

## CPU:

### Throughput:

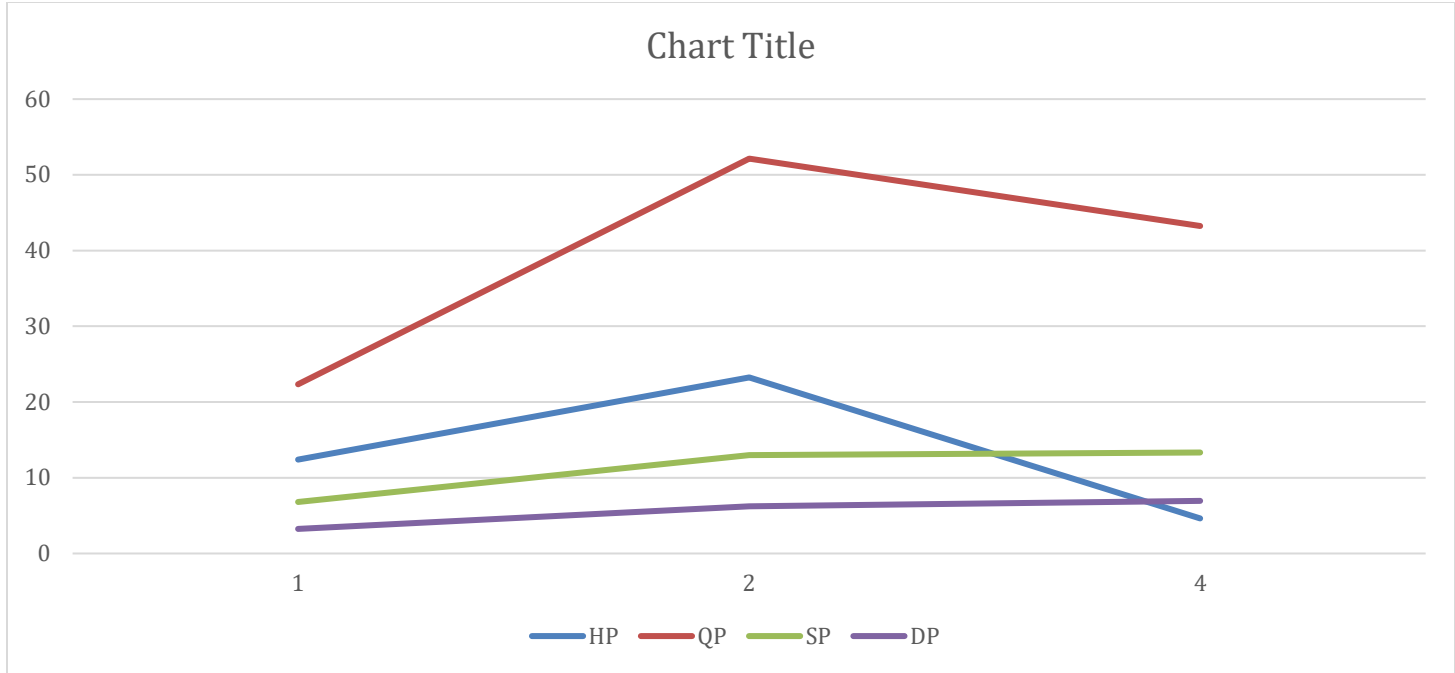
Workload	Concurrency	MyCPUBench Measured Ops/Sec (GigaOPS)	HPL Measured Ops/Sec (GigaOPS)	Theoretical Ops/Sec (GigaOPS)	MyCPUBench Efficiency (%)	HPL Efficiency (%)
QP	1	22.34	N/A	588.8	3.79415760	N/A
QP	2	52.14	N/A	588.8	8.855298913	N/A
QP	4	43.26	N/A	588.8	7.347146739	N/A
HP	1	12.38	N/A	294.4	4.205163043	N/A
HP	2	23.246	N/A	294.4	7.89605978	N/A
HP	4	4.62963	N/A	294.4	1.572564538	N/A
SP	1	6.802721	N/A	147.2	4.621413723	N/A
SP	2	12.987013	N/A	147.2	8.822699049	N/A
SP	4	13.333333	N/A	147.2	9.05797078	N/A
DP	1	3.246753	34.458	73.6	4.411349185	46.81793478
DP	2	6.21118	62.73	73.6	8.439103261	85.23097826
DP	4	6.944444	70.156	73.6	9.43538587	95.32065217

CPU Theoretical Value = No of CPU cores \* Clock Speed \* No of Instructions per cycle

CPU MyRAMBenchThroughput value = (No of Iterations / Time taken) /  $10^9$

MyCPUBenchEfficiency = (MyCPUBench / Theoretical)\*100

HPL Efficiency = (HPL Measured throughput / Theoretical)\*100



For 2 threads the throughput seems to increase gradually. For 4 threads the throughput fluctuates.

Memory:

Memory Throughput:

Workload	Concurrency	Block Size	MyRAMBenc h Measured Throughput (GB/sec)	pmbw Measured Throughput (GB/sec)	Theoretical Throughput (GB/sec)	MyRAMBenc h Efficiency (%)	pmbw Efficiency (%)
RWS	1	1KB	5.263158	16.43	68.25	7.711586813	24.07326007
RWS	1	1MB	5.555556	19.76	68.25	8.140008791	28.95238095
RWS	1	10MB	10	18.56	68.25	14.65201465	27.19413919
RWS	2	1KB	10	22.8	68.25	14.65201465	33.40659341
RWS	2	1MB	7.142857	17.52	68.25	10.46572454	25.67032967
RWS	2	10MB	16.666667	40	68.25	24.42002491	58.60805861
RWS	4	1KB	9.43	27.91	68.25	13.81684982	40.89377289
RWS	4	1MB	8.34	39.023	68.25	12.21978022	57.17655678

RWS	4	10MB	10.564	36.786	68.25	15.47838828	53.8989011
RWR	1	1KB	3.333333	4.5	68.25	4.884004396	6.593406593
RWR	1	1MB	5.555556	0.34	68.25	8.140008791	0.4981684982
RWR	1	10MB	12.5	0.56	68.25	18.31501832	0.8205128205
RWR	2	1KB	2.040816	2.7869	68.25	2.990206593	4.083369963
RWR	2	1MB	9.090909	2.08	68.25	13.32001319	3.047619048
RWR	2	10MB	20	0.79	68.25	29.3040293	1.157509158
RWR	4	1KB	1.818182	20.54	68.25	2.66400293	30.0952381
RWR	4	1MB	10.67	13.423	68.25	15.63369963	19.66739927
RWR	4	10MB	15.89	1.56	68.25	23.28205128	2.285714286

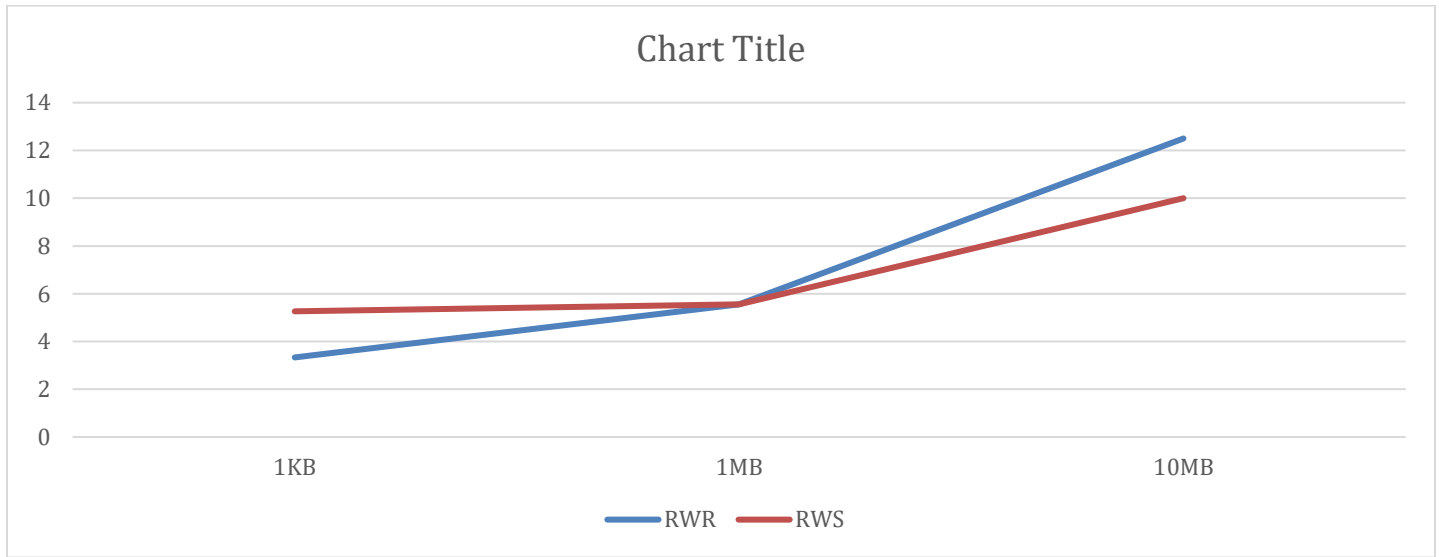
Memory Throughput = liner per clock \* clock frequency \* number of memory interfaces \* bus width

MyRAMBench Throughput = (No of Iterations / Time taken) / 10^9

MyRAMBenchEfficiency = (MyRAMBench throughput/ Theoretical)\*100

pmbw Efficiency = (pmbw Measured throughput / Theoretical)\*100

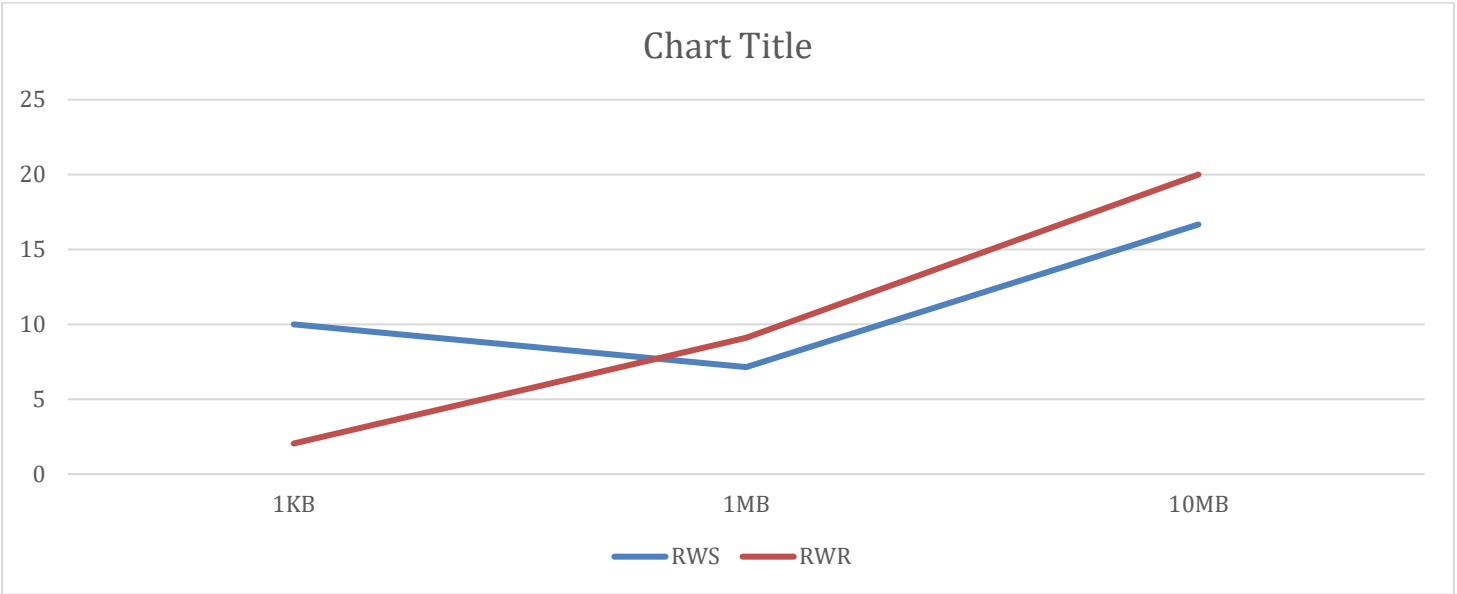
For 1 Thread:



For Read Write Random the throughput increases when block size is increased.

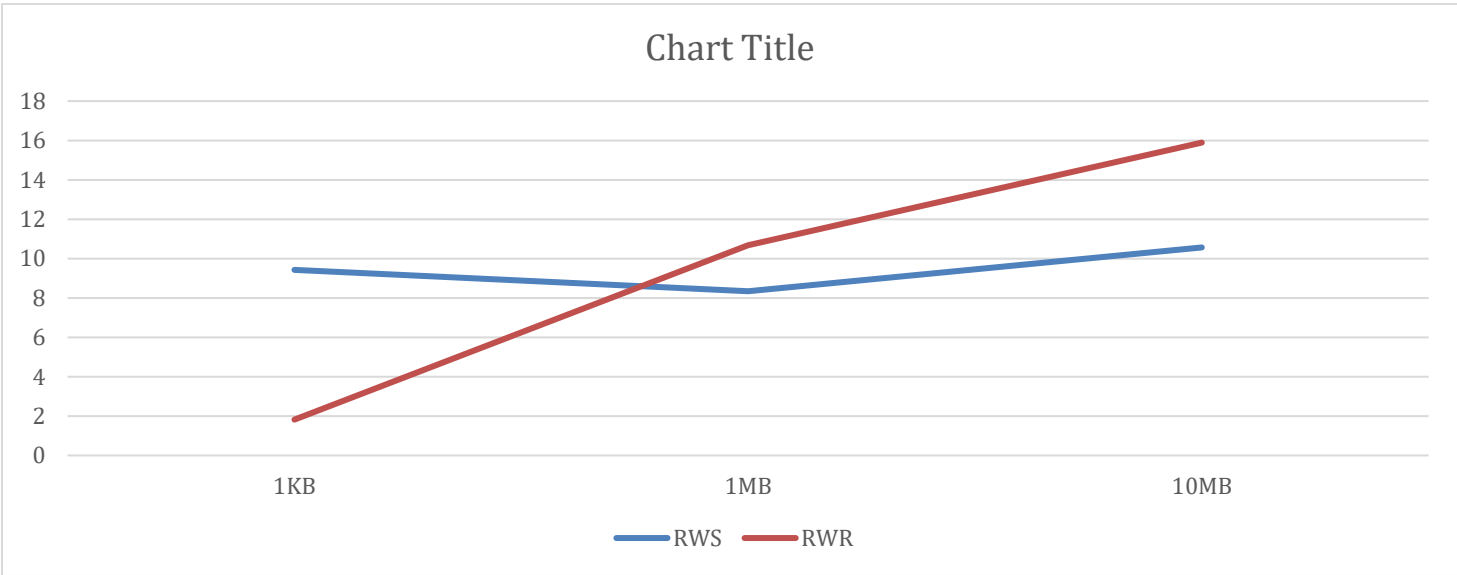
For Read Write Sequential throughput does not change much for block sizes 1KB and 1MB, increases when the block size is increased to 10MB

For 2 threads:



For Read Write Random the throughput increases gradually as the block size increases.  
For Read Write Sequential the throughput decreases a little when the block size is increased from 1KB to 1MB and increases gradually when block size is increased from 1MB to 10MB

For 4 Threads:



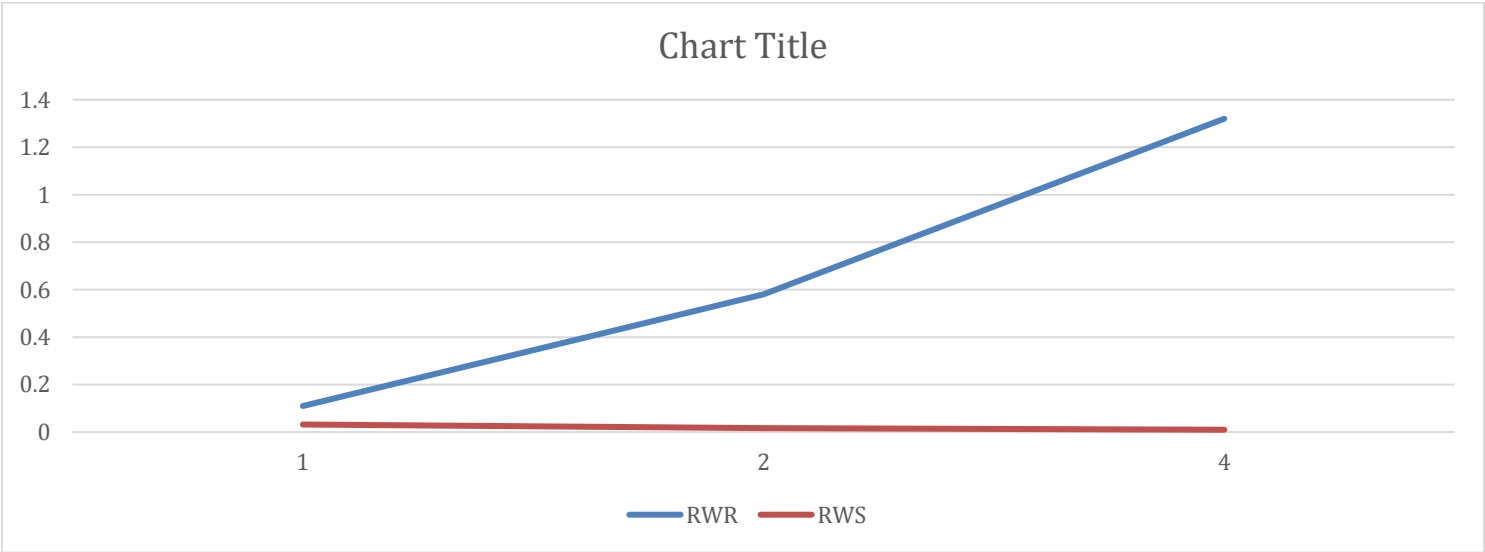
For Read Write Sequential the throughput varies little when the block size is increased  
For Read Write Random the throughput increases almost twice when the block size is increased.

Memory Latency:

Workload	Concurrency	Block Size	MyRAMBench Measured Latency (us)	Pmbw Measured Latency (us)	Theoretical Latency (us)	MyRAMBench Efficiency (%)	Pmbw Efficiency (%)
RWS	1	1B	0.032	0.023	0.014	43.75	60.86956522
RWS	2	1B	0.0167	0.027	0.014	83.83233533	51.85185185
RWS	4	1B	0.01	0.037	0.014	14	37.83783784
RWR	1	1B	0.11	0.3	0.014	12.72727273	4.666666667
RWR	2	1B	0.58	0.38	0.014	2.413793103	3.684210526
RWR	4	1B	1.32	0.78	0.014	1.060606061	1.794871795

MyRAMBenchLatency = time\_taken / total\_data\_size  
MyRAMBenchEfficiency = (MyRAMBench Latency / Theoretical)\*100  
pmbw Efficiency = (pmbw Measured throughput Latency/ Theoretical)\*100  
Theoretical Latency : Read Write Sequential 0.014  
Read Write Random 0.014

Latency:



Latency remains the same as block size is increased for Read Write Sequential. It increases gradually as the block size is increased for Read Write Random.

## Disk:

### Disk Throughput:

Workload	Concurrency	Block Size	MyDiskBench Measured Throughput (MB/sec)	iOZone Measured Throughput (MB/sec)	Theoretical Throughput (MB/sec)	MyDiskBench Efficiency (%)	iOZone Efficiency (%)
RS	1	1MB	320.65	312	540	59.37962963	57.77777778
RS	1	10MB	356.32	322	540	65.98518519	59.62962963
RS	1	100MB	342.12	320	540	63.35555556	59.25925926
RS	2	1MB	589.45	683	1080	54.5787037	63.24074074
RS	2	10MB	578.32	632	1080	53.54814815	58.51851852
RS	2	100MB	602.12	697	1080	55.75185185	64.53703704
RS	4	1MB	1134.25	1256	2160	52.51157407	58.14814815
RS	4	10MB	1190.12	1298	2160	55.09814815	60.09259259
RS	4	100MB	1152.67	1269	2160	53.36435185	58.75
WS	1	1MB	290.45	336	410	70.84146341	81.95121951
WS	1	10MB	289.65	328	410	70.64634146	80
WS	1	100MB	318.56	330	410	77.69756098	80.48780488
WS	2	1MB	330	368	820	40.24390244	44.87804878
WS	2	10MB	317.08	438	820	38.66829268	53.41463415
WS	2	100MB	319.56	546	820	38.97073171	66.58536585
WS	4	1MB	328.4	342	1640	20.02439024	20.85365854
WS	4	10MB	321.8	357	1640	19.62195122	21.76829268
WS	4	100MB	325.765	385	1640	19.86371951	23.47560976
RR	1	1MB	327.54	175	372	88.0483871	47.04301075
RR	1	10MB	312.9	302	372	84.11290323	81.1827957

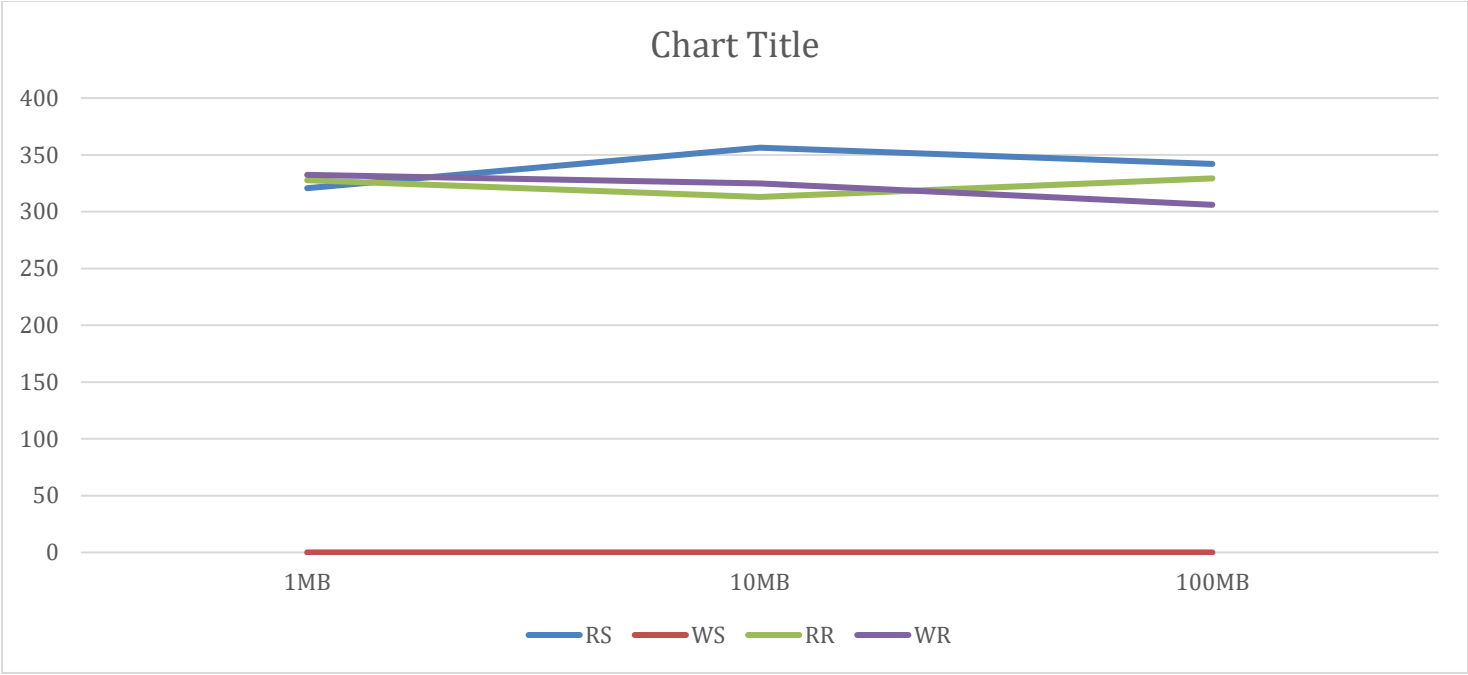
RR	1	100MB	329.3	189	372	88.52150538	50.80645161
RR	2	1MB	437.43	446	744	58.79435484	59.94623656
RR	2	10MB	614.8	668	744	82.6344086	89.78494624
RR	2	100MB	600.32	675	744	80.68817204	90.72580645
RR	4	1MB	1178	691	1488	79.16666667	46.43817204
RR	4	10MB	1168	1186	1488	78.49462366	79.70430108
RR	4	100MB	1173.56	1370	1488	78.86827957	92.06989247
WR	1	1MB	332.4	301	172	193.255814	175
WR	1	10MB	324.7	337	172	188.7790698	195.9302326
WR	1	100MB	306	320	172	177.9069767	186.0465116
WR	2	1MB	312.1	523	344	90.72674419	152.0348837
WR	2	10MB	310.5	508	344	90.26162791	147.6744186
WR	2	100MB	356.4	419	344	103.6046512	121.8023256
WR	4	1MB	342.5	568	688	49.78197674	82.55813953
WR	4	10MB	331.2	420	688	48.13953488	61.04651163
WR	4	100MB	304.2	407	688	44.21511628	59.15697674

Theoretical Throughput: Read Sequential 1 Thread 540  
Read Sequential 2 Thread 1080  
Read Sequential 4 Thread 2160  
Write Sequential 1 Thread 410  
Write Sequential 2 Thread 820  
Write Sequential 4 Thread 1640  
Read Random 1 Thread 372  
Read Random 2 Thread 744  
Read Random 4 Thread 1488

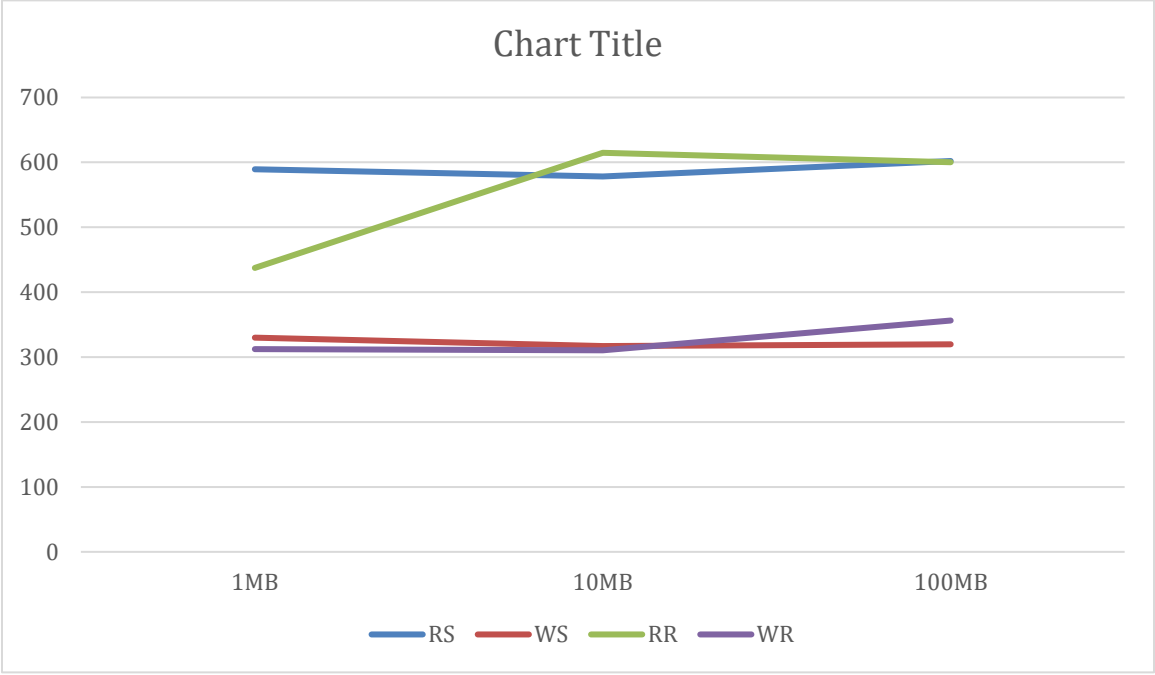
MyDiskBenchEfficiency = (MyDiskBench Latency / Theoretical)\*100

iOZONE Efficiency = (iOZONE Measured throughput Latency/ Theoretical)\*100

For 1 thread:

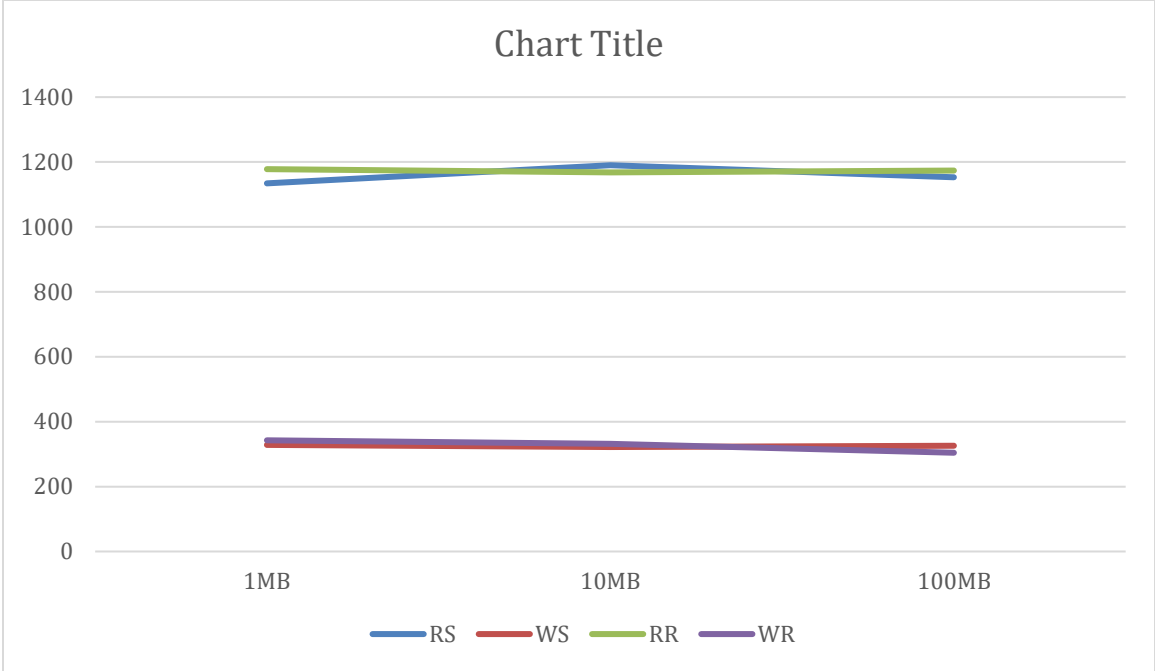


For 2 threads:



For 4 Threads:





Disk Latency (measured in ms):

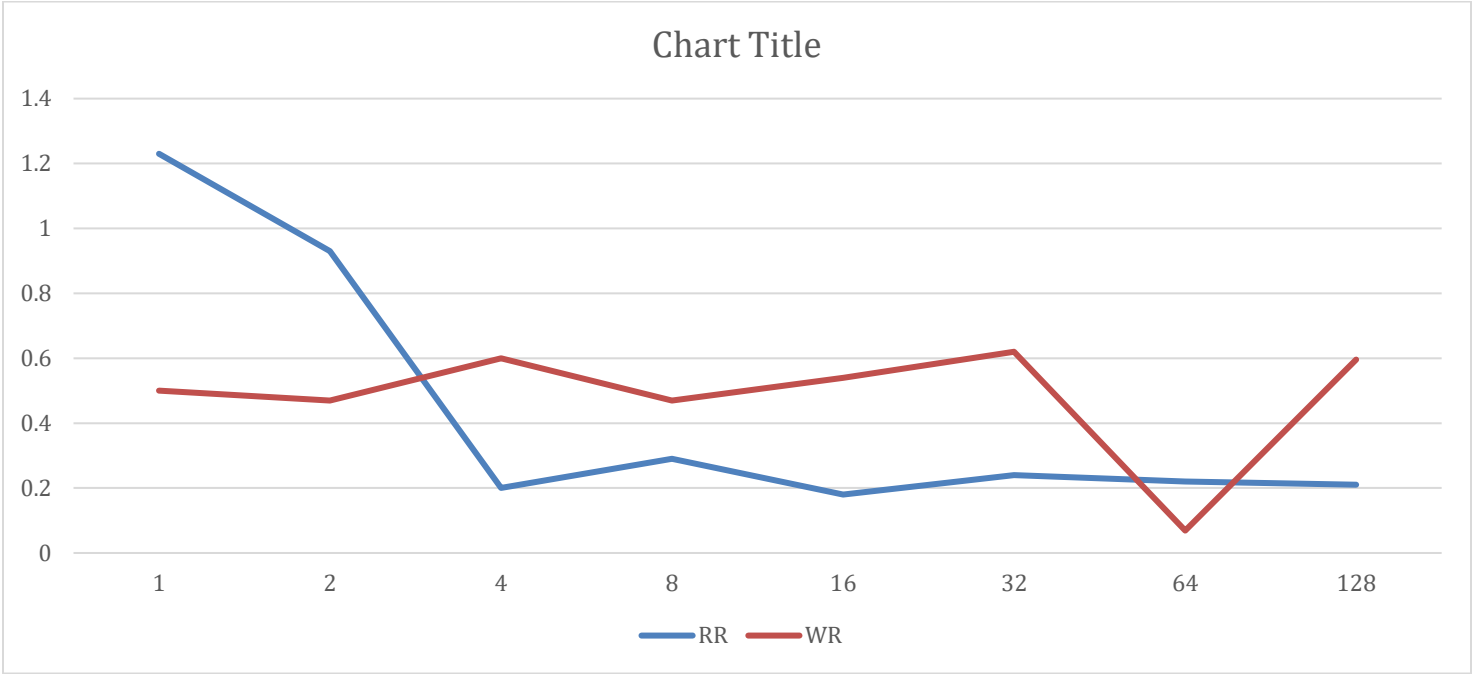
Workload	Concurrency	Block Size	MyDiskBench Measured Latency (ms)	IOZone Measured Latency (ms)	Theoretical Latency (ms)	MyDiskBench Efficiency (%)	IOZone Efficiency (%)
RR	1	1KB	1.23	0.002	0.5	40.6504065	
RR	2	1KB	0.93	0.0007	0.25	26.88172043	
RR	4	1KB	0.2	0.00062	0.125	62.5	
RR	8	1KB	0.29	0.0008	0.0625	21.55172414	
RR	16	1KB	0.18	0.00067	0.03125	17.36111111	
RR	32	1KB	0.24	0.0006	0.0156	6.5	
RR	64	1KB	0.22	0.00045	0.0078	3.545454545	
RR	128	1KB	0.21	0.00051	0.0039	1.857142857	
WR	1	1KB	0.5	0.013	0.5	100	
WR	2	1KB	0.47	0.008	0.25	53.19148936	
WR	4	1KB	0.6	0.0041	0.125	20.83333333	

WR	8	1KB	0.47	0.0026	0.0625	13.29787234	
WR	16	1KB	0.54	0.0023	0.03125	5.787037037	
WR	32	1KB	0.62	0.0024	0.0156	2.516129032	
WR	64	1KB	0.069	0.0015	0.0078	11.30434783	
WR	128	1KB	0.596	0.0021	0.0039	0.6543624161	

Theoretical Latency = 1 Thread 0.5  
2 Threads 0.25  
4 Threads 0.125  
8 Threads 0.0625  
16 Threads 0.03125  
32 Threads 0.0156  
64 Threads 0.0078

MyDiskBench Efficiency = (TheoreticalLatency / MyDiskBenchLatency)\*100  
IOZone Efficiency = (TheoreticalLatency / IOZoneLatency)\*100

Latency:



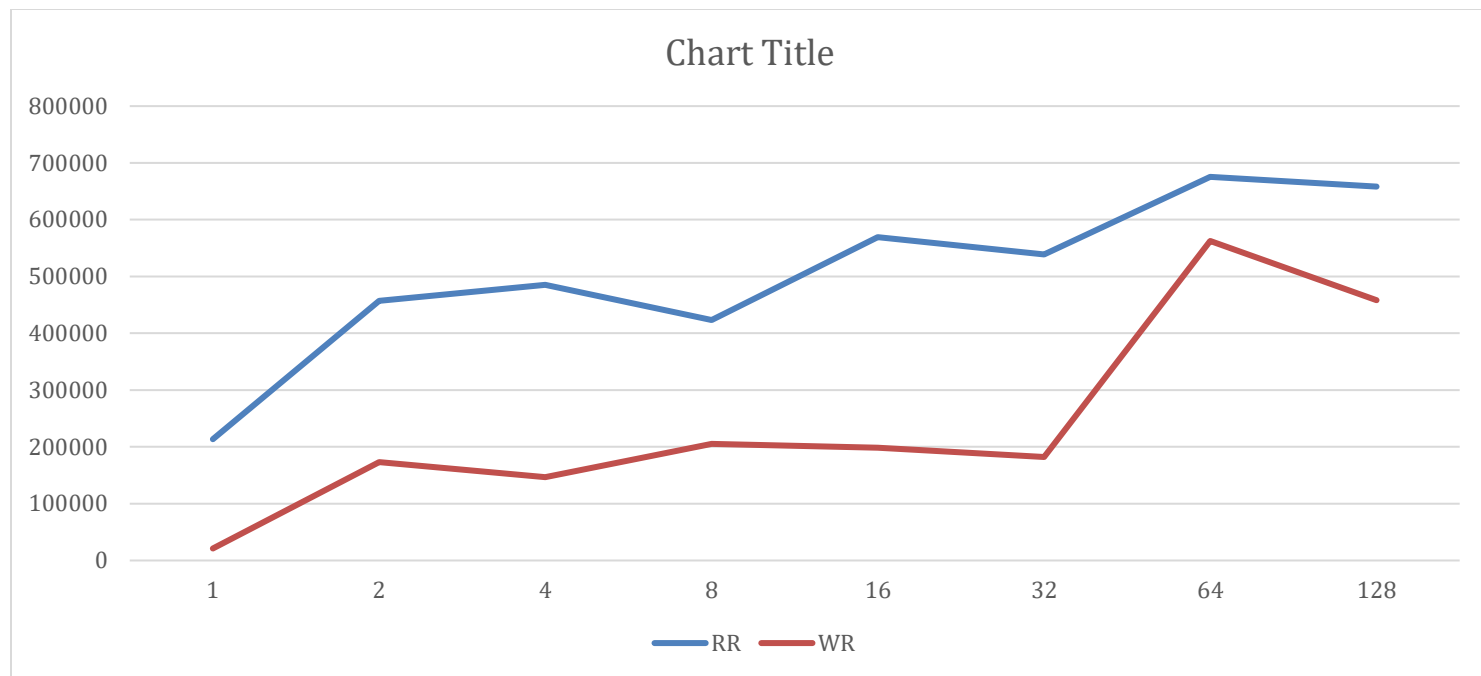
## Disk Latency (measured in IOPS):

Workload	Concurrency	Block Size	MyDiskBench Measured IOPS	IOZone Measured IOPS	Theoretical IOPS	MyDiskBench Efficiency (%)	IOZone Efficiency (%)
RR	1	1KB	213498	236745	372000	57.39193548	63.64112903
RR	2	1KB	457234	564538	744000	61.4561828	75.87876344
RR	4	1KB	485362	1285453	1488000	32.61841398	86.38797043
RR	8	1KB	423590	1586579	2976000	14.23353495	53.3124664
RR	16	1KB	569125	4673207	5952000	9.561911962	78.51490255
RR	32	1KB	538965	2783452	11904000	4.527595766	23.38249328
RR	64	1KB	675409	32464801	23808000	2.836899362	136.3608913
RR	128	1KB	658234	1672435	47616000	1.382379872	3.51233829
WR	1	1KB	21097	42673	172000	12.26569767	24.80988372
WR	2	1KB	173289	85635	344000	50.3747093	24.89389535
WR	4	1KB	146587	304523	688000	21.30625	44.26206395
WR	8	1KB	205438	287845	1376000	14.93008721	20.91896802
WR	16	1KB	198768	754535	2752000	7.222674419	27.41769622
WR	32	1KB	182253	2146480	5504000	3.311282703	38.99854651
WR	64	1KB	562546	395481	11008000	5.110337936	3.592668968
WR	128	1KB	458342	643543	22016000	2.081858648	2.923069586

MyDiskBench Efficiency = (TheoreticalIOPS / MyDiskBenchIOPS)\*100

IOZone Efficiency = (TheoreticalIOPS / IOZoneIOPS)\*100

Latency:

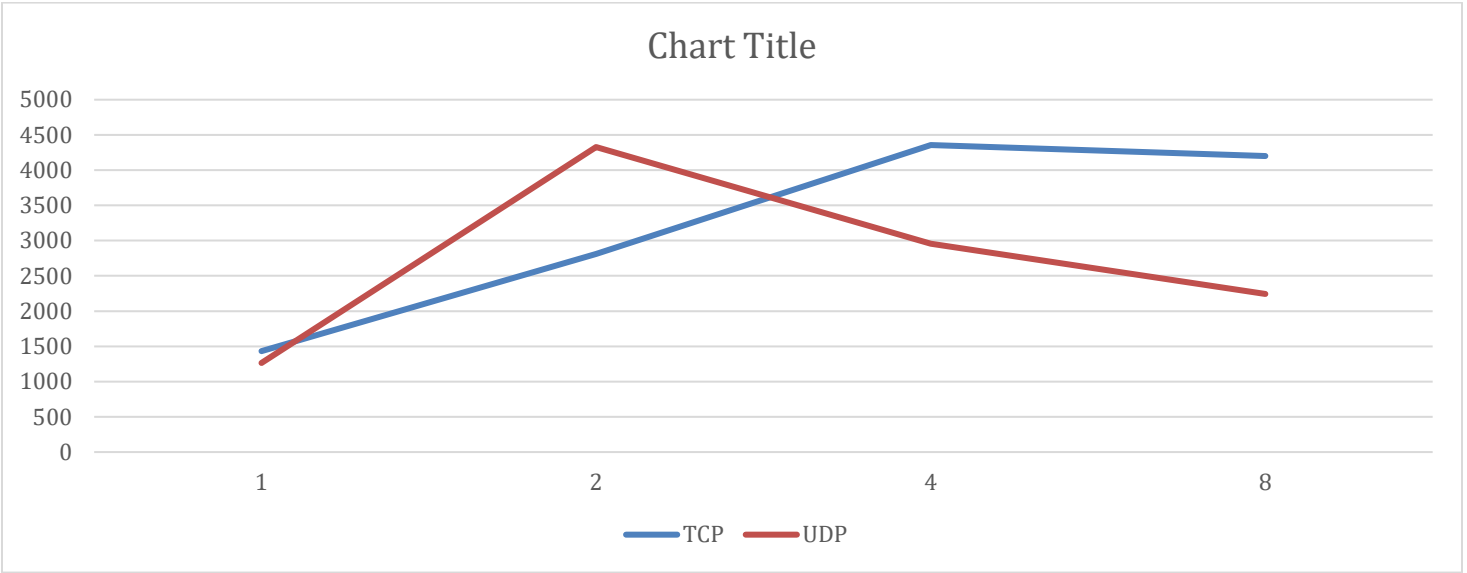


Network:

Network Throughput:

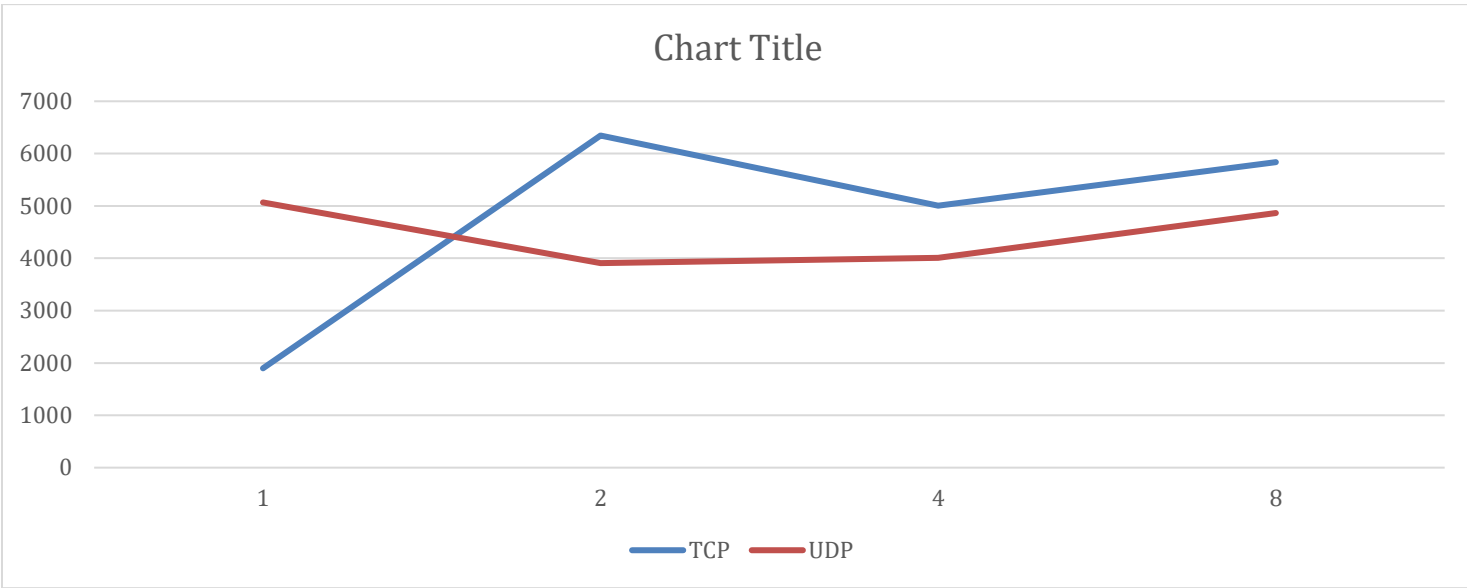
Protocol	Concurrency	Block Size	MyNETBench Measured Throughput (Mb/sec)	ipref Measured Throughput (Mb/sec)	Theoretical Throughput (Mb/sec)	MyNETBench Efficiency (%)	Ipref Efficiency (%)
TCP	1	1KB	1432	2056	10000	14.32	20.56
TCP	1	32KB	1898	5280	10000	18.98	52.8
TCP	2	1KB	2812.05	5600.6	10000	28.1205	56.006
TCP	2	32KB	6345.32	8627.4	10000	63.4532	86.274
TCP	4	1KB	4356.12	4856	10000	43.5612	48.56
TCP	4	32KB	5008	5976	10000	50.08	59.76
TCP	8	1KB	4198.78	5498	10000	41.9878	54.98
TCP	8	32KB	5834.12	6434	10000	58.3412	64.34
UDP	1	1KB	1264	1324	10000	12.64	13.24
UDP	1	32KB	5067	5346	10000	50.67	53.46
UDP	2	1KB	4328	5867	10000	43.28	58.67
UDP	2	32KB	3908	4576	10000	39.08	45.76
UDP	4	1KB	2956	3486	10000	29.56	34.86
UDP	4	32KB	4006.72	4535	10000	40.0672	45.35
UDP	8	1KB	2245.01	2317	10000	22.4501	23.17
UDP	8	32KB	4865	5187	10000	48.65	51.87

For 1KB:



For TCP the throughput increases gradually when the thread count is increased upto 4 threads and remains the same when the thread count is increased from 4 to 8.

For 32KB:

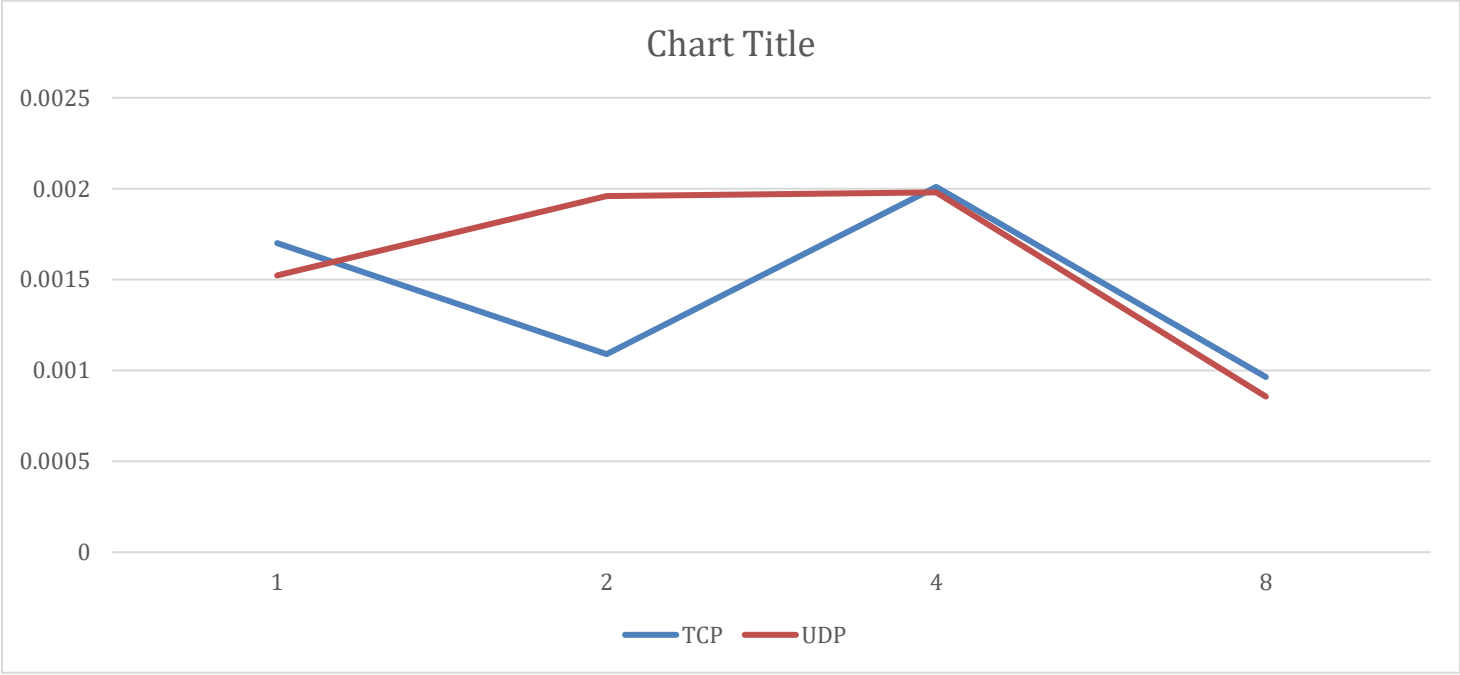


For TCP the throughput increases when the thread count changes from 1 to 2 threads, decreases when the thread count changes from 2 to 4 and increases again when the thread count increases from 4 to 8.

Network Latency:

Protocol	Concurrency	Message Size	MyNETBenc h Measured Latency (ms)	ping Measured Latency (ms)	Theoretical Latency (ms)	MyNETBenc h Efficiency (%)	ping Efficiency (%)
TCP	1	1B	0.0017	0.0009	0.0007	41.17647059	77.77777778
TCP	2	1B	0.00109	0.001	0.0007	64.22018349	70
TCP	4	1B	0.00201	0.00153	0.0007	34.82587065	45.75163399
TCP	8	1B	0.000964	0.0008	0.0007	72.61410788	87.5
UDP	1	1B	0.001523	0.0016	0.0007	45.96191727	43.75
UDP	2	1B	0.00196	0.0018	0.0007	35.71428571	38.88888889
UDP	4	1B	0.00198	0.00096	0.0007	35.35353535	72.91666667
UDP	8	1B	0.0008564	0.00084	0.0007	81.73750584	83.33333333

Latency:



For TCP the latency fluctuates as the no of threads are increased. For UDP the latency increases slightly upto 4 threads and goes down when the number of threads is 8.