tide test53-dayroute

Lucy Score = Throughput x Availability x Acc / 10,000. LPD condenses live-fit vs Acc-champ RAM.
[T]=Tween [S]=Split [FP]=FastProxy [L]=Linear [HP]=HeadProxy
done - epoch 1 - lr 20000 - 2026-08-26 23:28:27 - 0.0.0.0:8080
This epoch 3944 / 3944 cells. Recorded 3944 results. Learning rate 20000.
Score 0 usually means the cell finished before a Lucy pulse (Acc never sampled). Score is live-fit: Throughput x Availability x Acc.
SGD that blocks serve dies on Availability. SoftAcc is serve-confidence only.
dayroute - dense x mode x dtype x funny-LR

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	dense|uint6|Step[T][S]|lr=100m	245.32	51.2	17.9	5399.3	25.4
throughput	dense|float32|[T]Alt|lr=20k	3375.26	0.0	24.7	64445.1	21.2
availability	dense|fp6|Mesh[T]|lr=10m	1517.30	0.0	24.5	10621.8	58.2
lucy score	dense|uint8|Mesh[T]|lr=20k	4058.43	0.0	24.6	37742.3	43.6
mobile score (trap)	dense|binary|Mesh[T]|lr=20k	3453.95	0.0	24.7	37574.5	37.3
acc/sec	dense|int16|Mesh[T]Chain|lr=1m	294.25	0.9	50.0	7515.0	15.7

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	step_sgd	int8	singlex1	50.00
throughput	[T]Alt	float32	singlex1	64445.13
availability	Mesh[T]	fp6	singlex1	58.23
score	Mesh[T]	uint8	singlex1	4058.43
soft_acc	Step[T][S]	uint6	singlex1	51.25
acc_thru	[T]Alt	float32	singlex1	15899.37
realtime	Mesh[T]	uint8	singlex1	16470.71
adapt	Step[T][S][L]Cache	nf4	singlex1	31.47
keep_learn	Mesh[T]Chain	int16	singlex1	25.00
acc_per_sec	Mesh[T]Chain	int16	singlex1	25.00
consistency	Step[T][S][L]Cache	nf4	singlex1	100.00
stability	sgd	float64	singlex1	100.00
mobile_score	Mesh[T]	binary	singlex1	14603754~
lpd	[T][S]Sparse	binary	singlex1	5.70
mspeed	Mesh[T][S]Sparse	int4	singlex1	1.00
mavail	[T][S]Sparse	binary	singlex1	1.00
mix	[T][S]Sparse	binary	singlex1	0.95
gold_std	[T][S]Sparse	binary	singlex1	0.24

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
Mesh[T]	uint8	none	4058.4	0.0	24.6	43.6	136
[T]Alt	float32	none	3375.3	0.0	24.7	21.2	136
Step[T][S]Sparse	float64	none	2913.4	0.0	23.9	35.2	136
Mesh[T][S]Sparse	float32	none	2887.1	0.0	24.6	32.1	136
[T][S]Sparse	float64	none	2683.2	0.0	24.6	30.2	136
Mesh[T]Alt	float32	none	1688.7	0.0	24.7	19.8	136
Mesh[T][S][FP]	float64	none	1450.0	0.0	24.4	23.6	136
[T][S]	float64	none	1395.2	0.0	24.7	23.7	136
[T][S][HP]	float64	none	1359.2	0.0	24.8	21.9	136
Step[T][S]	float64	none	1355.6	0.0	24.6	24.8	136
Step[T][S][HP]	bfloat16	none	1347.3	0.0	24.5	29.7	136

Step[T][S][FP]	float64	none	1347.0	0.0	24.4	22.9	136
[T][S][HP]Async	float64	none	1341.2	0.0	24.5	23.0	136
[T][S][FP]	float64	none	1332.5	0.0	24.8	22.4	136
Mesh[T][S]	complex128	none	1322.9	0.0	24.5	38.0	136
Step[T][S][HP]Async	float64	none	1308.6	0.0	24.7	22.5	136
[T][S][L]Cache	ternary	none	1300.4	0.0	24.6	34.1	136
Step[T][S][L]	float64	none	1267.1	0.0	24.4	27.9	136
Step[T][S][L]Cache	int	none	1234.4	0.0	24.4	32.3	136
[T][S][L]	float64	none	1074.4	0.0	24.6	20.3	136
step_sgd	float64	none	843.6	0.0	24.6	17.2	136
tween	float64	none	830.4	0.0	25.5	27.9	136
Mesh[T]Chain	int64	none	758.5	0.0	24.7	23.9	136
step_tween	float64	none	727.7	0.0	24.5	21.8	136
step_tween_chain	float64	none	685.6	0.0	24.5	15.5	136
MeshBP	float32	none	674.5	0.0	24.5	16.1	136
tween_chain	float64	none	598.6	0.0	25.2	20.3	136
sgd	bfloat16	none	568.4	0.0	24.6	20.5	136
Step[T]Alt	bfloat16	none	281.8	0.0	23.0	19.0	136

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
Mesh[T]	uint8	4058.4	0.0	24.6
[T]Alt	float32	3375.3	0.0	24.7
Step[T][S]Sparse	float64	2913.4	0.0	23.9
Mesh[T][S]Sparse	float32	2887.1	0.0	24.6
[T][S]Sparse	float64	2683.2	0.0	24.6
Mesh[T]Alt	float32	1688.7	0.0	24.7
Mesh[T][S][FP]	float64	1450.0	0.0	24.4
[T][S]	float64	1395.2	0.0	24.7
[T][S][HP]	float64	1359.2	0.0	24.8
Step[T][S]	float64	1355.6	0.0	24.6
Step[T][S][HP]	bfloat16	1347.3	0.0	24.5
Step[T][S][FP]	float64	1347.0	0.0	24.4
[T][S][HP]Async	float64	1341.2	0.0	24.5
[T][S][FP]	float64	1332.5	0.0	24.8
Mesh[T][S]	complex128	1322.9	0.0	24.5
Step[T][S][HP]Async	float64	1308.6	0.0	24.7
[T][S][L]Cache	ternary	1300.4	0.0	24.6
Step[T][S][L]	float64	1267.1	0.0	24.4
Step[T][S][L]Cache	int	1234.4	0.0	24.4
[T][S][L]	float64	1074.4	0.0	24.6
step_sgd	float64	843.6	0.0	24.6
tween	float64	830.4	0.0	25.5
Mesh[T]Chain	int64	758.5	0.0	24.7
step_tween	float64	727.7	0.0	24.5
step_tween_chain	float64	685.6	0.0	24.5
MeshBP	float32	674.5	0.0	24.5
tween_chain	float64	598.6	0.0	25.2
sgd	bfloat16	568.4	0.0	24.6
Step[T]Alt	bfloat16	281.8	0.0	23.0

Best mode per dtype

DType	Winner mode	Score	Soft	Acc
uint8	Mesh[T]	4058.4	0.0	24.6
float32	Mesh[T]	3849.5	0.0	24.8
float64	Mesh[T]	3594.5	0.0	24.6
binary	Mesh[T]	3454.0	0.0	24.7
fp4	Mesh[T]	3400.5	0.0	24.6
int16	Mesh[T]	3385.3	0.0	24.6
int8	Mesh[T]	3354.8	0.0	24.7
int2	Mesh[T]	3350.3	0.0	24.8
uint4	Mesh[T]	3324.3	0.0	24.8
bfloat16	Mesh[T]	3290.6	0.0	24.8
complex128	Mesh[T]	3284.7	0.0	24.7
ternary	Mesh[T]	3279.9	0.0	24.7
uint32	Mesh[T]	3244.6	0.0	24.7
uint16	Mesh[T]	3225.6	0.0	24.7
int32	Mesh[T]	3220.5	0.0	24.7
int64	Mesh[T]	3135.3	0.0	24.6
uint64	Mesh[T]	3094.7	0.0	24.7
uint2	Mesh[T]	3091.5	0.0	24.7
uint	Mesh[T]	3056.9	0.0	24.7
int	Mesh[T]	2926.8	0.0	24.6
uintptr	Mesh[T]	2911.8	0.0	24.7
complex64	Mesh[T]	2885.4	0.0	24.6
fp8e5m2	Mesh[T]	2792.2	0.0	24.8
int4	Mesh[T]	2777.7	0.0	24.7
float16	Mesh[T]	2758.4	0.0	24.7
int3	Mesh[T]	2485.7	0.0	24.7
uint3	Mesh[T]	2263.6	0.0	24.5
int5	Mesh[T]	2115.2	0.0	24.8
fp6	Mesh[T]	2075.0	0.0	24.8
uint5	Mesh[T]	2073.7	0.0	24.7
int6	Mesh[T]	1926.5	0.0	24.6
uint6	Mesh[T]	1894.6	0.0	24.5
fp8e4m3	[T][S]Sparse	1829.4	0.0	24.8
nf4	Mesh[T][S]Sparse	1135.8	3.6	24.0

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|uint8|Mesh[T]|lr=20k	4058.4	0.0	24.6	37742.3	43.6
2	dense|float32|Mesh[T]|lr=20k	3849.5	0.0	24.8	59182.1	26.2
3	dense|float32|Mesh[T]|lr=1m	3750.2	0.0	24.7	55872.0	27.1
4	dense|float64|Mesh[T]|lr=20k	3594.5	0.0	24.6	54253.5	27.0
5	dense|binary|Mesh[T]|lr=20k	3454.0	0.0	24.7	37574.5	37.3
6	dense|float64|Mesh[T]|lr=100m	3401.5	0.0	24.6	43588.8	31.7
7	dense|fp4|Mesh[T]|lr=20k	3400.5	0.0	24.6	38483.2	36.0
8	dense|int16|Mesh[T]|lr=20k	3385.3	0.0	24.6	38181.2	36.0
9	dense|float32|[T]Alt|lr=20k	3375.3	0.0	24.7	64445.1	21.2
10	dense|float64|Mesh[T]|lr=10m	3358.6	0.0	24.6	44190.4	30.9
11	dense|int8|Mesh[T]|lr=20k	3354.8	0.0	24.7	39886.4	34.0
12	dense|int2|Mesh[T]|lr=1m	3350.3	0.0	24.8	33282.8	40.5
13	dense|uint4|Mesh[T]|lr=1m	3324.3	0.0	24.8	32541.2	41.3
14	dense|bfloat16|Mesh[T]|lr=1m	3290.6	0.0	24.8	33375.7	39.8

15	dense|complex128|Mesh[T]|lr=20k	3284.7	0.0	24.7	32217.3	41.4
16	dense|ternary|Mesh[T]|lr=20k	3279.9	0.0	24.7	36591.6	36.3
17	dense|uint4|Mesh[T]|lr=20k	3263.1	0.0	24.7	35902.8	36.8
18	dense|float32|Mesh[T]|lr=10m	3252.5	0.0	24.8	46776.8	28.1
19	dense|uint32|Mesh[T]|lr=1m	3244.6	0.0	24.7	33135.7	39.7
20	dense|uint16|Mesh[T]|lr=20k	3225.6	0.0	24.7	36785.1	35.5

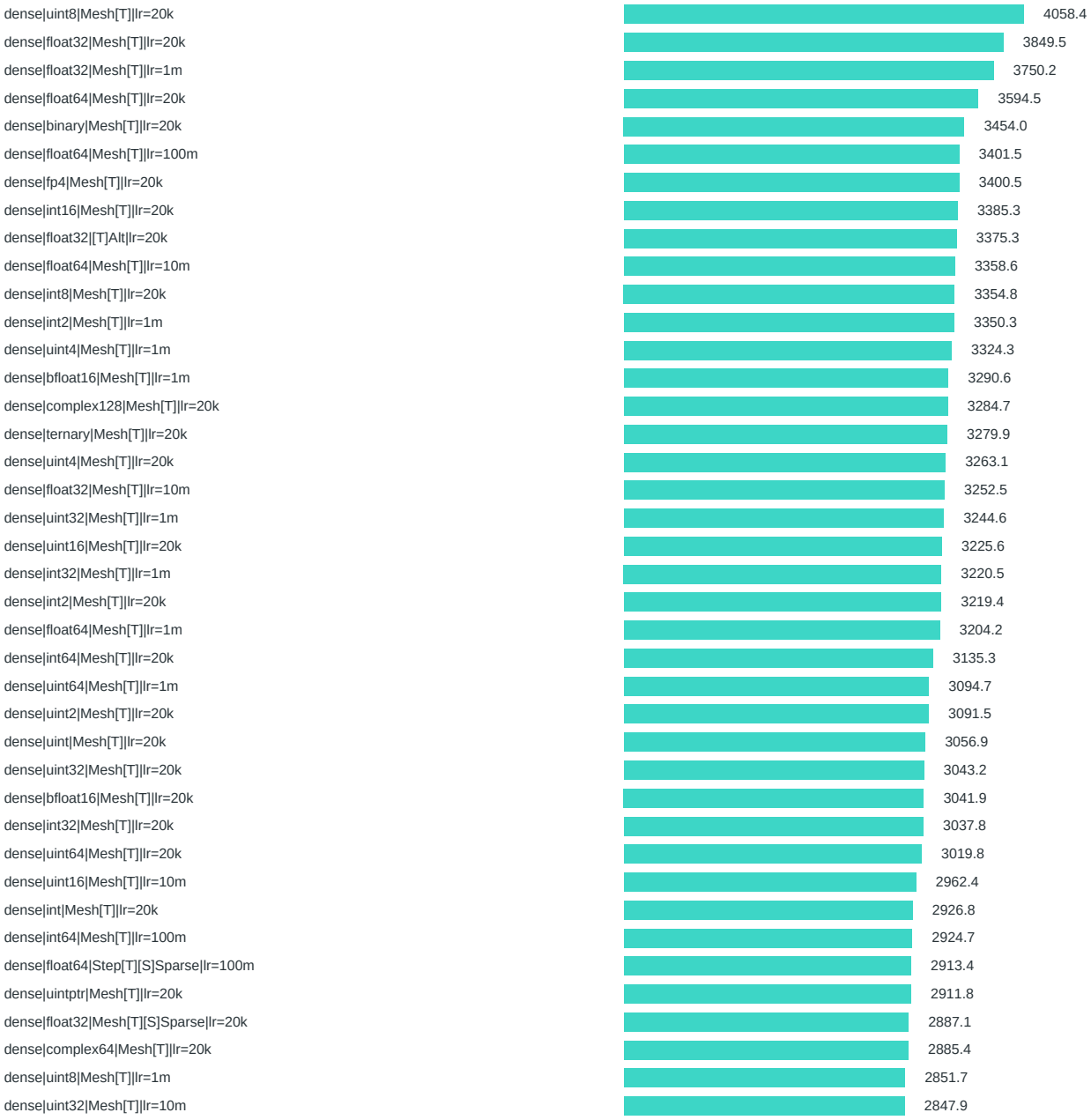
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|binary|Mesh[T]|lr=20k	3454.0	0.0	24.7	37574.5	37.3
2	dense|float32|Mesh[T][S]Sparse|lr=20k	2887.1	0.0	24.6	36552.0	32.1
3	dense|uint32|Mesh[T]|lr=10m	2847.9	0.0	24.7	25107.8	45.9
4	dense|complex128|Mesh[T]|lr=20k	3284.7	0.0	24.7	32217.3	41.4
5	dense|int64|Mesh[T]|lr=20k	3135.3	0.0	24.6	38933.0	32.7
6	dense|uint8|Mesh[T]|lr=20k	4058.4	0.0	24.6	37742.3	43.6
7	dense|uint64|Mesh[T]|lr=20k	3019.8	0.0	24.7	36393.4	33.6
8	dense|uint8|Mesh[T]|lr=1m	2851.7	0.0	24.6	34514.2	33.5
9	dense|uint|Mesh[T]|lr=20k	3056.9	0.0	24.7	32391.5	38.2
10	dense|int32|Mesh[T]|lr=20k	3037.8	0.0	24.7	39066.2	31.5
11	dense|uint4|Mesh[T]|lr=1m	3324.3	0.0	24.8	32541.2	41.3
12	dense|float32|Mesh[T]|lr=20k	3849.5	0.0	24.8	59182.1	26.2
13	dense|uintptr|Mesh[T]|lr=20k	2911.8	0.0	24.7	31808.7	37.0
14	dense|float64|Mesh[T]|lr=10m	3358.6	0.0	24.6	44190.4	30.9
15	dense|bfloat16|Mesh[T]|lr=20k	3041.9	0.0	24.9	36669.2	33.4
16	dense|uint2|Mesh[T]|lr=20k	3091.5	0.0	24.7	34648.8	36.2
17	dense|float64|Step[T][S]Sparse|lr=100m	2913.4	0.0	23.9	34661.7	35.2
18	dense|uint16|Mesh[T]|lr=20k	3225.6	0.0	24.7	36785.1	35.5
19	dense|float64|Mesh[T]|lr=1m	3204.2	0.0	24.7	49072.8	26.4
20	dense|int32|Mesh[T]|lr=1m	3220.5	0.0	24.7	32629.7	39.9

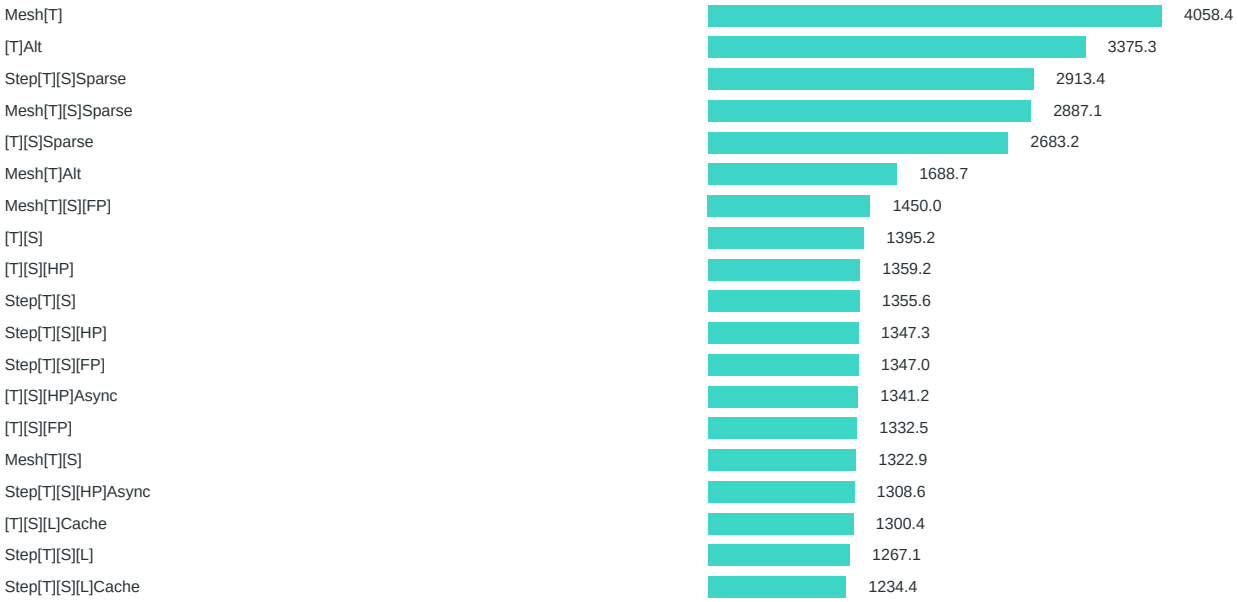
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	dense|int64|Mesh[T]|lr=100m	2924.7	0.0	25.3	25627.4	45.1
2	dense|uint16|Mesh[T]|lr=10m	2962.4	0.0	24.9	23821.3	49.9
3	dense|bfloat16|Mesh[T]|lr=20k	3041.9	0.0	24.9	36669.2	33.4
4	dense|int2|Mesh[T]|lr=1m	3350.3	0.0	24.8	33282.8	40.5
5	dense|bfloat16|Mesh[T]|lr=1m	3290.6	0.0	24.8	33375.7	39.8
6	dense|float32|Mesh[T]|lr=20k	3849.5	0.0	24.8	59182.1	26.2
7	dense|float32|Mesh[T]|lr=10m	3252.5	0.0	24.8	46776.8	28.1
8	dense|uint32|Mesh[T]|lr=20k	3043.2	0.0	24.8	36967.4	33.2
9	dense|uint4|Mesh[T]|lr=1m	3324.3	0.0	24.8	32541.2	41.3
10	dense|int2|Mesh[T]|lr=20k	3219.4	0.0	24.7	37091.2	35.1
11	dense|int32|Mesh[T]|lr=1m	3220.5	0.0	24.7	32629.7	39.9
12	dense|int8|Mesh[T]|lr=20k	3354.8	0.0	24.7	39886.4	34.0
13	dense|uint|Mesh[T]|lr=20k	3056.9	0.0	24.7	32391.5	38.2
14	dense|float32|Mesh[T]|lr=1m	3750.2	0.0	24.7	55872.0	27.1
15	dense|uintptr|Mesh[T]|lr=20k	2911.8	0.0	24.7	31808.7	37.0
16	dense|uint32|Mesh[T]|lr=10m	2847.9	0.0	24.7	25107.8	45.9
17	dense|uint16|Mesh[T]|lr=20k	3225.6	0.0	24.7	36785.1	35.5
18	dense|ternary|Mesh[T]|lr=20k	3279.9	0.0	24.7	36591.6	36.3
19	dense|int32|Mesh[T]|lr=20k	3037.8	0.0	24.7	39066.2	31.5
20	dense|uint64|Mesh[T]|lr=20k	3019.8	0.0	24.7	36393.4	33.6

Top scores



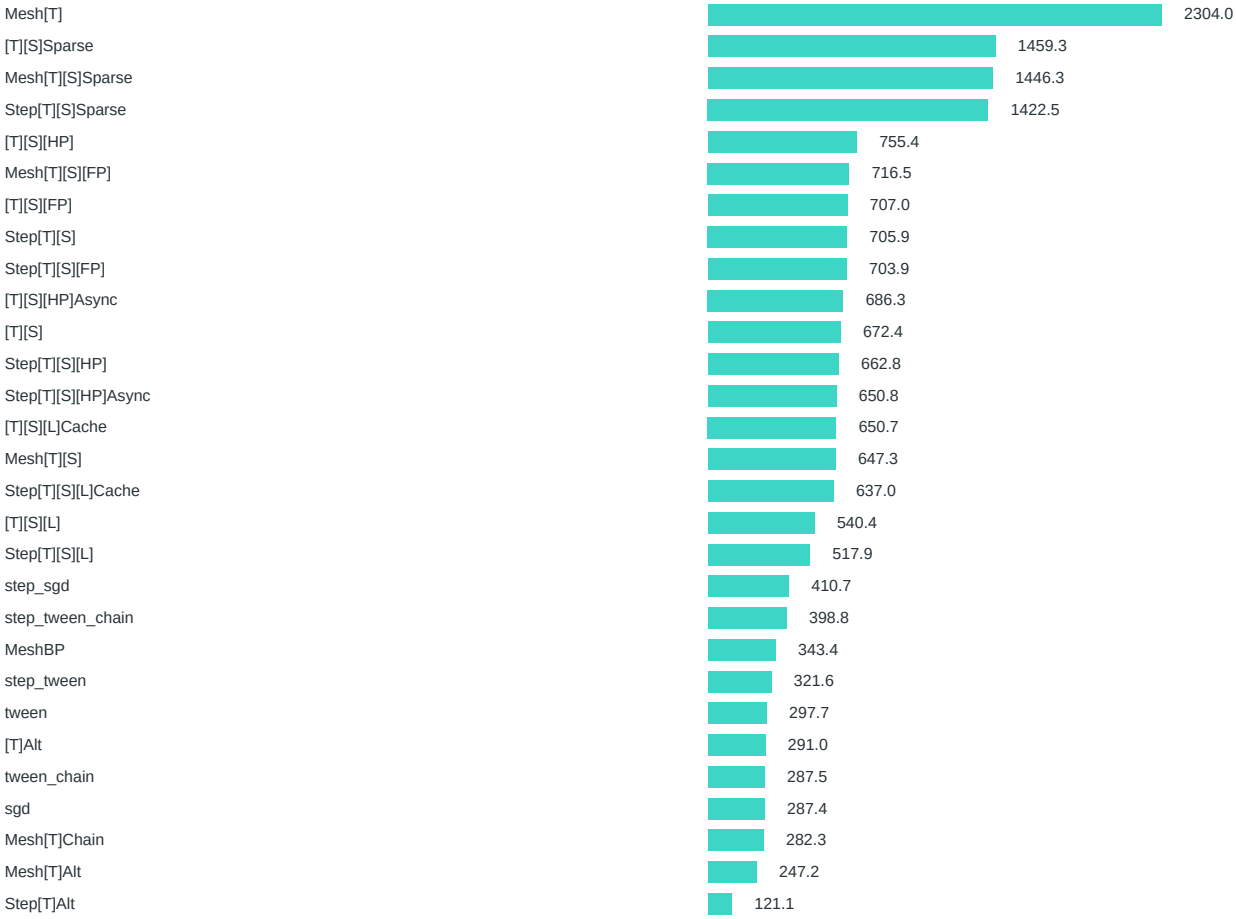
Best settings per mode



Best settings per mode



Mean Score by train mode



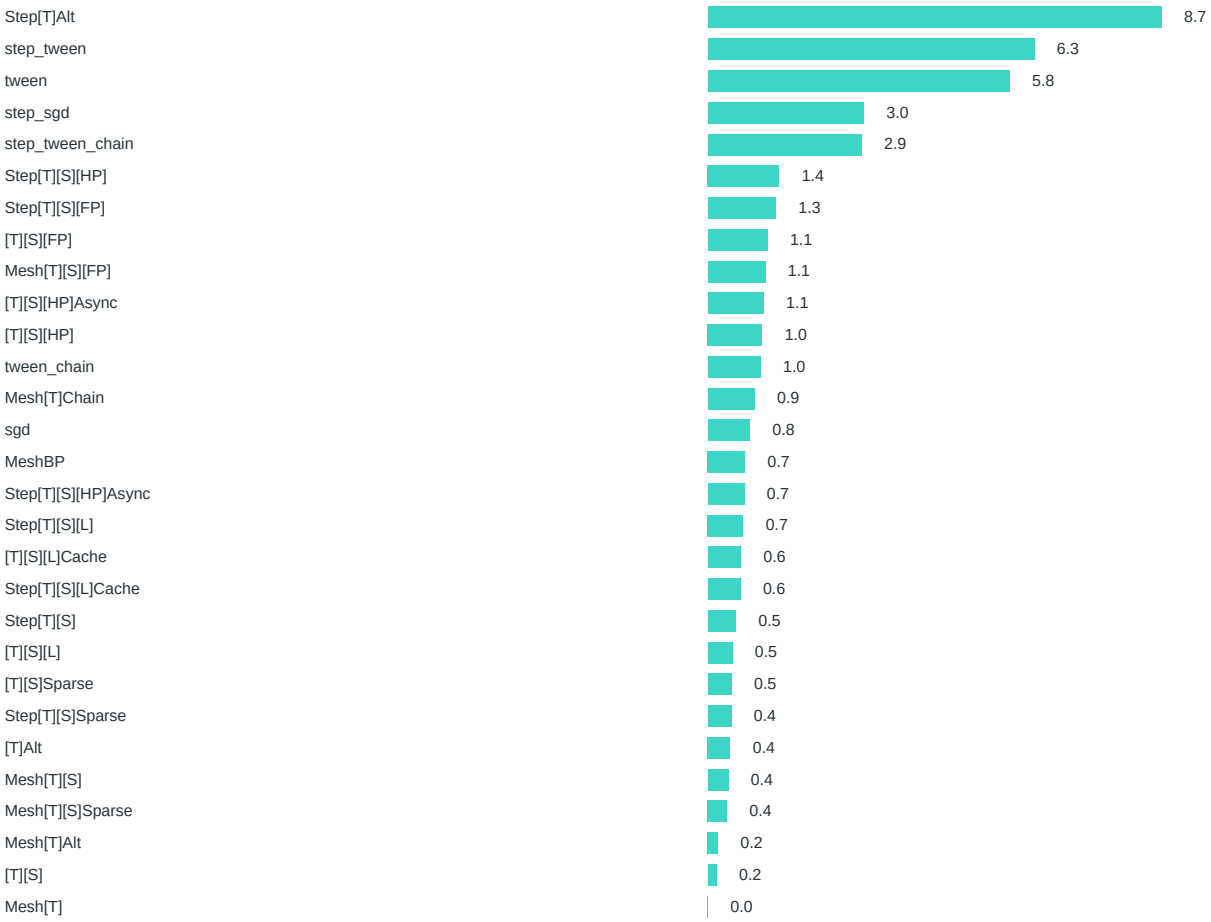
Mean hard Acc by train mode



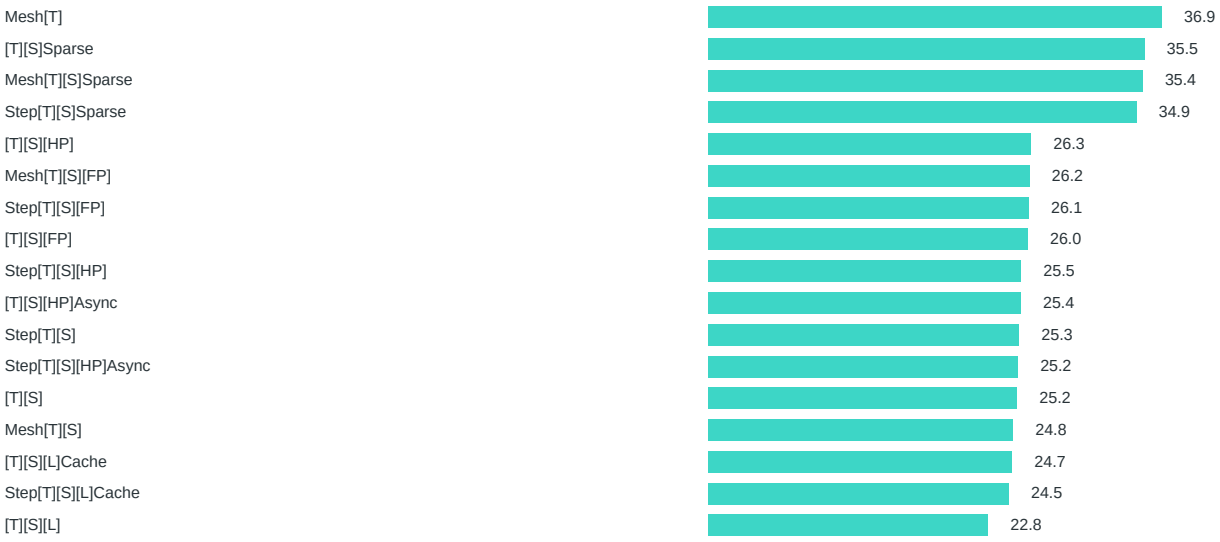
Mean hard Acc by train mode



Mean SoftAcc by train mode



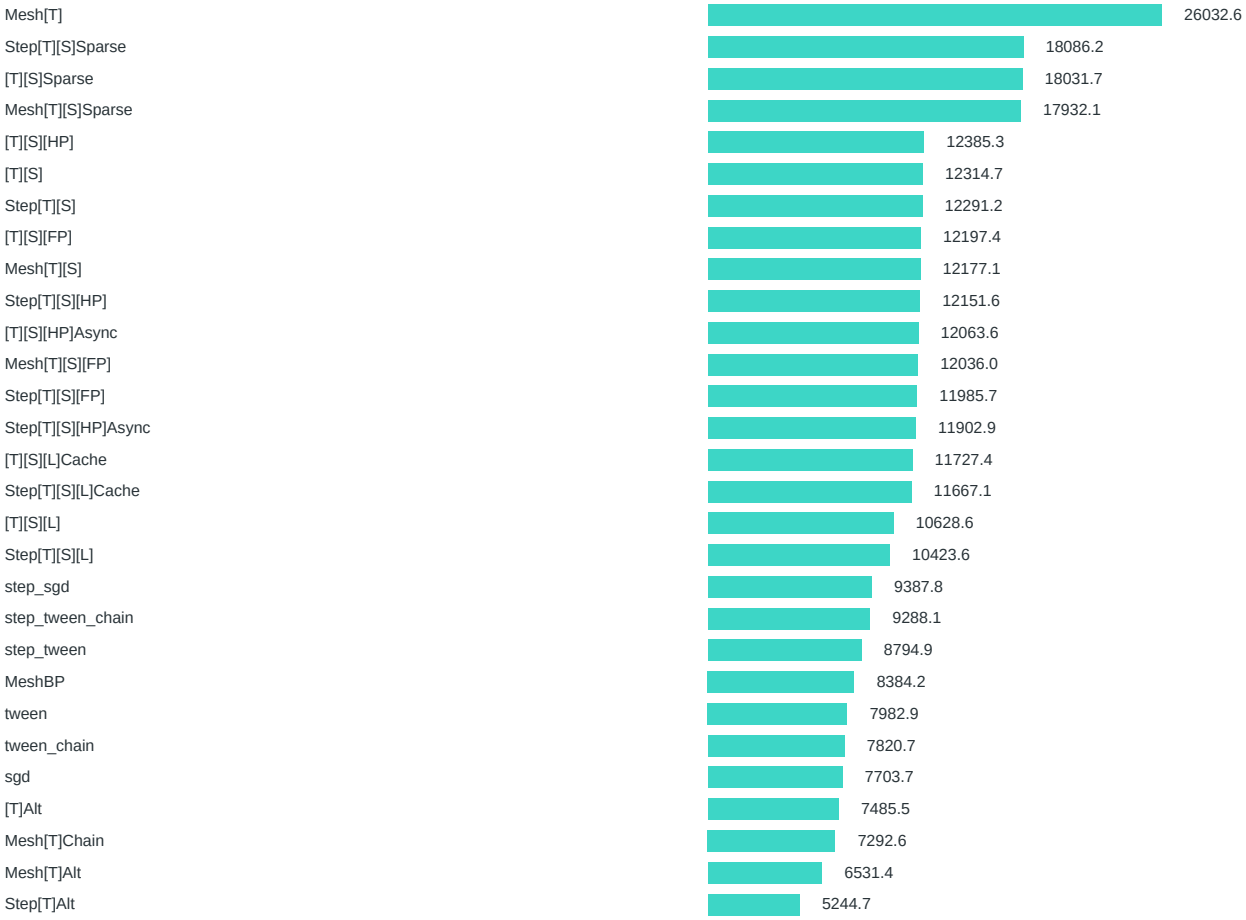
Mean Availability by train mode



Mean Availability by train mode



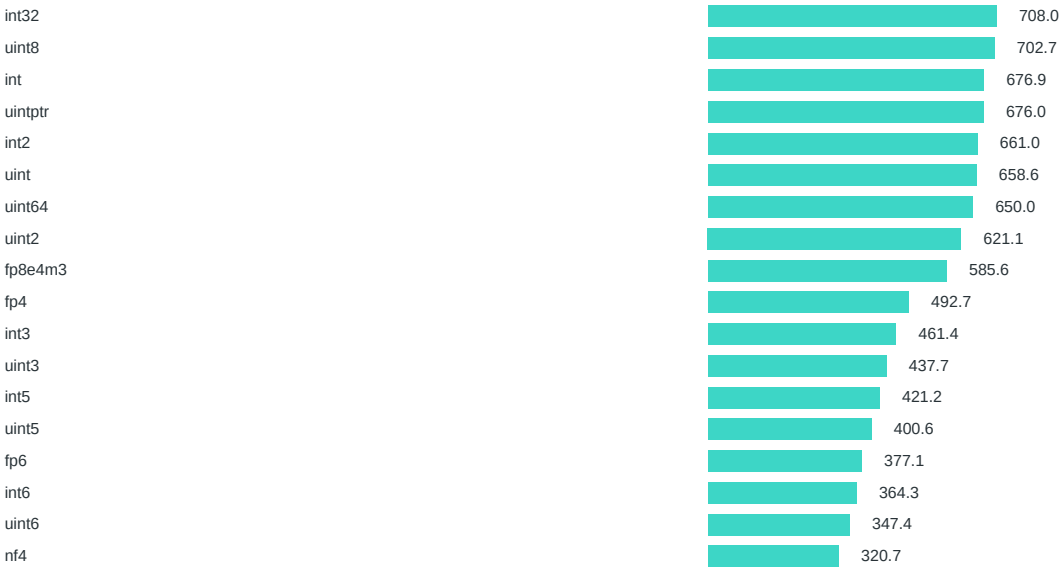
Mean Throughput by train mode



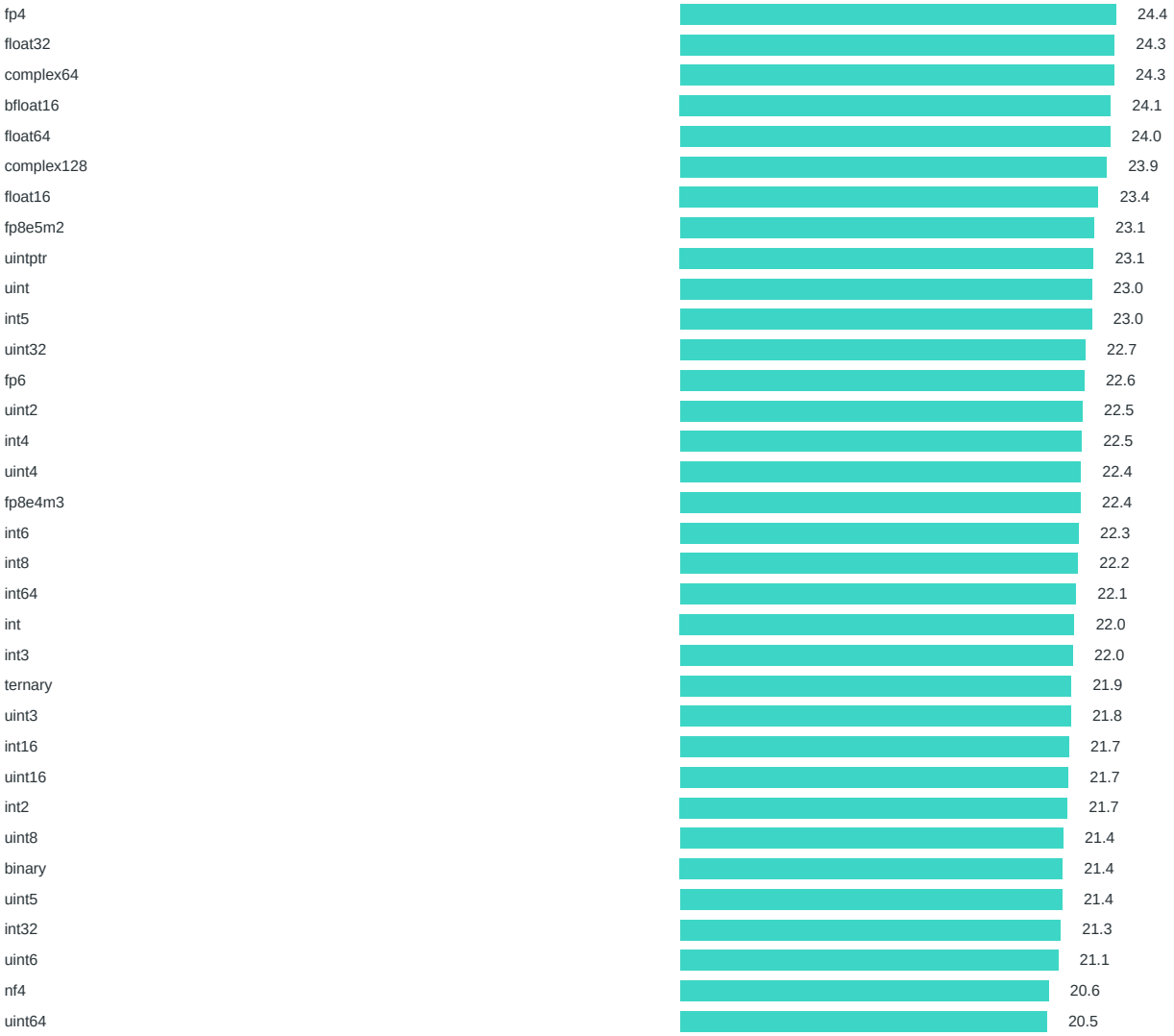
Mean Score by dtype



Mean Score by dtype



Mean hard Acc by dtype



Mean Score by arch



Honesty - mean Score, every mode x dtype (cols 1-12)

Honesty - mean Score, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	523	263	573	503	392	606	537	317	208	333	459	416
Mesh[T]	2622	1763	2405	2540	2391	3315	3390	2481	1496	1384	2572	2324
Mesh[T]Alt	703	135	601	711	787	1430	1150	66	38	82	723	159
Mesh[T]Chain	492	221	311	425	493	498	528	523	96	197	537	540
Mesh[T][S]	938	608	962	870	909	934	1009	340	680	529	882	599
Mesh[T][S][FP]	911	639	879	896	933	996	1146	423	376	592	948	578
Mesh[T][S]Sparse	1780	1830	1821	1890	1934	2283	2627	969	852	1467	1904	999
Step[T]Alt	169	142	152	145	73	180	157	94	62	146	69	146
Step[T][S]	949	895	912	757	833	678	1122	355	413	554	956	812
Step[T][S][FP]	892	350	949	836	886	548	1111	488	380	583	921	873
Step[T][S][HP]	1009	841	946	923	982	540	1019	460	362	610	863	829
Step[T][S][HP]Async	904	695	777	939	931	642	1042	440	274	759	975	774
Step[T][S][L]	646	713	643	636	668	463	917	410	300	538	641	581
Step[T][S][L]Cache	756	836	635	726	687	516	794	424	387	731	672	819
Step[T][S]Sparse	1881	1649	1767	1798	1805	1421	2517	964	637	1033	1684	891
[T]Alt	763	173	759	729	742	2312	1272	79	68	136	687	107
[T][S]	1071	840	868	973	1011	542	1127	307	504	675	861	641
[T][S][FP]	943	781	879	920	868	637	1138	455	427	715	901	639
[T][S][HP]	1004	781	935	1000	950	609	1147	454	515	919	1039	863
[T][S][HP]Async	944	709	855	929	914	585	1097	447	475	663	993	811
[T][S][L]	778	681	651	701	751	482	864	413	257	539	711	666
[T][S][L]Cache	714	841	770	564	635	512	884	471	360	642	660	904
[T][S]Sparse	1808	2398	1641	1710	1886	1544	2472	1166	712	1252	1903	1196
sgd	364	341	362	382	351	307	399	254	147	374	393	409
step_sgd	510	428	540	466	492	376	699	357	235	420	517	504
step_tween	500	444	353	367	310	408	460	269	170	310	158	432
step_tween_chain	462	394	509	489	529	569	577	343	223	280	526	328
tween	379	228	362	437	257	414	602	286	202	233	214	459
tween_chain	387	256	371	358	324	314	493	232	83	288	392	329

Honesty - mean Score, every mode x dtype (cols 13-24)

Honesty - mean Score, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	190	288	289	327	341	171	254	460	231	225	306	243
Mesh[T]	2786	2798	1878	2746	2295	1630	1433	2635	2674	470	2627	2396
Mesh[T]Alt	112	47	65	85	67	45	77	175	98	57	88	76
Mesh[T]Chain	395	255	87	194	211	145	143	558	278	103	256	176
Mesh[T][S]	868	746	434	672	678	613	421	783	516	270	796	527
Mesh[T][S][FP]	736	651	339	645	1147	403	563	862	692	278	961	747
Mesh[T][S]Sparse	1692	1451	888	1753	2704	1014	983	1843	1673	726	1998	1421
Step[T]Alt	142	67	59	158	137	80	55	156	118	63	236	150
Step[T][S]	730	672	478	458	797	477	355	890	876	310	469	710
Step[T][S][FP]	737	690	493	890	861	407	326	909	1035	328	679	739
Step[T][S][HP]	819	668	451	746	852	432	418	564	731	269	816	684
Step[T][S][HP]Async	693	713	456	811	884	384	425	844	695	388	675	619
Step[T][S][L]	643	357	342	617	596	338	308	739	655	290	575	541
Step[T][S][L]Cache	718	680	450	825	762	441	319	740	779	396	744	616
Step[T][S]Sparse	1558	1506	1071	1548	1755	1015	540	1862	1621	882	1865	1496
[T]Alt	116	113	69	102	94	57	63	143	150	79	129	131
[T][S]	789	558	639	731	758	348	212	1012	591	363	713	776
[T][S][FP]	536	729	521	726	967	548	388	606	716	252	602	517
[T][S][HP]	957	711	745	761	809	492	496	799	856	364	1078	667
[T][S][HP]Async	674	750	348	811	714	366	429	716	794	465	604	897
[T][S][L]	573	520	241	609	705	326	249	601	739	155	693	537
[T][S][L]Cache	642	660	481	720	796	413	319	985	895	399	780	711
[T][S]Sparse	1566	1551	1158	1541	2005	833	813	1767	1479	1242	1633	1661
sgd	204	229	184	241	228	155	148	430	323	177	331	330
step_sgd	392	355	328	351	525	303	173	551	799	142	347	465
step_tween	415	246	216	406	404	188	159	439	444	132	157	261
step_tween_chain	485	573	331	345	622	227	220	514	392	159	296	392
tween	357	205	174	379	293	203	121	356	340	131	514	311
tween_chain	296	380	165	335	254	160	154	333	323	184	249	302

Honesty - mean Score, every mode x dtype (cols 25-34)

Honesty - mean Score, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	390	408	246	351	406	222	122	323	392	360
Mesh[T]	2693	2324	1719	2936	2660	1654	1462	2593	2731	2515
Mesh[T]Alt	19	143	40	130	119	33	32	143	107	60
Mesh[T]Chain	280	193	115	279	261	132	122	220	253	80
Mesh[T][S]	600	736	466	755	789	341	409	368	310	650
Mesh[T][S][FP]	929	643	475	759	774	428	332	858	1083	741
Mesh[T][S]Sparse	1456	1098	839	1124	1021	835	681	995	1295	1329
Step[T]Alt	113	91	71	169	133	43	64	137	196	144
Step[T][S]	732	805	596	941	1149	486	424	591	1067	753
Step[T][S][FP]	1020	877	377	830	580	452	454	689	1040	702
Step[T][S][HP]	665	454	387	531	880	398	365	573	769	679
Step[T][S][HP]Async	1002	585	389	727	367	420	313	375	732	478
Step[T][S][L]	422	564	330	417	486	213	218	547	677	576
Step[T][S][L]Cache	745	686	354	840	653	392	346	759	750	681
Step[T][S]Sparse	1455	1360	1312	1386	1754	967	666	1573	1172	1955
[T]Alt	143	61	77	136	43	42	53	93	89	87
[T][S]	769	423	499	778	691	515	482	553	416	822
[T][S][FP]	882	905	844	753	696	577	386	762	775	1048
[T][S][HP]	572	502	494	1211	797	448	337	836	888	652
[T][S][HP]Async	1000	556	254	722	994	434	324	788	573	702
[T][S][L]	467	475	267	644	649	327	300	619	664	523
[T][S][L]Cache	626	763	440	766	630	418	428	722	858	714
[T][S]Sparse	1780	1346	854	1552	1567	741	708	1489	1366	1279
sgd	326	308	163	360	325	198	163	282	309	274
step_sgd	433	488	256	452	347	234	209	475	459	337
step_tween	404	285	203	386	333	232	185	401	506	352
step_tween_chain	376	401	263	365	785	228	155	424	294	482
tween	274	202	171	398	410	145	157	358	275	275
tween_chain	359	330	195	359	334	63	177	306	336	355

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	25	15	25	24	25	25	24	24	21	22	24	23
Mesh[T]	25	24	25	25	25	25	25	24	24	25	25	25
Mesh[T]Alt	24	23	24	24	24	25	25	24	12	24	25	30
Mesh[T]Chain	25	21	19	25	24	25	24	24	16	22	25	25
Mesh[T][S]	24	19	25	24	24	25	25	24	32	18	25	19
Mesh[T][S][FP]	24	18	25	25	25	24	25	24	22	22	25	16
Mesh[T][S]Sparse	24	24	24	25	25	24	25	24	29	26	25	17
Step[T]Alt	16	17	18	18	10	23	19	24	21	22	11	22
Step[T][S]	24	25	25	25	24	24	24	24	22	17	25	25
Step[T][S][FP]	24	10	25	24	25	24	24	25	22	20	25	23
Step[T][S][HP]	24	21	24	24	25	24	24	25	23	20	24	22
Step[T][S][HP]Async	24	21	24	25	24	25	25	24	16	24	25	21
Step[T][S][L]	25	25	25	25	25	25	25	25	24	23	25	24
Step[T][S][L]Cache	25	22	25	24	24	24	25	25	22	23	25	24
Step[T][S]Sparse	25	24	24	24	25	24	24	25	23	17	24	13
[T]Alt	24	28	25	25	25	25	25	24	21	27	25	21
[T][S]	24	23	25	24	24	25	25	23	25	25	25	18
[T][S][FP]	25	21	24	25	25	25	24	25	22	24	25	18
[T][S][HP]	25	23	24	25	24	25	25	25	24	29	25	23
[T][S][HP]Async	24	20	24	24	24	24	25	24	28	23	24	23
[T][S][L]	24	22	25	25	24	25	24	24	23	23	24	24
[T][S][L]Cache	24	23	25	25	25	25	25	24	22	22	24	25
[T][S]Sparse	24	29	24	25	24	24	25	24	22	20	24	17
sgd	25	23	24	24	24	24	24	25	22	27	25	26
step_sgd	24	23	25	24	24	24	25	25	23	23	25	24
step_tween	23	23	19	21	13	23	19	24	25	20	11	22
step_tween_chain	25	19	25	25	24	25	24	25	26	18	24	17
tween	23	17	22	26	19	22	23	25	28	20	13	28
tween_chain	25	17	25	25	25	24	25	24	14	23	24	23

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	12	18	23	16	19	20	24	22	16	26	17	17
Mesh[T]	24	25	25	24	24	25	25	25	24	24	25	25
Mesh[T]Alt	20	12	18	15	12	18	29	24	18	21	21	20
Mesh[T]Chain	36	22	14	21	18	20	23	24	23	19	23	21
Mesh[T][S]	28	25	19	20	18	30	22	23	16	18	23	19
Mesh[T][S][FP]	21	21	13	18	29	24	27	23	19	17	30	23
Mesh[T][S]Sparse	21	23	21	23	36	25	29	23	24	19	29	23
Step[T]Alt	22	21	20	22	20	21	18	23	17	22	29	23
Step[T][S]	22	22	20	15	23	22	20	23	24	19	14	23
Step[T][S][FP]	24	22	23	24	23	22	18	23	27	18	20	25
Step[T][S][HP]	23	23	21	23	24	30	22	16	22	17	22	21
Step[T][S][HP]Async	21	23	23	25	24	21	25	24	23	22	23	22
Step[T][S][L]	23	16	22	25	24	25	21	24	22	20	23	23
Step[T][S][L]Cache	21	22	23	23	24	23	21	24	21	24	18	23
Step[T][S]Sparse	21	23	25	21	22	30	13	22	22	26	26	25
[T]Alt	19	21	22	21	15	22	29	21	27	22	21	30
[T][S]	25	20	29	22	22	15	10	25	17	23	21	26
[T][S][FP]	16	21	24	21	29	25	22	15	18	16	18	18
[T][S][HP]	25	22	31	21	23	24	31	18	23	20	30	23
[T][S][HP]Async	20	22	17	24	21	22	29	17	24	25	17	27
[T][S][L]	21	23	16	23	22	23	23	22	24	13	23	23
[T][S][L]Cache	18	22	25	22	22	23	23	24	23	23	20	24
[T][S]Sparse	23	23	23	22	29	23	22	23	19	31	23	27
sgd	16	16	21	17	15	20	18	24	20	18	23	24
step_sgd	21	20	22	21	24	29	17	24	36	17	20	29
step_tween	22	22	22	23	23	22	23	24	30	20	11	18
step_tween_chain	22	30	23	21	28	20	22	24	22	18	18	23
tween	21	20	28	23	22	28	20	19	20	20	30	20
tween_chain	21	24	23	23	16	19	19	21	23	21	16	24

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	24	28	21	19	25	21	14	20	22	21
Mesh[T]	24	24	25	25	25	25	24	25	24	25
Mesh[T]Alt	5	23	17	29	23	17	16	25	21	19
Mesh[T]Chain	25	21	17	27	24	17	20	21	24	11
Mesh[T][S]	20	29	22	22	23	17	22	14	8	23
Mesh[T][S][FP]	23	25	23	21	22	23	17	23	27	23
Mesh[T][S]Sparse	19	16	22	16	17	22	22	18	18	22
Step[T]Alt	18	21	23	22	24	15	21	21	23	22
Step[T][S]	21	27	24	28	31	23	21	18	29	29
Step[T][S][FP]	30	29	18	23	14	23	26	18	29	27
Step[T][S][HP]	17	17	18	14	25	21	20	15	21	22
Step[T][S][HP]Async	29	21	23	21	13	24	17	12	22	19
Step[T][S][L]	18	22	22	16	23	18	20	23	24	24
Step[T][S][L]Cache	21	22	19	24	20	22	24	24	23	22
Step[T][S]Sparse	23	22	31	20	23	22	21	22	16	32
[T]Alt	29	17	24	24	12	20	18	16	18	23
[T][S]	22	15	22	25	21	21	22	17	16	30
[T][S][FP]	23	29	36	20	21	30	24	21	20	30
[T][S][HP]	16	17	23	31	23	25	20	23	23	24
[T][S][HP]Async	28	21	17	23	30	22	24	23	18	21
[T][S][L]	18	21	17	22	23	24	24	22	23	21
[T][S][L]Cache	18	23	24	23	17	23	23	22	22	24
[T][S]Sparse	27	21	22	22	20	21	20	21	22	22
sgd	24	22	17	24	26	24	18	22	20	24
step_sgd	22	25	21	22	20	22	25	24	20	16
step_tween	21	22	21	24	20	28	21	23	24	21
step_tween_chain	21	23	22	18	36	21	18	23	19	27
tween	20	23	21	26	29	22	28	21	21	21
tween_chain	25	26	23	25	21	8	21	20	24	27

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	0	1	0	0		0	0		1	0	0	0
Mesh[T]	0	0	0	0	0	0	0		0	0	0	0
Mesh[T]Alt	0	0	0	0	0	0	0	0	0	0	0	0
Mesh[T]Chain	0	1	0	0		0	0		0	0	0	
Mesh[T][S]	0	0	0	0	0	0	0	0	7	0	0	0
Mesh[T][S][FP]	0	2	0	0	0		0		2	0	0	0
Mesh[T][S]Sparse	0	1	0	0	0	0	0		0	0	0	0
Step[T]Alt	0	5	0	0	0	0	0		24	0	0	0
Step[T][S]		0	0	0	0	0	0	0	0	0	0	0
Step[T][S][FP]	0	1	0	0		0	0		1	0	0	
Step[T][S][HP]	0	1	0	0	0	0	0		1	0	0	0
Step[T][S][HP]Async	0	2	0	0	0	0	0		0	0	0	0
Step[T][S][L]	0	0	0		0	0	0		0		0	0
Step[T][S][L]Cache	0	0	0	0	0		0		0	0		0
Step[T][S]Sparse	0	0	0	0	0		0		0	0	0	0
[T]Alt	0	0	0	0	0		0	0	0	0	0	0
[T][S]	0	0	0	0	0	0	0	0	0	0	0	0
[T][S][FP]	0	4	0	0	0	0	0		2	0	0	0
[T][S][HP]	0	2	0	0	0	0	0		3	0	0	0
[T][S][HP]Async	0	0	0	0	0	0	0		0	0	0	0
[T][S][L]	0	1	0	0	0	0	0		0	0	0	0
[T][S][L]Cache	0	0	0	0	0	0	0		2	0	0	0
[T][S]Sparse	0	0	0		0	0	0		0	0	0	0
sgd	0	0	0	0	0	0	0		1	0	0	0
step_sgd	0	1	0	0	0	0	0		6	0	0	0
step_tween	0	3	0	0	0	0	0		14	0	0	0
step_tween_chain	0	5	0	0	0	0	0		7	0	0	0
tween	0	3	0	0	0		0		17	0	0	0
tween_chain	0	1	0		0	0	0		1	0	0	0

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	1	2	2	1	1	0	1	0	0	2	0	1
Mesh[T]	0	0	0	0	0	0	0	0	0	0	0	0
Mesh[T]Alt	0	0	0	0	0	0	0		0	6	0	0
Mesh[T]Chain	0	1	4	0	1	1	1	0	1	2	0	0
Mesh[T][S]	0	0	0	0	0	0	0	0	0	6	0	0
Mesh[T][S][FP]	0	3	1	2	0	0	1	0	1	4	2	1
Mesh[T][S]Sparse	1	4	0	1	0	0	0	0	0	4	0	1
Step[T]Alt	12	10	17	9	9	15	22	0	9	17	6	10
Step[T][S]	0	0	0	0	0	0	0	0	0	5	0	0
Step[T][S][FP]	1	3	1	1	1	1	1	0	1	4	4	1
Step[T][S][HP]	1	3	1	3	1	0	2	0	0	4	3	2
Step[T][S][HP]Async	2	4	1	0	4	0	0	0	0	7	0	0
Step[T][S][L]	0	1	3	0	3	0	0	0	0	15	0	0
Step[T][S][L]Cache	0	0	0	0	0	0	0	0	2	19	0	0
Step[T][S]Sparse	1	3	2	1	0	1	0	0	0	4	1	0
[T]Alt	0	0	0	0	0	8	0	0	0	6	0	0
[T][S]	0	0	0	0	0	0	0	0	0	5	0	0
[T][S][FP]	1	2	1	1	1	2	1		1	4	1	0
[T][S][HP]	1	3	2	0	2	1	1	0	1	4	2	1
[T][S][HP]Async	0	4	2	0	3	0	12	0	3	4	2	2
[T][S][L]	0	0	0	0	0	0	0	0	0	14	0	0
[T][S][L]Cache	0	0	0	0	0	0	0		0	19	0	0
[T][S]Sparse	0	4	1	0	1	1	2		0	5	1	0
sgd	3	2	0	0	0	1	3	0	1	2	1	2
step_sgd	2	5	10	4	4	6	6	0	2	5	1	8
step_tween	8	7	10	7	6	17	14	0	7	12	6	6
step_tween_chain	7	2	5	4	8	4	4	0	5	6	3	4
tween	6	5	14	5	6	11	15	0	5	9	4	8
tween_chain	1	2	1	1	1	6	1		1	2	0	1

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	1	1	2	0	0	2	1	1	1	1
Mesh[T]	0	0	0	0	0	0	0	0	0	0
Mesh[T]Alt	0	0	0	0	0	0	0	0	0	0
Mesh[T]Chain	0	1	1	2	1	5	3	1	1	1
Mesh[T][S]	0	0	0	0	0	0	0	0	0	0
Mesh[T][S][FP]	2	1	1	3	2	2	2	0	2	2
Mesh[T][S]Sparse	1	0	0	1	0	0	0	0	0	0
Step[T]Alt	12	11	16	11	9	22	22	10	9	10
Step[T][S]	0	0	0	0	0	0	13	0	0	0
Step[T][S][FP]	2	2	2	1	1	4	2	2	4	1
Step[T][S][HP]	3	1	4	1	2	3	4	1	3	2
Step[T][S][HP]Async	1	0	0	0	0	0	0	0	0	1
Step[T][S][L]	0	0	0	0	0	0	0	0	0	0
Step[T][S][L]Cache	0	0	0	0	0	0	0	0	0	0
Step[T][S]Sparse	1	0	0	1	0	0	0	0	0	0
[T]Alt	0	0	0	0	0	0	0	0	0	0
[T][S]	0	0	0	0	0	0	0	0	0	0
[T][S][FP]	1	1	1	2	2	2	2	1	1	2
[T][S][HP]	1	1	1	1	2	2	1	2	1	1
[T][S][HP]Async	0	0	0	1	0	0	1	3	0	0
[T][S][L]	0	0	0	0	0	0	0	0	0	0
[T][S][L]Cache	0	0	0	0	0	0	0	0	0	0
[T][S]Sparse	0	0	0	1	0	0	1	0	0	1
sgd	2	1	1	1	0	1	2	1	2	1
step_sgd	8	4	2	3	2	7	3	1	4	8
step_tween	6	9	12	6	8	16	17	8	5	9
step_tween_chain	5	5	2	2	1	6	6	5	1	2
tween	7	6	12	7	7	13	15	7	7	8
tween_chain	1	1	2	1	1	2	7	1	0	1

Honesty - mean Avail, every mode x dtype (cols 1-12)

Honesty - mean Avail, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	23	20	26	23	17	16	15	17	21	17	20	22
Mesh[T]	34	33	39	40	34	26	29	32	48	32	39	37
Mesh[T]Alt	20	12	21	26	28	21	19	8	12	8	24	12
Mesh[T]Chain	18	16	18	18	20	13	14	17	19	13	23	23
Mesh[T][S]	26	23	31	27	26	18	20	17	31	23	27	27
Mesh[T][S][FP]	24	27	29	29	27	19	22	19	27	23	28	29
Mesh[T][S]Sparse	35	37	39	38	38	29	33	26	36	32	38	37
Step[T]Alt	15	11	16	14	13	6	9	9	12	14	12	13
Step[T][S]	28	25	29	22	25	12	23	16	27	26	28	26
Step[T][S][FP]	26	29	32	28	25	10	22	21	28	26	29	30
Step[T][S][HP]	28	29	30	29	28	9	20	19	24	26	28	30
Step[T][S][HP]Async	25	25	26	29	27	12	21	20	29	27	30	31
Step[T][S][L]	21	24	24	23	23	9	20	18	26	23	23	22
Step[T][S][L]Cache	24	27	24	27	24	11	19	18	29	27	24	25
Step[T][S]Sparse	36	35	40	39	35	16	32	27	35	35	35	42
[T]Alt	21	13	27	26	24	17	21	9	14	11	22	11
[T][S]	29	26	28	30	29	10	22	15	31	24	26	27
[T][S][FP]	26	27	29	29	25	11	23	19	31	27	28	29
[T][S][HP]	27	24	30	31	26	10	22	19	33	26	30	30
[T][S][HP]Async	27	26	28	29	27	10	22	19	31	25	30	29
[T][S][L]	25	24	25	25	26	9	19	19	23	22	25	25
[T][S][L]Cache	25	26	29	21	22	10	20	19	27	23	25	28
[T][S]Sparse	35	41	38	35	39	17	31	31	38	34	40	37
sgd	17	17	18	18	17	7	12	14	16	19	20	21
step_sgd	19	18	24	19	19	7	17	17	23	20	21	23
step_tween	20	19	21	18	22	8	16	14	17	18	18	23
step_tween_chain	18	22	23	21	21	11	15	16	18	19	22	22
tween	17	16	20	20	18	9	18	16	18	16	16	20
tween_chain	17	16	19	19	15	7	15	13	16	17	20	19

Honesty - mean Avail, every mode x dtype (cols 13-24)

Honesty - mean Avail, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	17	19	22	21	18	18	23	19	16	15	23	19
Mesh[T]	39	36	42	37	31	42	44	36	36	19	38	39
Mesh[T]Alt	11	9	11	12	10	10	12	12	9	9	10	10
Mesh[T]Chain	16	15	16	13	17	17	17	20	17	10	19	15
Mesh[T][S]	24	24	27	26	27	29	27	23	24	18	26	25
Mesh[T][S][FP]	26	26	28	25	26	25	32	25	24	21	25	28
Mesh[T][S]Sparse	36	33	35	37	37	38	38	37	34	30	37	36
Step[T]Alt	10	7	10	12	11	14	12	10	12	9	13	14
Step[T][S]	24	23	28	23	24	29	29	25	26	20	25	26
Step[T][S][FP]	21	25	28	29	25	24	29	28	29	22	28	27
Step[T][S][HP]	26	24	27	24	25	23	30	24	23	20	28	28
Step[T][S][HP]Async	24	26	26	25	26	27	28	24	22	22	23	26
Step[T][S][L]	23	19	23	21	21	24	26	23	24	20	23	24
Step[T][S][L]Cache	24	26	26	27	23	27	24	19	25	20	32	25
Step[T][S]Sparse	36	34	35	35	40	35	38	37	34	27	39	36
[T]Alt	11	11	10	10	12	10	10	12	11	12	12	9
[T][S]	22	22	26	23	25	26	30	26	25	19	25	25
[T][S][FP]	26	29	26	26	24	30	27	27	29	19	27	24
[T][S][HP]	27	26	27	27	24	29	26	28	25	22	29	26
[T][S][HP]Async	25	27	30	24	24	26	26	25	24	20	27	29
[T][S][L]	21	21	23	23	25	25	20	19	25	18	27	24
[T][S][L]Cache	24	23	24	25	26	26	23	26	27	21	29	26
[T][S]Sparse	34	35	40	35	35	37	38	36	36	32	37	38
sgd	15	18	17	17	18	18	21	20	18	15	18	18
step_sgd	17	17	23	16	20	22	19	19	20	13	18	19
step_tween	19	15	20	18	17	17	18	17	16	12	19	19
step_tween_chain	20	19	22	16	20	22	21	19	16	13	18	20
tween	18	15	15	19	15	17	15	20	18	13	21	20
tween_chain	14	19	16	16	19	18	19	16	15	15	19	18

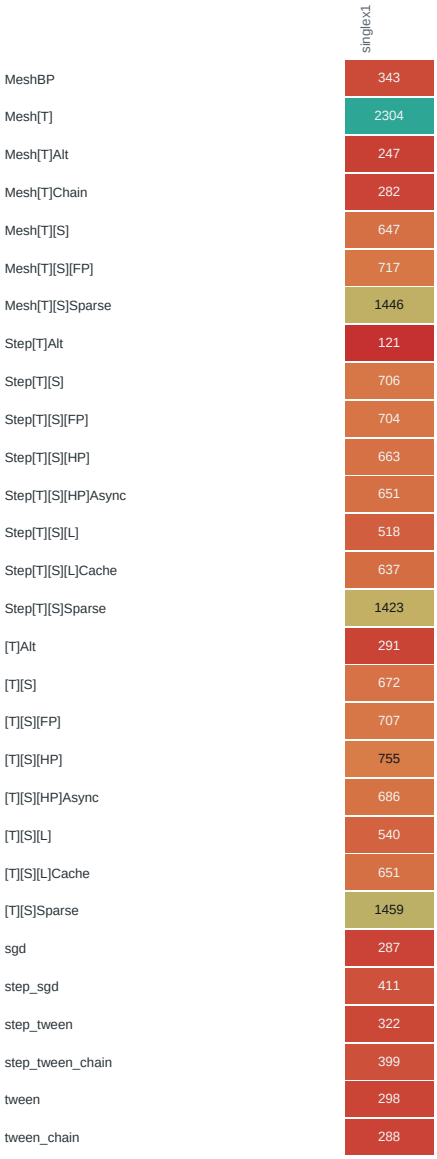
Honesty - mean Avail, every mode x dtype (cols 25-34)

Honesty - mean Avail, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	17	20	22	20	18	22	21	17	19	23
Mesh[T]	40	34	41	41	36	45	44	36	36	40
Mesh[T]Alt	10	12	11	9	11	10	8	10	10	8
Mesh[T]Chain	16	15	15	16	17	21	17	16	16	16
Mesh[T][S]	22	21	27	27	26	27	29	22	27	25
Mesh[T][S][FP]	30	22	28	27	28	27	31	27	28	27
Mesh[T][S]Sparse	37	36	37	33	33	40	35	33	36	37
Step[T]Alt	11	11	12	14	10	11	12	11	15	13
Step[T][S]	25	25	31	24	28	30	29	24	27	26
Step[T][S][FP]	25	24	26	28	28	29	29	27	25	25
Step[T][S][HP]	29	21	25	27	26	28	28	28	26	27
Step[T][S][HP]Async	27	23	24	26	24	29	30	24	25	24
Step[T][S][L]	22	24	26	24	20	22	22	20	24	26
Step[T][S][L]Cache	24	25	26	28	25	28	24	23	23	28
Step[T][S]Sparse	33	34	35	36	38	36	36	35	34	37
[T]Alt	10	9	10	13	9	8	13	11	9	9
[T][S]	25	24	29	25	25	34	31	25	21	26
[T][S][FP]	27	24	28	28	25	29	24	26	28	30
[T][S][HP]	25	24	28	29	25	29	27	27	29	25
[T][S][HP]Async	27	22	22	25	27	30	27	25	24	28
[T][S][L]	23	20	23	24	25	25	25	23	24	26
[T][S][L]Cache	23	27	25	26	28	28	30	24	27	28
[T][S]Sparse	34	35	36	38	39	37	35	37	32	35
sgd	16	18	20	19	16	20	23	16	18	16
step_sgd	18	21	21	21	17	21	18	18	23	22
step_tween	19	18	20	18	17	19	21	17	22	20
step_tween_chain	17	19	21	20	21	21	19	17	16	20
tween	16	12	20	17	18	16	16	19	14	17
tween_chain	15	15	17	17	19	19	21	17	17	19

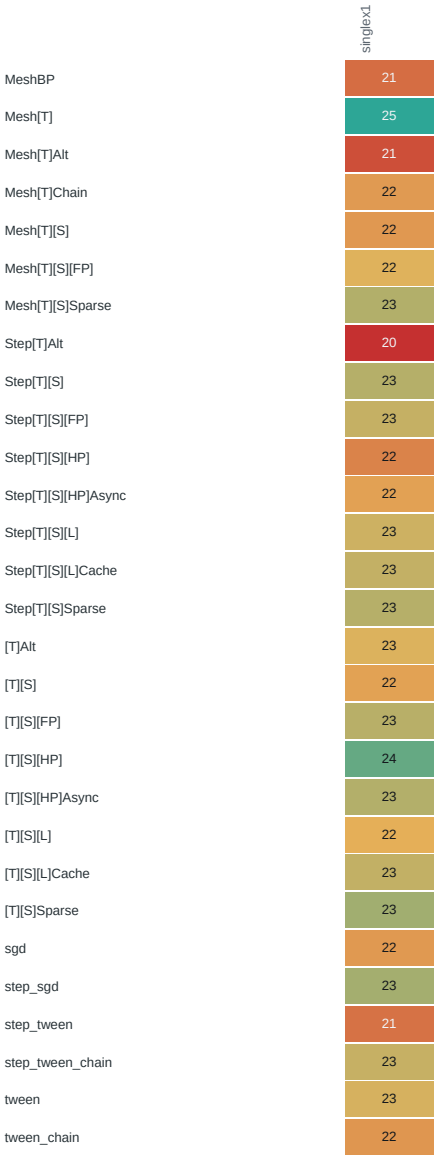
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

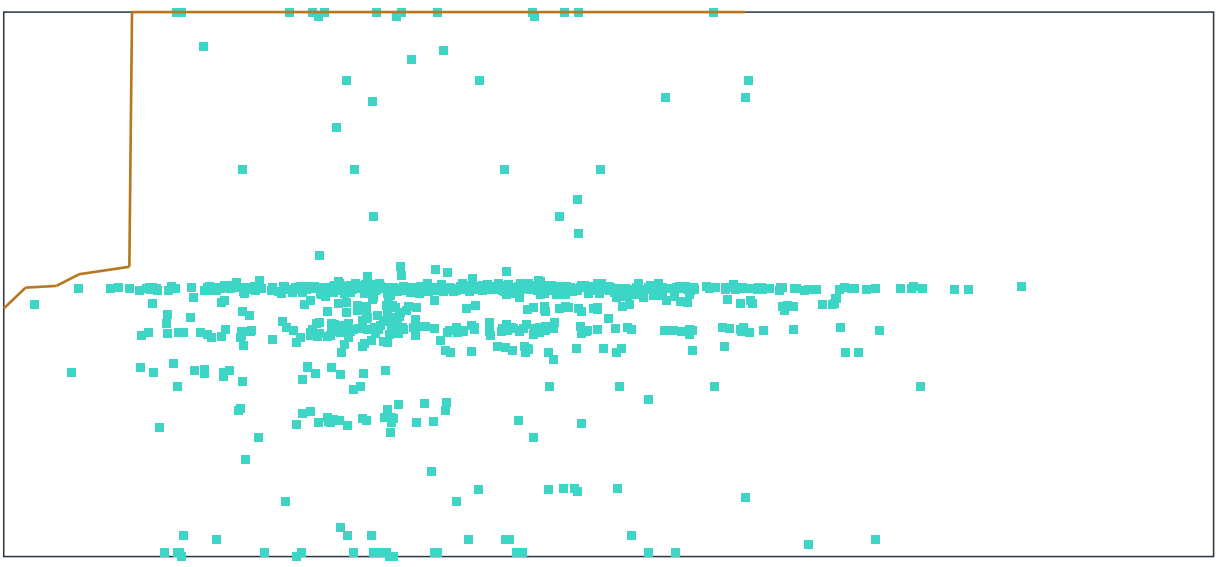


Mean Avail, every mode x arch

Mean Avail, every mode x arch

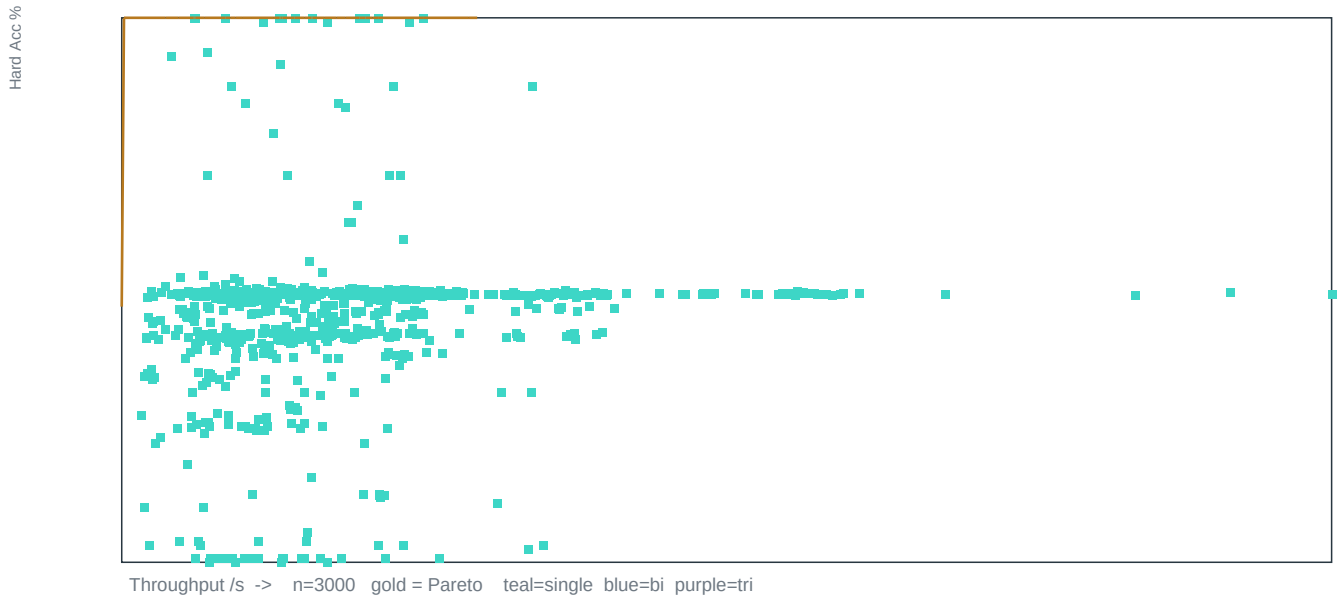
	single1
MeshBP	20
Mesh[T]	37
Mesh[T]Alt	13
Mesh[T]Chain	17
Mesh[T][S]	25
Mesh[T][S][FP]	26
Mesh[T][S]Sparse	35
Step[T]Alt	12
Step[T][S]	25
Step[T][S][FP]	26
Step[T][S][HP]	25
Step[T][S][HP]Async	25
Step[T][S][L]	22
Step[T][S][L]Cache	24
Step[T][S]Sparse	35
[T]Alt	13
[T][S]	25
[T][S][FP]	26
[T][S][HP]	26
[T][S][HP]Async	25
[T][S][L]	23
[T][S][L]Cache	25
[T][S]Sparse	36
sgd	17
step_sgd	19
step_tween	18
step_tween_chain	19
tween	17
tween_chain	17

Pillars - Availability vs hard Acc

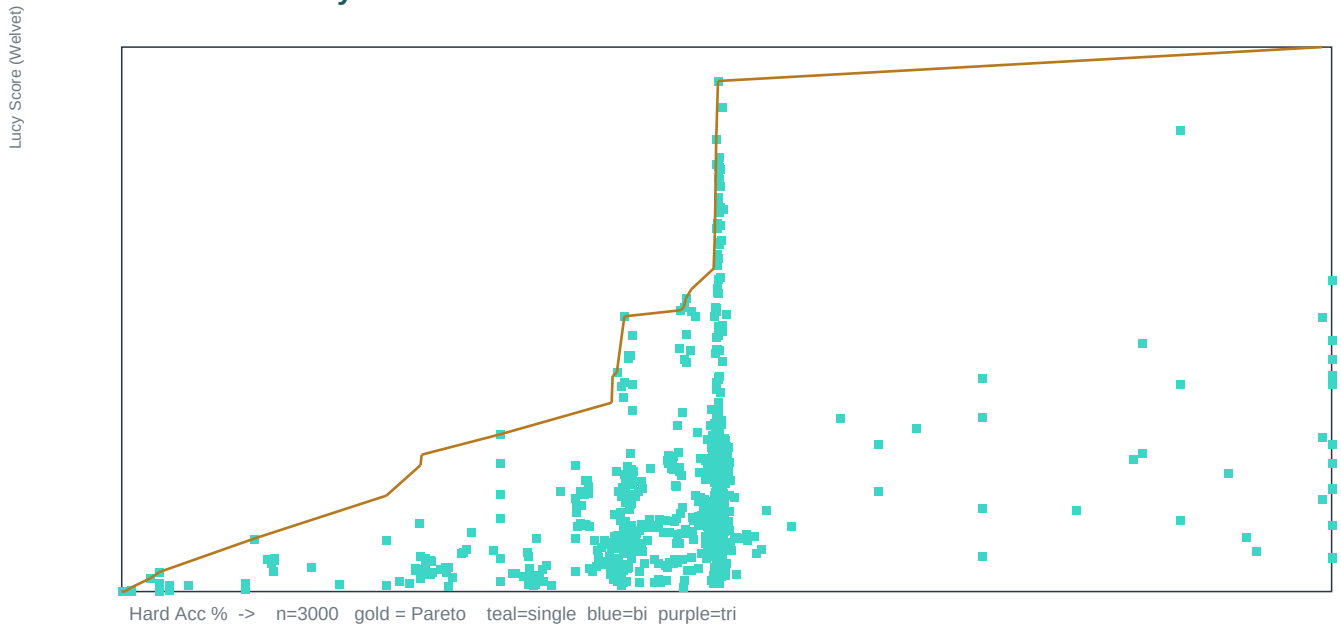



Availability % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

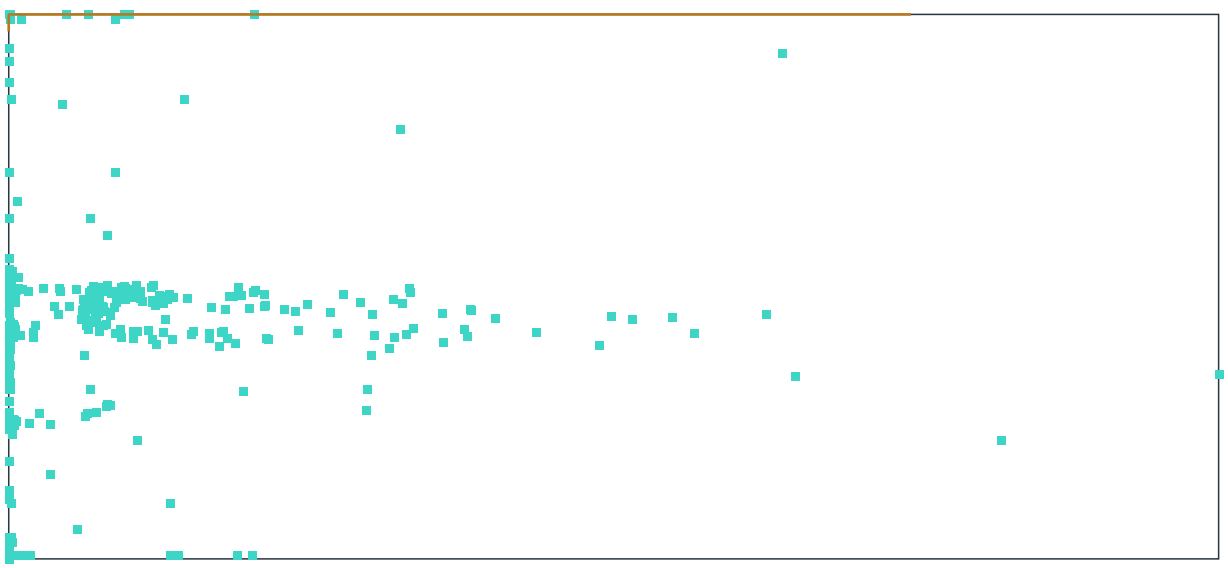
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

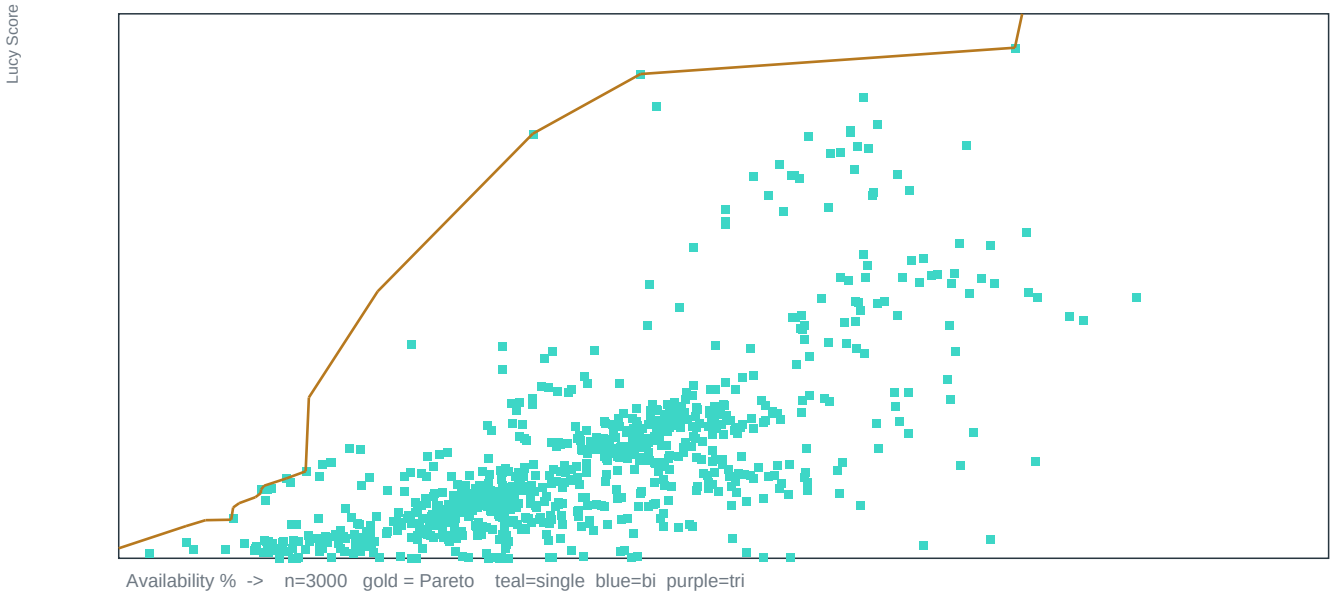


SoftAcc (serve-confidence) vs hard Acc




SoftAcc % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

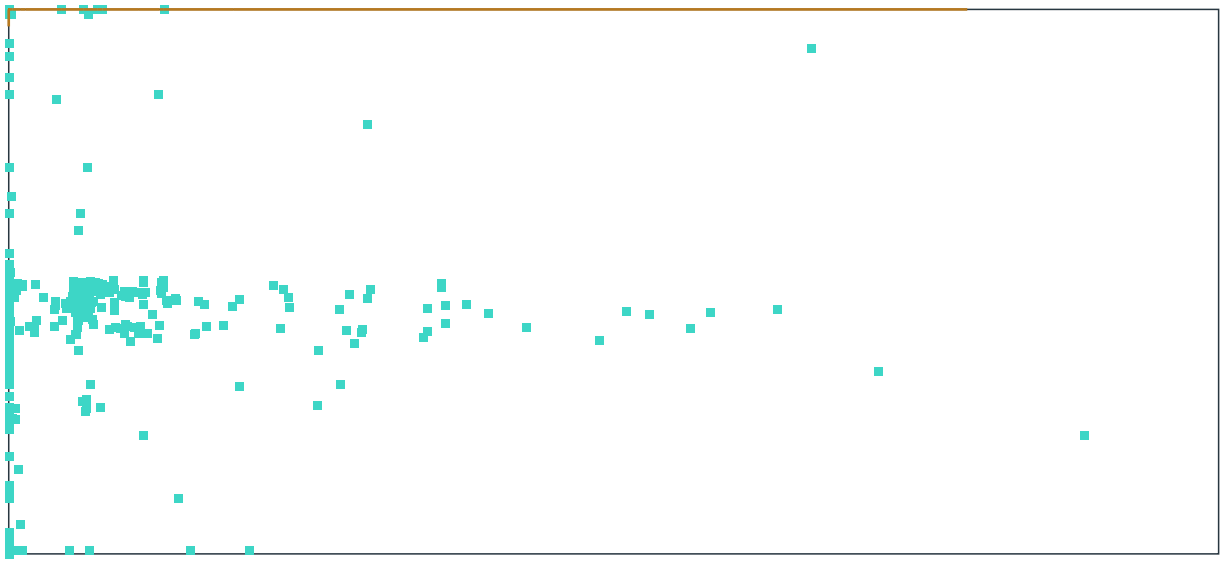
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



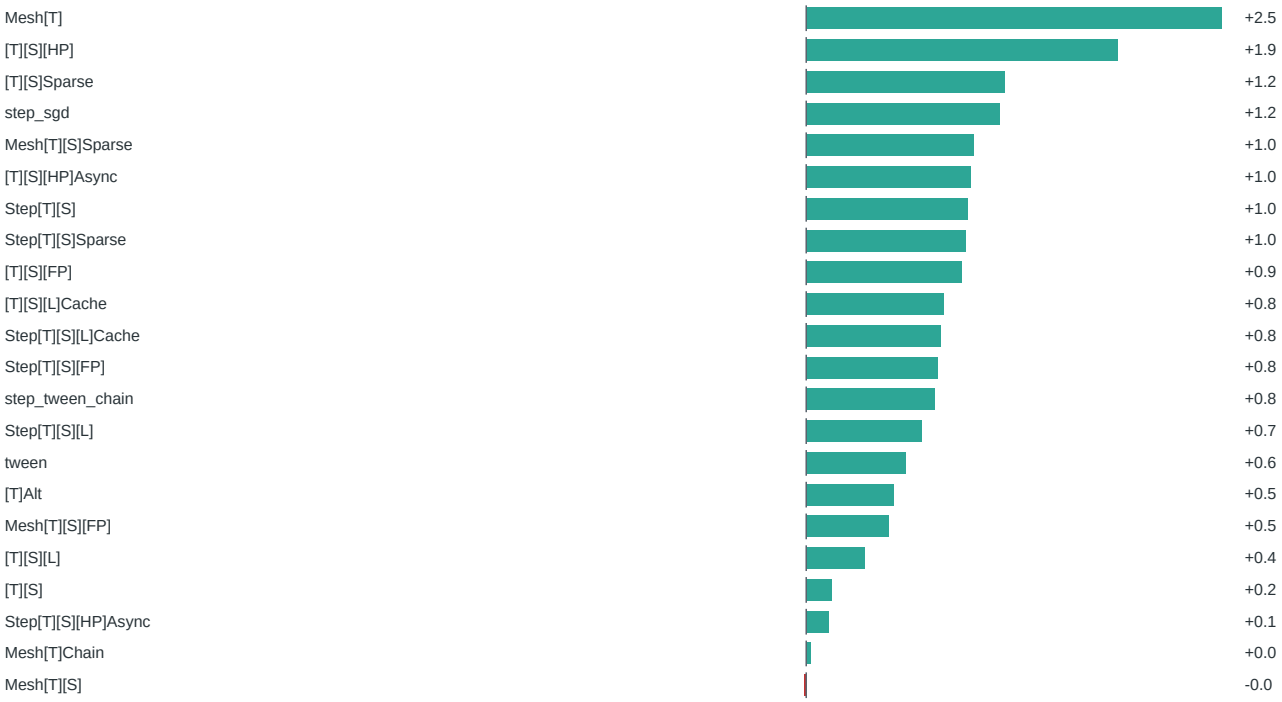

AdaptPct % -> n=3000 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
Mesh[T]	136	+2.5	60	-0.8	+19.6	+18329	+2016.6	100
[T][S][HP]	136	+1.9	48	+0.2	+8.9	+4682	+468.1	97
[T][S]Sparse	136	+1.2	45	-0.4	+18.1	+10328	+1172.0	99
step_sgd	136	+1.2	43	+2.2	+1.8	+1684	+123.4	80
Mesh[T][S]Sparse	136	+1.0	46	-0.4	+18.0	+10228	+1158.9	96
[T][S][HP]Async	136	+1.0	40	+0.3	+8.1	+4360	+398.9	95
Step[T][S]	136	+1.0	43	-0.3	+7.9	+4588	+418.6	95
Step[T][S]Sparse	136	+1.0	43	-0.4	+17.5	+10382	+1135.2	94
[T][S][FP]	136	+0.9	43	+0.3	+8.6	+4494	+419.7	93
[T][S][L]Cache	136	+0.8	49	-0.2	+7.4	+4024	+363.3	98
Step[T][S][L]Cache	136	+0.8	43	-0.2	+7.1	+3963	+349.6	98
Step[T][S][FP]	136	+0.8	40	+0.5	+8.7	+4282	+416.5	95
step_tween_chain	136	+0.8	41	+2.1	+1.6	+1584	+111.5	75
Step[T][S][L]	136	+0.7	48	-0.1	+4.9	+2720	+230.6	94
tween	136	+0.6	41	+5.0	-0.5	+279	+10.3	50
[T]Alt	136	+0.5	38	-0.4	-4.2	-218	+3.7	21
Mesh[T][S][FP]	136	+0.5	44	+0.3	+8.8	+4332	+429.2	96
[T][S][L]	136	+0.4	43	-0.3	+5.4	+2925	+253.0	94
[T][S]	136	+0.2	43	-0.6	+7.8	+4611	+385.1	90
Step[T][S][HP]Async	136	+0.1	40	-0.1	+7.8	+4199	+363.4	93
Mesh[T]Chain	136	+0.0	42	+0.1	-0.6	-411	-5.1	37
Mesh[T][S]	136	-0.0	38	-0.4	+7.4	+4473	+360.0	89
tween_chain	136	-0.0	38	+0.2	-0.5	+117	+0.2	46
Step[T][S][HP]	136	-0.3	38	+0.6	+8.1	+4448	+375.5	93
step_tween	136	-0.6	42	+5.5	+0.6	+1091	+34.2	61
MeshBP	136	-0.7	37	-0.1	+2.2	+681	+56.1	69
Mesh[T]Alt	136	-1.2	37	-0.6	-4.5	-1172	-40.1	21
Step[T]Alt	136	-1.7	35	+7.9	-5.7	-2459	-166.3	2

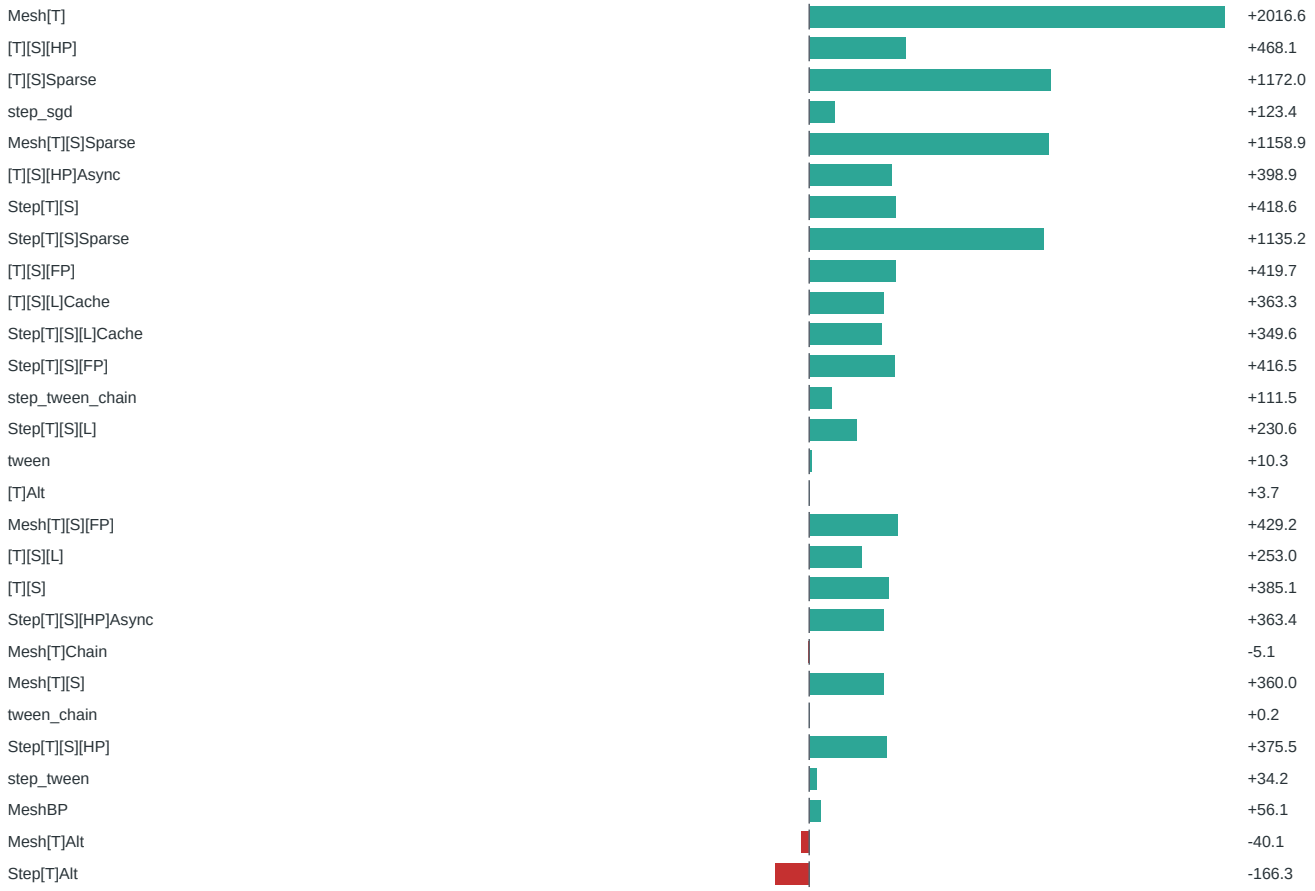
mean AccD vs sgd



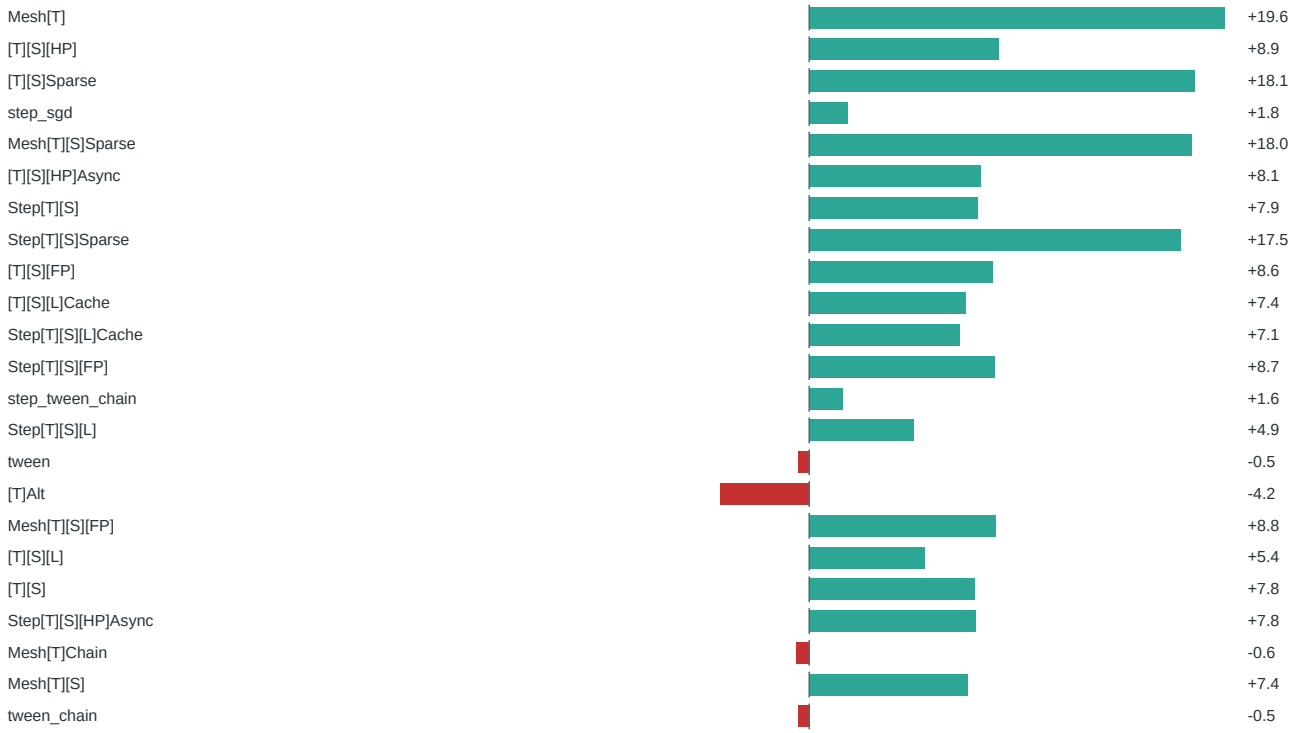
mean AccD vs sgd



mean ScoreD vs sgd (duty clock)



mean AvailD vs sgd



mean AvailD vs sgd



AccD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	-0	-8	+0	-0	+0	+0	-0	-0	-1	-5	-0	-3
Mesh[T]	+0	+1	+0	+0	+0	+0	+0	-0	+2	-3	+0	-1
Mesh[T]Alt	-0	+0	-0	-1	-0	+0	+0	-1	-10	-3	+0	+4
Mesh[T]Chain	+1	-2	-5	+0	-0	+0	-0	-0	-6	-5	+0	-1
Mesh[T][S]	-0	-4	+1	+0	-0	+0	+0	-0	+10	-9	+0	-7
Mesh[T][S][FP]	-0	-5	+0	+0	+0	-0	+0	-0	-0	-6	+0	-10
Mesh[T][S]Sparse	-0	+1	+0	+1	+1	+0	+0	-0	+6	-1	-0	-9
Step[T]Alt	-9	-6	-6	-6	-14	-2	-6	-1	-1	-5	-14	-4
Step[T][S]	-0	+2	+0	+0	-0	+0	-0	-1	-0	-11	+0	-2
Step[T][S][FP]	-1	-14	+0	-0	+0	-0	-0	+0	-0	-8	-0	-3
Step[T][S][HP]	-0	-2	+0	-0	+0	-0	-0	+0	+1	-7	-0	-5
Step[T][S][HP]Async	-0	-3	+0	+0	-0	+0	+0	-0	-7	-3	-0	-5
Step[T][S][L]	-0	+2	+1	+0	+0	+0	+0	+0	+1	-4	+0	-2
Step[T][S][L]Cache	+0	-1	+0	-0	-0	+0	+0	+0	-0	-5	+0	-2
Step[T][S]Sparse	-0	+1	-0	-0	+0	-0	-0	+0	+0	-10	-1	-13
[T]Alt	-0	+5	+0	+0	+0	+0	+0	-0	-1	-0	+0	-5
[T][S]	-0	+0	+0	+0	-0	+0	+0	-1	+2	-3	+0	-8
[T][S][FP]	-0	-2	+0	+0	+0	+0	-0	+0	-0	-3	+0	-8
[T][S][HP]	-0	-0	-0	+1	-0	+1	+0	+0	+2	+2	+0	-3
[T][S][HP]Async	-0	-3	-0	-0	-1	-0	+0	-0	+5	-4	-0	-4
[T][S][L]	-0	-1	+0	+0	-0	+0	-0	-0	+1	-4	-0	-2
[T][S][L]Cache	-0	-0	+0	+0	+0	+0	+0	-0	-1	-5	-1	-1
[T][S]Sparse	-0	+6	-0	+1	-0	-0	+0	-0	-0	-7	-1	-9
step_sgd	-0	+0	+0	+0	+0	-0	+0	+0	+0	-5	-0	-2
step_tween	-1	+0	-5	-4	-12	-2	-6	-0	+3	-7	-14	-4
step_tween_chain	-0	-4	+0	+0	-0	+0	-0	+0	+3	-10	-0	-9
tween	-2	-6	-3	+1	-6	-3	-2	+0	+5	-7	-12	+2
tween_chain	+0	-6	+0	+1	+0	+0	+0	-0	-8	-5	-1	-3

AccD vs sgd, every mode x dtype (cols 13-24)

AccD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	-3	+2	+2	-1	+4	+0	+7	-2	-5	+8	-6	-7
Mesh[T]	+9	+8	+3	+7	+10	+5	+7	+1	+4	+7	+1	+0
Mesh[T]Alt	+5	-4	-3	-2	-2	-2	+12	+0	-2	+3	-3	-5
Mesh[T]Chain	+21	+6	-8	+5	+3	+0	+6	+0	+3	+1	-0	-3
Mesh[T][S]	+12	+9	-2	+3	+3	+10	+5	-1	-5	+0	-0	-5
Mesh[T][S][FP]	+5	+5	-8	+1	+14	+4	+9	-1	-1	-1	+6	-1
Mesh[T][S]Sparse	+6	+7	+0	+6	+22	+5	+11	-1	+3	+1	+6	-1
Step[T]Alt	+6	+5	-1	+5	+5	+1	+1	-1	-3	+4	+6	-2
Step[T][S]	+6	+6	-1	-2	+8	+2	+2	-1	+3	+2	-10	-1
Step[T][S][FP]	+8	+6	+1	+7	+9	+2	-0	-1	+6	+0	-3	+1
Step[T][S][HP]	+7	+7	-1	+6	+9	+10	+4	-8	+2	-1	-1	-3
Step[T][S][HP]Async	+5	+7	+2	+8	+9	+1	+7	-0	+2	+4	-1	-3
Step[T][S][L]	+7	+0	+0	+8	+9	+5	+4	-0	+2	+2	-1	-1
Step[T][S][L]Cache	+5	+5	+1	+6	+9	+4	+4	-0	+1	+6	-6	-1
Step[T][S]Sparse	+5	+7	+3	+4	+7	+10	-5	-2	+2	+8	+3	+1
[T]Alt	+3	+5	+1	+4	+1	+2	+11	-3	+6	+4	-2	+6
[T][S]	+9	+4	+8	+5	+7	-5	-8	+0	-4	+6	-2	+2
[T][S][FP]	+0	+5	+2	+4	+14	+5	+5	-9	-2	-2	-5	-6
[T][S][HP]	+9	+6	+10	+5	+8	+4	+13	-6	+3	+2	+7	-1
[T][S][HP]Async	+4	+6	-4	+7	+6	+2	+11	-7	+3	+8	-6	+3
[T][S][L]	+6	+6	-5	+6	+8	+3	+5	-2	+4	-5	-1	-1
[T][S][L]Cache	+3	+6	+3	+5	+7	+4	+5	+0	+3	+5	-3	-1
[T][S]Sparse	+7	+7	+2	+5	+15	+3	+4	-1	-2	+13	-0	+2
step_sgd	+5	+4	+1	+4	+9	+10	-0	-0	+16	-1	-4	+5
step_tween	+6	+5	+1	+6	+8	+2	+5	-0	+9	+3	-12	-7
step_tween_chain	+7	+14	+2	+4	+13	+0	+4	-0	+2	-0	-5	-1
tween	+6	+4	+7	+6	+7	+8	+2	-5	-1	+2	+7	-4
tween_chain	+6	+8	+2	+6	+1	-0	+2	-3	+3	+3	-7	-0

AccD vs sgd, every mode x dtype (cols 25-34)

AccD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+1	+5	+4	-5	-1	-3	-3	-1	+2	-4
Mesh[T]	+0	+2	+8	+0	-1	+1	+6	+3	+4	+0
Mesh[T]Alt	-19	+1	-0	+5	-2	-7	-2	+4	+1	-6
Mesh[T]Chain	+1	-1	+0	+3	-1	-7	+2	-1	+5	-13
Mesh[T][S]	-3	+7	+5	-2	-3	-7	+4	-7	-12	-1
Mesh[T][S][FP]	-1	+3	+6	-3	-4	-0	-1	+1	+8	-1
Mesh[T][S]Sparse	-5	-6	+5	-8	-9	-2	+4	-4	-2	-2
Step[T]Alt	-6	-1	+6	-2	-2	-8	+3	-0	+3	-3
Step[T][S]	-2	+4	+7	+4	+5	-1	+3	-4	+9	+4
Step[T][S][FP]	+7	+7	+1	-2	-11	-1	+8	-4	+9	+2
Step[T][S][HP]	-6	-5	+1	-10	-1	-3	+2	-7	+1	-2
Step[T][S][HP]Async	+6	-2	+6	-3	-13	+0	-1	-10	+3	-5
Step[T][S][L]	-6	+0	+5	-8	-3	-6	+2	+1	+4	-1
Step[T][S][L]Cache	-2	-0	+2	-1	-6	-2	+7	+2	+4	-2
Step[T][S]Sparse	-0	-0	+14	-4	-2	-2	+3	+0	-4	+7
[T]Alt	+5	-5	+7	-0	-13	-4	+0	-6	-2	-1
[T][S]	-1	-7	+5	+0	-4	-3	+5	-4	-4	+5
[T][S][FP]	-0	+7	+20	-4	-5	+7	+6	-1	+0	+5
[T][S][HP]	-8	-5	+6	+7	-3	+1	+2	+1	+3	+0
[T][S][HP]Async	+5	-1	+0	-1	+4	-2	+6	+2	-2	-3
[T][S][L]	-5	-1	+1	-2	-3	-0	+6	-0	+3	-3
[T][S][L]Cache	-6	+1	+7	-2	-9	-1	+5	+1	+3	-0
[T][S]Sparse	+3	-1	+5	-2	-5	-3	+2	-1	+2	-3
step_sgd	-1	+2	+4	-2	-6	-2	+8	+2	-0	-8
step_tween	-2	+0	+4	-0	-5	+4	+3	+2	+4	-3
step_tween_chain	-3	+1	+6	-6	+10	-3	+0	+1	-1	+3
tween	-4	+1	+5	+2	+3	-2	+11	-1	+1	-3
tween_chain	+2	+3	+6	+1	-4	-16	+3	-1	+4	+2

ScoreD vs sgd, every mode x dtype (cols 1-12)

ScoreD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+159	-77	+210	+121	+41	+299	+138	+63	+61	-40	+66	+7
Mesh[T]	+2258	+1422	+2043	+2157	+2040	+3007	+2991	+2227	+1348	+1010	+2178	+1915
Mesh[T]Alt	+339	-205	+239	+329	+436	+1123	+752	-187	-109	-292	+329	-250
Mesh[T]Chain	+128	-119	-51	+43	+142	+191	+129	+270	-51	-177	+144	+131
Mesh[T][S]	+574	+267	+599	+488	+558	+627	+610	+86	+533	+156	+488	+190
Mesh[T][S][FP]	+547	+298	+516	+514	+582	+689	+747	+169	+229	+218	+555	+169
Mesh[T][S]Sparse	+1416	+1490	+1459	+1508	+1583	+1976	+2228	+715	+704	+1093	+1511	+590
Step[T]Alt	-195	-198	-211	-237	-278	-127	-241	-160	-86	-227	-325	-263
Step[T][S]	+586	+554	+549	+375	+482	+371	+723	+102	+265	+180	+563	+403
Step[T][S][FP]	+528	+9	+586	+454	+535	+241	+712	+234	+232	+209	+528	+464
Step[T][S][HP]	+646	+501	+583	+541	+631	+233	+620	+206	+214	+236	+470	+419
Step[T][S][HP]Async	+540	+355	+415	+557	+580	+334	+643	+187	+127	+385	+582	+365
Step[T][S][L]	+282	+373	+281	+254	+317	+156	+518	+157	+153	+164	+248	+172
Step[T][S][L]Cache	+392	+495	+272	+344	+336	+209	+395	+170	+239	+357	+278	+410
Step[T][S]Sparse	+1517	+1308	+1405	+1416	+1454	+1113	+2118	+710	+489	+659	+1291	+482
[T]Alt	+399	-167	+396	+346	+391	+2005	+873	-175	-79	-238	+294	-302
[T][S]	+707	+499	+506	+591	+660	+235	+729	+53	+357	+301	+468	+232
[T][S][FP]	+580	+440	+516	+538	+518	+330	+739	+201	+280	+341	+507	+230
[T][S][HP]	+640	+440	+573	+618	+599	+302	+748	+200	+368	+545	+645	+454
[T][S][HP]Async	+580	+368	+493	+546	+563	+277	+698	+193	+327	+289	+599	+402
[T][S][L]	+414	+340	+289	+319	+401	+174	+465	+159	+110	+165	+318	+257
[T][S][L]Cache	+350	+500	+408	+181	+285	+205	+486	+218	+212	+268	+267	+495
[T][S]Sparse	+1444	+2057	+1278	+1327	+1535	+1237	+2073	+912	+565	+878	+1510	+787
step_sgd	+146	+87	+177	+84	+141	+68	+300	+104	+88	+46	+123	+95
step_tween	+136	+103	-9	-15	-41	+100	+61	+16	+22	-64	-235	+23
step_tween_chain	+98	+53	+147	+107	+178	+261	+178	+90	+75	-93	+133	-81
tween	+15	-113	-0	+55	-94	+106	+204	+32	+55	-141	-179	+50
tween_chain	+23	-84	+8	-24	-27	+6	+94	-22	-64	-86	-1	-80

ScoreD vs sgd, every mode x dtype (cols 13-24)

ScoreD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	-14	+59	+106	+86	+113	+16	+106	+30	-92	+48	-25	-87
Mesh[T]	+2582	+2569	+1695	+2505	+2067	+1475	+1285	+2206	+2351	+293	+2297	+2066
Mesh[T]Alt	-92	-182	-119	-156	-161	-110	-71	-254	-225	-120	-242	-254
Mesh[T]Chain	+191	+26	-96	-47	-17	-10	-5	+128	-45	-74	-75	-153
Mesh[T][S]	+664	+517	+250	+431	+451	+457	+273	+354	+194	+93	+465	+197
Mesh[T][S][FP]	+532	+422	+155	+404	+919	+248	+415	+432	+369	+101	+630	+418
Mesh[T][S]Sparse	+1488	+1222	+704	+1512	+2476	+859	+835	+1413	+1350	+549	+1668	+1091
Step[T]Alt	-62	-162	-124	-83	-91	-75	-93	-274	-205	-114	-95	-180
Step[T][S]	+526	+443	+295	+217	+570	+322	+207	+461	+553	+133	+138	+380
Step[T][S][FP]	+533	+460	+310	+649	+634	+252	+179	+480	+712	+151	+348	+409
Step[T][S][HP]	+615	+439	+267	+505	+624	+277	+270	+134	+408	+93	+486	+354
Step[T][S][HP]Async	+489	+484	+272	+570	+656	+229	+278	+414	+372	+211	+344	+289
Step[T][S][L]	+439	+128	+158	+376	+368	+183	+161	+309	+332	+113	+245	+211
Step[T][S][L]Cache	+514	+451	+267	+585	+534	+286	+171	+311	+456	+219	+414	+286
Step[T][S]Sparse	+1354	+1277	+887	+1308	+1528	+859	+392	+1433	+1298	+705	+1534	+1166
[T]Alt	-88	-116	-115	-139	-134	-98	-85	-286	-173	-98	-202	-199
[T][S]	+585	+329	+455	+490	+531	+193	+64	+583	+268	+187	+382	+446
[T][S][FP]	+332	+500	+337	+485	+740	+393	+240	+176	+393	+75	+271	+187
[T][S][HP]	+752	+482	+561	+520	+581	+337	+348	+369	+533	+187	+747	+337
[T][S][HP]Async	+470	+521	+164	+570	+487	+211	+281	+286	+471	+288	+274	+567
[T][S][L]	+368	+291	+57	+368	+478	+171	+102	+171	+416	-21	+362	+207
[T][S][L]Cache	+438	+431	+298	+479	+568	+258	+171	+555	+572	+223	+449	+382
[T][S]Sparse	+1361	+1322	+975	+1300	+1777	+678	+665	+1337	+1156	+1065	+1303	+1331
step_sgd	+188	+126	+145	+110	+297	+148	+25	+121	+476	-34	+17	+135
step_tween	+211	+17	+33	+165	+176	+33	+11	+9	+121	-45	-173	-69
step_tween_chain	+281	+344	+147	+105	+395	+72	+72	+84	+69	-18	-34	+62
tween	+152	-24	-9	+138	+65	+48	-27	-73	+17	-45	+183	-19
tween_chain	+92	+151	-19	+94	+26	+5	+7	-96	+0	+7	-82	-28

ScoreD vs sgd, every mode x dtype (cols 25-34)

ScoreD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+64	+100	+83	-9	+81	+24	-41	+41	+83	+86
Mesh[T]	+2367	+2016	+1556	+2576	+2334	+1456	+1299	+2311	+2422	+2240
Mesh[T]Alt	-307	-166	-123	-230	-206	-164	-131	-139	-202	-214
Mesh[T]Chain	-46	-115	-48	-81	-65	-65	-40	-62	-56	-194
Mesh[T][S]	+273	+428	+303	+395	+463	+144	+247	+87	+0	+376
Mesh[T][S][FP]	+602	+335	+311	+399	+448	+231	+169	+576	+773	+467
Mesh[T][S]Sparse	+1130	+790	+676	+764	+695	+637	+519	+714	+985	+1054
Step[T]Alt	-213	-217	-92	-191	-192	-155	-99	-145	-114	-130
Step[T][S]	+406	+496	+433	+581	+823	+288	+262	+309	+758	+479
Step[T][S][FP]	+694	+569	+214	+470	+254	+255	+292	+407	+731	+428
Step[T][S][HP]	+339	+145	+224	+171	+555	+200	+202	+292	+459	+405
Step[T][S][HP]Async	+676	+276	+226	+367	+42	+222	+151	+93	+423	+204
Step[T][S][L]	+95	+256	+167	+57	+160	+16	+55	+265	+368	+302
Step[T][S][L]Cache	+418	+378	+191	+480	+327	+195	+183	+477	+441	+407
Step[T][S]Sparse	+1128	+1052	+1149	+1026	+1429	+770	+503	+1291	+863	+1681
[T]Alt	-183	-248	-87	-224	-282	-155	-110	-188	-221	-187
[T][S]	+443	+115	+336	+418	+365	+318	+319	+271	+107	+548
[T][S][FP]	+556	+597	+681	+392	+371	+379	+223	+480	+466	+774
[T][S][HP]	+246	+194	+331	+851	+471	+251	+174	+555	+578	+377
[T][S][HP]Async	+673	+248	+91	+362	+668	+236	+161	+506	+263	+428
[T][S][L]	+140	+166	+104	+283	+324	+129	+137	+337	+354	+249
[T][S][L]Cache	+299	+454	+277	+406	+305	+220	+266	+441	+548	+440
[T][S]Sparse	+1453	+1037	+691	+1191	+1241	+544	+545	+1207	+1057	+1005
step_sgd	+107	+180	+93	+92	+22	+36	+47	+193	+150	+62
step_tween	+78	-24	+40	+26	+8	+34	+23	+119	+197	+77
step_tween_chain	+49	+93	+99	+5	+459	+31	-8	+143	-15	+208
tween	-52	-106	+7	+38	+85	-53	-6	+76	-34	+1
tween_chain	+32	+22	+32	-1	+9	-135	+14	+24	+27	+81

AvailD vs sgd, every mode x dtype (cols 1-12)

AvailD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+6	+4	+8	+5	-1	+9	+2	+3	+5	-2	+0	+1
Mesh[T]	+17	+16	+21	+22	+17	+19	+17	+18	+32	+12	+19	+16
Mesh[T]Alt	+3	-4	+3	+8	+10	+14	+7	-6	-4	-11	+4	-9
Mesh[T]Chain	+1	-1	-0	+0	+3	+6	+2	+3	+3	-6	+2	+2
Mesh[T][S]	+9	+6	+13	+9	+8	+11	+8	+3	+15	+4	+6	+6
Mesh[T][S][FP]	+8	+10	+11	+11	+9	+11	+10	+4	+11	+4	+8	+8
Mesh[T][S]Sparse	+18	+20	+21	+20	+20	+22	+20	+12	+20	+12	+18	+16
Step[T]Alt	-2	-5	-2	-4	-4	-1	-3	-5	-5	-6	-8	-8
Step[T][S]	+11	+9	+11	+4	+8	+5	+10	+2	+11	+7	+8	+5
Step[T][S][FP]	+9	+12	+14	+10	+8	+3	+10	+7	+12	+7	+9	+9
Step[T][S][HP]	+11	+12	+12	+10	+10	+2	+8	+5	+8	+7	+8	+9
Step[T][S][HP]Async	+9	+8	+8	+11	+10	+4	+9	+5	+12	+8	+10	+10
Step[T][S][L]	+4	+8	+6	+5	+5	+2	+8	+4	+10	+3	+3	+1
Step[T][S][L]Cache	+8	+10	+6	+9	+7	+4	+6	+4	+13	+8	+4	+4
Step[T][S]Sparse	+19	+18	+22	+21	+17	+9	+20	+13	+18	+15	+15	+21
[T]Alt	+4	-4	+9	+8	+7	+9	+9	-5	-2	-8	+2	-10
[T][S]	+12	+9	+10	+12	+11	+2	+10	+1	+15	+4	+5	+6
[T][S][FP]	+9	+10	+11	+11	+7	+4	+11	+5	+15	+8	+8	+8
[T][S][HP]	+10	+8	+12	+13	+9	+3	+10	+5	+17	+7	+10	+9
[T][S][HP]Async	+10	+9	+10	+11	+10	+3	+9	+5	+15	+6	+10	+8
[T][S][L]	+8	+7	+7	+7	+8	+2	+7	+5	+7	+3	+5	+4
[T][S][L]Cache	+8	+9	+11	+2	+5	+3	+8	+5	+11	+4	+5	+7
[T][S]Sparse	+18	+24	+20	+17	+21	+10	+19	+17	+22	+14	+20	+16
step_sgd	+2	+2	+6	+1	+2	-0	+5	+3	+6	+1	+1	+2
step_tween	+3	+2	+3	-0	+4	+1	+4	+0	+1	-1	-2	+2
step_tween_chain	+1	+5	+5	+3	+4	+4	+3	+2	+2	+0	+2	+1
tween	-0	-1	+2	+2	+1	+1	+6	+1	+2	-4	-4	-1
tween_chain	+0	-1	+1	+1	-3	-0	+3	-1	-0	-2	-0	-2

AvailD vs sgd, every mode x dtype (cols 13-24)

AvailD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	+2	+0	+5	+4	-0	+0	+2	-1	-1	-0	+5	+1
Mesh[T]	+24	+18	+25	+20	+13	+25	+23	+16	+18	+4	+19	+21
Mesh[T]Alt	-4	-10	-5	-5	-8	-8	-9	-7	-8	-6	-9	-8
Mesh[T]Chain	+1	-3	-1	-4	-1	-0	-4	+1	-0	-4	+0	-4
Mesh[T][S]	+9	+6	+10	+9	+9	+11	+5	+3	+7	+3	+8	+7
Mesh[T][S][FP]	+11	+7	+11	+8	+8	+8	+11	+6	+6	+6	+6	+10
Mesh[T][S]Sparse	+21	+14	+19	+20	+19	+21	+17	+17	+16	+15	+18	+18
Step[T]Alt	-5	-11	-6	-5	-7	-4	-9	-9	-6	-6	-6	-5
Step[T][S]	+9	+5	+11	+6	+6	+12	+8	+5	+8	+5	+7	+8
Step[T][S][FP]	+6	+6	+11	+12	+7	+6	+8	+9	+12	+7	+9	+8
Step[T][S][HP]	+11	+5	+11	+7	+7	+6	+9	+4	+6	+5	+9	+10
Step[T][S][HP]Async	+9	+7	+9	+8	+8	+10	+7	+4	+4	+7	+5	+8
Step[T][S][L]	+8	+0	+7	+4	+3	+6	+5	+4	+7	+6	+5	+6
Step[T][S][L]Cache	+9	+7	+9	+10	+5	+9	+3	-0	+8	+6	+13	+7
Step[T][S]Sparse	+21	+16	+18	+18	+22	+18	+17	+18	+16	+12	+21	+18
[T]Alt	-3	-7	-7	-7	-6	-7	-11	-8	-6	-3	-6	-10
[T][S]	+7	+4	+10	+6	+7	+9	+9	+6	+8	+4	+7	+7
[T][S][FP]	+11	+10	+10	+9	+6	+13	+6	+7	+11	+4	+8	+6
[T][S][HP]	+12	+7	+11	+10	+6	+11	+5	+9	+8	+8	+10	+8
[T][S][HP]Async	+10	+9	+13	+7	+6	+8	+5	+5	+7	+5	+9	+11
[T][S][L]	+7	+2	+6	+6	+7	+7	-1	-0	+7	+3	+9	+5
[T][S][L]Cache	+9	+4	+8	+8	+8	+8	+2	+7	+9	+7	+10	+8
[T][S]Sparse	+19	+16	+24	+18	+17	+19	+16	+16	+19	+18	+19	+20
step_sgd	+2	-1	+6	-1	+2	+4	-3	-0	+3	-2	-1	+1
step_tween	+4	-4	+4	+1	-1	-1	-3	-3	-2	-3	+1	+1
step_tween_chain	+5	+1	+5	-1	+2	+5	-0	-1	-1	-1	-0	+1
tween	+3	-4	-1	+2	-3	-1	-6	+0	+1	-2	+3	+2
tween_chain	-1	+0	-0	-1	+1	+0	-2	-4	-2	+0	+0	+0

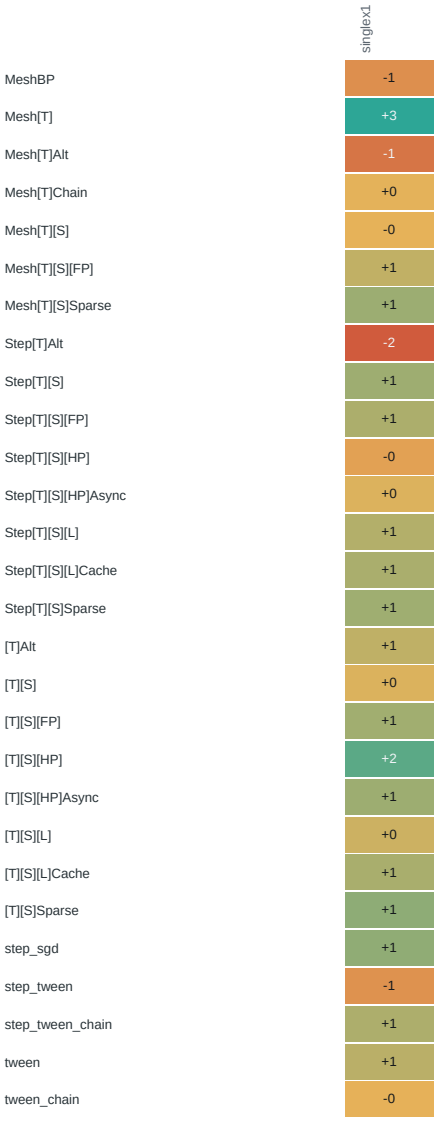
AvailD vs sgd, every mode x dtype (cols 25-34)

AvailD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+1	+2	+2	+1	+2	+2	-2	+2	+1	+8
Mesh[T]	+23	+15	+21	+22	+20	+26	+21	+21	+18	+25
Mesh[T]Alt	-6	-6	-9	-10	-5	-10	-14	-6	-8	-7
Mesh[T]Chain	-0	-3	-5	-3	+0	+2	-5	+0	-2	-0
Mesh[T][S]	+6	+2	+7	+8	+9	+7	+6	+6	+9	+9
Mesh[T][S][FP]	+14	+4	+8	+8	+11	+8	+8	+12	+10	+11
Mesh[T][S]Sparse	+20	+18	+17	+14	+17	+20	+12	+18	+18	+21
Step[T]Alt	-5	-8	-8	-5	-6	-9	-11	-5	-3	-2
Step[T][S]	+9	+6	+11	+5	+11	+10	+7	+9	+9	+10
Step[T][S][FP]	+9	+6	+6	+9	+12	+10	+7	+11	+7	+9
Step[T][S][HP]	+12	+2	+6	+8	+10	+8	+5	+12	+8	+11
Step[T][S][HP]Async	+10	+5	+4	+7	+8	+9	+7	+9	+7	+8
Step[T][S][L]	+6	+5	+6	+5	+4	+2	-1	+4	+6	+10
Step[T][S][L]Cache	+8	+7	+6	+9	+9	+9	+2	+8	+5	+13
Step[T][S]Sparse	+17	+16	+15	+17	+21	+16	+13	+19	+16	+21
[T]Alt	-6	-10	-10	-5	-7	-11	-10	-5	-8	-6
[T][S]	+8	+5	+9	+7	+9	+14	+9	+9	+3	+10
[T][S][FP]	+11	+6	+8	+9	+8	+10	+2	+10	+10	+15
[T][S][HP]	+9	+6	+8	+10	+9	+10	+4	+11	+11	+9
[T][S][HP]Async	+10	+3	+2	+6	+10	+11	+4	+9	+6	+12
[T][S][L]	+6	+2	+3	+6	+9	+5	+2	+7	+6	+11
[T][S][L]Cache	+7	+9	+6	+7	+12	+9	+7	+8	+9	+12
[T][S]Sparse	+18	+16	+16	+19	+23	+18	+12	+21	+14	+20
step_sgd	+2	+3	+2	+2	+1	+1	-5	+3	+5	+6
step_tween	+3	-1	+0	-1	+1	-1	-1	+2	+4	+4
step_tween_chain	+1	+0	+1	+1	+4	+1	-3	+1	-1	+4
tween	-1	-6	-0	-1	+2	-3	-7	+4	-3	+1
tween_chain	-1	-3	-3	-2	+3	-0	-2	+1	-1	+4

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

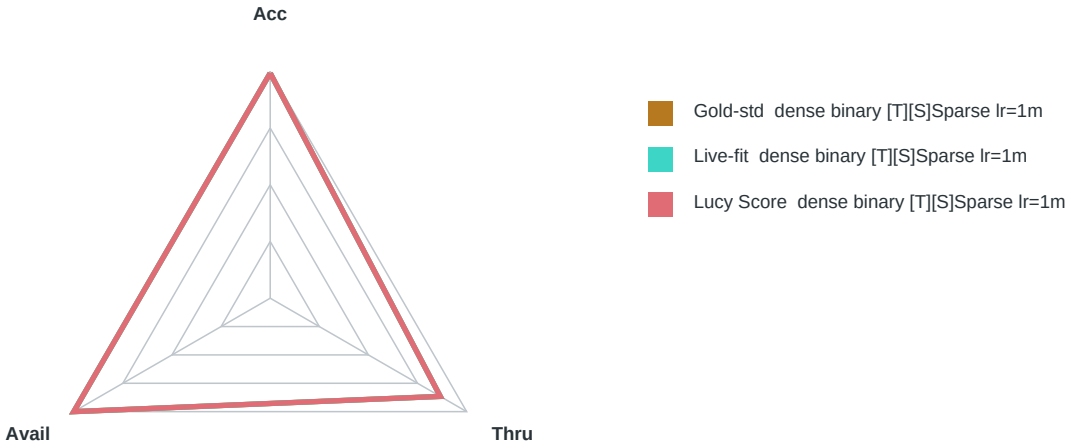
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	5.50
Step[T][S]	[T][S]	34	7.52
Step[T][S][FP]	[T][S][FP]	34	5.66
Step[T][S][HP]	[T][S][HP]	34	5.84
Step[T][S][HP]Async	[T][S][HP]Async	34	5.62
Step[T][S][L]	[T][S][L]	34	1.69
Step[T][S][L]Cache	[T][S][L]Cache	34	2.97
Step[T][S]Sparse	[T][S]Sparse	34	5.10
step_sgd	sgd	34	6.17
step_tween	tween	34	7.86
step_tween_chain	tween_chain	34	4.65

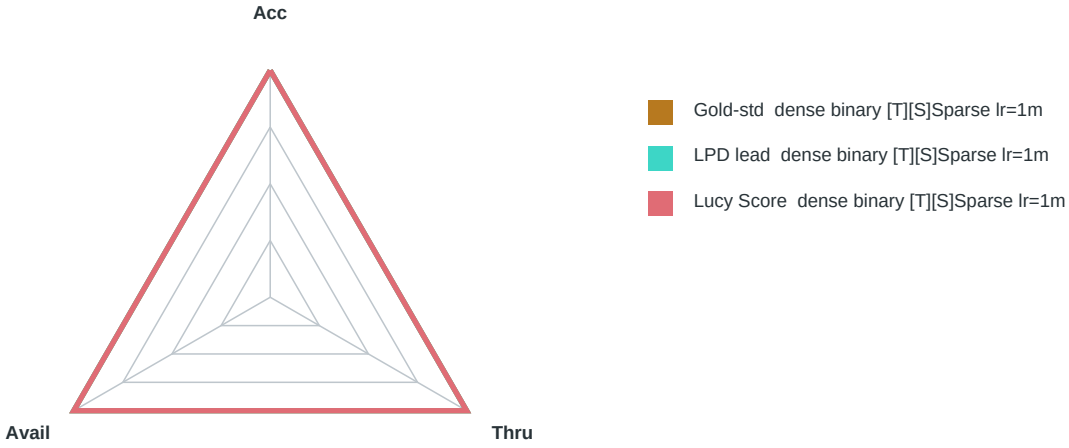
Consciousness - Acc, Throughput, Availability

Synthetic organism / Lucy density: can the net run and train at the same time in a small box. Lucy Score = Throughput x Availability x Acc / 10,000 (hard Acc; SoftAcc is serve-confidence only). SGD that blocks serve dies on Availability. Q = geomean Acc/Thru/Avail vs learner peaks (traps do not set Thru/Avail). LPD = Q x shrink vs Acc-champ RAM; 0 unless Acc keep >=70%. Gold = all 3 pillars >=80% at <=20% Acc-champ RAM. Gold-std = Acc >=80% plus Thru or Avail, then smallest then fastest. Score/MiB is the binary trap.
Acc champ dense|int6|[T][S][HP]Async|lr=100m Acc 50.0 Thru 5421 Avail 19.8% 1.5 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) dense|binary|[T][S]Sparse|lr=1m Score 4328.0 Acc 49.6 Soft 0 0.2 KiB
Live-fit champ (best Q) dense|binary|[T][S]Sparse|lr=1m Acc 49.6 Thru 19837 Avail 44.0% 0.2 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): dense|binary|[T][S]Sparse|lr=1m mode [T][S]Sparse Acc 49.6 Thru 19837 0.2 KiB
Board fastest dense|float32|[T]Alt|lr=20k Thru 64445 (traps may own this) Best availability dense|fp6|Mesh[T]|lr=10m 58.2%
Learner Thru peak 22911 learner Avail peak 44.0%

Consciousness radar - Acc / Thru / Avail vs learner peaks



Memory density radar - same pillars x shrink vs Acc champ (traps sit at origin)



Gold - trifecta >=80% at <=20% of Acc-champ RAM

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
gold	dense binary [T][S]Sparse lr=1m	99	87	100	95	17	6.0	5.70	49.6	19837	0.2

Gold-standard train modes - 2+ pillars, Acc keep >= 80%, smallest then fastest

Mode	n	Acc	KiB	Thru	Cell
[T][S]Sparse	1	49.6	0.2	19837	dense binary [T][S]Sparse lr=1m
Mesh[T][S]Sparse	5	50.0	0.5	22911	dense ternary Mesh[T][S]Sparse lr=1m / dense int4 Mesh[T][S]Spar~
Step[T][S]Sparse	4	49.6	0.7	20620	dense uint3 Step[T][S]Sparse lr=20k / dense uint16 Step[T][S]Spars~
Mesh[T][S]	1	49.6	1.5	6152	dense fp6 Mesh[T][S] lr=100m

Near-gold - 2+ pillars, RAM <= 50% of Acc champ

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
near	dense ternary Mesh[T][S]Sparse lr=1m	100	86	83	89	33	3.0	2.68	50.0	19629	0.5
near	dense uint3 Step[T][S]Sparse lr=20k	99	59	85	79	50	2.0	1.59	49.6	13621	0.7

Lucy density (LPD) - Q x shrink vs Acc-champ RAM; 0 if Acc keep < 70%

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
gold	dense binary [T][S]Sparse lr=1m	99	87	100	95	17	6.0	5.70	49.6	19837	0.2
near	dense ternary Mesh[T][S]Sparse lr=1m	100	86	83	89	33	3.0	2.68	50.0	19629	0.5
acc	dense binary [T]Alt lr=20k	94	26	26	40	17	6.0	2.39	46.9	6041	0.2
-	dense ternary Step[T][S]Sparse lr=10m	71	64	92	75	33	3.0	2.25	35.5	14749	0.5
acc	dense ternary Mesh[T][S][FP] lr=1m	99	52	74	73	33	3.0	2.18	49.6	11908	0.5
acc	dense uint2 [T][S][FP] lr=20k	100	65	50	69	33	3.0	2.07	50.0	14917	0.5
acc	dense uint2 Step[T][S][FP] lr=1m	100	48	63	67	33	3.0	2.02	50.0	11103	0.5
acc	dense ternary [T][S][HP] lr=10m	99	52	57	66	33	3.0	1.99	49.6	11830	0.5
acc	dense uint2 Mesh[T][S] lr=1m	100	53	42	61	33	3.0	1.82	50.0	12112	0.5
acc	dense int2 Step[T]Chain lr=20k	100	46	44	59	33	3.0	1.76	50.0	10580	0.5
acc	dense int2 [T]Chain lr=1m	99	42	39	55	33	3.0	1.64	49.6	9604	0.5
acc	dense ternary [T] lr=10m	100	30	49	53	33	3.0	1.59	50.0	6980	0.5
near	dense uint3 Step[T][S]Sparse lr=20k	99	59	85	79	50	2.0	1.59	49.6	13621	0.7
acc	dense uint2 MeshBP lr=100m	100	33	36	49	33	3.0	1.47	50.0	7566	0.5
-	dense uint2 [T]Chain lr=1m	71	37	44	49	33	3.0	1.47	35.5	8557	0.5
acc	dense ternary Step[T]Alt lr=20k	100	30	35	47	33	3.0	1.42	50.0	6962	0.5
acc	dense uint3 Step[T][S]Sparse lr=100m	100	59	59	71	50	2.0	1.41	50.0	13561	0.7
acc	dense uint3 [T][S][FP] lr=20k	100	43	80	70	50	2.0	1.40	50.0	9841	0.7
keep	dense int4 Mesh[T][S]Sparse lr=20k	88	100	83	90	67	1.5	1.35	43.8	22911	1.0
keep	dense int4 Mesh[T][S]Sparse lr=1m	100	88	81	89	67	1.5	1.34	50.0	20063	1.0

Consciousness rank - Q = geomean Acc/Thru/Avail keep

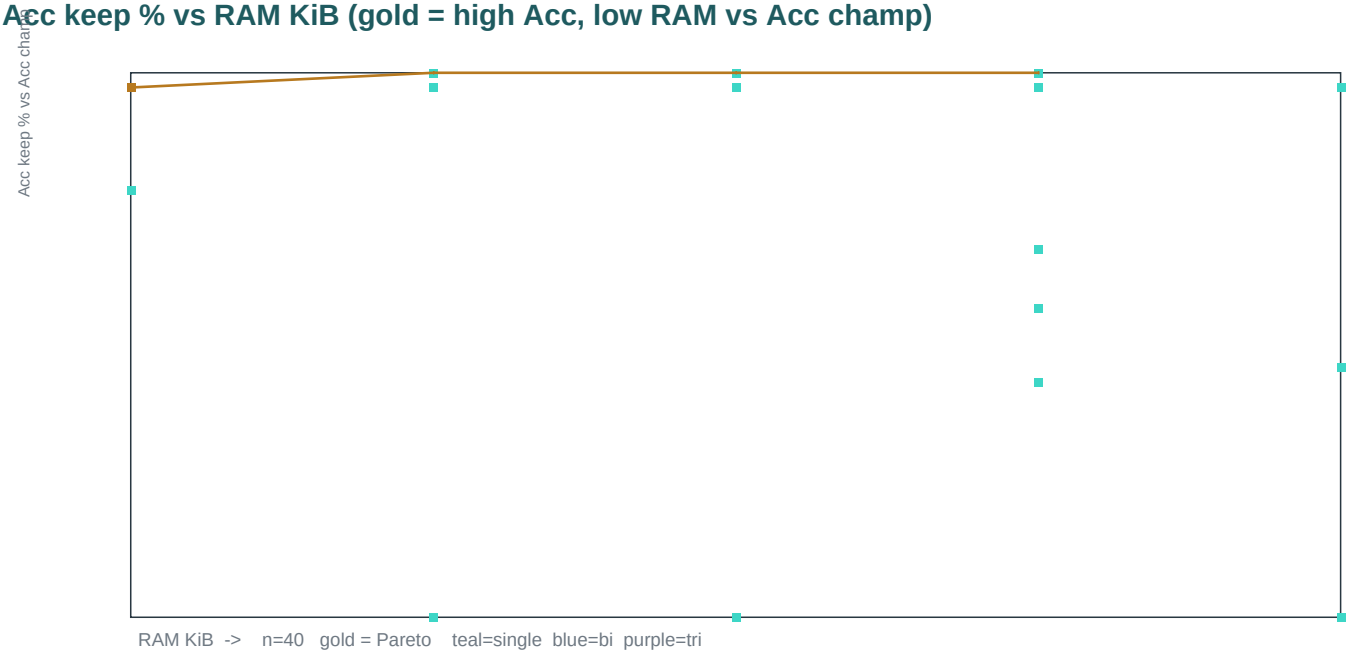
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
gold	dense binary [T][S]Sparse lr=1m	99	87	100	95	5.70	19837	44.0
keep	dense int4 Mesh[T][S]Sparse lr=20k	88	100	83	90	1.35	22911	36.6
near	dense ternary Mesh[T][S]Sparse lr=1m	100	86	83	89	2.68	19629	36.4
keep	dense int4 Mesh[T][S]Sparse lr=1m	100	88	81	89	1.34	20063	35.6
keep	dense uintptr Step[T][S]Sparse lr=1m	99	76	90	88	0.08	17412	39.6
keep	dense uint16 Step[T][S]Sparse lr=100m	99	90	75	87	0.33	20620	32.9
acc	dense fp8e4m3 Mesh[T][S]Sparse lr=100m	100	75	74	82	0.62	17174	32.8
near	dense uint3 Step[T][S]Sparse lr=20k	99	59	85	79	1.59	13621	37.2
acc	dense int4 Mesh[T][S][FP] lr=20k	100	75	65	79	1.18	17253	28.7
acc	dense int4 [T][S]Sparse lr=10m	91	69	76	78	1.17	15853	33.6

Trap - tiny RAM, Acc keep < 70% (Score/MiB and SoftAcc Score lie here)

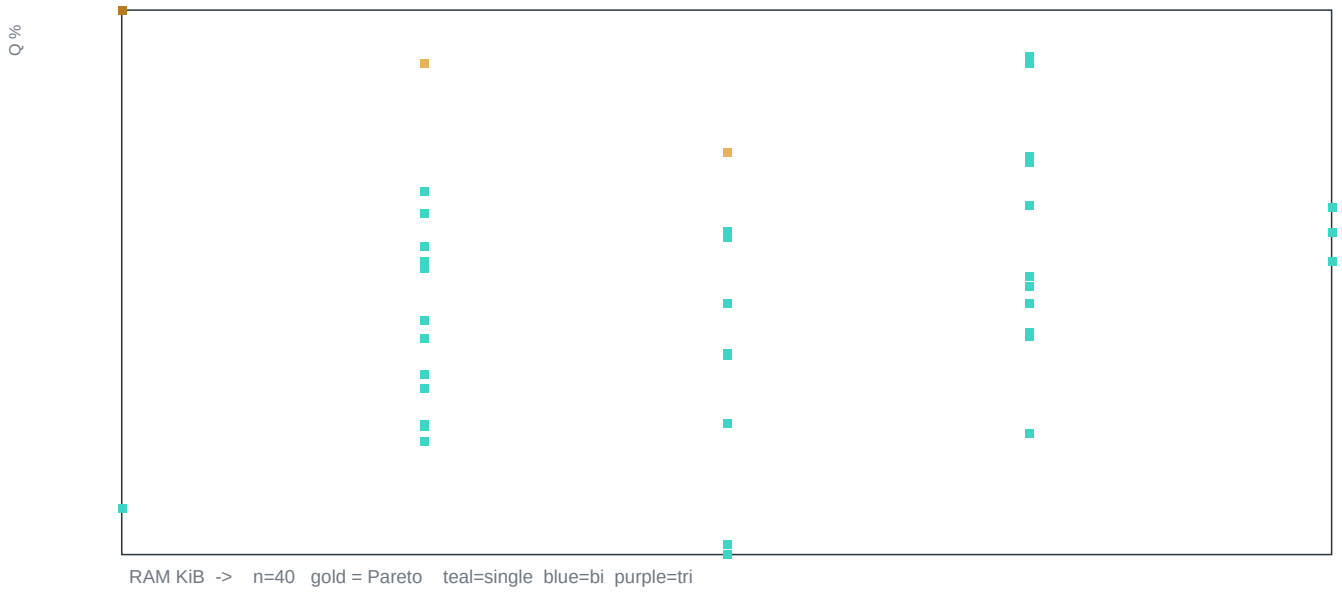
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	dense binary NormalBP lr=20k	49	43	46	46	17	6.0	0.00	24.6	9794	0.2

trap	dense binary StepBP lr=20k	49	51	47	49	17	6.0	0.00	24.4	11580	0.2
trap	dense binary [T] lr=20k	5	49	40	22	17	6.0	0.00	2.7	11251	0.2
trap	dense binary [T]Chain lr=20k	41	42	44	42	17	6.0	0.00	20.5	9659	0.2
trap	dense binary Step[T] lr=20k	42	54	43	46	17	6.0	0.00	20.9	12456	0.2
trap	dense binary Step[T]Chain lr=20k	46	52	48	49	17	6.0	0.00	22.9	11975	0.2
trap	dense binary MeshBP lr=20k	4	49	43	20	17	6.0	0.00	2.0	11161	0.2
trap	dense binary Mesh[T] lr=20k	49	100	85	75	17	6.0	0.00	24.7	37574	0.2
trap	dense binary Mesh[T]Chain lr=20k	48	37	30	38	17	6.0	0.00	24.1	8478	0.2
trap	dense binary [T][S] lr=20k	49	70	63	60	17	6.0	0.00	24.6	16053	0.2

Acc keep % vs RAM KiB (gold = high Acc, low RAM vs Acc champ)

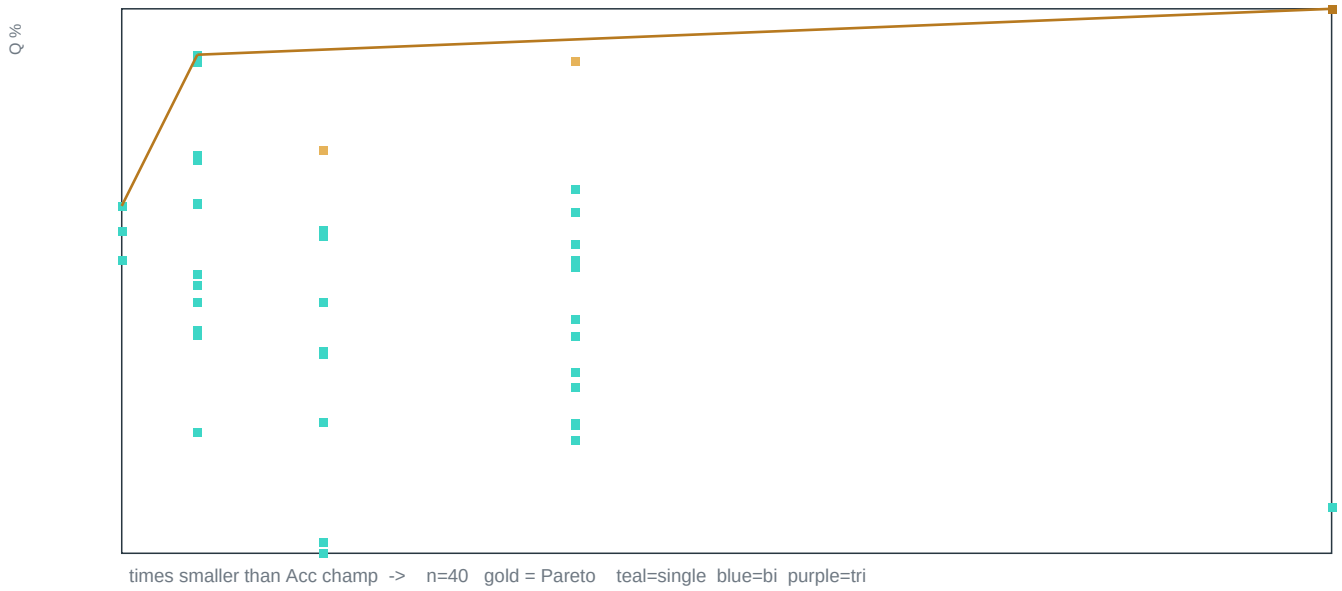


Q% vs RAM KiB (gold = high consciousness, low RAM)

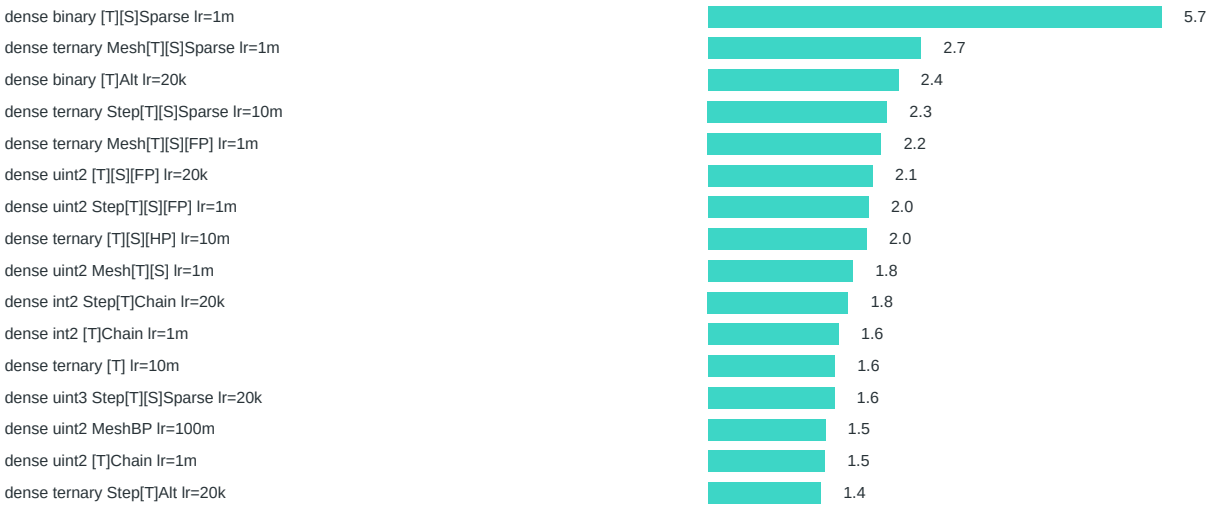


Q% vs shrink vs Acc champ (gold = upper right)

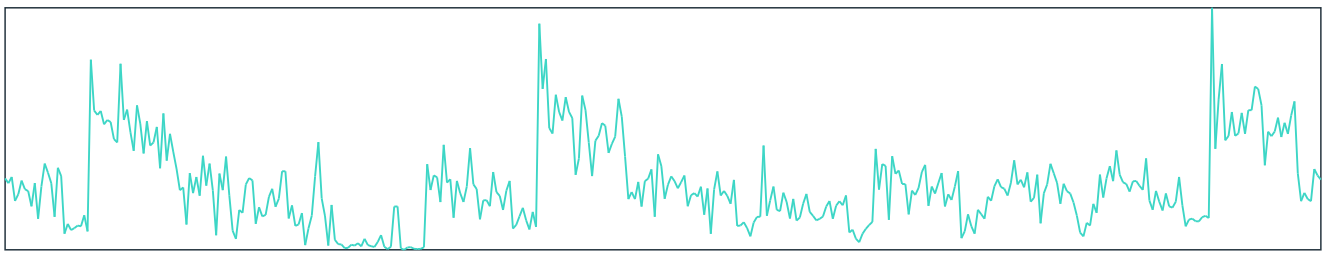
Q% vs shrink vs Acc champ (gold = upper right)



Top Lucy density (LPD)

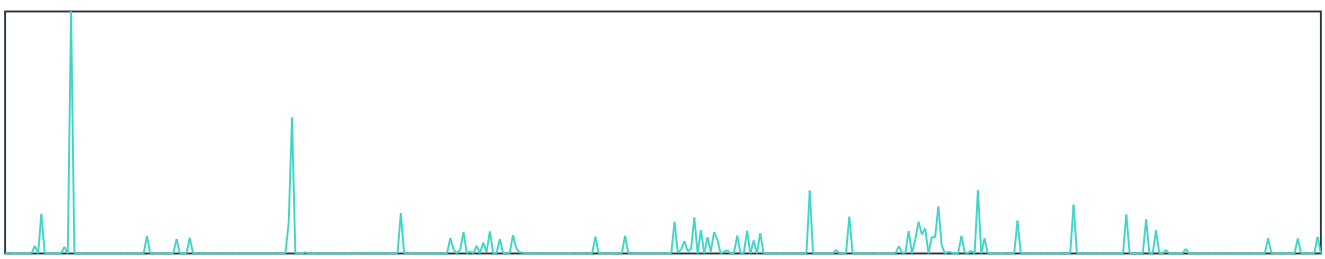


Live pulse (Score)



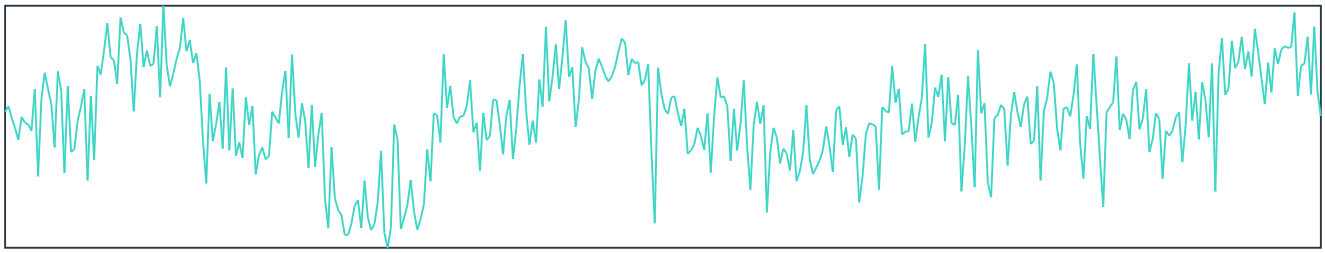
n=400 min=21.44 max=2913.44

Live pulse (SoftAcc)



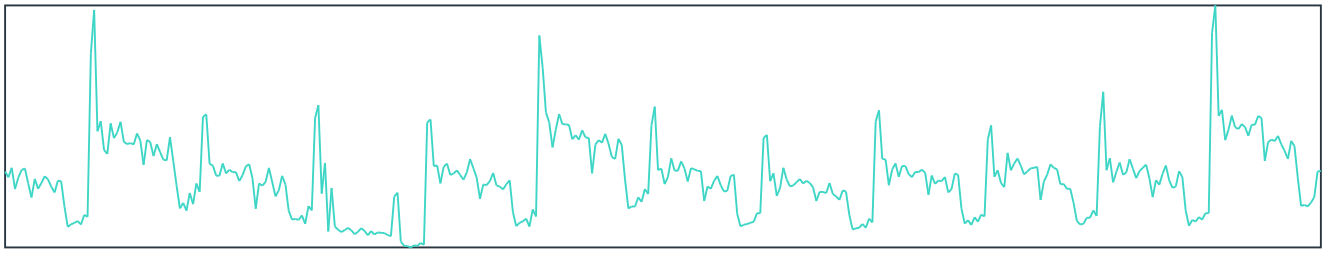
n=400 min=0.00 max=49.86

Live pulse (Availability)



n=400 min=3.19 max=45.19

Live pulse (Throughput)



n=400 min=1899.40 max=38829.25

Queue by train mode (this epoch)

Mode	Done	Run	Left	Total
sgd	136	0	0	136
step_sgd	136	0	0	136
tween	136	0	0	136
tween_chain	136	0	0	136
step_tween	136	0	0	136
step_tween_chain	136	0	0	136
MeshBP	136	0	0	136
Mesh[T]	136	0	0	136
Mesh[T]Chain	136	0	0	136
[T][S]	136	0	0	136
Step[T][S]	136	0	0	136
[T]Alt	136	0	0	136
Step[T]Alt	136	0	0	136
[T][S][HP]	136	0	0	136
[T][S][L]	136	0	0	136
[T][S][FP]	136	0	0	136
[T][S][L]Cache	136	0	0	136
[T][S][HP]Async	136	0	0	136
[T][S]Sparse	136	0	0	136
Mesh[T][S]	136	0	0	136
Mesh[T]Alt	136	0	0	136
Mesh[T][S][FP]	136	0	0	136
Mesh[T][S]Sparse	136	0	0	136
Step[T][S][HP]	136	0	0	136
Step[T][S][L]	136	0	0	136
Step[T][S][FP]	136	0	0	136
Step[T][S][L]Cache	136	0	0	136
Step[T][S][HP]Async	136	0	0	136

Step[T][S]Sparse	136	0	0	136