

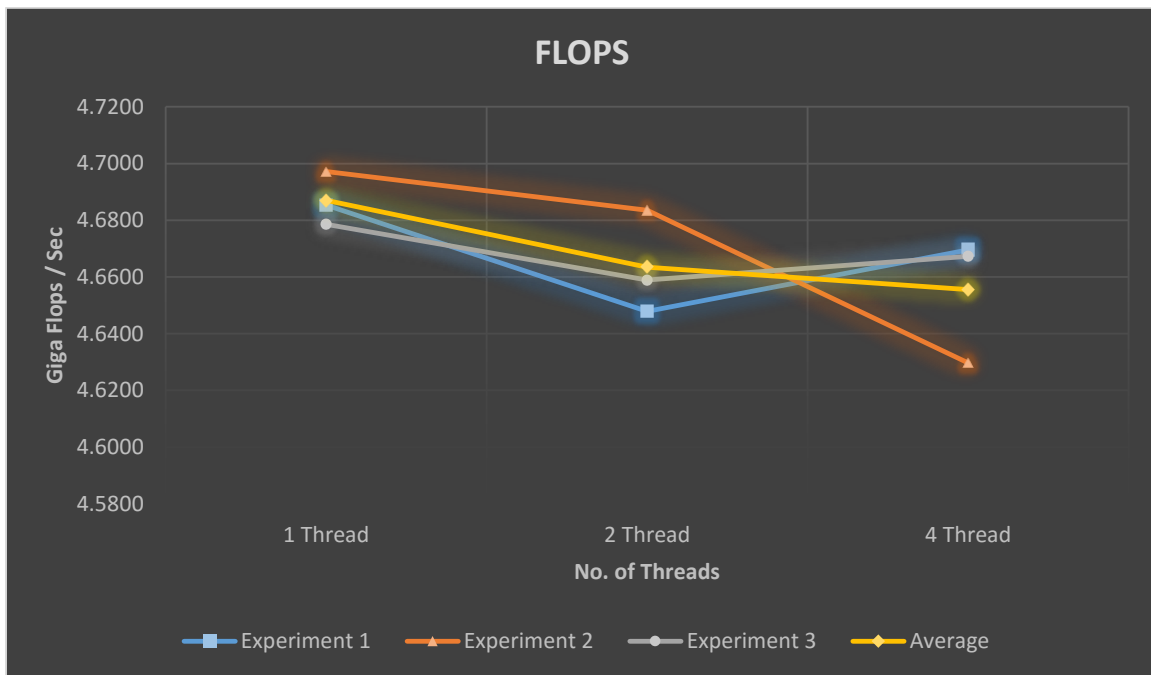
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# 1. CPU Benchmarking

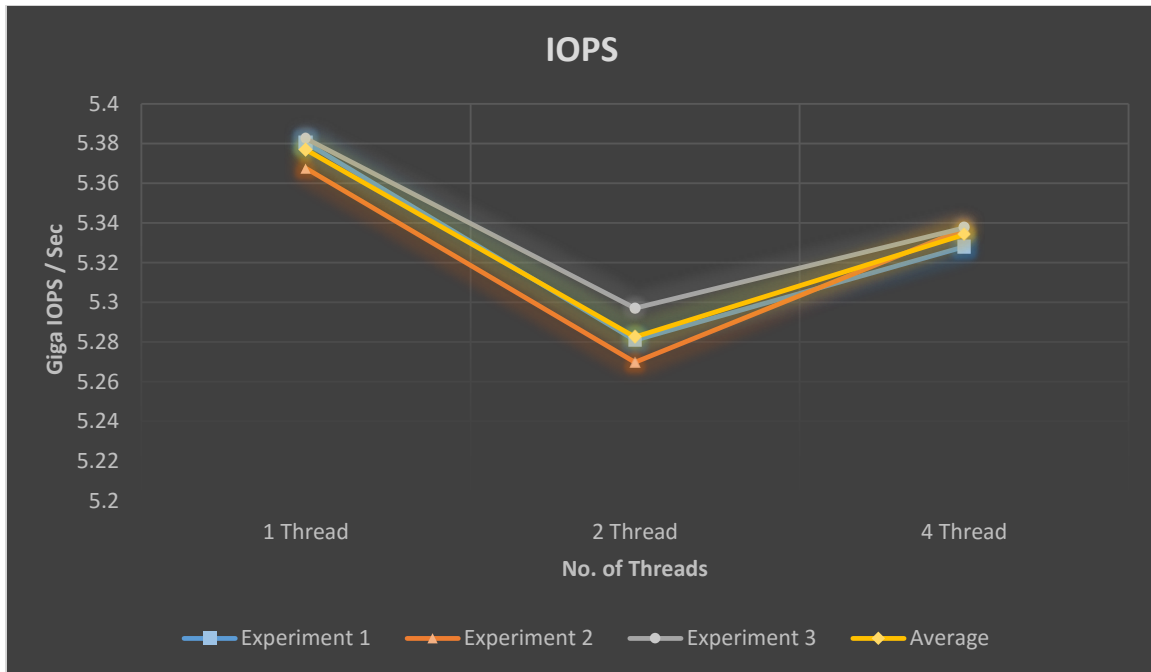
## a. FLOPS & IOPS computation

	FLOPS			IOPS		
	1 Thread	2 Threads	4 Threads	1 Thread	2 Threads	4 Threads
<b>Exp. 1</b>	4.6853	4.6479	4.6696	5.3805	5.2809	5.3281
<b>Exp. 2</b>	4.6971	4.6835	4.6297	5.3675	5.2698	5.3369
<b>Exp. 3</b>	4.6785	4.6589	4.6672	5.3826	5.2970	5.3376
<b>Average</b>	4.6870	4.6634	4.6555	5.3768	5.2826	5.3342
<b>Std. Dev.</b>	0.0094	0.0183	0.0224	0.0082	0.0137	0.0053



- The above graph illustrates the FLOPS trend for the 3 experiments and their average.
- Assignment achieves approximately 12.23%  $((4.6971 / 38.4) * 100 = 12.23 \%)$  of Theoretical Performance
- Please refer to “benchmarking\_11FEB2016\_CPU\_1.txt”, “benchmarking\_11FEB2016\_CPU\_2.txt” and “benchmarking\_11FEB2016\_CPU\_3.txt” for the output details

## Benchmarking Performance Evaluation



- The above graph illustrates the IOPS trend for the 3 experiments and their average.
- Please refer to “benchmarking\_11FEB2016\_CPU\_1.txt”, “benchmarking\_11FEB2016\_CPU\_2.txt” and “benchmarking\_11FEB2016\_CPU\_3.txt” for the output details.

### b. FLOPS & IOPS sampling over 10 min. with 1 sec. sampling interval

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
1	4.3120	4.5561	4.8042	4.5575	0.2461	5.0303	5.3027	5.1202	5.1511	0.1388
2	4.3254	4.5452	4.7932	4.5546	0.2340	5.0556	5.3237	5.1301	5.1698	0.1384
3	4.1306	4.3514	4.5935	4.3585	0.2315	5.0512	5.3225	5.1274	5.1671	0.1399
4	4.3220	4.5411	4.7928	4.5520	0.2356	3.7908	4.6521	4.6976	4.3802	0.5109
5	4.1262	3.7828	4.1973	4.0354	0.2217	5.0567	5.3189	5.1293	5.1683	0.1354
6	4.3002	4.5187	4.7752	4.5314	0.2378	3.7924	4.6584	4.7021	4.3843	0.5130
7	4.2511	4.4751	4.3573	4.3612	0.1120	5.0514	5.3177	5.1255	5.1649	0.1374
8	4.3179	4.5453	4.8019	4.5550	0.2421	5.0483	5.3151	5.1238	5.1624	0.1375
9	4.3177	4.5388	4.7985	4.5517	0.2407	5.0441	5.3111	5.1203	5.1585	0.1375
10	4.3079	4.5293	4.7895	4.5422	0.2411	4.9453	5.2110	5.0188	5.0584	0.1372
11	4.3139	4.5344	4.7890	4.5458	0.2378	4.9917	5.2525	5.0674	5.1039	0.1342
12	4.3060	4.5336	4.7898	4.5431	0.2420	4.8842	5.1383	4.9558	4.9928	0.1310

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
13	4.3054	4.5399	4.7955	4.5469	0.2451	5.0207	5.2689	5.0777	5.1224	0.1300
14	4.3287	4.5532	4.7992	4.5604	0.2353	5.0650	5.3190	5.1319	5.1720	0.1316
16	4.3153	4.5347	4.7882	4.5460	0.2366	5.0587	5.3124	5.1336	5.1682	0.1304
16	3.2202	3.9639	4.3834	3.8558	0.5891	5.0650	5.3171	5.1284	5.1702	0.1312
17	4.3148	4.5441	4.7900	4.5496	0.2376	5.0559	5.3217	5.1300	5.1692	0.1371
18	4.3106	4.5416	4.7899	4.5474	0.2397	5.0620	5.3316	5.1327	5.1754	0.1398
19	4.3342	4.5526	4.7960	4.5609	0.2311	5.0619	5.3190	5.1285	5.1698	0.1335
20	4.3110	4.5456	4.7913	4.5493	0.2402	5.0626	5.3110	5.1360	5.1699	0.1276
21	4.3295	4.5645	4.4144	4.4361	0.1190	5.0449	5.2898	5.1239	5.1528	0.1250
22	4.3099	4.5459	4.7873	4.5477	0.2387	5.0610	5.3059	4.7149	5.0273	0.2969
23	4.3154	4.5480	4.7951	4.5528	0.2399	5.0647	4.6598	4.7052	4.8099	0.2218
24	3.2339	3.9801	4.3931	3.8690	0.5875	5.0622	5.3057	5.1273	5.1651	0.1261
25	4.3121	4.5477	4.7896	4.5498	0.2388	4.2748	4.4817	4.3349	4.3638	0.1065
26	4.3391	4.5290	4.7787	4.5489	0.2205	5.0327	5.2927	5.1225	5.1493	0.1321
27	4.3029	4.5379	4.7882	4.5430	0.2427	5.0153	5.2866	5.1191	5.1403	0.1369
28	4.3238	4.5447	4.0013	4.2899	0.2733	5.0081	5.2875	5.1238	5.1398	0.1404
29	4.3332	4.5561	4.7994	4.5629	0.2332	5.0125	4.6090	4.2441	4.6219	0.3844
30	4.3110	4.5431	4.7900	4.5480	0.2395	5.0121	5.2895	5.1213	5.1410	0.1398
31	4.3252	4.5479	4.7946	4.5559	0.2348	5.0260	5.2872	5.1203	5.1445	0.1323
32	4.2158	4.4921	4.4543	4.3874	0.1498	3.9643	4.7249	4.1432	4.2775	0.3977
33	3.3846	4.0519	4.1206	3.8524	0.4066	3.7435	4.1392	3.9317	3.9381	0.1979
34	4.3043	4.5362	4.7853	4.5419	0.2406	5.0459	5.2973	5.1219	5.1550	0.1289
35	4.1320	4.3519	4.5959	4.3599	0.2321	5.0442	5.2978	5.1207	5.1542	0.1301
36	4.3145	4.5402	4.7976	4.5508	0.2417	5.0470	5.3038	5.1207	5.1572	0.1322
37	4.1452	4.3615	4.6125	4.3731	0.2339	5.0495	5.3034	5.1163	5.1564	0.1316
38	4.3072	4.5451	4.7969	4.5497	0.2449	5.0422	5.3077	5.1162	5.1553	0.1370
39	4.2611	4.4885	4.3480	4.3659	0.1148	5.0477	5.3022	4.6853	5.0117	0.3100
40	4.3218	4.5409	4.8017	4.5548	0.2403	5.0391	5.3005	5.1109	5.1502	0.1351
41	4.3069	4.5415	4.8055	4.5513	0.2494	5.0388	5.2919	5.1120	5.1476	0.1303
42	4.3093	4.5329	4.7879	4.5434	0.2395	4.9378	5.1902	5.0130	5.0470	0.1296
43	4.2961	4.5340	4.7879	4.5393	0.2459	4.9800	4.5568	4.6268	4.7212	0.2268
44	4.2988	4.5355	4.7908	4.5417	0.2460	4.8693	5.1153	4.9559	4.9802	0.1248
45	4.3164	4.5484	4.8053	4.5567	0.2446	4.9776	5.2408	5.0695	5.0960	0.1336
46	4.3183	4.5561	4.8103	4.5616	0.2460	5.0134	5.2813	5.1055	5.1334	0.1361
47	4.2946	4.5314	4.7876	4.5379	0.2466	5.0142	4.6313	4.6832	4.7763	0.2077
48	4.3142	3.9814	3.9698	4.0885	0.1956	5.0097	5.2741	5.0965	5.1268	0.1348
49	4.3139	4.5452	4.7977	4.5522	0.2420	5.0071	5.2816	5.0993	5.1293	0.1397
50	4.3288	4.5531	4.8067	4.5629	0.2391	5.0082	5.2856	5.1035	5.1325	0.1409

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
51	4.3170	4.5431	4.4006	4.4203	0.1143	5.0126	4.6179	4.6746	4.7684	0.2134
52	4.3099	3.9674	4.3910	4.2228	0.2248	5.0195	5.2883	5.1076	5.1385	0.1370
53	4.3058	4.5385	4.7869	4.5438	0.2406	5.0059	5.2823	5.0985	5.1289	0.1407
54	4.3115	4.5397	4.7880	4.5464	0.2383	3.7686	4.6328	4.6846	4.3620	0.5146
55	4.3210	4.5462	4.7878	4.5517	0.2335	5.0450	5.2998	5.1137	5.1528	0.1319
56	4.3163	3.5407	4.0781	3.9784	0.3973	5.0550	4.4938	4.5959	4.7149	0.2989
57	4.3352	3.9406	4.3623	4.2127	0.2360	4.2626	3.9189	3.9599	4.0472	0.1877
58	4.3297	4.5587	4.8015	4.5633	0.2359	5.0235	5.2869	5.1047	5.1384	0.1349
59	4.3242	4.5459	4.7908	4.5536	0.2334	5.0335	5.2854	5.1030	5.1407	0.1301
60	4.3180	4.5437	4.3803	4.4140	0.1166	5.0335	5.2913	5.1141	5.1463	0.1319
61	4.3357	4.5541	4.7928	4.5609	0.2286	5.0451	5.2996	5.1199	5.1549	0.1308
62	4.3400	4.5582	4.7988	4.5657	0.2295	5.0341	5.2926	5.1168	5.1478	0.1320
63	4.3444	4.5678	4.8099	4.5740	0.2328	5.0328	5.2927	5.1121	5.1459	0.1332
64	4.3474	4.5712	4.4245	4.4477	0.1137	5.0305	5.3071	5.1203	5.1526	0.1412
65	4.3466	4.5664	4.8070	4.5733	0.2303	5.0201	5.3043	5.1155	5.1466	0.1446
66	4.3372	4.5594	3.9882	4.2949	0.2879	5.0216	5.3055	5.1206	5.1492	0.1441
67	3.1010	3.8127	4.2051	3.7063	0.5597	5.0337	5.3113	5.1235	5.1562	0.1416
68	4.3250	4.5600	4.8013	4.5621	0.2381	5.0174	4.6293	4.6802	4.7756	0.2109
69	4.1581	4.3572	4.5982	4.3712	0.2204	5.0085	5.2793	5.1016	5.1298	0.1376
70	4.3454	4.5734	4.8081	4.5756	0.2314	5.0537	5.3031	5.1163	5.1577	0.1298
71	4.2823	4.5070	4.7442	4.5112	0.2310	5.0539	5.3036	5.1181	5.1585	0.1297
72	4.3306	4.5648	4.8068	4.5674	0.2381	5.0456	5.3077	5.1215	5.1583	0.1349
73	4.3333	4.5662	4.8089	4.5695	0.2378	5.0363	5.3053	5.1214	5.1543	0.1375
74	4.3466	4.5732	4.8189	4.5795	0.2362	4.9391	5.1980	5.0160	5.0510	0.1329
75	4.3417	4.5624	4.8151	4.5731	0.2369	4.9791	5.2344	5.0557	5.0897	0.1310
76	4.3419	4.5637	4.8099	4.5718	0.2341	4.8686	5.1256	4.9486	4.9809	0.1315
77	4.3405	4.5676	4.8103	4.5728	0.2349	4.9898	5.2420	5.0622	5.0980	0.1299
78	4.3388	4.5674	4.8096	4.5719	0.2354	5.0320	5.2904	5.1097	5.1440	0.1326
79	4.3302	4.5625	4.8073	4.5667	0.2386	5.0355	5.2914	5.1102	5.1457	0.1316
80	3.2561	3.9969	4.4099	3.8877	0.5846	5.0389	5.2936	5.1148	5.1491	0.1308
81	4.3143	4.5514	4.7982	4.5546	0.2420	5.0373	5.2931	5.1119	5.1474	0.1316
82	4.3092	4.5468	4.7881	4.5480	0.2395	5.0622	5.3062	5.1212	5.1632	0.1273
83	4.3224	3.4181	4.0054	3.9153	0.4588	5.0206	5.2787	5.1090	5.1361	0.1312
84	3.2408	3.9854	4.4023	3.8762	0.5884	5.0285	5.2846	5.1113	5.1415	0.1307
85	4.3212	4.5521	4.8011	4.5581	0.2400	5.0231	5.2842	5.1063	5.1379	0.1334
86	4.3176	4.5567	4.8045	4.5596	0.2435	5.0354	5.2928	5.1058	5.1447	0.1330
87	4.3153	4.5588	4.8028	4.5590	0.2438	5.0376	5.2925	5.1038	5.1446	0.1323
88	4.3157	4.5561	4.8095	4.5605	0.2469	5.0394	5.2906	5.1082	5.1461	0.1298

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
89	4.3222	4.5575	4.8113	4.5637	0.2446	4.2579	4.4768	4.3219	4.3522	0.1126
90	4.3178	4.5446	4.4166	4.4264	0.1137	5.0235	5.2887	5.1092	5.1405	0.1353
91	4.3328	4.5457	4.8024	4.5603	0.2351	5.0356	5.2868	5.1058	5.1427	0.1296
92	3.6974	4.2159	4.3141	4.0758	0.3314	4.7168	5.1240	4.0047	4.6152	0.5665
93	3.0425	3.8756	3.8058	3.5746	0.4621	3.4644	4.4626	4.2813	4.0694	0.5318
94	4.3317	4.5581	4.8072	4.5657	0.2378	5.0447	5.2946	5.1164	5.1519	0.1287
95	4.3404	4.5633	4.8165	4.5734	0.2382	5.0348	5.2882	4.7051	5.0094	0.2924
96	4.3389	4.5631	4.8156	4.5726	0.2385	5.0420	5.2972	5.1190	5.1527	0.1309
97	4.3427	4.5590	4.8117	4.5711	0.2347	5.0465	5.3041	5.1295	5.1600	0.1315
98	4.3315	4.5488	4.8006	4.5603	0.2348	5.0396	5.2895	5.1186	5.1492	0.1277
99	4.1501	4.3582	4.5906	4.3663	0.2204	5.0566	5.3099	5.1286	5.1650	0.1305
100	4.3361	4.5629	4.8117	4.5702	0.2379	5.0452	4.6506	4.7021	4.7993	0.2145
101	4.1760	4.3852	4.6262	4.3958	0.2253	5.0357	5.3000	5.1159	5.1505	0.1355
102	4.3400	4.5571	4.8061	4.5678	0.2332	5.0598	5.3121	5.1279	5.1666	0.1305
103	4.2751	3.3641	3.9476	3.8622	0.4614	5.0384	5.2977	4.7021	5.0127	0.2986
104	3.2621	3.9918	4.4091	3.8877	0.5806	3.7885	4.6349	4.6925	4.3720	0.5061
105	4.3447	4.5646	4.8109	4.5734	0.2333	5.0367	5.2903	5.1123	5.1464	0.1302
106	4.3436	4.5661	4.8070	4.5722	0.2318	4.9495	5.1900	5.0090	5.0495	0.1252
107	4.3338	4.5435	4.8043	4.5605	0.2357	4.9940	4.6346	4.6693	4.7660	0.1983
108	4.3209	4.5424	4.7975	4.5536	0.2385	4.8793	5.1215	4.9426	4.9811	0.1256
109	4.3277	4.5494	4.7982	4.5584	0.2354	4.9903	5.2414	5.0604	5.0973	0.1296
111	4.3252	4.5530	4.8117	4.5633	0.2434	5.0358	5.2982	4.6994	5.0111	0.3001
111	4.3302	4.5570	4.8037	4.5636	0.2368	5.0336	5.3058	5.1189	5.1528	0.1392
112	4.3262	4.5596	4.8016	4.5625	0.2377	5.0248	4.6368	4.6908	4.7841	0.2102
113	4.3249	4.5498	4.7967	4.5571	0.2360	5.0369	5.2938	5.1123	5.1477	0.1321
114	4.3304	4.5530	4.7928	4.5587	0.2313	5.0342	5.2886	5.1119	5.1449	0.1304
115	4.3289	4.5531	4.7970	4.5597	0.2342	5.0289	5.2864	5.1035	5.1396	0.1325
116	4.3272	3.4460	4.0148	3.9294	0.4468	5.0361	4.3698	4.5103	4.6387	0.3512
117	4.3216	4.3843	4.6793	4.4618	0.1910	5.0461	5.2923	5.1078	5.1488	0.1281
118	4.3259	4.5606	4.8096	4.5654	0.2419	5.0567	5.3173	4.7109	5.0283	0.3042
119	4.3152	4.5571	4.8152	4.5625	0.2501	5.0671	5.3022	5.1098	5.1597	0.1253
120	4.3122	4.5523	4.8083	4.5576	0.2481	2.5307	3.9725	4.2544	3.5859	0.9246
121	4.3119	4.5521	4.8084	4.5574	0.2483	1.9434	2.7016	2.8379	2.4943	0.4819
122	4.3172	4.5566	4.8077	4.5605	0.2453	5.0416	5.3025	4.6965	5.0135	0.3040
123	4.3103	4.5513	4.8024	4.5546	0.2460	5.0283	5.3069	5.1191	5.1514	0.1421
124	4.3097	4.5500	4.8015	4.5537	0.2460	5.0396	5.2951	5.1146	5.1497	0.1313
125	4.3089	4.5536	4.8066	4.5564	0.2488	5.0409	5.2891	5.1125	5.1475	0.1277
126	4.3075	4.5376	4.7949	4.5467	0.2438	5.0216	5.2772	5.1016	5.1335	0.1307

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
127	4.3064	4.5357	4.7934	4.5452	0.2437	5.0263	5.2784	5.0996	5.1348	0.1297
128	4.3094	4.5463	4.8044	4.5533	0.2476	5.0158	5.2809	5.1004	5.1323	0.1354
129	4.3066	4.5345	4.7912	4.5441	0.2424	5.0438	5.2989	5.1134	5.1520	0.1319
130	4.3085	4.5378	4.7925	4.5463	0.2421	5.0655	5.3039	5.1159	5.1617	0.1256
131	4.1257	4.3497	4.1913	4.2222	0.1152	5.0285	5.2874	5.1090	5.1417	0.1325
132	4.2943	4.5261	4.7824	4.5343	0.2441	5.0174	5.2722	5.0977	5.1291	0.1303
133	4.1272	4.3519	4.5965	4.3585	0.2347	5.0195	5.2741	4.6793	4.9910	0.2984
134	4.3013	4.5347	4.7901	4.5420	0.2445	5.0256	4.6226	4.6818	4.7767	0.2176
135	4.2291	4.4796	4.7291	4.4793	0.2500	5.0299	5.2797	5.1054	5.1384	0.1281
136	4.3097	3.3847	3.9766	3.8903	0.4685	5.0284	5.2867	5.1133	5.1428	0.1316
137	4.3070	4.5355	4.7908	4.5444	0.2421	5.0198	5.2884	5.1152	5.1411	0.1361
138	4.3083	4.5421	4.7972	4.5492	0.2446	4.8916	5.1691	5.0041	5.0216	0.1396
139	4.3010	4.5337	4.7896	4.5414	0.2444	4.9635	5.2270	5.0488	5.0798	0.1345
140	4.3073	3.9638	4.3951	4.2221	0.2279	4.8546	4.4287	4.5018	4.5950	0.2277
141	3.2260	3.9704	4.3995	3.8653	0.5938	4.9744	5.2415	4.6791	4.9650	0.2813
142	4.3036	4.5270	4.7858	4.5388	0.2413	5.0317	5.2916	4.6870	5.0034	0.3033
143	4.3017	4.5251	4.7844	4.5371	0.2415	5.0193	5.2772	5.0969	5.1311	0.1323
144	4.3003	4.5312	4.7883	4.5399	0.2441	5.0332	5.2924	5.1075	5.1444	0.1335
145	4.2880	4.5282	4.7857	4.5340	0.2489	5.0239	5.2966	5.1120	5.1442	0.1391
146	4.3125	4.5391	4.7948	4.5488	0.2413	5.0345	5.2933	5.1153	5.1477	0.1324
147	4.3109	4.5380	4.7934	4.5474	0.2414	5.0384	5.2931	5.1159	5.1491	0.1306
148	4.3068	4.5339	4.7907	4.5438	0.2421	5.0225	5.2833	5.1094	5.1384	0.1328
149	4.3048	4.5277	4.7817	4.5380	0.2386	5.0257	5.2885	4.6761	4.9968	0.3072
150	4.3079	4.5365	4.3944	4.4129	0.1154	5.0132	5.2732	5.0973	5.1279	0.1327
151	4.3004	4.5287	4.7845	4.5378	0.2422	5.0301	5.2812	5.1002	5.1372	0.1296
152	3.9515	4.3474	4.4561	4.2517	0.2656	3.6080	4.5427	4.2440	4.1316	0.4774
153	1.9670	3.2979	3.4223	2.8958	0.8067	1.5247	3.0354	3.3810	2.6470	0.9872
154	4.3081	4.5316	4.4004	4.4134	0.1123	5.0278	5.2869	5.1155	5.1434	0.1318
155	3.2435	3.9734	4.3984	3.8718	0.5841	5.0224	5.2828	5.1103	5.1385	0.1325
156	4.3114	4.5387	4.7968	4.5490	0.2429	5.0373	5.2969	5.1173	5.1505	0.1329
157	4.3190	4.5378	4.8000	4.5523	0.2408	5.0410	5.2896	5.1117	5.1474	0.1281
158	4.3275	4.5572	4.8097	4.5648	0.2412	5.0566	5.3030	5.1146	5.1581	0.1288
159	4.3065	4.5489	4.8004	4.5519	0.2470	5.0477	5.3062	4.6835	5.0125	0.3128
160	4.3040	4.5446	4.7937	4.5474	0.2449	5.0254	4.6243	4.6746	4.7748	0.2185
161	4.3027	4.5406	4.7956	4.5463	0.2465	5.0280	5.2815	5.0998	5.1364	0.1306
162	4.3017	4.5272	4.3900	4.4063	0.1136	5.0245	5.2870	5.1016	5.1377	0.1349
163	4.1173	4.3419	4.5908	4.3500	0.2368	5.0184	5.2736	5.0982	5.1301	0.1306
164	3.2289	3.9663	4.3991	3.8647	0.5917	5.0232	5.2866	5.1068	5.1389	0.1346

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
165	4.1048	4.3396	4.5968	4.3471	0.2461	5.0236	5.2809	5.1014	5.1353	0.1320
166	4.3041	4.5325	4.7916	4.5427	0.2439	5.0267	5.2851	5.1059	5.1393	0.1324
167	4.2430	4.4682	4.7210	4.4774	0.2391	5.0204	5.2846	5.1199	5.1416	0.1334
168	4.2789	4.5156	4.7849	4.5265	0.2531	5.0128	5.2711	5.1054	5.1298	0.1309
169	4.2937	4.5234	4.3655	4.3942	0.1175	5.0043	5.2779	5.1013	5.1278	0.1387
170	4.2937	4.5202	4.7769	4.5303	0.2418	4.9121	5.1964	5.0181	5.0422	0.1437
171	4.3051	4.5394	4.7886	4.5443	0.2418	4.9574	5.2430	5.0620	5.0875	0.1445
172	4.2978	4.5352	4.7840	4.5390	0.2432	4.8614	5.1206	4.9486	4.9769	0.1319
173	4.3180	4.5403	4.7887	4.5490	0.2355	4.9741	5.2325	4.6787	4.9617	0.2771
174	4.2986	4.5278	4.7799	4.5354	0.2407	5.0225	5.2845	5.1073	5.1381	0.1337
175	4.2993	4.5301	4.7841	4.5378	0.2425	5.0273	5.2961	5.1139	5.1458	0.1372
176	4.2958	3.9085	4.3442	4.1829	0.2388	5.0270	5.1754	5.0318	5.0781	0.0843
177	4.2985	4.0320	4.1080	4.1462	0.1373	5.0390	5.2051	5.0537	5.0993	0.0919
178	4.2924	4.5388	4.7887	4.5400	0.2482	5.0181	5.2930	5.1080	5.1397	0.1401
179	4.2942	4.5435	4.7924	4.5434	0.2491	5.0171	4.6414	4.6919	4.7835	0.2039
180	4.2861	4.5289	4.7812	4.5320	0.2476	5.0266	5.2982	5.1155	5.1468	0.1385
181	4.2981	4.5331	4.7866	4.5393	0.2443	5.0188	5.2867	4.6905	4.9987	0.2986
182	4.3042	4.5328	4.7795	4.5388	0.2377	5.0238	5.2956	5.1070	5.1421	0.1392
183	4.2979	4.5296	4.7802	4.5359	0.2412	5.0168	5.2880	5.1039	5.1362	0.1385
184	4.2948	4.5359	4.7804	4.5370	0.2428	5.0112	5.2739	5.0984	5.1278	0.1338
185	4.2933	4.5341	4.7815	4.5363	0.2441	4.2389	4.4585	4.3082	4.3352	0.1123
186	4.3156	4.5455	4.7899	4.5503	0.2372	5.0216	5.2839	5.1062	5.1372	0.1339
187	3.2114	3.9728	4.3884	3.8575	0.5969	5.0111	5.2884	5.1113	5.1369	0.1404
188	4.3121	4.5432	4.7841	4.5465	0.2360	5.0085	5.2818	5.1067	5.1323	0.1384
189	4.3126	4.5358	4.7839	4.5441	0.2358	5.0371	5.2919	5.1104	5.1465	0.1311
190	4.3042	4.5345	4.3861	4.4083	0.1167	5.0421	5.2993	5.1165	5.1526	0.1323
191	4.3073	4.5360	4.7929	4.5454	0.2430	5.0265	5.2892	5.1202	5.1453	0.1331
192	4.3037	4.5515	4.7978	4.5510	0.2471	5.0282	5.2890	5.1053	5.1408	0.1340
193	4.3080	4.5433	4.7910	4.5474	0.2415	3.7635	4.6132	4.6749	4.3505	0.5093
194	4.3138	3.9508	4.3760	4.2135	0.2296	5.0171	5.2831	5.1039	5.1347	0.1356
195	4.1335	4.3530	4.5906	4.3591	0.2286	5.0206	5.2886	4.2634	4.8575	0.5317
196	3.2402	3.9769	4.3917	3.8696	0.5832	3.7674	4.6203	4.6782	4.3553	0.5100
197	4.1398	4.3548	4.5965	4.3637	0.2285	5.0228	5.2791	5.1048	5.1356	0.1309
198	4.3055	4.5363	4.7831	4.5416	0.2389	5.0298	5.3021	5.1161	5.1494	0.1392
199	4.2573	4.4778	4.7268	4.4873	0.2349	5.0231	5.2988	5.1119	5.1446	0.1407
200	4.3460	4.5573	4.3971	4.4335	0.1103	5.0222	5.2861	5.1015	5.1366	0.1354
201	4.3408	4.5569	4.7992	4.5656	0.2293	5.0332	5.2850	5.1068	5.1417	0.1295
202	3.2218	3.9632	4.3822	3.8557	0.5876	4.9339	5.1853	5.0140	5.0444	0.1284



## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
203	4.3079	4.5335	4.7851	4.5422	0.2387	4.9741	5.2311	4.5589	4.9214	0.3392
204	4.3047	4.5268	4.7804	4.5373	0.2380	4.8557	5.1106	4.9363	4.9675	0.1303
205	4.2988	4.5260	4.7828	4.5359	0.2422	4.9929	5.2523	5.0691	5.1048	0.1333
206	4.2989	4.5305	4.7893	4.5395	0.2453	5.0355	5.2916	5.1123	5.1465	0.1315
207	4.3219	4.5412	4.7931	4.5521	0.2358	5.0333	5.2868	5.1139	5.1447	0.1295
208	4.3230	4.5422	4.7908	4.5520	0.2341	5.0289	5.2837	5.1045	5.1390	0.1309
209	4.3033	4.5256	4.3778	4.4022	0.1131	5.0132	5.2787	5.1016	5.1311	0.1352
210	4.3054	4.5319	4.7804	4.5392	0.2376	5.0133	5.2743	5.0941	5.1272	0.1336
211	4.3207	4.5422	4.7889	4.5506	0.2342	5.0270	5.2857	5.1075	5.1401	0.1324
212	3.9406	4.3436	4.4632	4.2491	0.2738	4.4828	4.9911	4.4679	4.6472	0.2978
213	2.9192	3.7958	3.9583	3.5578	0.5590	2.7288	4.0695	4.1377	3.6453	0.7944
214	4.3157	4.5334	4.7875	4.5456	0.2362	5.0252	5.2910	5.1082	5.1415	0.1360
215	4.3304	4.5436	4.7942	4.5561	0.2322	5.0235	5.2845	5.1033	5.1371	0.1337
216	4.3168	4.5394	4.7957	4.5506	0.2396	5.0283	5.2834	5.1102	5.1407	0.1302
217	4.3272	4.5398	4.7971	4.5547	0.2353	4.2598	4.0054	4.0212	4.0955	0.1425
218	4.3267	4.5413	4.7945	4.5542	0.2341	5.0339	5.2877	5.1214	5.1477	0.1289
220	4.3324	4.5459	4.4038	4.4274	0.1087	5.0160	5.2768	5.1121	5.1350	0.1319
220	4.3386	4.5566	4.8167	4.5706	0.2394	5.0252	5.2790	5.1179	5.1407	0.1284
221	4.3394	4.5561	4.8065	4.5674	0.2338	5.0227	5.2824	5.1117	5.1389	0.1320
222	4.3404	4.5479	4.7982	4.5622	0.2292	5.0144	5.2849	5.1099	5.1364	0.1372
223	4.3384	4.5603	4.8083	4.5690	0.2351	5.0067	5.2782	5.1055	5.1301	0.1374
224	4.3283	4.5569	4.8095	4.5649	0.2407	5.0279	5.2837	5.1147	5.1421	0.1301
225	4.3240	4.5493	4.7969	4.5567	0.2365	5.0371	5.2918	5.1202	5.1497	0.1299
226	4.3122	4.5423	4.7904	4.5483	0.2392	5.0284	5.2850	5.1093	5.1409	0.1312
227	3.1060	3.8009	4.2096	3.7055	0.5580	5.0586	5.2957	5.1113	5.1552	0.1245
228	4.3073	4.5342	4.7846	4.5421	0.2387	5.0276	5.2865	5.1054	5.1399	0.1328
229	4.1361	4.3554	4.6002	4.3639	0.2321	3.7852	4.6353	4.6855	4.3687	0.5059
230	4.3068	4.5335	4.7899	4.5434	0.2417	5.0397	5.2930	5.1120	5.1482	0.1305
231	4.2457	4.4676	4.7154	4.4762	0.2350	5.0189	5.2806	4.6576	4.9857	0.3128
232	4.3216	4.5373	4.7858	4.5482	0.2323	5.0068	5.2740	5.0931	5.1246	0.1364
233	4.3028	4.5290	4.7794	4.5371	0.2384	5.0171	5.2763	5.1045	5.1326	0.1319
234	4.3065	4.5262	4.7778	4.5368	0.2358	4.9249	5.1761	5.0009	5.0340	0.1288
235	4.3033	4.5304	4.7822	4.5386	0.2396	4.9651	5.2193	5.0422	5.0755	0.1303
236	4.3058	4.0609	4.1076	4.1581	0.1300	4.8540	4.1140	4.2988	4.4223	0.3852
237	4.3004	4.4225	4.7055	4.4761	0.2078	3.7228	4.3040	4.0672	4.0313	0.2922
238	4.3057	4.3887	4.6890	4.4611	0.2017	5.0054	5.2856	5.1049	5.1320	0.1421
239	4.3117	4.5443	4.8070	4.5543	0.2478	5.0148	5.2875	5.1020	5.1348	0.1393
240	4.3079	4.5459	4.7975	4.5504	0.2448	3.7652	4.6387	4.6848	4.3629	0.5181

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
241	4.3220	4.5588	4.8036	4.5615	0.2408	5.0285	5.2965	5.1144	5.1465	0.1368
242	4.3282	4.5595	4.8018	4.5632	0.2368	5.0246	5.2948	5.1150	5.1448	0.1376
243	4.3107	4.5437	4.7926	4.5490	0.2410	5.0023	5.2783	5.0937	5.1247	0.1406
244	4.3051	4.5478	4.7979	4.5503	0.2464	5.0082	4.6089	4.6695	4.7622	0.2152
245	4.3082	4.5409	4.7992	4.5494	0.2456	5.0229	5.2932	5.1128	5.1430	0.1377
246	4.3237	4.5381	4.8027	4.5548	0.2399	5.0207	4.6174	4.6726	4.7702	0.2187
247	4.3042	4.5348	4.7906	4.5432	0.2433	5.0235	5.2922	5.1133	5.1430	0.1368
248	4.3097	4.5362	4.7937	4.5465	0.2421	5.0207	4.5325	4.6198	4.7244	0.2603
249	3.2219	3.9601	4.3883	3.8568	0.5901	4.2488	4.4847	4.3248	4.3527	0.1204
250	4.2934	4.5221	4.7783	4.5313	0.2426	5.0691	5.3268	5.1370	5.1776	0.1336
251	3.2349	3.9635	4.3868	3.8617	0.5827	5.0605	5.3173	5.1250	5.1676	0.1336
252	4.3048	4.5255	4.7804	4.5369	0.2380	5.0288	5.2850	5.1072	5.1404	0.1313
253	4.3030	4.5471	4.7941	4.5480	0.2456	5.0215	5.2835	5.1078	5.1376	0.1335
254	4.3008	4.5409	4.7875	4.5431	0.2434	5.0222	5.2894	5.1094	5.1403	0.1362
255	4.3196	4.5391	4.7902	4.5496	0.2355	5.0105	5.2775	5.1015	5.1298	0.1358
256	4.3180	4.5368	4.7865	4.5471	0.2344	5.0223	5.2814	4.6776	4.9938	0.3029
257	4.3078	4.5435	4.7929	4.5481	0.2426	5.0325	5.2893	5.1067	5.1428	0.1321
258	4.3061	4.5274	4.7810	4.5382	0.2376	5.0317	4.6278	4.6885	4.7827	0.2178
259	4.0453	4.2497	4.4911	4.2620	0.2231	5.0218	5.2840	5.1042	5.1367	0.1341
260	4.3026	4.5239	4.7799	4.5355	0.2388	5.0205	5.2758	5.1005	5.1323	0.1306
261	4.1366	4.3553	4.5963	4.3627	0.2300	5.0166	5.2773	5.0986	5.1308	0.1333
262	4.3144	4.5331	4.7849	4.5441	0.2355	5.0652	5.3021	5.1200	5.1624	0.1240
263	4.2341	4.4401	4.7005	4.4582	0.2337	5.0282	5.2890	5.1045	5.1406	0.1341
264	4.3050	4.5276	4.7853	4.5393	0.2404	5.0217	5.2862	5.1039	5.1372	0.1354
265	4.3048	4.5309	4.7863	4.5407	0.2409	5.0178	5.2821	4.6883	4.9960	0.2975
266	4.3001	4.5389	4.7993	4.5461	0.2497	4.9448	5.1926	5.0133	5.0502	0.1279
267	4.2955	4.5304	4.7866	4.5375	0.2456	4.9625	5.2232	5.0480	5.0779	0.1329
268	4.3062	3.3925	3.9871	3.8952	0.4637	4.8488	5.1042	4.9399	4.9643	0.1295
269	4.3050	4.5330	4.7884	4.5421	0.2418	4.9702	5.2287	5.0502	5.0831	0.1323
270	4.2994	4.5386	4.7903	4.5428	0.2455	5.0259	5.2864	5.1083	5.1402	0.1332
271	4.3126	4.5383	4.7913	4.5474	0.2395	5.0110	5.2758	5.0985	5.1284	0.1349
272	3.7807	4.2563	4.4320	4.1563	0.3370	4.0449	4.7658	4.3370	4.3825	0.3626
273	3.2449	3.9754	3.7555	3.6586	0.3748	3.7842	4.6345	4.4219	4.2802	0.4425
274	3.1864	3.9493	4.3821	3.8393	0.6054	5.0234	5.2806	4.6636	4.9892	0.3099
275	4.3266	4.5429	4.7971	4.5555	0.2355	5.0248	5.2858	5.1057	5.1388	0.1336
276	4.3307	4.5477	4.8019	4.5601	0.2358	5.0347	5.2930	5.1201	5.1493	0.1316
277	4.3279	4.5431	4.7985	4.5565	0.2356	5.0437	5.2992	5.1270	5.1566	0.1303
278	4.3379	3.9942	4.4183	4.2501	0.2253	5.0485	5.2961	5.1281	5.1575	0.1264

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
279	4.3272	4.5412	4.8059	4.5581	0.2398	5.0382	5.3047	4.7168	5.0199	0.2944
280	4.3290	4.5422	4.8045	4.5586	0.2382	5.0348	5.2959	5.1156	5.1487	0.1337
281	4.3251	3.9872	4.4054	4.2392	0.2220	4.2455	4.4813	4.3292	4.3520	0.1196
282	4.3284	4.5429	4.7975	4.5563	0.2348	5.0385	5.2997	5.1192	5.1525	0.1337
283	4.3271	4.5368	4.7915	4.5518	0.2326	5.0611	5.3072	5.1197	5.1627	0.1286
284	4.3132	4.5364	4.7904	4.5467	0.2388	5.0236	5.2871	5.1078	5.1395	0.1346
285	4.3412	4.5437	4.7929	4.5593	0.2262	5.0208	5.2773	4.2492	4.8491	0.5351
286	4.3406	3.9843	4.3993	4.2414	0.2246	5.0331	4.6210	4.6710	4.7750	0.2249
287	4.3211	4.5451	4.7938	4.5533	0.2365	5.0087	5.2779	5.1058	5.1308	0.1364
288	4.3123	4.5338	4.7852	4.5438	0.2366	5.0175	5.2801	5.1031	5.1336	0.1339
289	4.3237	4.5422	4.7952	4.5537	0.2360	5.0080	5.2767	5.1008	5.1285	0.1365
290	4.3417	4.5537	4.8030	4.5661	0.2309	5.0187	5.2875	5.1108	5.1390	0.1366
291	4.1484	4.3513	4.5900	4.3632	0.2210	5.0229	5.2982	5.1135	5.1449	0.1403
292	4.3300	4.5518	4.3451	4.4090	0.1239	5.0218	5.2971	5.1120	5.1436	0.1403
293	4.0953	4.3341	4.5854	4.3383	0.2451	5.0216	5.2880	5.1117	5.1404	0.1355
294	4.3184	4.5369	4.7956	4.5503	0.2389	5.0296	5.2846	5.1039	5.1394	0.1312
295	4.2595	4.4765	4.7286	4.4882	0.2348	5.0190	4.6043	4.6622	4.7618	0.2246
296	4.3086	3.8732	4.3270	4.1696	0.2569	5.0186	4.2276	4.4218	4.5560	0.4122
297	4.3155	3.9638	4.3872	4.2222	0.2266	5.0100	4.6897	4.7184	4.8061	0.1772
298	4.3291	4.5437	4.7934	4.5554	0.2324	4.9284	5.1891	5.0050	5.0408	0.1340
299	4.3313	4.5379	4.7946	4.5546	0.2321	4.9599	5.2240	5.0447	5.0762	0.1348
300	4.2924	4.5256	4.7843	4.5341	0.2460	4.8597	5.1232	4.9500	4.9776	0.1339
301	4.3232	4.5452	4.8009	4.5564	0.2390	4.9634	5.2432	5.0637	5.0901	0.1418
302	4.3047	4.5363	4.7928	4.5446	0.2442	5.0096	5.2939	5.1101	5.1379	0.1442
303	4.2969	4.5236	4.7837	4.5348	0.2436	5.0063	5.2936	5.1086	5.1362	0.1456
305	4.2954	4.5216	4.7785	4.5318	0.2417	5.0262	5.3106	5.1204	5.1524	0.1449
305	4.3013	3.9758	4.3945	4.2239	0.2198	5.0224	5.3001	4.6971	5.0065	0.3018
306	4.3137	4.5331	4.7852	4.5440	0.2360	5.0137	5.2936	5.1195	5.1423	0.1413
307	4.2991	4.5360	4.7882	4.5411	0.2446	5.0222	5.3069	5.1197	5.1496	0.1447
308	4.2947	4.5339	4.7843	4.5376	0.2448	5.0225	5.2880	5.1132	5.1413	0.1350
309	4.3018	4.5355	4.7818	4.5397	0.2400	5.0127	5.2821	5.1083	5.1344	0.1366
310	4.3011	4.5277	4.7793	4.5360	0.2392	5.0244	5.2874	5.1046	5.1388	0.1348
311	4.3116	4.5352	4.7852	4.5440	0.2369	5.0076	5.2755	5.0970	5.1267	0.1364
312	4.3079	4.5276	4.7831	4.5396	0.2378	5.0161	5.2817	5.1101	5.1359	0.1347
313	4.3150	4.5348	4.7829	4.5443	0.2341	4.2391	4.4630	4.3190	4.3403	0.1135
314	4.2966	4.5262	4.7787	4.5338	0.2411	5.0246	5.2937	5.1254	5.1479	0.1359
315	4.3134	4.5331	4.7912	4.5459	0.2392	5.0115	5.2791	5.1157	5.1354	0.1349
316	4.3220	4.5393	4.7959	4.5524	0.2372	5.0146	5.2859	5.1203	5.1403	0.1367

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
317	2.1398	3.4022	3.9932	3.1784	0.9467	5.0523	5.3185	5.1433	5.1714	0.1353
318	4.3057	4.5443	4.7917	4.5472	0.2430	5.0517	5.3245	5.1458	5.1740	0.1386
319	4.3025	4.5328	4.7900	4.5418	0.2439	5.0320	5.3100	5.1313	5.1577	0.1409
321	3.2337	3.9718	4.3884	3.8646	0.5847	5.0392	5.3082	5.1248	5.1574	0.1374
321	4.3207	4.5409	4.7873	4.5496	0.2334	5.0537	5.2921	5.1176	5.1545	0.1234
322	4.3047	3.9332	4.3617	4.1999	0.2327	5.0312	5.2707	5.1042	5.1354	0.1228
323	4.1262	4.3498	4.5880	4.3547	0.2309	5.0099	5.2689	5.1052	5.1280	0.1310
324	4.2362	4.5053	4.7363	4.4926	0.2503	5.0002	5.2770	5.1144	5.1305	0.1391
325	4.1280	4.3575	4.5976	4.3611	0.2348	5.0007	4.6094	4.6823	4.7641	0.2081
326	4.2935	4.5270	4.7811	4.5339	0.2439	5.0135	5.2661	5.1098	5.1298	0.1275
327	4.2499	4.3005	4.6003	4.3836	0.1894	5.0069	5.2720	5.1101	5.1297	0.1336
328	4.3170	4.5404	4.7881	4.5485	0.2356	3.7776	4.6324	4.6953	4.3684	0.5127
329	4.3221	4.5391	4.7864	4.5492	0.2323	5.0083	5.2823	5.1026	5.1311	0.1392
331	4.3072	4.5336	4.7844	4.5417	0.2387	3.5189	4.4046	4.1021	4.0085	0.4502
331	4.3029	4.5272	4.7822	4.5374	0.2398	4.9576	4.5697	4.6264	4.7179	0.2095
332	4.2445	4.4996	4.6655	4.4699	0.2121	4.4218	4.8836	4.3944	4.5666	0.2749
333	3.2022	3.9508	4.0440	3.7323	0.4615	2.5561	3.9597	4.1593	3.5584	0.8737
334	4.3032	4.5281	4.7795	4.5370	0.2383	5.0125	5.2845	5.1188	5.1386	0.1370
335	4.3048	4.5300	4.7844	4.5397	0.2399	5.0098	5.2796	5.1161	5.1352	0.1359
336	4.3193	4.5426	4.7924	4.5514	0.2367	5.0178	5.2832	5.1173	5.1394	0.1341
337	4.3197	4.5444	4.7991	4.5544	0.2399	5.0156	5.2796	5.1146	5.1366	0.1333
338	4.3297	4.5427	4.7921	4.5548	0.2314	5.0184	5.2863	5.1179	5.1408	0.1354
339	4.3163	4.5398	4.7891	4.5484	0.2365	5.0160	5.2814	5.1183	5.1386	0.1339
340	4.3265	4.5379	4.7931	4.5525	0.2336	3.7594	4.6172	4.6915	4.3560	0.5180
341	4.3380	4.5441	4.7992	4.5604	0.2310	5.0392	5.2867	5.1171	5.1477	0.1265
342	4.3353	3.9728	4.3962	4.2348	0.2289	5.0301	5.2844	5.1164	5.1436	0.1293
343	4.3313	4.5418	4.7961	4.5564	0.2327	5.0020	5.2669	5.1003	5.1231	0.1339
344	4.3353	4.5439	4.7904	4.5565	0.2278	5.0159	5.2774	4.5467	4.9467	0.3703
345	4.3362	4.5456	4.7926	4.5581	0.2284	4.2531	4.4690	4.3250	4.3490	0.1100
346	4.3165	4.5349	4.7878	4.5464	0.2359	5.0212	5.2851	5.1199	5.1421	0.1334
347	4.3168	4.5327	4.7897	4.5464	0.2367	5.0217	5.2855	5.1200	5.1424	0.1333
348	4.3067	4.5286	4.7844	4.5399	0.2390	5.0010	5.2746	5.1139	5.1298	0.1375
349	4.3005	4.5310	4.7846	4.5387	0.2421	5.0222	5.2855	5.1211	5.1430	0.1330
350	4.3188	3.9662	4.3865	4.2238	0.2257	5.0063	5.2781	5.1145	5.1330	0.1368
351	4.3171	3.9667	4.3857	4.2232	0.2247	3.7737	4.6251	4.6959	4.3649	0.5132
352	4.3136	4.5365	4.7870	4.5457	0.2368	5.0095	5.2815	5.1183	5.1364	0.1369
353	4.3182	4.5355	4.7988	4.5508	0.2407	5.0178	5.2824	5.1170	5.1390	0.1337
354	4.3274	4.5393	4.7953	4.5540	0.2343	5.0062	5.2810	5.1193	5.1355	0.1381

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
355	4.1396	4.3509	4.0888	4.1931	0.1390	5.0160	5.2844	5.1207	5.1404	0.1353
356	4.3074	3.8292	4.2841	4.1402	0.2696	5.0159	3.6805	4.0726	4.2563	0.6864
357	4.1427	4.3381	4.5831	4.3546	0.2206	3.7511	4.2282	4.4349	4.1380	0.3507
358	4.3163	4.5372	4.7810	4.5449	0.2325	5.0183	5.2947	5.1123	5.1418	0.1406
359	4.2272	4.4566	4.2940	4.3259	0.1180	5.0193	5.2882	5.1096	5.1390	0.1368
360	4.3185	4.5444	4.7879	4.5503	0.2348	5.0112	5.2791	5.1043	5.1315	0.1360
361	4.3167	4.5436	4.7962	4.5522	0.2399	5.0117	5.2791	5.1059	5.1322	0.1356
362	4.3096	4.5273	4.3921	4.4096	0.1099	4.9145	5.1781	4.5722	4.8883	0.3038
363	4.3005	4.5208	4.7738	4.5317	0.2369	4.9605	5.2219	5.0450	5.0758	0.1334
364	4.3041	4.5264	4.7805	4.5370	0.2384	4.8544	4.4352	4.5036	4.5978	0.2249
365	4.2976	4.5427	4.7948	4.5450	0.2486	4.9576	5.2453	5.0652	5.0893	0.1454
367	4.2952	4.5395	4.7879	4.5409	0.2463	5.0126	5.3010	4.6891	5.0009	0.3061
367	4.2989	4.5400	4.7864	4.5418	0.2438	5.0010	5.2985	5.1142	5.1379	0.1502
368	4.3034	4.5396	4.7894	4.5441	0.2431	3.7658	4.6437	4.6905	4.3667	0.5209
369	4.3017	4.5243	4.7736	4.5332	0.2361	5.0101	5.2859	5.1060	5.1340	0.1400
370	4.3056	3.9528	4.3746	4.2110	0.2263	4.9964	5.2645	5.0876	5.1162	0.1363
371	4.3058	4.5304	4.7797	4.5386	0.2370	5.0029	5.2777	5.0968	5.1258	0.1397
372	3.2498	3.9866	4.4054	3.8806	0.5850	5.0129	5.2898	5.0984	5.1337	0.1418
373	4.3219	4.5373	4.7911	4.5501	0.2349	5.0142	5.2947	5.1133	5.1407	0.1422
374	4.3378	4.5566	4.8062	4.5669	0.2344	4.9992	5.2713	4.6719	4.9808	0.3001
375	4.3108	4.5468	4.8031	4.5536	0.2462	5.0253	5.2868	5.1092	5.1404	0.1335
376	4.3118	4.5320	4.3813	4.4083	0.1126	5.0208	5.2917	5.1132	5.1419	0.1377
377	3.2186	3.9554	4.3825	3.8522	0.5888	3.1837	3.9095	3.9571	3.6834	0.4334
378	4.2962	4.5238	4.7830	4.5343	0.2436	5.0095	5.2788	5.1100	5.1328	0.1361
379	3.2276	3.9682	4.3892	3.8617	0.5881	5.0080	5.2820	5.1067	5.1323	0.1388
380	4.3008	4.5278	4.7785	4.5357	0.2389	5.0117	5.2859	5.0991	5.1322	0.1401
381	4.3043	4.5280	4.7827	4.5383	0.2394	5.0170	5.2775	5.0976	5.1307	0.1334
382	3.2214	3.9640	4.3869	3.8574	0.5900	5.0234	5.2811	5.1092	5.1379	0.1312
383	4.3117	4.5392	4.7895	4.5468	0.2390	5.0026	5.2686	5.0989	5.1234	0.1347
384	4.3082	4.5319	4.7848	4.5417	0.2384	5.0172	5.2774	5.1015	5.1320	0.1327
385	4.3139	4.5366	4.7900	4.5468	0.2382	5.0010	5.2726	5.1004	5.1246	0.1374
386	4.3080	4.5529	4.7990	4.5533	0.2455	5.0118	5.2754	5.1018	5.1297	0.1340
387	4.1378	4.3490	4.5898	4.3589	0.2262	5.0240	5.2812	5.1060	5.1371	0.1314
388	3.2248	3.9598	4.3801	3.8549	0.5848	5.0247	5.2859	5.1135	5.1414	0.1328
389	4.1382	4.3632	4.6056	4.3690	0.2338	5.0293	5.2882	5.1119	5.1431	0.1323
390	4.3052	4.5343	4.7884	4.5426	0.2417	5.0316	5.2933	5.1130	5.1460	0.1339
391	3.1953	3.9262	4.3336	3.8184	0.5768	3.7596	4.6243	4.6809	4.3549	0.5164
392	3.7780	4.2525	4.1150	4.0485	0.2442	3.4095	4.4394	4.0041	3.9510	0.5170

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
393	1.1670	2.8744	2.9140	2.3185	0.9974	3.0720	4.2521	3.7956	3.7066	0.5951
394	4.3052	4.5285	4.7781	4.5373	0.2365	4.9118	5.1760	5.0044	5.0308	0.1341
395	4.3053	4.5259	4.7831	4.5381	0.2392	4.9560	5.2319	5.0615	5.0831	0.1392
396	4.3108	4.5234	4.7857	4.5399	0.2379	4.8696	5.1269	4.9584	4.9850	0.1307
397	4.3151	4.5302	4.7917	4.5457	0.2387	5.0020	5.2569	5.0852	5.1147	0.1300
398	4.3075	4.5284	4.7931	4.5430	0.2431	5.0351	5.2948	5.1244	5.1514	0.1320
399	4.3161	4.5288	4.7839	4.5429	0.2342	5.0119	5.2805	5.1087	5.1337	0.1360
400	4.3215	4.5331	4.7846	4.5464	0.2318	5.0033	5.2684	5.1019	5.1245	0.1340
401	4.3119	4.5295	4.3674	4.4029	0.1131	3.7919	4.6304	4.6968	4.3730	0.5044
402	4.2937	4.5231	4.7808	4.5326	0.2437	5.0482	5.2899	5.1252	5.1545	0.1235
403	4.3018	4.5188	4.7757	4.5321	0.2372	5.0449	5.3002	5.1300	5.1584	0.1300
404	4.3073	4.5206	4.7823	4.5367	0.2379	5.0639	5.3109	5.1312	5.1687	0.1277
405	4.3154	4.5312	4.7837	4.5434	0.2344	3.7571	4.6216	4.6891	4.3560	0.5197
406	4.3162	4.5295	4.7839	4.5432	0.2341	5.0178	5.2909	5.1208	5.1432	0.1379
407	4.3043	4.5238	4.7800	4.5360	0.2381	3.7498	3.9515	4.2482	3.9832	0.2507
408	4.3163	4.5298	4.7867	4.5443	0.2355	5.0029	5.2715	5.1009	5.1251	0.1359
409	4.3102	4.5306	4.7896	4.5435	0.2399	4.2334	4.4521	4.3028	4.3294	0.1117
410	4.3048	4.5296	4.7894	4.5413	0.2425	5.0075	5.2726	5.1004	5.1268	0.1345
411	4.3128	4.5326	4.7914	4.5456	0.2396	5.0083	5.2754	5.1035	5.1291	0.1354
412	4.3297	4.5409	4.7945	4.5550	0.2327	5.0065	5.2725	5.0997	5.1262	0.1350
413	4.3290	4.5354	4.7897	4.5513	0.2307	5.0143	5.2728	5.1054	5.1308	0.1311
414	4.3089	4.5272	4.7828	4.5396	0.2372	5.0107	5.2802	5.1151	5.1353	0.1359
415	4.3125	4.5302	4.7804	4.5410	0.2342	5.0253	5.2876	5.1197	5.1442	0.1328
416	4.3056	4.2525	4.5865	4.3816	0.1795	5.0143	4.5113	4.6183	4.7147	0.2650
417	4.3085	4.4780	4.7484	4.5117	0.2219	5.0244	5.1219	5.0102	5.0522	0.0608
418	4.2988	4.5270	4.7827	4.5362	0.2421	5.0195	5.2940	5.1198	5.1444	0.1389
419	4.1211	4.3333	4.5740	4.3428	0.2266	5.0139	5.2842	5.1112	5.1364	0.1369
420	3.2304	3.9579	4.3791	3.8558	0.5811	5.0101	4.6254	4.6876	4.7743	0.2065
421	4.1329	3.7847	4.1948	4.0374	0.2211	5.0358	5.2958	5.1278	5.1531	0.1318
422	4.2944	3.9389	4.3713	4.2016	0.2307	5.0353	5.2952	5.1281	5.1529	0.1318
423	3.1767	3.9145	4.3321	3.8078	0.5850	5.0183	5.2784	5.1048	5.1338	0.1324
424	4.3074	4.5263	4.7818	4.5385	0.2374	5.0210	5.2823	5.0979	5.1337	0.1343
425	4.3147	4.5378	4.7934	4.5486	0.2396	5.0585	5.3102	5.1267	5.1651	0.1301
426	4.3112	4.5445	4.7953	4.5503	0.2421	4.9120	5.1797	5.0028	5.0315	0.1361
427	4.3084	4.5360	4.7935	4.5460	0.2427	4.9562	5.2118	5.0422	5.0701	0.1301
428	3.2254	3.9618	4.3818	3.8563	0.5854	4.8474	5.1057	4.9361	4.9631	0.1313
429	3.2393	3.9612	3.9772	3.7259	0.4215	4.9743	4.6166	4.6584	4.7498	0.1956
430	4.3042	4.5206	4.7732	4.5326	0.2347	5.0151	5.2907	5.1076	5.1378	0.1403

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
431	4.3027	4.5263	4.7838	4.5376	0.2407	5.0116	5.2978	5.1112	5.1402	0.1453
432	4.3174	4.5295	4.7841	4.5437	0.2337	5.0151	5.2875	5.1092	5.1373	0.1383
433	4.3052	4.5285	4.7843	4.5393	0.2397	5.0349	4.6482	4.2688	4.6507	0.3830
434	4.3038	3.9615	4.3798	4.2150	0.2228	5.0181	5.3026	4.6855	5.0021	0.3088
435	4.2845	4.5143	4.7734	4.5241	0.2446	5.0373	5.3071	5.1221	5.1555	0.1380
436	4.2979	4.5239	4.7789	4.5336	0.2406	5.0174	5.2807	5.1022	5.1335	0.1344
437	4.3171	4.5312	4.7795	4.5426	0.2314	5.0092	5.2837	5.1019	5.1316	0.1396
438	4.3200	4.5367	4.7815	4.5461	0.2309	5.0130	5.2832	5.1055	5.1339	0.1373
439	4.2981	4.5235	4.3735	4.3984	0.1147	5.0205	5.2850	5.1116	5.1391	0.1343
440	4.2990	4.5265	4.7760	4.5338	0.2386	3.7735	4.6231	4.6820	4.3596	0.5084
441	4.3059	4.5223	4.7709	4.5331	0.2327	4.2369	4.4529	4.3038	4.3312	0.1106
442	4.3016	4.5247	4.7744	4.5336	0.2365	5.0110	5.2689	5.1029	5.1276	0.1307
443	4.2995	4.5226	4.7724	4.5315	0.2366	5.0038	5.2783	5.1037	5.1286	0.1389
444	4.3069	4.5251	4.7804	4.5375	0.2370	5.0119	5.2838	5.1046	5.1335	0.1382
445	4.3004	4.5246	4.7800	4.5350	0.2400	3.7586	4.6196	4.6781	4.3521	0.5148
446	4.2902	3.9635	4.3836	4.2124	0.2206	5.0193	5.2765	5.0991	5.1316	0.1317
447	4.2953	4.5199	4.7728	4.5294	0.2389	5.0159	5.2723	5.0974	5.1285	0.1310
448	4.3004	4.5276	4.7815	4.5365	0.2407	5.0408	5.2911	5.1099	5.1473	0.1293
449	4.2951	4.5222	4.7770	4.5314	0.2410	5.0277	5.2915	5.1108	5.1433	0.1348
450	4.2963	4.5230	4.7748	4.5314	0.2394	4.9976	5.2674	5.0945	5.1198	0.1367
451	4.1304	4.3427	4.5846	4.3525	0.2272	5.0364	5.2888	5.1045	5.1432	0.1306
452	4.0661	4.3608	4.3481	4.2583	0.1666	3.9929	4.7465	4.3156	4.3517	0.3781
453	1.3468	2.8817	3.2905	2.5063	1.0248	2.7531	4.0964	3.3433	3.3976	0.6733
454	4.3342	3.3925	3.9837	3.9035	0.4759	3.7907	4.6380	4.6855	4.3714	0.5035
455	3.9418	4.3057	4.4857	4.2444	0.2771	5.0450	5.2987	5.1146	5.1528	0.1311
456	4.3180	4.5326	4.7908	4.5471	0.2367	5.0386	5.2921	5.1159	5.1489	0.1300
457	4.3224	4.5280	4.7831	4.5445	0.2308	5.0136	5.2794	5.1068	5.1332	0.1349
458	4.3219	4.5327	4.7828	4.5458	0.2307	4.9019	5.1782	5.0093	5.0298	0.1393
459	3.2281	3.9556	4.3744	3.8527	0.5800	4.9649	5.2204	5.0530	5.0794	0.1298
460	4.3109	4.5279	4.3738	4.4042	0.1117	4.8778	5.1299	4.9646	4.9908	0.1281
461	4.3166	4.5375	4.7892	4.5478	0.2364	4.9832	5.2416	5.0716	5.0988	0.1313
462	4.3423	4.5512	4.8004	4.5646	0.2293	5.0381	5.2879	5.1154	5.1471	0.1279
463	4.3049	3.9583	4.3958	4.2197	0.2309	5.0348	5.2838	5.1101	5.1429	0.1277
464	4.3061	4.5261	4.7866	4.5396	0.2405	4.9938	5.2703	5.0945	5.1195	0.1399
465	4.2976	4.5209	4.7755	4.5313	0.2391	5.0182	5.2771	5.0989	5.1314	0.1325
466	4.2979	4.5250	4.7760	4.5330	0.2392	5.0187	5.2961	5.1098	5.1415	0.1414
467	4.2999	4.5197	4.7724	4.5307	0.2365	5.0124	5.2791	5.1079	5.1331	0.1351
468	4.3148	4.5299	4.7863	4.5437	0.2361	5.0143	5.2849	5.1106	5.1366	0.1372

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
469	4.2958	4.5215	4.7777	4.5317	0.2411	5.0226	5.2847	4.6893	4.9989	0.2984
470	4.3003	4.5338	4.3768	4.4036	0.1190	5.0327	5.2937	5.1131	5.1465	0.1337
471	4.3182	4.5395	4.7886	4.5487	0.2353	5.0367	4.6424	4.6864	4.7885	0.2160
472	4.3153	4.5341	4.7846	4.5447	0.2348	5.0359	5.2909	4.5315	4.9527	0.3865
473	4.3137	4.5412	4.7933	4.5494	0.2399	4.2404	4.4490	4.3120	4.3338	0.1060
474	4.3187	4.5430	4.7929	4.5515	0.2372	5.0352	5.2846	5.1191	5.1463	0.1269
475	4.3104	4.5359	4.7829	4.5431	0.2363	5.0236	5.2864	5.1182	5.1427	0.1331
476	4.3063	3.8708	4.3155	4.1642	0.2541	5.0073	3.9949	4.2851	4.4291	0.5214
477	4.3071	3.7324	4.2193	4.0863	0.3096	5.0222	4.2334	4.4377	4.5644	0.4094
478	4.3141	4.5461	4.7938	4.5513	0.2399	5.0058	5.2678	5.1043	5.1260	0.1323
479	4.2860	4.5318	4.7877	4.5352	0.2509	5.0158	5.2854	5.1123	5.1378	0.1366
480	4.2744	4.5229	4.7822	4.5265	0.2539	5.0034	5.2799	5.1120	5.1318	0.1393
481	4.3204	4.5528	4.8028	4.5587	0.2412	5.0093	5.2795	5.1035	5.1307	0.1372
482	4.3453	4.5649	4.8102	4.5734	0.2326	5.0321	5.2917	5.1141	5.1459	0.1327
483	4.1153	4.3516	4.1990	4.2220	0.1198	5.0554	5.2990	5.1306	5.1617	0.1247
484	4.3044	4.5492	4.7945	4.5494	0.2450	5.0671	5.3051	5.1187	5.1636	0.1252
485	4.1372	4.3535	4.5767	4.3558	0.2198	5.0665	5.3260	5.1291	5.1739	0.1354
486	4.3239	4.5507	4.7961	4.5569	0.2361	5.0585	5.3039	5.1203	5.1609	0.1276
487	4.2458	4.4756	4.7246	4.4820	0.2395	5.0573	5.2980	5.1141	5.1564	0.1258
488	4.3067	4.5342	4.7832	4.5414	0.2383	5.0322	5.2897	5.1064	5.1428	0.1326
489	4.3193	4.5446	4.3973	4.4204	0.1144	5.0248	5.2878	5.1049	5.1391	0.1348
490	4.3018	4.5441	4.3939	4.4133	0.1223	4.9241	5.1805	5.0085	5.0377	0.1306
491	4.3024	4.5413	4.7933	4.5457	0.2455	4.9780	5.2366	5.0534	5.0893	0.1330
492	4.3098	4.5440	4.8016	4.5518	0.2460	4.8619	5.1167	4.9421	4.9736	0.1303
493	4.3105	4.5419	4.7930	4.5485	0.2413	4.9791	5.2377	5.0591	5.0920	0.1324
494	4.3061	4.5362	4.7893	4.5438	0.2417	5.0348	5.2943	5.1158	5.1483	0.1327
495	4.3010	4.5266	4.3949	4.4075	0.1133	5.0186	5.2890	5.1039	5.1372	0.1382
496	4.3094	4.5308	4.7834	4.5412	0.2372	5.0102	5.3046	5.1162	5.1437	0.1491
497	4.3140	4.5370	4.7880	4.5463	0.2371	5.0134	5.2915	5.1151	5.1400	0.1407
498	4.3206	4.5402	4.7852	4.5487	0.2324	5.0114	5.2919	4.7044	5.0026	0.2938
499	4.3054	4.5292	4.7825	4.5390	0.2387	5.0123	5.3027	5.1176	5.1442	0.1470
500	4.3076	3.3988	3.9909	3.8991	0.4613	5.0082	5.2788	5.1021	5.1297	0.1374
501	3.2250	3.4028	4.0011	3.5430	0.4066	5.0038	5.2885	4.6759	4.9894	0.3066
502	4.3104	4.5363	4.7833	4.5433	0.2365	5.0090	5.2939	5.1181	5.1403	0.1438
503	3.2316	3.9628	4.3800	3.8581	0.5813	5.0113	5.2823	5.1146	5.1361	0.1368
504	4.3068	4.5281	4.7817	4.5389	0.2377	5.0271	5.2943	5.1091	5.1435	0.1369
505	4.3011	4.5236	4.7788	4.5345	0.2390	4.2643	4.4929	4.3285	4.3619	0.1179
507	4.3077	4.5474	4.7970	4.5507	0.2446	5.0339	5.3002	5.1183	5.1508	0.1361



## Benchmarking Performance Evaluation

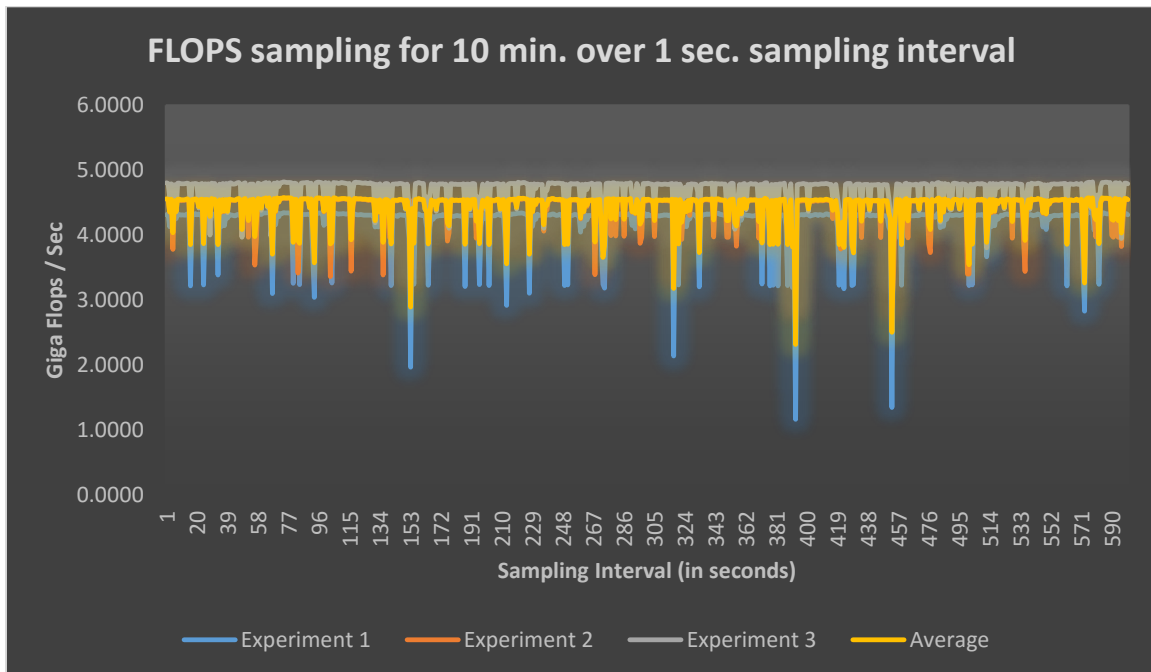
Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
507	4.3107	4.5390	4.7901	4.5466	0.2398	3.7639	4.6235	4.6810	4.3561	0.5137
508	4.3080	4.5321	4.7851	4.5417	0.2387	5.0131	5.2818	4.6742	4.9897	0.3044
509	4.3198	4.5400	4.7950	4.5516	0.2378	5.0157	5.2860	5.1083	5.1367	0.1374
510	4.3033	4.5325	4.7840	4.5399	0.2404	5.0184	5.2830	5.1028	5.1347	0.1352
511	4.3068	4.5277	4.7827	4.5391	0.2381	5.0102	5.2763	5.0994	5.1286	0.1354
513	3.6661	4.1928	3.8052	3.8880	0.2729	4.0325	4.7720	4.3807	4.3951	0.3699
513	3.9238	4.3302	4.3802	4.2114	0.2504	2.1666	3.7973	3.4423	3.1354	0.8576
514	4.3093	4.5426	4.7961	4.5493	0.2435	5.0437	5.3052	5.1197	5.1562	0.1346
515	4.1285	4.3436	4.5943	4.3555	0.2331	5.0319	5.3065	5.1265	5.1550	0.1395
516	4.3094	4.5376	4.7973	4.5481	0.2441	5.0407	4.6207	4.6838	4.7818	0.2265
517	4.1437	4.3592	4.6060	4.3696	0.2313	5.0345	5.3092	5.1262	5.1566	0.1398
518	4.2939	4.5277	4.7924	4.5380	0.2494	5.0693	5.3030	4.6863	5.0195	0.3113
519	4.2457	4.4811	4.7323	4.4864	0.2433	5.0354	5.3075	4.2766	4.8731	0.5343
520	4.2806	4.5264	4.7846	4.5305	0.2520	5.0491	4.6490	4.7042	4.8007	0.2168
521	4.3084	4.5392	4.7954	4.5477	0.2436	5.0645	5.3169	5.1275	5.1696	0.1313
522	4.2962	4.5360	4.8013	4.5445	0.2527	4.9607	5.1860	5.0119	5.0529	0.1181
523	4.3166	4.5478	4.4070	4.4238	0.1165	4.9838	5.2359	5.0479	5.0892	0.1311
524	4.3222	4.5383	4.7865	4.5490	0.2323	4.8672	4.5032	4.5454	4.6386	0.1991
525	4.3294	4.5472	4.7962	4.5576	0.2336	4.9838	5.2599	4.9171	5.0536	0.1817
526	4.3120	4.5378	4.7905	4.5467	0.2394	5.0104	5.2971	5.1144	5.1406	0.1451
527	4.3065	4.5334	4.7843	4.5414	0.2390	5.0226	5.3000	5.1193	5.1473	0.1408
528	4.3094	3.9510	4.3740	4.2115	0.2279	5.0588	5.3066	5.1272	5.1642	0.1279
529	4.3058	4.5439	4.7913	4.5470	0.2428	5.0678	5.3193	4.6987	5.0286	0.3122
530	4.3027	4.5420	4.7942	4.5463	0.2458	3.7973	4.6439	4.6946	4.3786	0.5040
531	4.3106	4.5378	4.7941	4.5475	0.2419	5.0192	5.2768	5.1042	5.1334	0.1313
532	4.3032	4.5315	4.7812	4.5386	0.2391	5.0222	5.2882	5.1103	5.1402	0.1355
533	4.3078	4.5365	4.7835	4.5426	0.2379	5.0124	5.2902	5.1109	5.1378	0.1409
534	4.3110	4.5365	4.7827	4.5434	0.2359	5.0143	5.2885	5.1113	5.1380	0.1390
535	4.3190	3.9602	4.3762	4.2185	0.2255	3.7722	4.6492	4.6981	4.3731	0.5210
536	4.3021	3.4411	4.0144	3.9192	0.4383	5.0309	3.7818	4.1396	4.3174	0.6432
537	4.3087	4.3196	4.6330	4.4204	0.1842	2.0030	2.1957	2.5436	2.2474	0.2740
538	4.3034	4.5410	4.7877	4.5441	0.2422	5.0304	5.3102	5.1254	5.1553	0.1423
539	4.3155	4.5503	4.3941	4.4200	0.1195	5.0259	5.3055	5.1196	5.1503	0.1423
540	4.3123	4.5554	4.8021	4.5566	0.2449	5.0126	5.3025	5.1170	5.1440	0.1468
541	4.2994	4.5405	4.7894	4.5431	0.2450	5.0202	5.3049	5.1149	5.1467	0.1450
542	4.3081	4.5455	4.7899	4.5478	0.2409	5.0142	5.3050	5.1190	5.1461	0.1473
543	4.3070	4.5467	4.7901	4.5479	0.2416	5.0148	5.3041	5.1133	5.1441	0.1471
544	4.3291	4.5568	4.7993	4.5617	0.2351	5.0242	5.3074	5.1171	5.1496	0.1444

## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
545	4.3147	4.5488	4.7953	4.5529	0.2403	5.0136	5.2924	5.1120	5.1394	0.1414
546	4.3139	4.5387	4.7873	4.5467	0.2368	5.0206	5.3024	5.1147	5.1459	0.1434
547	4.1258	4.3364	4.5795	4.3472	0.2270	3.7806	4.6434	4.2809	4.2350	0.4332
548	4.2997	4.5281	4.7780	4.5353	0.2392	5.0191	5.2993	4.8648	5.0611	0.2203
549	4.0843	4.3238	4.5697	4.3259	0.2427	5.0388	5.3139	4.0528	4.8018	0.6631
550	4.2923	4.5239	4.7741	4.5301	0.2410	5.0377	5.3060	4.0555	4.7997	0.6583
551	4.2451	4.4736	4.7199	4.4795	0.2374	5.0276	4.6117	3.6015	4.4136	0.7334
552	4.2942	4.5307	4.7834	4.5361	0.2446	5.0305	5.2848	4.0414	4.7856	0.6569
553	4.2941	4.5275	4.7866	4.5360	0.2464	3.7743	4.6324	3.6195	4.0087	0.5456
554	4.3057	4.5334	4.7889	4.5427	0.2417	4.9002	5.1644	3.9435	4.6694	0.6423
555	4.3050	4.5378	4.7868	4.5432	0.2410	3.7681	4.5913	3.5850	3.9815	0.5360
556	4.3048	4.5363	4.7840	4.5417	0.2397	4.8886	4.4834	3.4977	4.2899	0.7153
557	4.2957	4.5355	4.7849	4.5387	0.2446	4.9783	5.2361	3.9949	4.7364	0.6550
558	4.3059	4.5416	4.7896	4.5457	0.2419	5.0302	5.2897	4.0395	4.7865	0.6598
559	4.3121	4.5424	4.7919	4.5488	0.2400	5.0252	5.2892	4.0374	4.7839	0.6598
560	4.3046	4.5409	4.7945	4.5467	0.2450	5.0252	5.2836	3.8836	4.7308	0.7450
561	4.3183	4.5447	4.7944	4.5525	0.2381	5.0355	5.2887	4.0408	4.7883	0.6597
562	3.2186	3.9703	4.3914	3.8601	0.5941	5.0326	5.2879	4.0358	4.7854	0.6616
563	4.2975	4.5315	4.7812	4.5367	0.2419	5.0403	5.2849	4.0427	4.7893	0.6580
564	4.3039	4.5367	4.7882	4.5429	0.2422	5.0606	5.3069	3.8688	4.7454	0.7691
565	4.2965	4.5384	4.7857	4.5402	0.2446	5.0184	5.2788	4.0401	4.7791	0.6531
566	4.2978	4.5277	4.7789	4.5348	0.2406	5.0277	5.2898	4.0468	4.7881	0.6552
567	4.2967	4.5360	4.7847	4.5392	0.2440	5.0329	5.2920	4.0419	4.7889	0.6598
568	4.3213	4.5536	4.7932	4.5560	0.2359	5.0440	5.2923	4.0414	4.7926	0.6623
569	4.2967	4.5316	4.7807	4.5363	0.2420	1.9928	2.7209	2.0495	2.2544	0.4050
570	4.2983	4.5405	4.7839	4.5409	0.2428	5.0408	5.2921	4.0450	4.7927	0.6595
571	4.3147	4.5479	4.7932	4.5519	0.2393	5.0587	5.3006	4.0529	4.8041	0.6617
572	3.5021	4.1222	4.3752	3.9999	0.4492	4.2383	4.8652	3.6087	4.2374	0.6283
573	2.8303	3.4212	3.5335	3.2617	0.3778	4.5482	5.0303	3.8593	4.4793	0.5885
575	4.3089	4.5499	4.8024	4.5537	0.2468	5.0411	5.2914	4.0349	4.7891	0.6650
575	4.3401	4.5659	4.8102	4.5721	0.2351	5.0374	4.6144	3.5957	4.4158	0.7410
576	4.3447	4.5683	4.8154	4.5762	0.2354	5.0373	5.2888	4.0405	4.7888	0.6602
577	4.3458	4.5619	4.4123	4.4400	0.1107	5.0390	5.2901	4.0416	4.7902	0.6603
578	4.3390	4.5653	4.8190	4.5745	0.2401	5.0349	4.6383	3.6189	4.4307	0.7305
580	4.0782	4.2851	4.5265	4.2966	0.2244	5.0479	5.2970	4.0437	4.7962	0.6635
580	4.3425	3.9711	4.4020	4.2386	0.2335	5.0379	5.2940	4.0493	4.7937	0.6573
581	4.1611	4.3791	4.6192	4.3865	0.2291	5.0541	5.2931	4.0498	4.7990	0.6597
583	3.2416	3.9708	4.3922	3.8682	0.5821	5.0523	5.2909	4.0403	4.7945	0.6640

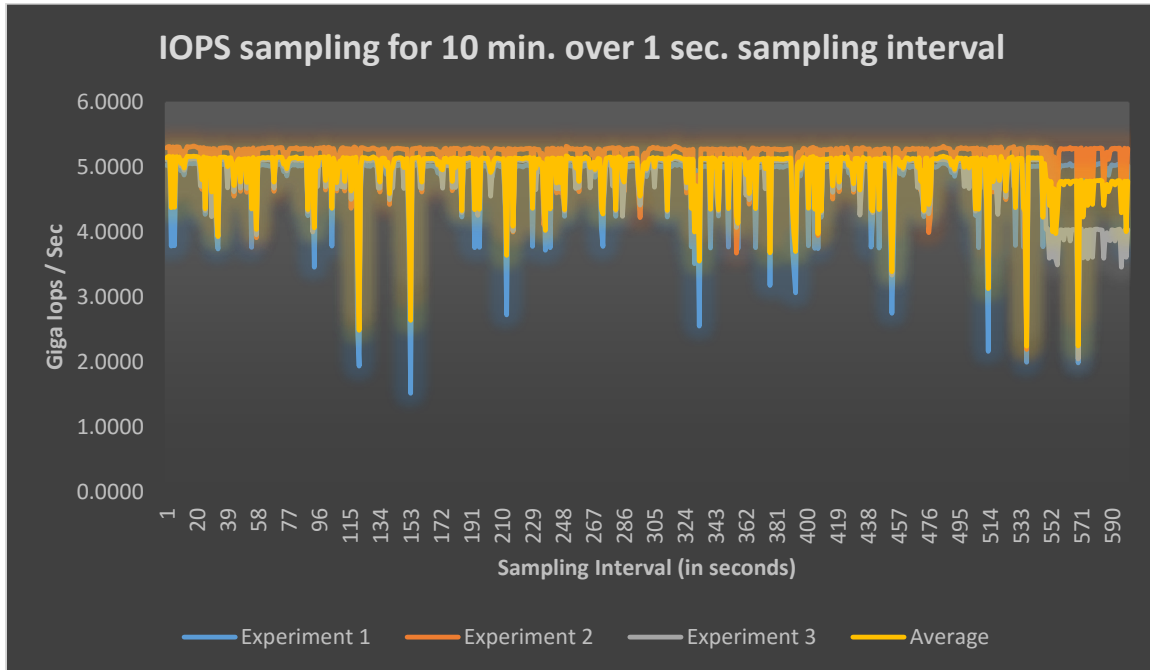
## Benchmarking Performance Evaluation

Sr. No.	FLOPS					IOPS				
	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
583	4.2753	4.4931	4.7365	4.5017	0.2307	5.0635	5.3014	4.0405	4.8018	0.6699
584	4.3453	4.5616	4.8084	4.5718	0.2317	5.0488	5.2910	4.0354	4.7917	0.6661
585	4.3422	4.5602	4.8089	4.5704	0.2335	5.0384	4.6096	3.6010	4.4163	0.7379
586	4.3331	4.5624	4.8175	4.5710	0.2423	4.9190	5.1775	3.9623	4.6863	0.6402
587	4.3288	4.5619	4.8149	4.5685	0.2431	4.9865	5.2360	3.9986	4.7404	0.6544
588	4.3298	4.5587	4.8074	4.5653	0.2389	4.8768	5.1237	3.8841	4.6282	0.6561
589	4.3206	4.5581	4.8118	4.5635	0.2456	4.9968	5.2500	3.8741	4.7070	0.7323
590	4.3241	3.9955	4.4170	4.2455	0.2214	5.0410	5.2898	4.0390	4.7899	0.6621
591	4.3154	3.9677	4.3962	4.2264	0.2277	5.0300	5.2827	4.0337	4.7821	0.6604
592	4.3288	4.5539	4.8077	4.5634	0.2396	5.0311	5.2951	3.8663	4.7308	0.7603
593	4.3240	4.5511	4.8043	4.5598	0.2403	5.0345	5.2817	4.0361	4.7841	0.6595
594	4.3150	3.9675	4.3880	4.2235	0.2247	5.0503	5.2983	4.0467	4.7984	0.6627
595	4.3087	4.5557	4.8029	4.5558	0.2471	5.0389	5.2983	4.0519	4.7964	0.6576
597	4.3255	3.8235	3.9477	4.0322	0.2615	5.0382	4.3955	3.4653	4.2997	0.7908
597	4.2966	4.2170	4.5609	4.3582	0.1801	5.0261	5.0941	3.9266	4.6822	0.6553
598	4.3331	4.5552	4.7993	4.5625	0.2332	5.0354	5.2973	4.0363	4.7897	0.6654
599	4.3339	4.5535	4.7981	4.5619	0.2322	3.7772	4.6361	3.6169	4.0101	0.5480
600	4.3130	4.5430	4.7911	4.5490	0.2391	5.0321	5.2907	4.0468	4.7899	0.6564



## Benchmarking Performance Evaluation

- The above graph illustrates the trending chart for FLOPS for 600 sampling intervals for the 3 experiments and their average
- Please refer to “benchmarking\_11FEB2016\_CPU\_1.txt”, “benchmarking\_11FEB2016\_CPU\_2.txt” and “benchmarking\_11FEB2016\_CPU\_3.txt” for the output details



- The above graph illustrates the trending chart for IOPS for 600 sampling intervals for the 3 experiments and their average
- Please refer to “benchmarking\_11FEB2016\_CPU\_1.txt”, “benchmarking\_11FEB2016\_CPU\_2.txt” and “benchmarking\_11FEB2016\_CPU\_3.txt” for the output details

### c. Theoretical Performance

Processor:	Intel(R) Xeon(R) CPU E5-2676 v3 @ 2.40GHz
Frequency:	2400.078
Cache Size:	30720 KB
CPU Cores:	1
No. of CPUs:	1

## Benchmarking Performance Evaluation

IPC:	16 (please refer <a href="https://www.microway.com/hpc-tech-tips/intel-xeon-e5-2600-v3-haswell-processor-review/">https://www.microway.com/hpc-tech-tips/intel-xeon-e5-2600-v3-haswell-processor-review/</a> for further details)
Theoretical FLOPS:	= Frequency * IPC * Cores = 2.4 * 16 * 1 = 38.4 Giga Flops

### d. LINPACK GFLOPS Performance Summary

Size	LDA	Align.	Average	Maximal
1000	1000	4	26.9857	27.3013
2000	2000	4	29.9049	30.1553
5000	5008	4	34.3264	34.3960
10000	10000	4	36.4561	37.0360

- LINPACK achieves approximately 96.45%  $((37.0360 / 38.4) * 100 = 96.44792 \%)$  of Theoretical Performance
- Please refer to “Hardware Info.txt”, “Processor Info.txt” and “linpack\_data\_aws.txt” from “logs” folder for further details

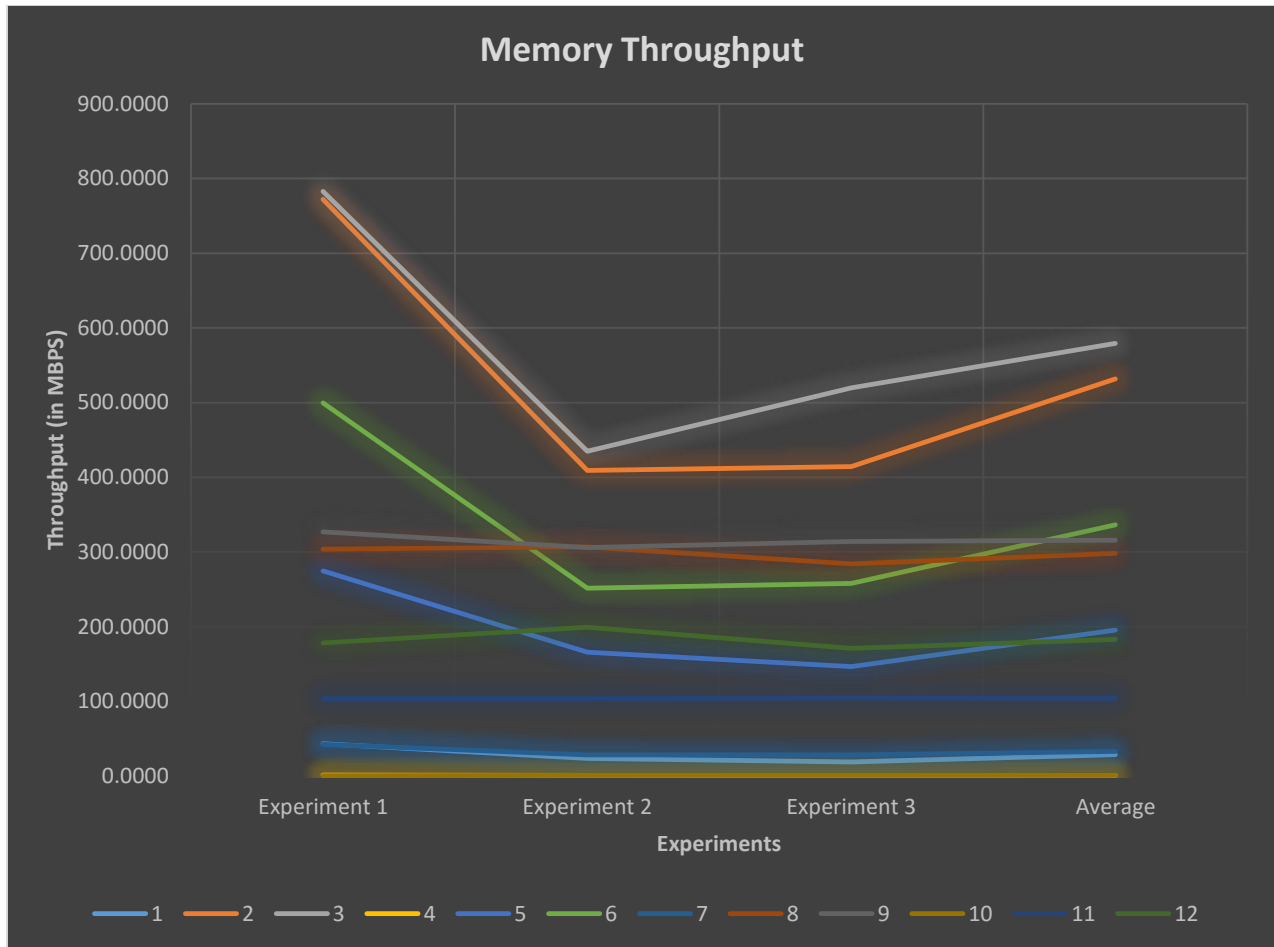
### e. Comparative Analysis & Summary

- Due to the complexity in understanding and fine-tuning of LINPACK Benchmarking, program's performance is no match with LINPACK output
- Due to AWS t2.micro instance, unable to benchmark experiment with multicore and many-core architecture
- Experiment can be tested with more number of threads
- Similar to LINPACK, we could have used Linear Equation Solver or some other complex operations to improve benchmarking performance
- Better and optimized performance can be achieved by understanding LINPACK's internal logic in detail

## 2. Memory Benchmarking

### a. Memory Throughput Results in MBPS

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
1.	Sequential - 1 Thread - 1 Byte	43.3921	23.7197	18.9967	28.7028	12.9386
2.	Sequential - 1 Thread - 1 KB	772.2604	409.2206	414.2725	531.9178	208.1581
3.	Sequential - 1 Thread - 1 MB	782.8647	434.9698	519.7721	579.2022	181.4020
4.	Random - 1 Thread - 1 Byte	1.3082	0.7005	0.5895	0.8661	0.3869
5.	Random - 1 Thread - 1 KB	274.6046	165.7264	146.3760	195.5690	69.1273
6.	Random - 1 Thread - 1 MB	499.7476	251.3807	257.8496	336.3260	141.5642
7.	Sequential - 2 Threads - 1 Byte	42.4705	28.3983	28.2547	33.0412	8.1664
8.	Sequential - 2 Threads - 1 KB	303.9761	306.7178	283.9637	298.2192	12.4215
9.	Sequential - 2 Threads - 1 MB	326.8955	305.8861	314.1964	315.6593	10.5808
10.	Random - 2 Threads - 1 Byte	0.6173	0.7854	0.7301	0.7109	0.0857
11.	Random - 2 Threads - 1 KB	103.8380	103.8067	104.7642	104.1363	0.5440
12.	Random - 2 Threads - 1 MB	178.1941	199.1533	171.0431	182.7968	14.6094



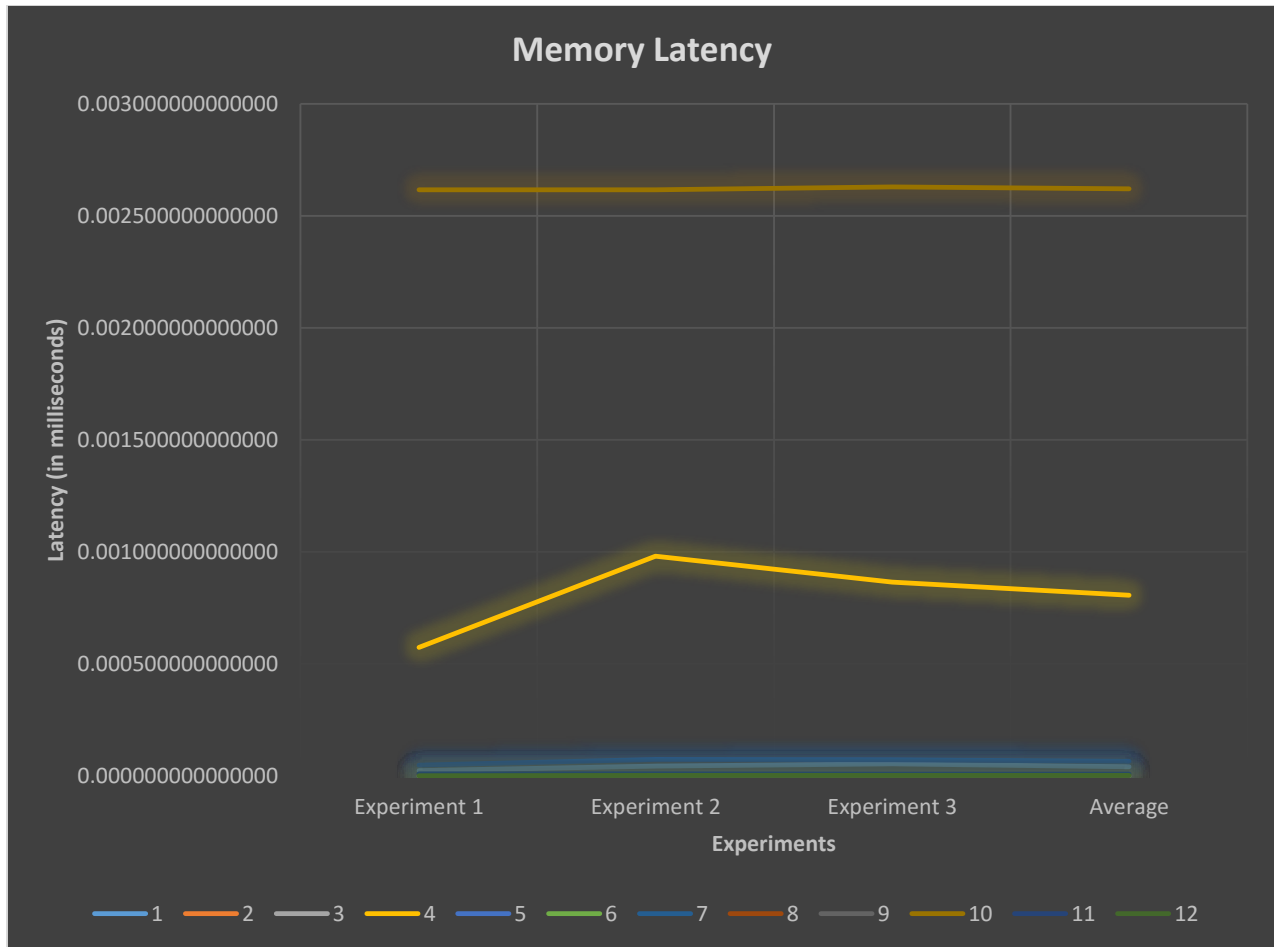
- The above graph illustrates the Memory Throughput trend for 3 experiments and their average. The number in the Legends indicate the combination of Memory Operations. Please refer to the “Sr. No.” and “Description” columns from the table “Memory Throughput Results in MBPS” from page 22
- Assignment achieves approximately 9.15%  $((782.8647 / 8553) * 100 = 9.15 \%)$  of Theoretical Performance
- Please refer to “benchmarking\_11FEB2016\_Memory\_1.txt”, “benchmarking\_11FEB2016\_Memory\_2.txt” and “benchmarking\_11FEB2016\_Memory\_3.txt” for the output details

## Benchmarking Performance Evaluation

### b. Memory Latency Results in milliseconds

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
1.	Sequential - 1 Thread - 1 Byte	0.0000242473 69766	0.000043 80810737 6	0.000054 85392570 5	0.000040 96980094 9	0.000015 49942915 5
2.	Sequential - 1 Thread - 1 KB	0.0000010344 12384	0.000001 29873275 8	0.000001 33769989 0	0.000001 22361501 1	0.000000 16500859 0
3.	Sequential - 1 Thread - 1 MB	0.0000005461 12061	0.000000 94285965 0	0.000000 77921867 4	0.000000 75606346 2	0.000000 19938476 7
4.	Random - 1 Thread - 1 Byte	0.0005739108 27637	0.000980 54789543 2	0.000864 90036010 7	0.000806 45302772 5	0.000209 52444779 3
5.	Random - 1 Thread - 1 KB	0.0000021078 20511	0.000003 34789276 1	0.000003 38333129 9	0.000002 94634819 0	0.000000 72640241 9
6.	Random - 1 Thread - 1 MB	0.0000005353 92761	0.000000 77014923 1	0.000000 76707840 0	0.000000 69087346 4	0.000000 13465899 2
7.	Sequential - 2 Threads - 1 Byte	0.0000484150 69580	0.000073 75555992 1	0.000073 14714908 6	0.000065 10592619 6	0.000014 45790655 2
8.	Sequential - 2 Threads - 1 KB	0.0000042964 02931	0.000004 29330349 0	0.000004 51867580 4	0.000004 36946074 2	0.000000 12923332 7
9.	Sequential - 2 Threads - 1 MB	326.8955	305.8861	314.1964	315.6593	10.5808
10.	Random - 2 Threads - 1 Byte	0.6173	0.7854	0.7301	0.7109	0.0857
11.	Random - 2 Threads - 1 KB	103.8380	103.8067	104.7642	104.1363	0.5440
12.	Random - 2 Threads - 1 MB	178.1941	199.1533	171.0431	182.7968	14.6094





- The above graph illustrates the Memory Latency trend for 3 experiments and their average. The number in the Legends indicate the combination of Memory Operations. Please refer to the “Sr. No.” and “Description” columns from the table “Memory Latency Results in milliseconds” from page 24
- Please refer to “benchmarking\_11FEB2016\_Memory\_1.txt”, “benchmarking\_11FEB2016\_Memory\_2.txt” and “benchmarking\_11FEB2016\_Memory\_3.txt” for the output details

### c. Theoretical Performance

- Unable to determine the exact type of RAM installed on Cloud Instance. However, based on the STREAM’s maximum “Best Rate MBPS” (7990.4 MBPS), it was assumed that the installed RAM will be of model DDR3-1066E or DDR3-1066F or DDR3-1066G. Please refer to link [https://en.wikipedia.org/wiki/DDR3\\_SDRAM](https://en.wikipedia.org/wiki/DDR3_SDRAM) for the average DDR 3 RAM Speeds.
- The assumed DDR3 SDRAM model supports Peak Transfer Rate of 8533 MBPS.

### d. STREAM Performance Summary

Function	Best Rate MB/s	Avg time	Min time	Max time
Copy	5706.5	0.028777	0.028038	0.029195
Scale	5574.8	0.029434	0.028701	0.029792
Add	7990.4	0.030752	0.030036	0.031013
Triad	7490.4	0.032750	0.032041	0.033136

- STREAM achieves approximately 93.64%  $((7990.4 / 8533) * 100 = 93.64112 \%)$  of Theoretical Performance
- Please refer to “stream\_data\_aws.txt” from “logs” folder for further details

### e. Comparative Analysis & Summary

- Disabling or manipulating the Cache could have given better results
- Scarce resource availability on internet on Memory Benchmarking makes it difficult to understand it programmatically

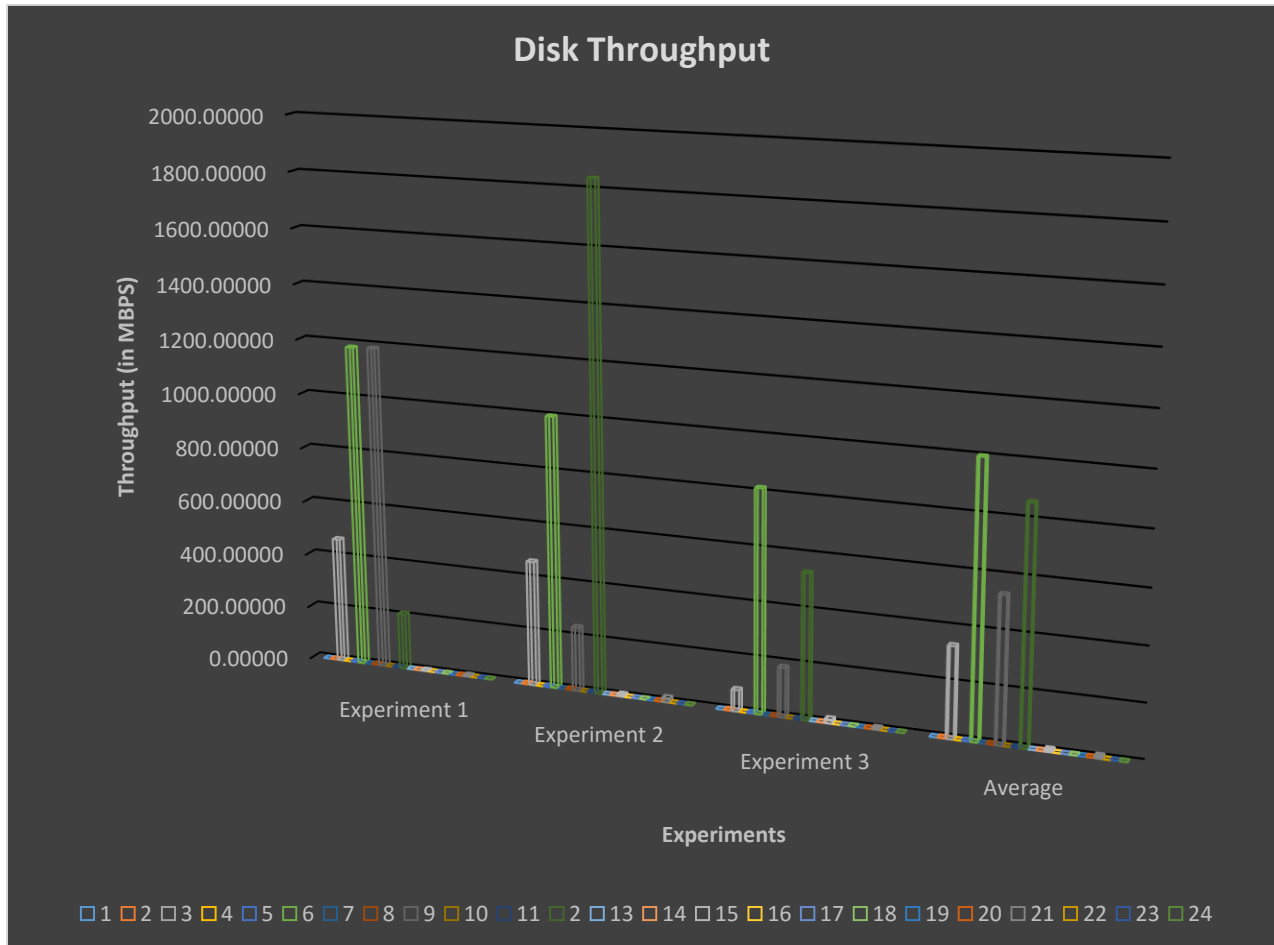
### 3. Disk Benchmarking

#### a. Disk Throughput Results in MBPS

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
1.	Read - Sequential - 1 Thread - 1 Byte	0.00180	0.00200	0.00160	0.00180	0.00020
2.	Read - Sequential - 1 Thread - 1 KB	0.60610	1.94600	1.64180	1.39797	0.70244
3.	Read - Sequential - 1 Thread - 1 MB	464.46390	463.32760	79.78768	335.85973	221.76563
4.	Read - Random - 1 Thread - 1 Byte	0.00140	0.00130	0.00160	0.00143	0.00015
5.	Read - Random - 1 Thread - 1 KB	1.60980	2.40240	1.87020	1.96080	0.40399
6.	Read - Random - 1 Thread - 1 MB	1183.01190	998.72160	816.63320	999.45557	183.19045
7.	Read - Sequential - 2 Threads - 1 Byte	0.00190	0.00140	0.00140	0.00157	0.00029
8.	Read - Sequential - 2 Threads - 1 KB	1.74170	2.25480	1.31810	1.77153	0.46906
9.	Read - Sequential - 2 Threads - 1 MB	1185.89470	238.71930	183.63890	536.08430	563.42580
10.	Read - Random - 2 Threads - 1 Byte	0.00160	0.00170	0.00120	0.00150	0.00026
11.	Read - Random - 2 Threads - 1 KB	1.67220	1.78390	1.08020	1.51210	0.37818
12.	Read - Random - 2 Threads - 1 MB	209.52650	1837.64990	535.62650	860.93430	861.43214
13.	Write - Sequential - 1 Thread - 1 Byte	0.00020	0.00040	0.00040	0.00033	0.00012
14.	Write - Sequential - 1 Thread - 1 KB	0.33380	0.97000	0.69130	0.66503	0.31891
15.	Write - Sequential - 1 Thread - 1 MB	2.39380	7.20270	15.24210	8.27953	6.49149
16.	Write - Random - 1 Thread - 1 Byte	0.00010	0.00030	0.00020	0.00020	0.00010
17.	Write - Random - 1 Thread - 1 KB	0.09090	0.64630	0.13420	0.29047	0.30892
18.	Write - Random - 1 Thread - 1 MB	1.01410	1.07790	0.90490	0.99897	0.08749
19.	Write - Sequential - 2 Threads - 1 Byte	0.00020	0.00050	0.00020	0.00030	0.00017
20.	Write - Sequential - 2 Threads - 1 KB	0.68410	0.97050	0.52350	0.72603	0.22643
21.	Write - Sequential - 2 Threads - 1 MB	4.18940	16.01300	5.66750	8.62330	6.44220
22.	Write - Random - 2 Threads - 1 Byte	0.00020	0.00030	0.00020	0.00023	0.00006

## Benchmarking Performance Evaluation

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
23.	Write - Random - 2 Threads - 1 KB	0.52280	0.47350	0.37390	0.45673	0.07585
24.	Write - Random - 2 Threads - 1 MB	0.36450	1.05320	1.07600	0.83123	0.40436



- The above graph illustrates the Disk Throughput trend for 3 experiments and their average. The number in the Legends indicate the combination of Disk Operations. Please refer to the “Sr. No.” and “Description” columns from the table “Disk Throughput Results in MBPS” from page 27 & 28
- Assignment achieves approximately 11.5% ( $((18.37 / 160) * 100 = 11.48 \%)$  of Theoretical Performance
- Please refer to “benchmarking\_11FEB2016\_Disk\_1.txt”, “benchmarking\_11FEB2016\_Disk\_2.txt” and “benchmarking\_11FEB2016\_Disk\_3.txt” for the output details

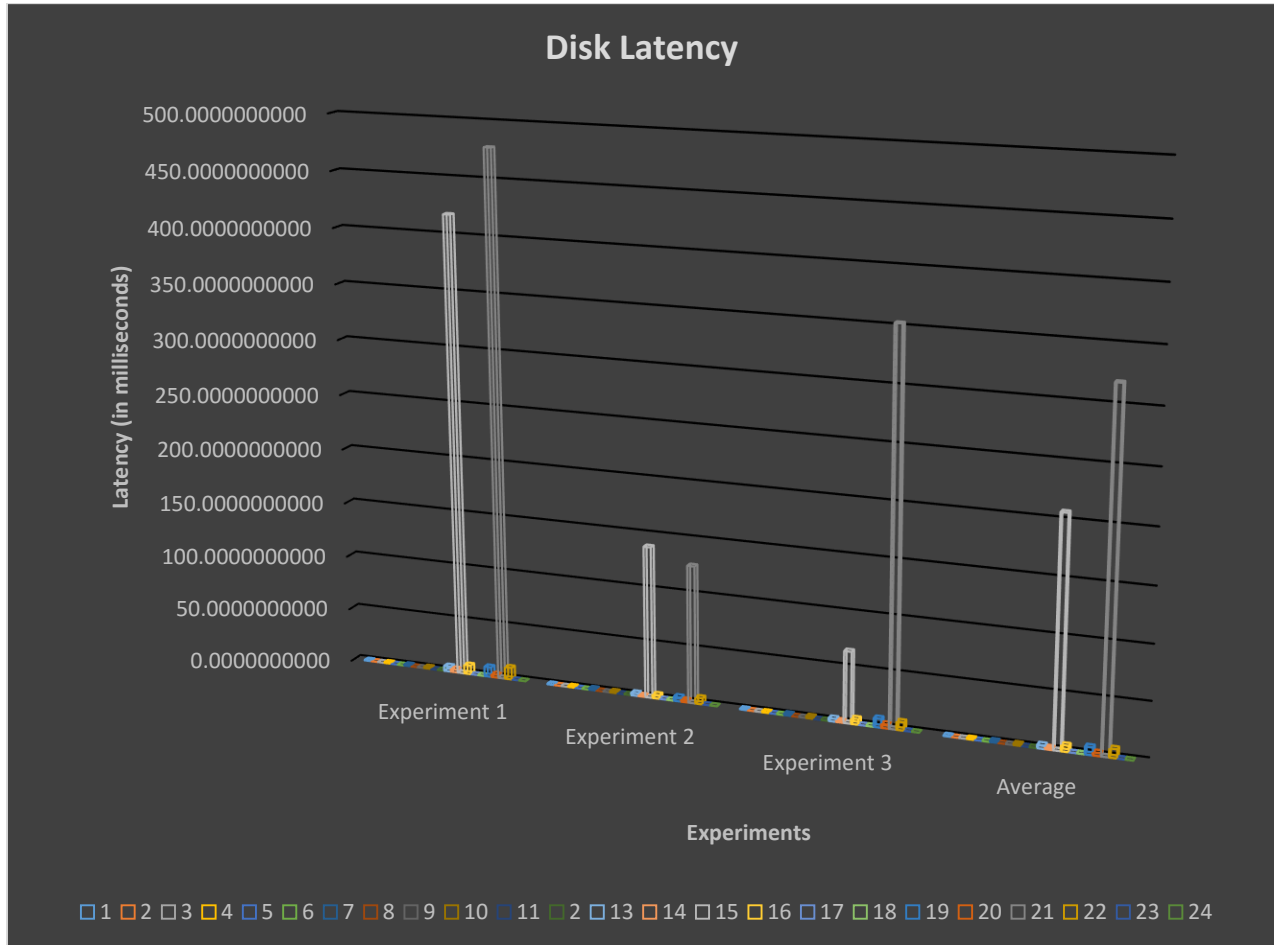
## Benchmarking Performance Evaluation

### b. Disk Latency Results in milliseconds

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
1.	Read - Sequential - 1 Thread - 1 Byte	0.539340 2995	0.485805 0456	0.615095 3776	0.546746 9076	0.064962 6113
2.	Read - Sequential - 1 Thread - 1 KB	0.001573 5026	0.000490 0716	0.000580 8594	0.000881 4779	0.000601 0277
3.	Read - Sequential - 1 Thread - 1 MB	0.000002 0533	0.000002 0583	0.000011 9527	0.000005 3548	0.000005 7140
4.	Read - Random - 1 Thread - 1 Byte	0.684837 2070	0.738930 2409	0.610617 1875	0.678128 2118	0.064419 0801
5.	Read - Random - 1 Thread - 1 KB	0.000592 4154	0.000396 9727	0.000509 9284	0.000499 7721	0.000098 1164
6.	Read - Random - 1 Thread - 1 MB	0.000000 8061	0.000000 9549	0.000001 1678	0.000000 9763	0.000000 1818
7.	Read - Sequential - 2 Threads - 1 Byte	1.020000 5371	1.348561 7350	1.363501 3672	1.244021 2131	0.194151 3472
8.	Read - Sequential - 2 Threads - 1 KB	0.001096 8099	0.000846 0938	0.001448 2096	0.001130 3711	0.000302 4577
9.	Read - Sequential - 2 Threads - 1 MB	0.000001 6121	0.000007 9909	0.000010 3888	0.000006 6639	0.000004 5363
10.	Read - Random - 2 Threads - 1 Byte	1.213083 9030	1.149833 2845	1.580555 8919	1.314491 0265	0.232579 1148
11.	Read - Random - 2 Threads - 1 KB	0.001174 5931	0.001069 2546	0.002131 4290	0.001458 4256	0.000585 2130
12.	Read - Random - 2 Threads - 1 MB	0.000009 1065	0.000001 0422	0.000003 5620	0.000004 5703	0.000004 1256
13.	Write - Sequential - 1 Thread - 1 Byte	4.763875 3906	2.419662 0117	2.672650 0326	3.285395 8116	1.286634 0326
14.	Write - Sequential - 1 Thread - 1 KB	2.926000 0000	1.006766 6667	1.412666 6667	1.781811 1111	1.011466 6888
15.	Write - Sequential - 1 Thread - 1 MB	417.7385 400000	138.8368 800000	65.60786 00000	207.3944 266667	185.8066 383449
16.	Write - Random - 1 Thread - 1 Byte	8.368664 6484	3.475502 1484	5.143722 6888	5.662629 8286	2.487510 4578
17.	Write - Random - 1 Thread - 1 KB	0.010488 6068	0.001475 6510	0.007105 3711	0.006356 5430	0.004552 9002
18.	Write - Random - 1 Thread - 1 MB	0.000940 4431	0.000884 7863	0.001053 8916	0.000959 7070	0.000086 1828
19.	Write - Sequential - 2 Threads - 1 Byte	9.039380 3223	4.029779 4434	8.034003 2715	7.034387 6790	2.650179 0017
20.	Write - Sequential - 2 Threads - 1 KB	2.858700 0000	2.012483 3333	3.737316 6667	2.869500 0000	0.862467 3831
21.	Write - Sequential - 2 Threads - 1 MB	477.4522 700000	125.9847 800000	352.8998 500000	318.7789 666667	178.2008 000580
22.	Write - Random - 2 Threads - 1 Byte	11.07127 98340	5.749681 5267	7.677080 3548	8.166013 9052	2.694279 8942
23.	Write - Random - 2 Threads - 1 KB	0.003666 3086	0.004027 8971	0.005302 7832	0.004332 3296	0.000859 6637

## Benchmarking Performance Evaluation

Sr. No.	Description	Exp. 1	Exp. 2	Exp. 3	Average	Std. Dev.
24.	Write - Random - 2 Threads - 1 MB	0.005233 2847	0.001810 9987	0.001772 6757	0.002938 9864	0.001987 0130



- The above graph illustrates the Disk Latency trend for 3 experiments and their average. The number in the Legends indicate the combination of Disk Operations. Please refer to the “Sr. No.” and “Description” columns from the table “Disk Latency Results in MBPS” from page 29 & 30
- Please refer to “benchmarking\_11FEB2016\_Disk\_1.txt”, “benchmarking\_11FEB2016\_Disk\_2.txt” and “benchmarking\_11FEB2016\_Disk\_3.txt” for the output details

### c. Theoretical Performance

- t2.micro instance do not have their own attached storage. EBS is used to store the data
- Unable to determine the exact type of EBS on Cloud Instance. However, based on the hardware specifications of t2.micro instance (<http://aws.amazon.com/ec2/instance-types/> and <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/t2-instances.html>), it was assumed that general purpose EBS is used.
- The assumed general purpose EBS supports maximum throughput of 160 MBPS / volume (<https://aws.amazon.com/ebs/details/>).

### d. IOZONE Performance Summary

	write	rewrite	read	reread	random read	random write	block read	record rewrite	stride read	fwrite	frewrite	fread	freread
Maximum Output	2767722	5754221	22737791	20962191	15972885	6421025	13102174	8183918	16789959	5971678	8036304	14613561	15471149

- IOZONE achieves approximately 13878.04% ( $(22204.87 / 160) * 100 = 13878.04375 \%$ ) of Theoretical Performance
- Please refer to "iozone\_data\_aws.txt" from "logs" folder for further details

### e. Comparative Analysis & Summary

- During Sequential Read and Write operations, cache is used which is more of a Memory Benchmarking than Disk Benchmarking
- Testing the Disk Throughput and Latency by avoiding the cache usage
- Testing the Disk Throughput and Latency by using a big disk file (typically 1.5 or 2 GB)