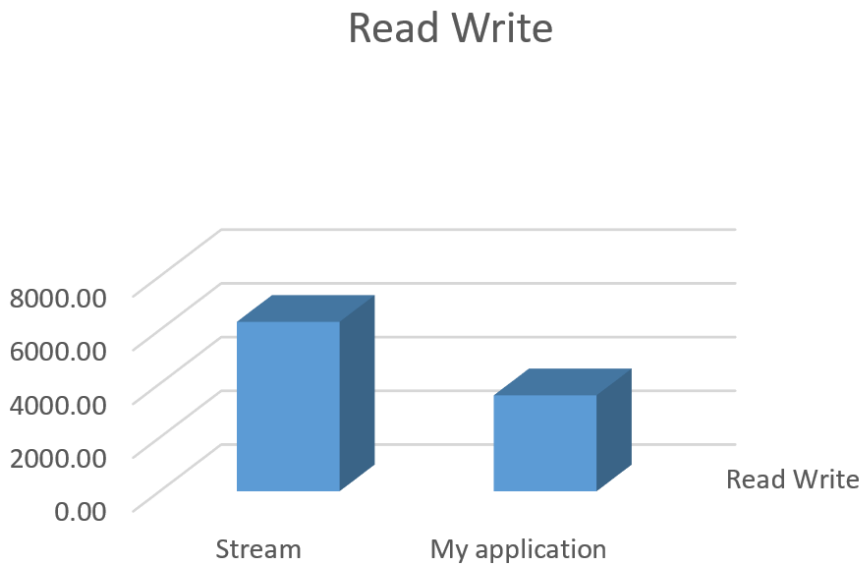
Function	Best Rate MB/s	AVG time	Min Time	Max Time
Copy	6306.2	0.025416	0.025416	0.025446
Scale	6166.9	0.025987	0.025945	0.026014
Add	8751.1	0.027455	0.027425	0.027476
Triad	8306	0.02892	0.028895	0.028973



Comparison with Stream Benchmark Tool

	Read+Write
Stream	**6306.2**
My Application	**3571.43**

	Read Write	
Stream	6306.20	
My application	3571.43	
	57%	



Above is comparison between the bandwidth achieved by STREAM and MyApplication.The throughtput achieved is **57%** of the bandwidth reported by STREAM

3. Disk Benchmark

Tested on Bare Metal instance since resources were insufficient, execution was terminating.

File size tested = 1GB

Throughput: [Block Size 8KB,8MB,80MB]

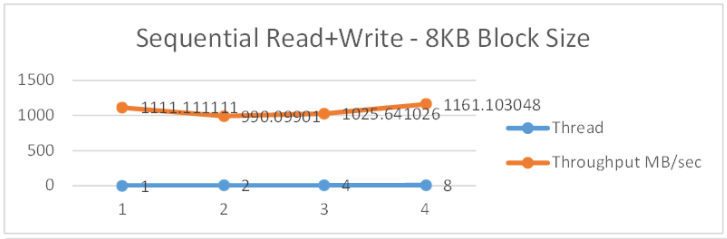
Comparing throughput of Sequential write operations for different level of concurrency

1. Read Write Operation

Sequential Read Write

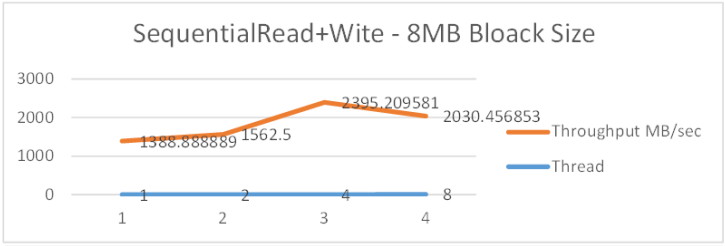
Block Size = 8KB

Thread	Throughput MB/sec
1	1111.111111
2	990.09901
4	1025.641026
8	1161.103048



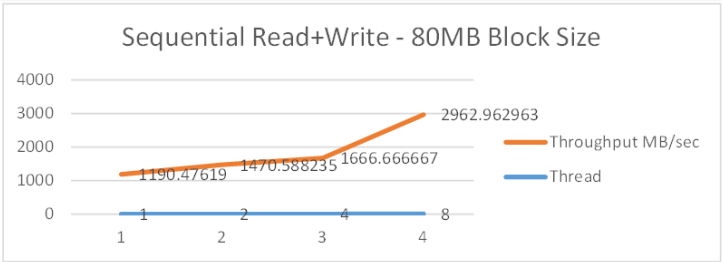
Block Size = 8MB

Thread	Throughput MB/sec
1	1388.888889
2	1562.5
4	2395.209581
8	2030.456853



Block Size = 80MB

Thread	Throughput MB/sec
1	1190.47619
2	1470.588235
4	1666.666667
8	2962.962963

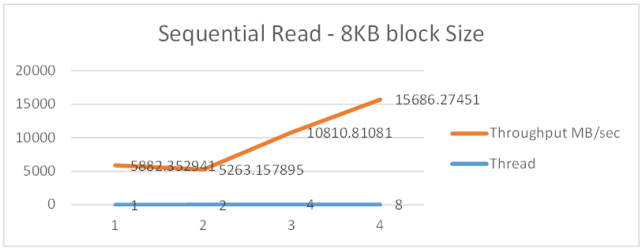


2. Sequential Read

Sequential Read

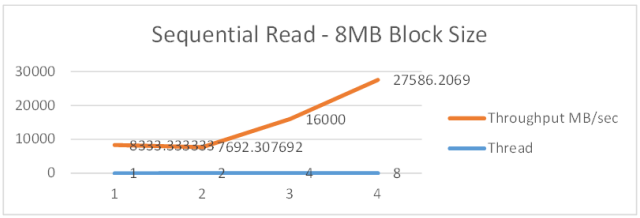
Block Size = 8KB

Thread	Throughput MB/sec
1	5882.352941
2	5263.157895
4	10810.81081
8	15686.27451



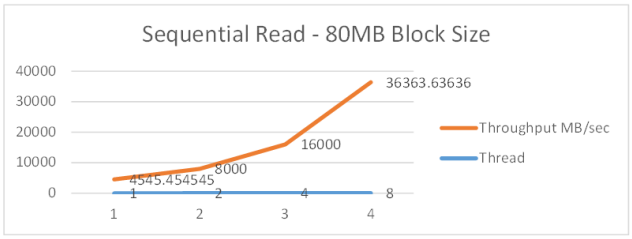
Block Size = 8MB

Thread	Throughput MB/sec
1	8333.333333
2	7692.307692
4	16000
8	27586.2069



Block Size = 80MB

Thread	Throughput MB/sec
1	4545.454545
2	8000
4	16000
8	36363.63636

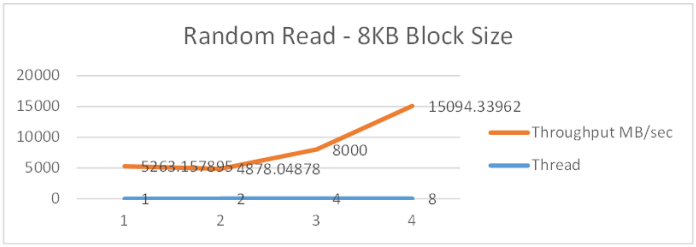


3. Random Read

Random Read

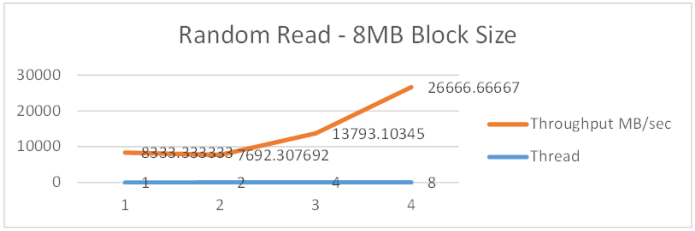
Block Size = 8KB

Thread	Throughput MB/sec
1	5263.157895
2	4878.04878
4	8000
8	15094.33962



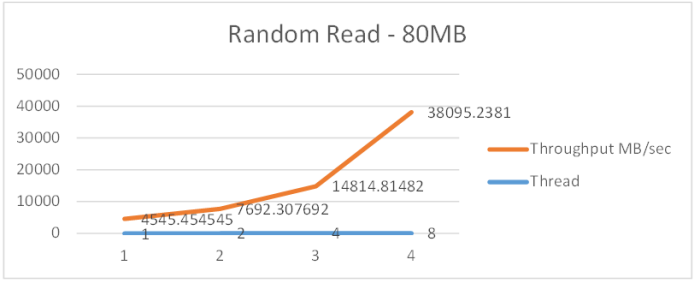
Block Size = 8MB

Thread	Throughput MB/sec
1	8333.333333
2	7692.307692
4	13793.10345
8	26666.66667



Block Size = 80MB

Thread	Throughput MB/sec
1	4545.454545
2	7692.307692
4	14814.81482
8	38095.2381



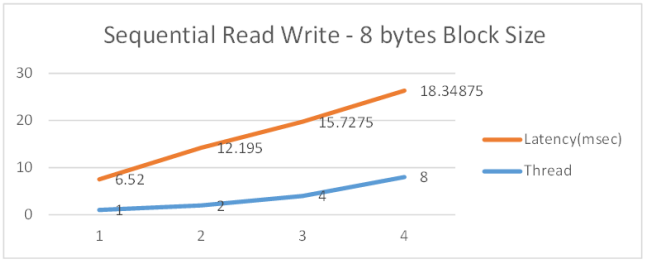
Latency [Block Size: 8Bytes]

Tested on Bare Metal instance since resources were insufficient, execution was terminating.

Sequential Read+Write

Block Size = 8 bytes

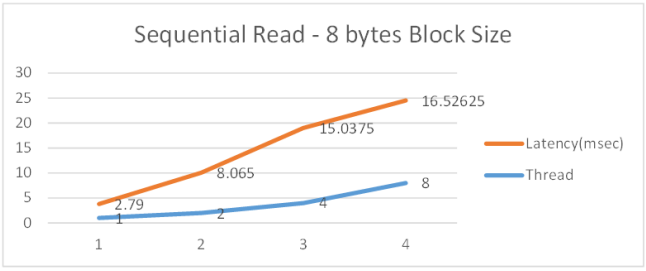
Thread	Latency(msec)
1	6.52
2	12.195
4	15.7275
8	18.34875



Sequential Read

Block Size = 8byte

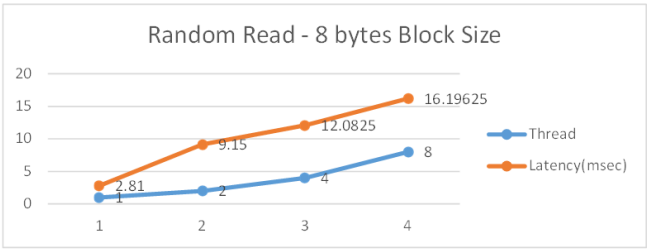
Thread	Latency(msec)
1	2.79
2	8.065
4	15.0375
8	16.52625



Random Read

Block Size = 8byte

Thread	Latency(msec)
1	2.81
2	9.15
4	12.0825
8	16.19625



Iozone Benchmark:

Command Prompt - ssh -i cloud.key cc@129.114.109.2

```
[cc@sharvari current]$ ./iozone -a
        Iozone: Performance Test of File I/O
                Version $Revision: 3.394 $
                Compiled for 64 bit mode.
                Build: linux

        Contributors:William Norcott, Don Capps, Isom Crawford, Kirby Collins
                     Al Slater, Scott Rhine, Mike Wisner, Ken Goss
                     Steve Landherr, Brad Smith, Mark Kelly, Dr. Alain CYR,
                     Randy Dunlap, Mark Montague, Dan Million, Gavin Brebner,
                     Jean-Marc Zucconi, Jeff Blomberg, Benny Halevy, Dave Boone,
                     Erik Habbinga, Kris Strecker, Walter Wong, Joshua Root,
                     Fabrice Bacchella, Zhenghua Xue, Qin Li, Darren Sawyer.
                     Ben England.

        Run began: Sat Oct  7 05:14:37 2017

        Auto Mode
        Command line used: ./iozone -a
        Output is in Kbytes/sec
        Time Resolution = 0.000001 seconds.
        Processor cache size set to 1024 Kbytes.
        Processor cache line size set to 32 bytes.
        File stride size set to 17 * record size.
                                                        random  random    bkwd   record   stride
              KB  reclen   write rewrite    read    reread    read   write    read  rewrite     read   fwrite frewrite   fread  freread
              64       4  581273 1310683  2561267  4018152 2772930 2662899 3791156  3541098  4274062  2662899  3057153  587635  9006179
              64       8 1484662 3541098  5389653 15972885 9318832 3203069 5283570  4564786  2892445  1553394  3738358 3057153  4564786
              64      16  735831 3738358  6421025 15972885 9318832 3363612 5389653  1991276  7100397  3541098  4564786 7100397 12310336
              64      32  771797 4018152 15972885  6421025210920017 3541098 5860307  4564786  2923952  3541098  2278628 3057153  4564786
              64      64 1599680 4018152  6421025  6421025 4564786 1879725 5735102  1879725  6421025  1330167  1933893 3022727 12902017
             128       4 1508887 1852520  4135958 10779307 8036304 3895854 5847904  4596273  6114306  3785961  3657016 7582312  3468030
             128       8 1622919 1852520  5603747 1420079410567140 3895854 7476717  2511022  3867787  4407601  4557257 4012317  5122535
             128      16 1997245 4717434 16365173 1588107812542043 3199360 8036304  2608629  9287508  4889281  2098744 4135958  5325799
             128      32 1526043 4889281  5545860 1588107812842051 5603747 8036304  5784891  9129573  2326073  5603747 9129573  5325799
             128      64 1727352 2166499 15881078  640613814200794 4934216 3359523  6114306  9977956  1967960  2905056 4135958  5325799
             128     128 1997245 2202044  6114306 15881078 6114306 3895854 7476717  3657016  9129573  5545860  5847904 9977956  5545860
             256       4  886067 2849590  4281170  4350555 2588541 2639446 6936061  5455847  7120034  1694118  4197489 8534922  3879045
             256       8 1312954 4929815 13454450 1416439511091721 5455847 9114515  6936061  4054829  2114473  5022044 4477549 12812277
             256      16 1610276 5455847  8815202  6107548 5217259 2392442 9114515  7314033  7735574  5320671  2242541 4819184 14164395
             256      32  856386 2170027 14953435 1495343513454450 639872010245071 7571923 11695808  5938650  610754811569783 14164395
             256      64 1003679 2539563 16072608 1607260814164395 693606110651598 7791708  3810220  3368013  6761355 4553502  5687020
             256     128 1829808 2533571 14164395  5971678 8534922 7120034 4197489  5320671  4197489  4264168  355772511091721  4652146
```

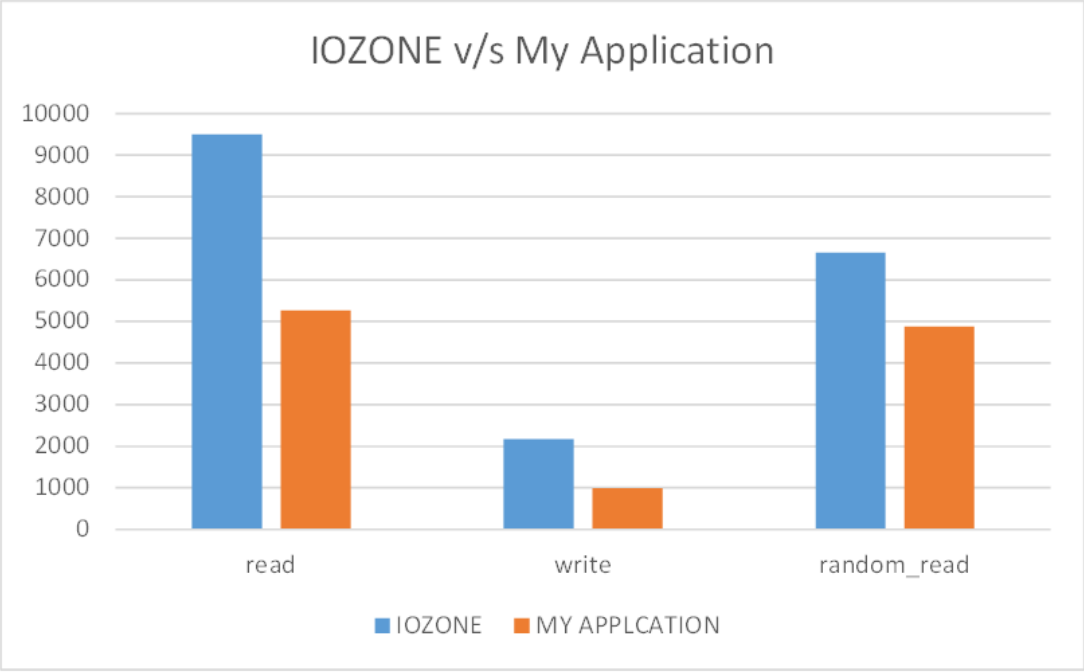
Command Prompt - ssh -i cloud.key cc@129.114.109.2

```
            4096    1024 3340563 5120972 12151506 1256035711014108 609473310344298  7027089 11128258  6370914  642044710806269 12680688
            4096    2048 3268741 5257310 12264277 11222762 8340529 572127211222762  7486415 12015527  4442909  8944095 8902382 10089154
            4096    4096 3042943 5504946 12264277 1271823811378861 637045112414943  7642951 12083134  7599002  731429912040791 11940367
            8192       4 2169475 3897073  9502650 10517839 6660405 3745826 7543623  5992483  6816318  4313945  4345590 7846828  8990446
            8192       8 2767419 4729615 13145483 1429389111554130 547669711699697  8159896 10638329  5626466  5780764 9309549 13587338
            8192      16 3000901 5188093 12333860 14401733 9471217 534049912099327  8560389  9071145  5988306  603670212103589 14270145
            8192      32 3253514 5512724 13236637 14444113 6014511 628745811113162  8507400 12783564  6290911  650160814628599 10229748
            8192      64 2813188 6648806 13539152 1403122212568463 697120913883812 10368664 10076743  5512724  644067213889424 10625170
            8192     128 2863357 6643663 12879400 12642455 9638600 636078712099327  8990446 10151170  5148447  612275912263426 13318731
            8192     256 2777036 6439465 12082308 12065338 6611703 653251011652086  8688097 10254172  5669170  5649594 8876637 10463389
            8192     512 3202568 5472336 11671877 12298542 9102385 602822911024023  8291831 10894690  5741161  504710911207409 12172193
            8192    1024 3301977 5642173 12224159 1278356412759828 7440706 7006749  7961372 11719650  5214865  540009211820445 12172193
            8192    2048 2681462 6435847 12263426 1178396012338289 750736212450057  8242105 12048414  5534924  547582511523131 10306460
            8192    4096 2590098 6272536 11569692 12391686 8167655 597580812133508  7854003 12154969  4280090  872560511523131 12189466
            8192    8192 2350057 6220301 12189466 1279784912797849 759867611977018  7359427 12120667  7118525  758525612504427 12642455
           16384       4 1891962 4212867  9930839  9912217 7927213 4398382 8095305  5906370  7780028  4585331  4611177 8932953  8543154
           16384       8 2182762 5405531 11916384 13013066 8511410 481606310258466  8304663 10409194  5488861  576466712910386 13107385
           16384      16 2145619 5002580 12337858 1372247212881345 626099612709810  8981992  9585903  6239394  603236012828443 14513684
           16384      32 2872911 5912977 13440658 1447394410395022 582674312859651  9661374 13385679  6206148  636008413129925 13485497
           16384      64 2999042 5685024 13711520 1424885813586816 743009112922524 10253874 13824615  6583078  608147413597570 11138029
           16384     128 2628116 4423296 12154552 1352797312929819 753271212920095 10008945 13097393  6222445  541789112679324 12799769
           16384     256 2683745 5439333 11545987 1230031611761383 723377711795703  8899405 11914318  5736755  515223211635919 12208535
           16384     512 2923635 5396617 11743294 12191209 7996396 451217011984967  7888086  9426791  5058554  589168510590466 11881359
           16384    1024 2475324 6182697 11432656 11628043 8894797 638787111941233  8380622 10652851  5042962  3705991 9991482 12101043
           16384    2048 2832180 5328410 11761383 1190606211677441 721479011984967  8423769 11873148  4935040  4949970 9524785  9599293
           16384    4096 2830197 5249445 11474654 1197661212081895 740367511771456  8249829 12572616  5516621  531275610667735 11520824
           16384    8192 2103777 5083626 10296895 10988425 8175239 581195910246230  6624965 10709296  4666602  6323215 7522817  9746329
           16384   16384 1995582 3592836  6750568  7089740 7129459 4475437 6306387  4332113  6511962  4351590  4310375 6296564  7037464
           32768      64 2207187 3786843  7016556  8051111 7924382 4315627 8421604 10272118  8416963  3849204  4029072 8982465  9770445
           32768     128 2595302 3999410  8634290  9314229 9872916 5398271 9974663  9711760  8145107  4508589  4109794 8346424  9124998
           32768     256 2592805 3894027  7937654  8493425 9238472 5286763 8827841  8832380  9550469  4585455  4031081 8152837  8999522
           32768     512 2560204 4033447  7425196  8127285 9059436 4955825 9185987  8314613  9287792  4695909  4047344 7990262  8568617
           32768    1024 2182512 3547470  6365329  7357228 8363693 4940860 7812668  8365730  8598099  3822228  3364577 6575772  7534697
           32768    2048 2181923 3798670  6743879  7666672 7992585 4777360 7713573  8264615 10485275  2912409  3220762 8052998  8480323
           32768    4096 2563834 3984915  8389219  8527150 9061825 4783013 8548896  8260145 12477655  3903317  3461693 7995840  8486607
           32768    8192 2530693 3823185  8054885  8355050 8200509 4347022 8216688  7918903 12710757  3911204  3920576 7654290  7884378
           32768   16384 2386929 3623221  6732647  6811054 6574514 3906979 6691346  4582244  7243233  4421419  5807000 6064783  6425141
           65536      64 2462825 3720659  8034357  8265312 8434475 3713472 8275764 10124488  7999984  3783184  3701171 7975611  8066895
           65536     128 2467268 3789077  7734584  7760351 7603645 4026818 7636599  9668652  7929367  3674356  3476527 7845852  7939903
           65536     256 2487317 3812199  6866659  7087988 7445471 3999748 7594821  9028136  7542513  3588634  3532145 7367641  7363694
           65536     512 2145542 3380915  5689898  5951824 6454077 3741066 6053005  8415882  6678471  3362182  3227107 5930892  6221377
           65536    1024 2144069 3490610  5973554  6249241 6306447 3754352 6284675  8738265  6744509  2982687  2944096 6042892  6352209
           65536    2048 2147738 3530647  6227861  6398639 6463030 3764274 6250520  8625296  6924782  2665927  2769918 6080050  6318624
```

Comparing IOZone average value with the maximum bandwidth achieved

IOZONE Benchmark

	Size	read	write	random_read
IOZONE	8192	9502.65	2169.475	6660.405
MY APPLCATION	2 threads - 8KB	5263.158	990.09901	4878.04878
		55%	46%	73%



<u>Performance achieved by the application compared to IOZone is as below</u>

Write – 46%
Read – 55%
Random Read – 73%

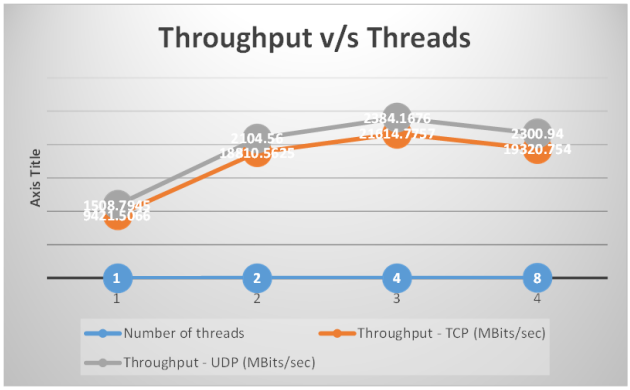
4. Network Benchmark - Tested on KVM Open Stack instance

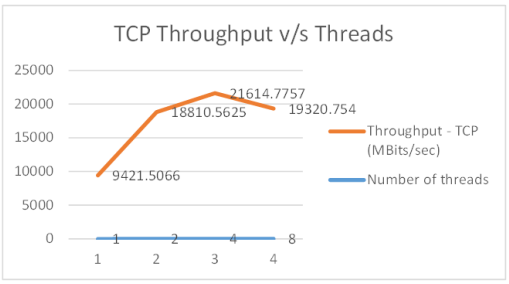
Throughput:

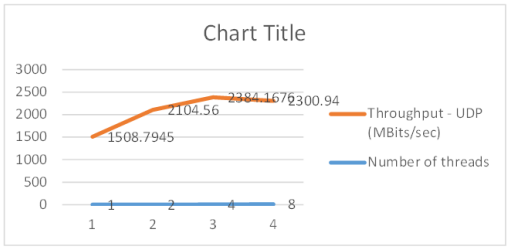
Throughput

Number of Blocks = 64KB

Number of threads	Throughput - TCP (MBits/sec)	Throughput - UDP (MBits/sec)
1	9421.5066	1508.7945
2	18810.5625	2104.56
4	21614.7757	2384.1676
8	19320.754	2300.94





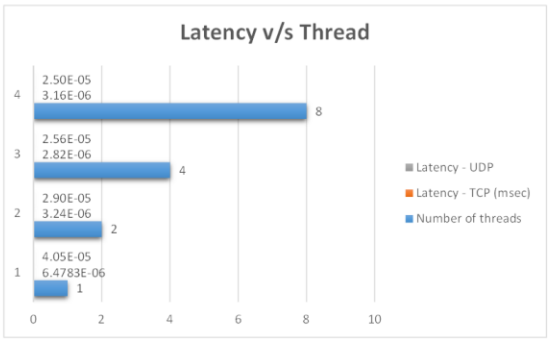


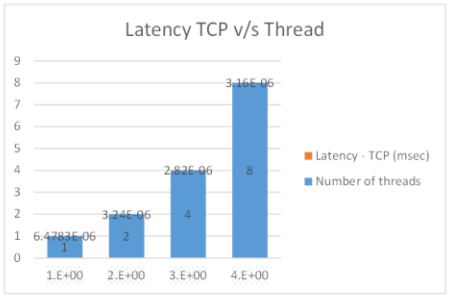
Latency:

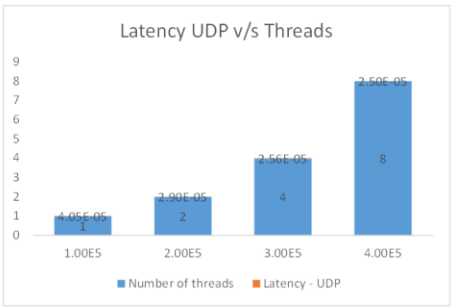
Latency

Number of Blocks = 8B

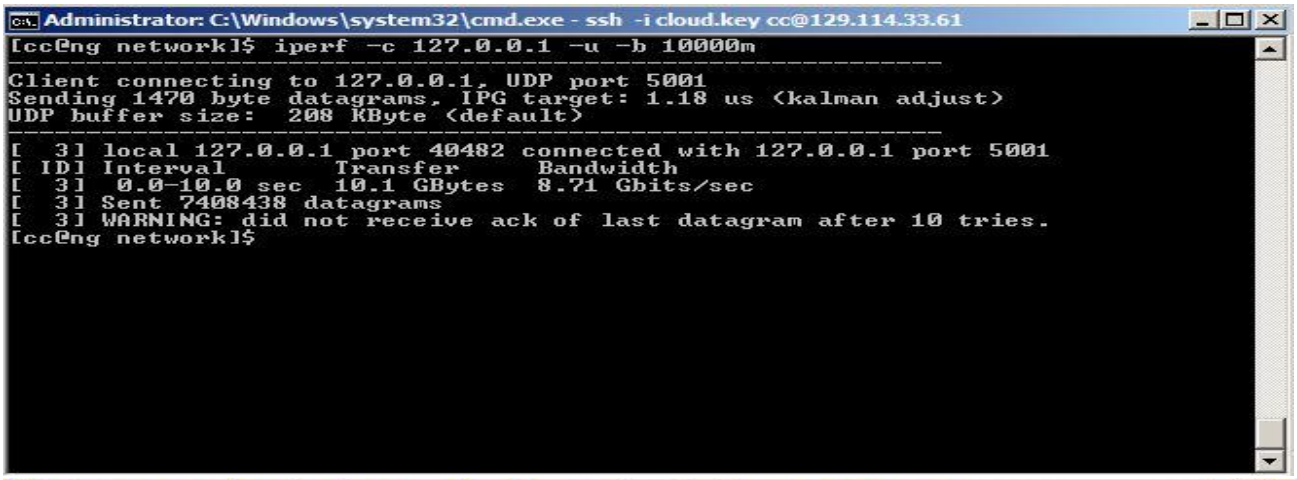
Number of threads	Latency - TCP (msec)	Latency - UDP
1	6.4783E-06	4.05E-05
2	3.24E-06	2.90E-05
4	2.82E-06	2.56E-05
8	3.16E-06	2.50E-05

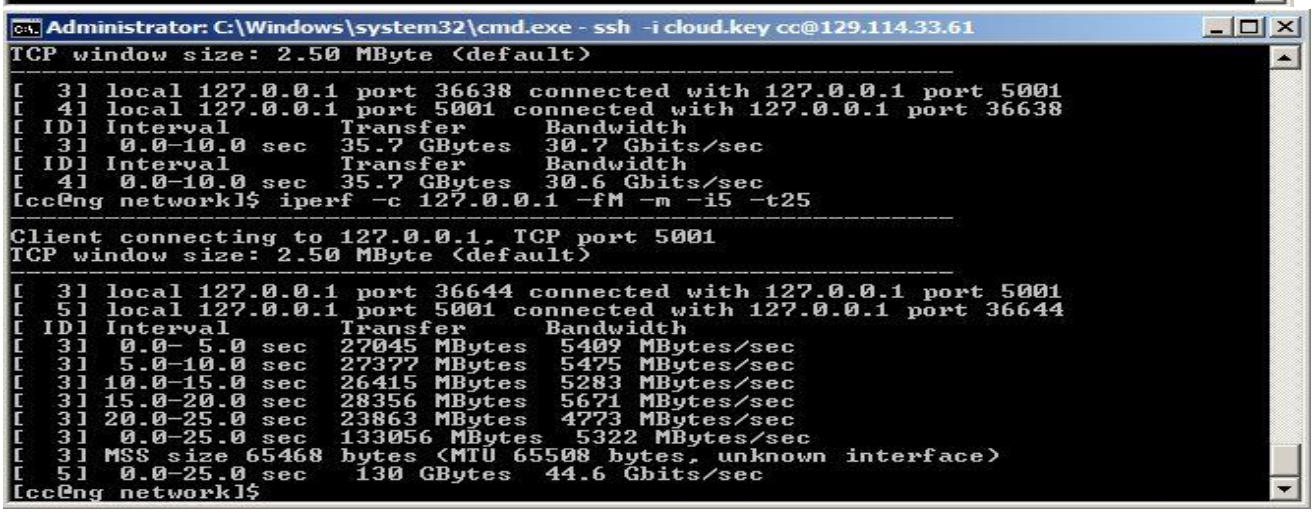






Iperf Benchmark:





IERF v/s My Application

Iperf Benchmark

	TCP Bandwidth (Gbits/sec)	UDP Bandwidth (Gbits/sec)
IPERF	44.6	8.71
My Application	21.62	2.34
	27%	27%