tide GPT-char

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 200 - 2026-08-21 07:30:45 - 0.0.0.0:8155
This epoch 986 / 986 cells. Recorded 986 results. Learning rate 200.
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.
live_gpt v1.0.0 - cameralx3 - tinyshakespeare - 4096 windows - seq 32 - causal MHA - A->B->A2 - SIMD

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	int8|none|Mesh[T]Alt|tricameral|simd	3.25	6.6	8.3	298.5	13.2
throughput	float32|none|[T][S][L]|tricameral|simd	9.67	0.0	2.5	1145.2	34.4
availability	int|none|[T][S][L]Cache|tricameral|simd	4.27	1.6	2.5	480.8	35.6
lucy score	int8|none|[T][S][L]Cache|tricameral|simd	32.64	4.8	9.3	1035.8	34.1
mobile score (trap)	binary|none|[T][S][L]Cache|tricameral|simd	28.75	4.8	8.6	990.6	33.7
acc/sec	int8|none|[T][S][L]Cache|tricameral|simd	32.64	4.8	9.3	1035.8	34.1

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	Step[T]Alt	float16	tricameralx3	11.00
throughput	[T][S][L]	float32	tricameralx3	1145.23
availability	[T][S][L]Cache	int	tricameralx3	35.59
score	[T][S][L]Cache	int8	tricameralx3	32.64
soft_acc	Mesh[T]Alt	int8	tricameralx3	6.63
acc_thru	[T][S][L]Cache	int8	tricameralx3	95.83
realtime	[T][S][L]	float32	tricameralx3	394.05
adapt	Mesh[T]Alt	uint3	tricameralx3	7.45
keep_learn	[T][S][L]Cache	int2	tricameralx3	10.68
acc_per_sec	[T][S][L]Cache	int8	tricameralx3	1.50
consistency	[T]Alt	uint6	tricameralx3	11.63
stability	sgd	fp4	tricameralx3	100.00
mobile_score	[T][S][L]Cache	binary	tricameralx3	2735.26
lpd	[T][S][L]Cache	ternary	tricameralx3	7.28
mspeed	[T][S][L]Cache	int8	tricameralx3	1.00
mavail	[T][S][L]Cache	uintptr	tricameralx3	1.00
mix	[T][S][L]Cache	int8	tricameralx3	0.93
gold_std	[T][S][L]Cache	ternary	tricameralx3	21.52

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
[T][S][L]Cache	int8	none	32.6	4.8	9.3	34.1	34
[T][S]Sparse	int8	none	23.4	3.9	6.9	33.5	34
Mesh[T][S]Sparse	int2	none	21.8	4.4	7.1	32.4	34
Step[T][S][L]Cache	float32	none	20.4	1.9	9.3	28.1	34
[T][S][L]	int2	none	20.3	4.6	7.3	31.1	34
Step[T][S][L]	float32	none	18.5	1.8	8.3	28.3	34
Step[T][S][FP]	float32	none	10.9	2.0	9.5	21.2	34
Step[T][S][HP]Async	float32	none	10.8	2.1	9.7	21.0	34
Step[T][S]	float32	none	10.6	2.0	9.3	21.2	34
step_tween	float32	none	9.7	1.7	9.1	20.5	34
step_sgd	uint8	none	9.7	4.2	6.9	24.4	34

step_tween_chain	int8	none	9.7	4.0	6.6	23.6	34
Step[T][S][HP]	float32	none	9.4	2.0	9.3	20.2	34
[T][S][FP]	uint8	none	9.4	4.1	6.4	25.1	34
Mesh[T][S]	int8	none	9.3	4.0	5.8	24.8	34
[T][S][HP]Async	uint8	none	9.3	3.7	6.9	24.1	34
[T][S]	int8	none	8.9	4.1	5.7	24.4	34
Mesh[T][S][FP]	binary	none	8.8	4.7	7.3	22.1	34
[T][S][HP]	int4	none	8.5	4.2	6.5	22.8	34
Step[T][S]Sparse	float32	none	8.5	1.9	8.4	20.2	34
MeshBP	int8	none	8.1	4.4	7.6	20.6	34
Mesh[T]	float32	none	7.4	1.7	9.0	18.2	34
tween_chain	int8	none	6.9	3.9	6.6	20.3	34
tween	float32	none	6.8	1.7	9.3	17.4	34
sgd	uint8	none	6.2	4.2	6.5	20.6	34
Mesh[T]Chain	float32	none	6.1	5.5	5.5	20.7	34
Step[T]Alt	float32	none	4.1	2.0	8.0	14.7	34
Mesh[T]Alt	int8	none	3.2	6.6	8.3	13.2	34
[T]Alt	int8	none	3.1	6.4	7.9	13.0	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
[T][S][L]Cache	int8	32.6	4.8	9.3
[T][S]Sparse	int8	23.4	3.9	6.9
Mesh[T][S]Sparse	int2	21.8	4.4	7.1
Step[T][S][L]Cache	float32	20.4	1.9	9.3
[T][S][L]	int2	20.3	4.6	7.3
Step[T][S][L]	float32	18.5	1.8	8.3
Step[T][S][FP]	float32	10.9	2.0	9.5
Step[T][S][HP]Async	float32	10.8	2.1	9.7
Step[T][S]	float32	10.6	2.0	9.3
step_tween	float32	9.7	1.7	9.1
step_sgd	uint8	9.7	4.2	6.9
step_tween_chain	int8	9.7	4.0	6.6
Step[T][S][HP]	float32	9.4	2.0	9.3
[T][S][FP]	uint8	9.4	4.1	6.4
Mesh[T][S]	int8	9.3	4.0	5.8
[T][S][HP]Async	uint8	9.3	3.7	6.9
[T][S]	int8	8.9	4.1	5.7
Mesh[T][S][FP]	binary	8.8	4.7	7.3
[T][S][HP]	int4	8.5	4.2	6.5
Step[T][S]Sparse	float32	8.5	1.9	8.4
MeshBP	int8	8.1	4.4	7.6
Mesh[T]	float32	7.4	1.7	9.0
tween_chain	int8	6.9	3.9	6.6
tween	float32	6.8	1.7	9.3
sgd	uint8	6.2	4.2	6.5
Mesh[T]Chain	float32	6.1	5.5	5.5
Step[T]Alt	float32	4.1	2.0	8.0
Mesh[T]Alt	int8	3.2	6.6	8.3
[T]Alt	int8	3.1	6.4	7.9

Best mode per dtype

DType	Winner mode	Score	Soft	Acc
int8	[T][S][L]Cache	32.6	4.8	9.3
ternary	[T][S][L]Cache	30.5	4.7	8.9
binary	[T][S][L]Cache	28.7	4.8	8.6
int4	[T][S][L]Cache	28.7	4.6	8.2
int2	[T][S][L]Cache	27.8	4.9	8.3
uint8	[T][S][L]Cache	27.3	4.7	8.3
float32	Step[T][S][L]Cache	20.4	1.9	9.3
uint4	[T][S][L]Cache	20.4	4.8	9.8
uint32	[T][S][L]Cache	19.9	4.8	9.4
uint64	[T][S][L]Cache	17.7	4.9	8.5
bfloat16	Step[T][S][L]	16.8	1.9	10.6
uint	[T][S][L]Cache	15.7	4.9	9.0
uint2	[T][S][L]Cache	15.6	4.6	7.8
uintptr	[T][S][L]Cache	15.6	4.7	8.4
uint16	[T][S][L]Cache	15.6	4.5	7.7
int32	[T][S][L]Cache	15.5	4.6	8.2
int16	[T][S][L]Cache	15.3	4.7	8.1
float64	Step[T][S][L]	12.7	1.9	8.8
nf4	[T][S][L]Cache	12.1	4.5	8.0
int64	Step[T][S][L]	11.7	2.4	10.6
float16	Step[T][S][L]Cache	10.5	1.9	9.3
uint3	[T][S][L]Cache	10.3	4.5	8.3
int3	[T][S][L]Cache	9.7	4.4	8.2
int	Step[T][S][L]Cache	9.0	2.1	9.7
fp8e5m2	Step[T][S][L]	8.8	1.8	7.8
uint5	[T][S][L]Cache	8.8	4.7	8.4
complex128	Step[T][S][L]	8.7	2.1	9.5
complex64	Step[T][S][L]Cache	8.5	2.0	8.9
fp8e4m3	[T][S][L]	8.3	4.9	4.9
int5	[T][S][L]Cache	8.1	4.7	8.1
uint6	[T][S][L]Cache	7.8	4.6	8.0
fp6	[T][S][L]Cache	7.7	4.9	8.7
int6	[T][S][L]Cache	7.1	4.7	8.0
fp4	[T][S]Sparse	6.9	1.5	2.8

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	int8|none|[T][S][L]Cache|tricameral|simd	32.6	4.8	9.3	1035.8	34.1
2	ternary|none|[T][S][L]Cache|tricameral|simd	30.5	4.7	8.9	1011.3	33.8
3	binary|none|[T][S][L]Cache|tricameral|simd	28.7	4.8	8.6	990.6	33.7
4	int4|none|[T][S][L]Cache|tricameral|simd	28.7	4.6	8.2	1025.1	34.2
5	int2|none|[T][S][L]Cache|tricameral|simd	27.8	4.9	8.3	998.1	33.5
6	uint8|none|[T][S][L]Cache|tricameral|simd	27.3	4.7	8.3	942.4	34.9
7	int8|none|[T][S]Sparse|tricameral|simd	23.4	3.9	6.9	1012.0	33.5
8	uint8|none|[T][S]Sparse|tricameral|simd	22.1	4.1	7.6	876.1	33.3
9	int2|none|[T][S]Sparse|tricameral|simd	21.8	4.6	6.8	975.9	33.0
10	int2|none|Mesh[T][S]Sparse|tricameral|simd	21.8	4.4	7.1	943.5	32.4
11	binary|none|[T][S]Sparse|tricameral|simd	21.4	4.1	6.8	959.0	32.9
12	int4|none|Mesh[T][S]Sparse|tricameral|simd	20.5	4.2	6.6	949.0	32.7
13	float32|none|Step[T][S][L]Cache|tricameral|simd	20.4	1.9	9.3	783.6	28.1
14	uint4|none|[T][S][L]Cache|tricameral|simd	20.4	4.8	9.8	590.1	35.2

15	int2|none|[T][S][L]|tricameral|simd	20.3	4.6	7.3	891.3	31.1
16	binary|none|[T][S][L]|tricameral|simd	19.9	4.5	7.1	894.8	31.5
17	uint32|none|[T][S][L]Cache|tricameral|simd	19.9	4.8	9.4	596.8	35.4
18	ternary|none|[T][S][L]|tricameral|simd	19.6	4.3	6.9	902.8	31.3
19	uint8|none|Mesh[T][S]Sparse|tricameral|simd	19.5	3.5	6.6	883.2	33.5
20	int8|none|[T][S][L]|tricameral|simd	19.2	4.5	6.5	926.1	31.6

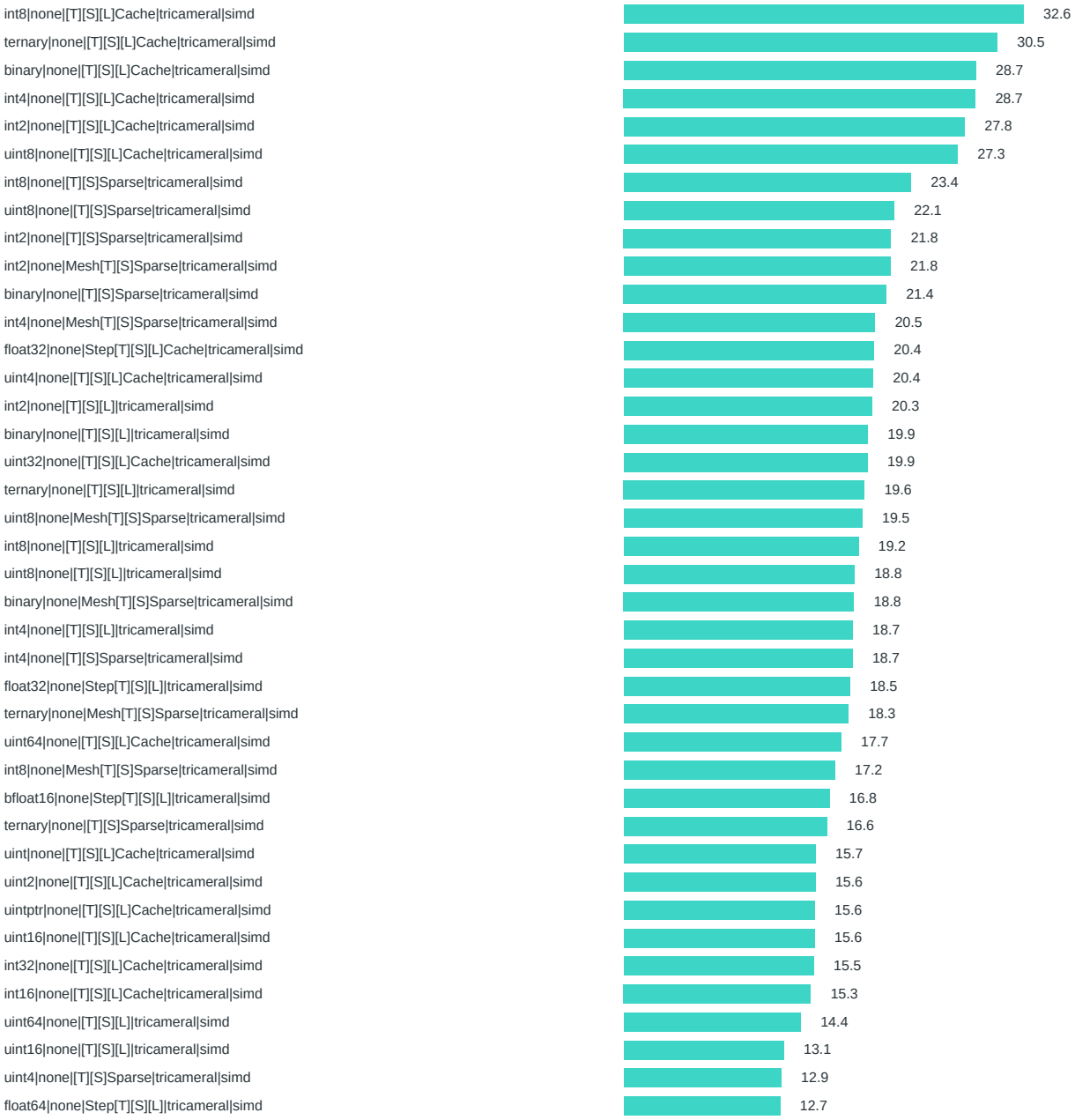
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	uint|none|[T][S][L]Cache|tricameral|simd	15.7	4.9	9.0	502.2	34.8
2	uint64|none|[T][S][L]Cache|tricameral|simd	17.7	4.9	8.5	594.7	35.1
3	int2|none|[T][S][L]Cache|tricameral|simd	27.8	4.9	8.3	998.1	33.5
4	uint32|none|[T][S][L]Cache|tricameral|simd	19.9	4.8	9.4	596.8	35.4
5	int8|none|[T][S][L]Cache|tricameral|simd	32.6	4.8	9.3	1035.8	34.1
6	binary|none|[T][S][L]Cache|tricameral|simd	28.7	4.8	8.6	990.6	33.7
7	uint4|none|[T][S][L]Cache|tricameral|simd	20.4	4.8	9.8	590.1	35.2
8	uintptr|none|[T][S][L]Cache|tricameral|simd	15.6	4.7	8.4	519.6	35.5
9	int16|none|[T][S][L]Cache|tricameral|simd	15.3	4.7	8.1	539.1	34.9
10	uint8|none|[T][S][L]|tricameral|simd	18.8	4.7	7.3	811.9	31.7
11	uint8|none|[T][S][L]Cache|tricameral|simd	27.3	4.7	8.3	942.4	34.9
12	ternary|none|[T][S][L]Cache|tricameral|simd	30.5	4.7	8.9	1011.3	33.8
13	int32|none|[T][S][L]Cache|tricameral|simd	15.5	4.6	8.2	540.8	34.9
14	uint64|none|[T][S][L]|tricameral|simd	14.4	4.6	7.5	564.6	33.9
15	uint2|none|[T][S][L]Cache|tricameral|simd	15.6	4.6	7.8	569.0	35.2
16	int2|none|[T][S][L]|tricameral|simd	20.3	4.6	7.3	891.3	31.1
17	int2|none|[T][S]Sparse|tricameral|simd	21.8	4.6	6.8	975.9	33.0
18	int4|none|[T][S][L]Cache|tricameral|simd	28.7	4.6	8.2	1025.1	34.2
19	int4|none|[T][S][L]|tricameral|simd	18.7	4.5	6.3	925.2	31.9
20	uint16|none|[T][S][L]Cache|tricameral|simd	15.6	4.5	7.7	584.0	34.8

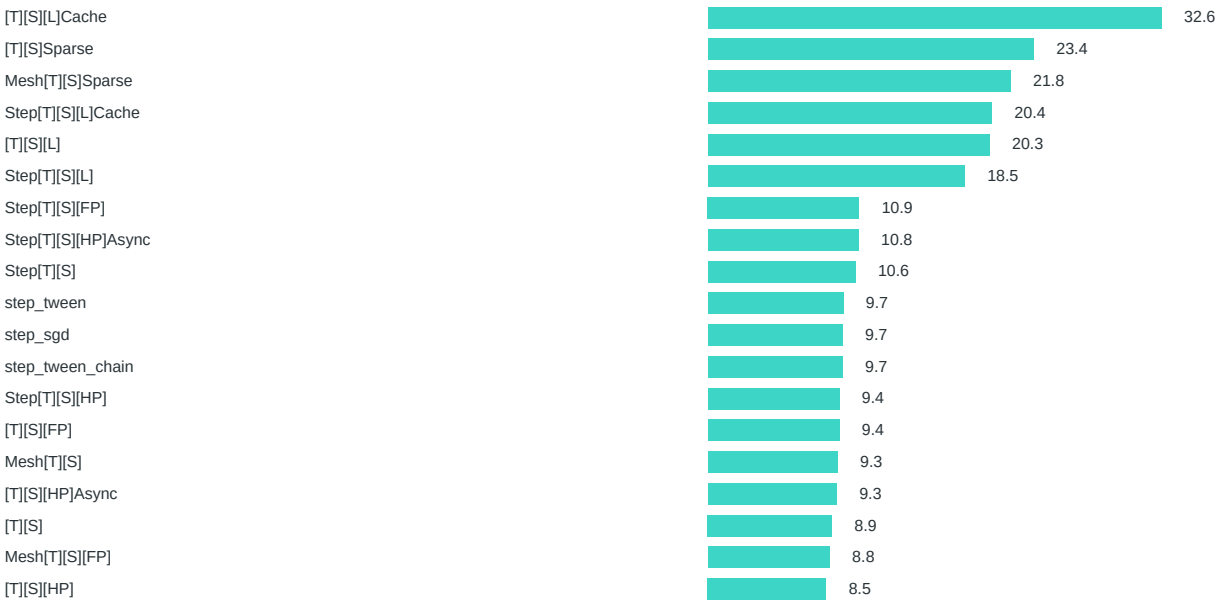
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|Step[T][S][L]|tricameral|simd	16.8	1.9	10.6	557.7	28.4
2	uint4|none|[T][S][L]Cache|tricameral|simd	20.4	4.8	9.8	590.1	35.2
3	uint32|none|[T][S][L]Cache|tricameral|simd	19.9	4.8	9.4	596.8	35.4
4	float32|none|Step[T][S][L]Cache|tricameral|simd	20.4	1.9	9.3	783.6	28.1
5	int8|none|[T][S][L]Cache|tricameral|simd	32.6	4.8	9.3	1035.8	34.1
6	uint|none|[T][S][L]Cache|tricameral|simd	15.7	4.9	9.0	502.2	34.8
7	ternary|none|[T][S][L]Cache|tricameral|simd	30.5	4.7	8.9	1011.3	33.8
8	float64|none|Step[T][S][L]|tricameral|simd	12.7	1.9	8.8	524.8	27.5
9	binary|none|[T][S][L]Cache|tricameral|simd	28.7	4.8	8.6	990.6	33.7
10	uint64|none|[T][S][L]Cache|tricameral|simd	17.7	4.9	8.5	594.7	35.1
11	uintptr|none|[T][S][L]Cache|tricameral|simd	15.6	4.7	8.4	519.6	35.5
12	int2|none|[T][S][L]Cache|tricameral|simd	27.8	4.9	8.3	998.1	33.5
13	uint8|none|[T][S][L]Cache|tricameral|simd	27.3	4.7	8.3	942.4	34.9
14	float32|none|Step[T][S][L]|tricameral|simd	18.5	1.8	8.3	789.8	28.3
15	int32|none|[T][S][L]Cache|tricameral|simd	15.5	4.6	8.2	540.8	34.9
16	int4|none|[T][S][L]Cache|tricameral|simd	28.7	4.6	8.2	1025.1	34.2
17	int16|none|[T][S][L]Cache|tricameral|simd	15.3	4.7	8.1	539.1	34.9
18	uint2|none|[T][S][L]Cache|tricameral|simd	15.6	4.6	7.8	569.0	35.2
19	uint16|none|[T][S][L]Cache|tricameral|simd	15.6	4.5	7.7	584.0	34.8
20	uint8|none|[T][S]Sparse|tricameral|simd	22.1	4.1	7.6	876.1	33.3

Top scores



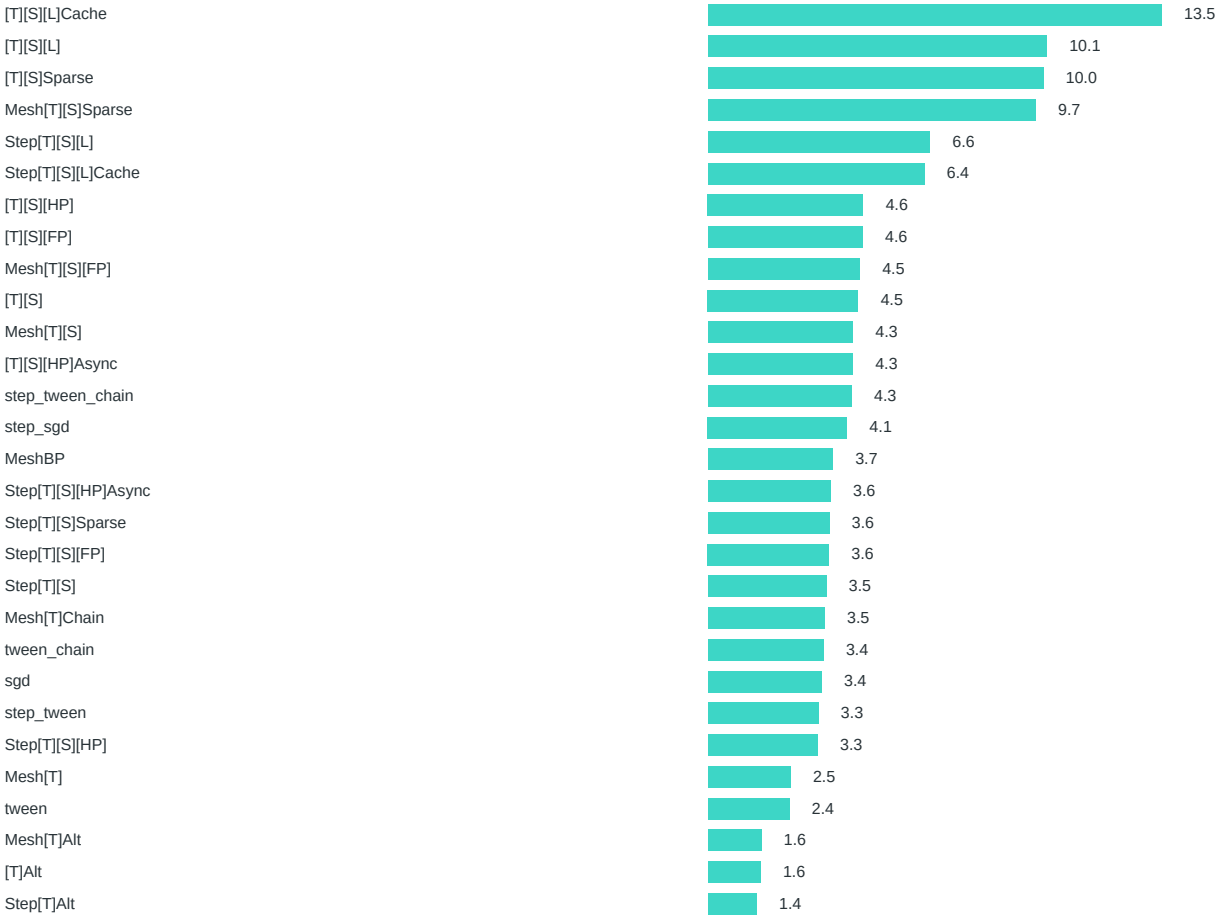
Best settings per mode



Best settings per mode



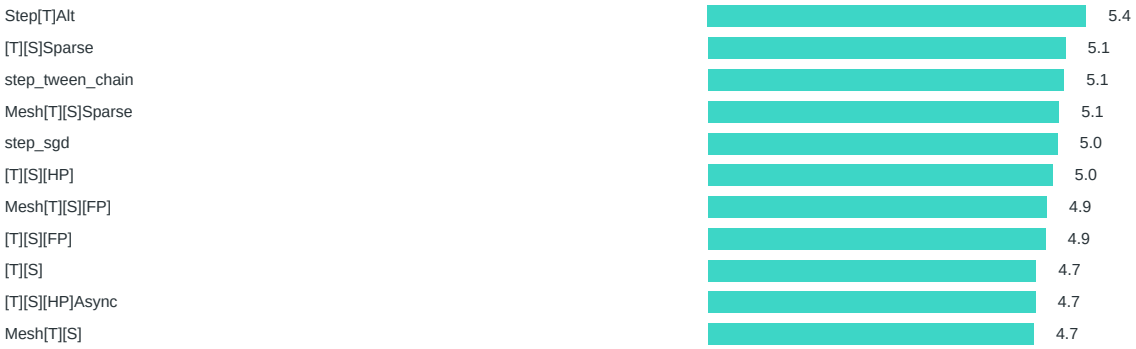
Mean Score by train mode



Mean hard Acc by train mode



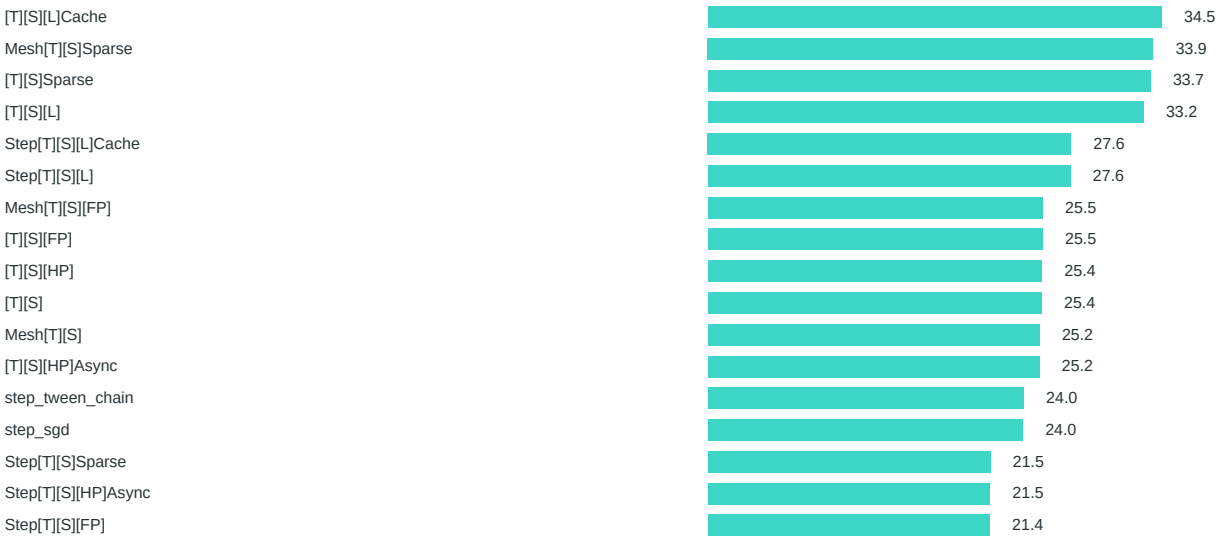
Mean hard Acc by train mode



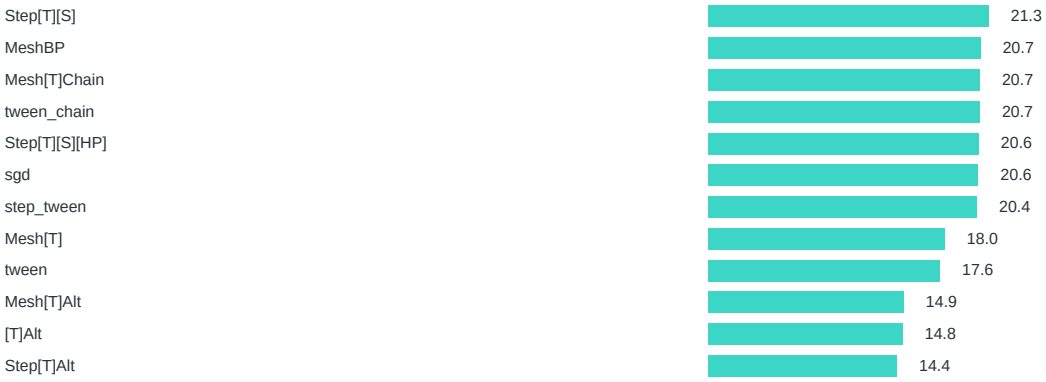
Mean SoftAcc by train mode



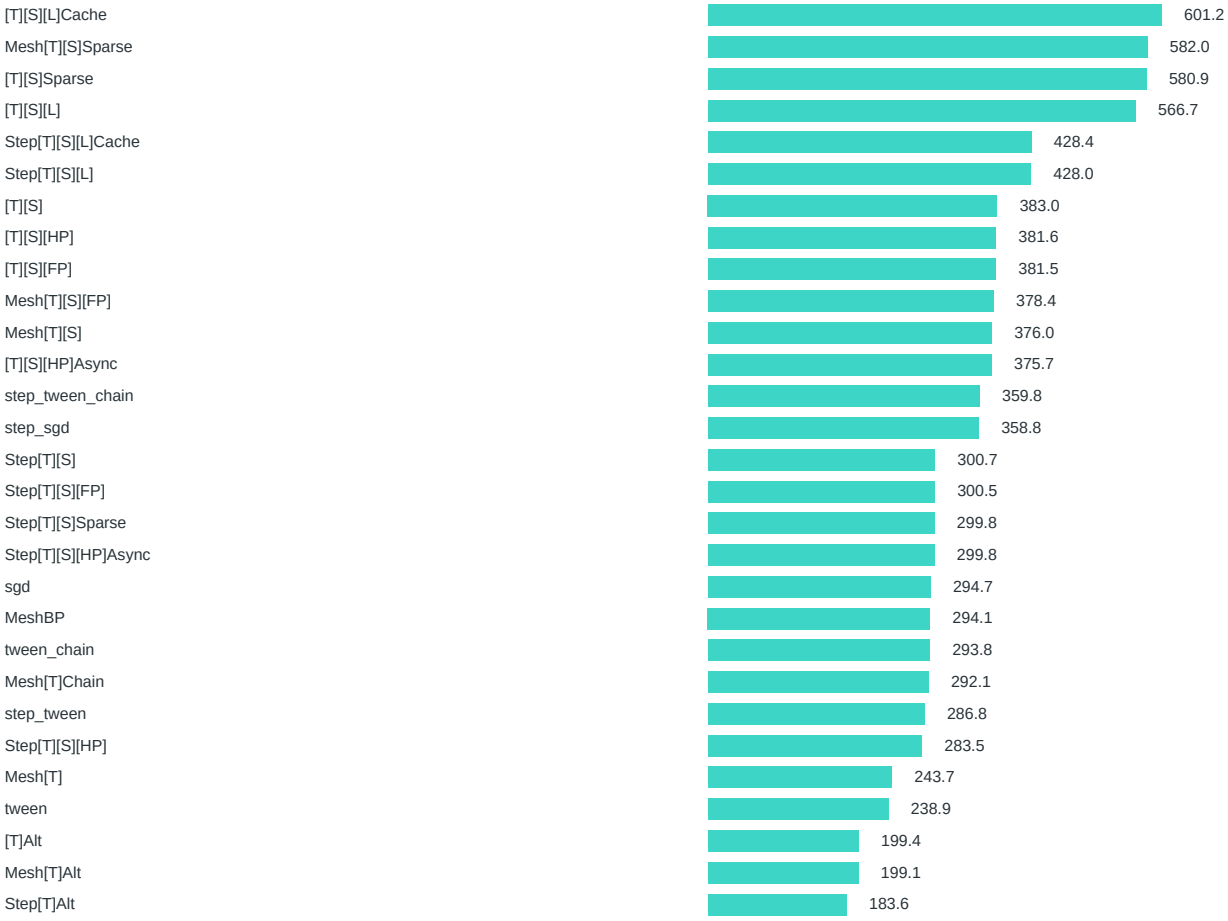
Mean Availability by train mode



Mean Availability by train mode



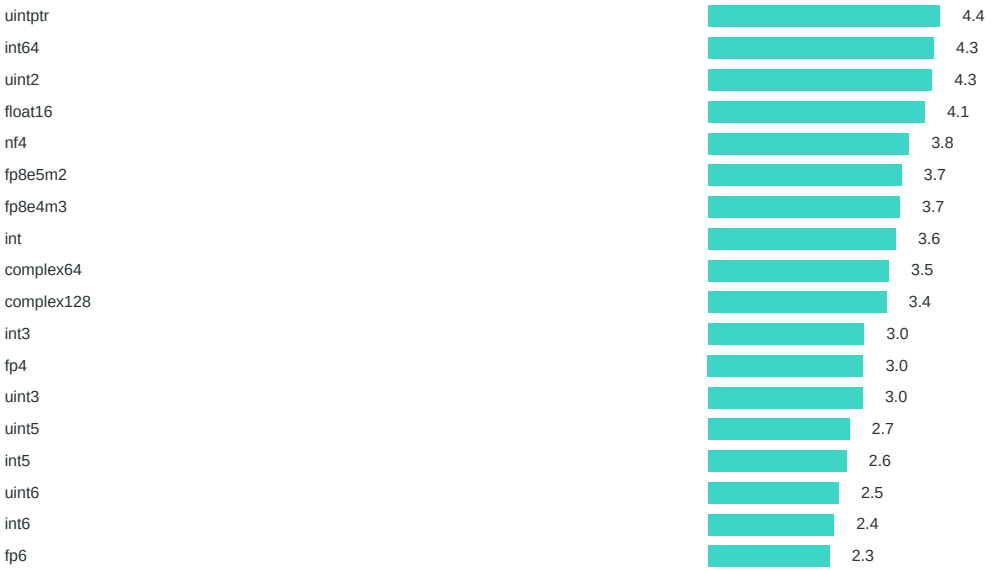
Mean Throughput by train mode



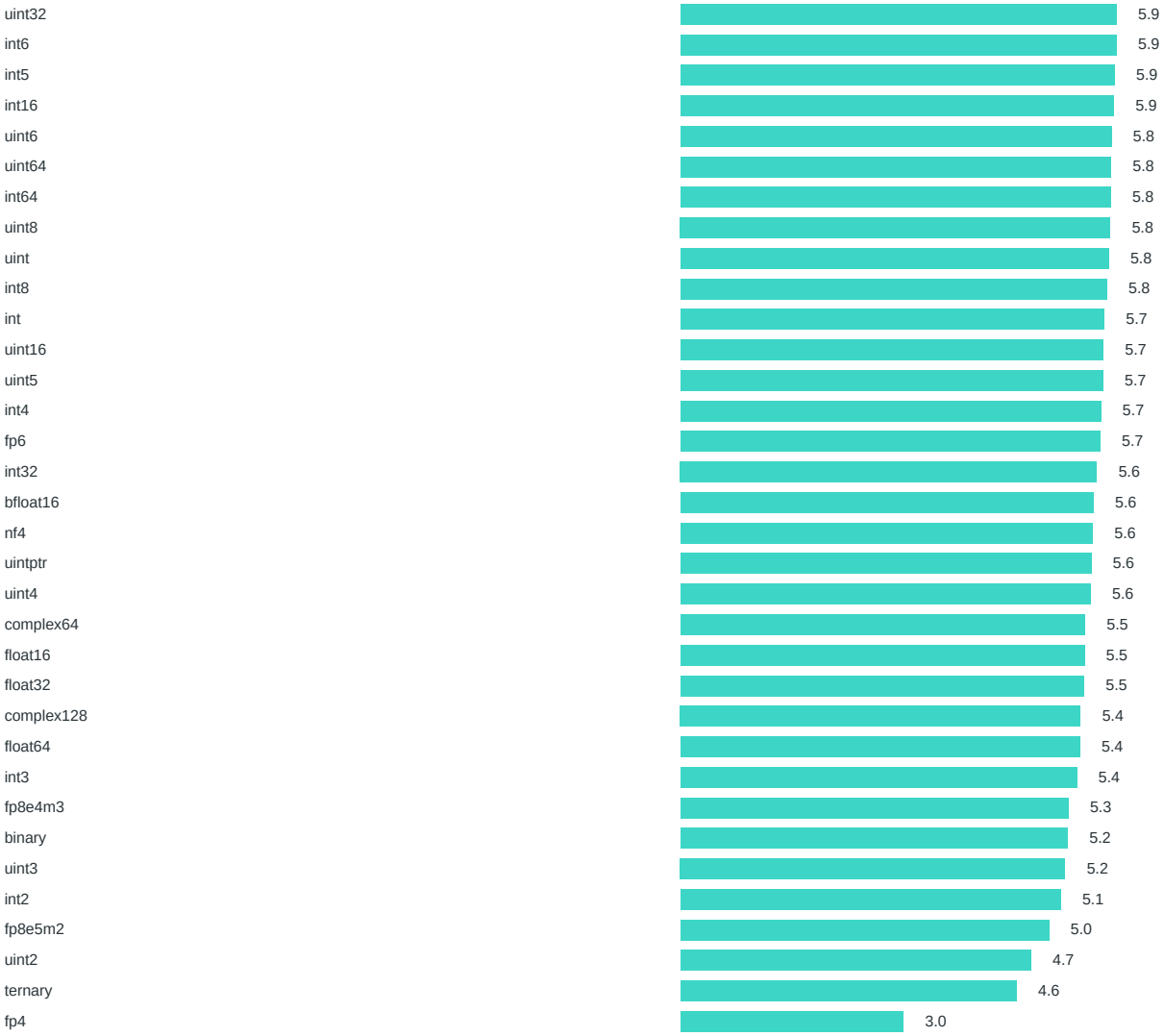
Mean Score by dtype



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	4	5	3	3	3	6	5	2	2	2	3	2
Mesh[T]	5	1	4	4	4	7	4	1	1	3	3	3
Mesh[T]Alt	2	2	1	1	1	3	2	2	1	1	1	1
Mesh[T]Chain	5	5	3	2	3	6	4	2	2	2	3	3
Mesh[T][S]	3	7	2	2	3	4	3	4	2	4	3	4
Mesh[T][S][FP]	3	9	2	2	3	4	3	3	3	3	3	2
Mesh[T][S]Sparse	8	19	3	4	5	10	7	7	5	6	4	4
Step[T]Alt	3	1	2	2	3	4	4	1	1	1	2	2
Step[T][S]	8	4	4	5	5	11	7	2	1	4	5	5
Step[T][S][FP]	6	3	5	5	6	11	8	2	2	4	5	5
Step[T][S][HP]	7	2	5	5	6	9	6	2	1	4	4	4
Step[T][S][HP]Async	8	4	6	5	5	11	7	2	1	5	6	4
Step[T][S][L]	17	7	9	8	9	18	13	4	2	7	9	8
Step[T][S][L]Cache	12	6	8	8	11	20	12	4	2	8	8	9
Step[T][S]Sparse	8	4	5	5	6	8	7	2	1	5	5	5
[T]Alt	2	2	1	1	1	3	2	2	1	1	2	1
[T][S]	3	8	3	3	2	5	3	4	2	4	3	4
[T][S][FP]	3	8	2	2	3	5	4	3	3	3	2	2
[T][S][HP]	3	8	2	2	3	4	4	3	3	3	3	2
[T][S][HP]Async	3	8	2	2	3	4	3	3	3	2	3	2
[T][S][L]	7	20	4	4	5	10	7	7	5	8	5	5
[T][S][L]Cache	6	29	4	4	6	10	6	5	8	4	4	4
[T][S]Sparse	7	21	4	4	6	9	6	7	5	6	5	4
sgd	4	3	3	2	3	6	4	2	2	2	3	3
step_sgd	2	8	2	2	2	4	3	3	2	2	2	2
step_tween	7	1	4	4	5	10	8	2	1	4	4	4
step_tween_chain	2	7	2	2	2	4	3	3	3	3	2	1
tween	5	1	3	3	4	7	6	1	1	3	3	3
tween_chain	4	4	3	3	3	6	5	2	1	2	3	2

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	4	5	3	4	6	2	2	3	8	3	5	4
Mesh[T]	2	2	1	2	3	1	1	4	4	2	1	2
Mesh[T]Alt	2	2	1	2	2	1	1	1	3	1	2	1
Mesh[T]Chain	3	5	2	4	6	2	2	3	6	3	5	4
Mesh[T][S]	5	6	3	4	7	3	2	4	9	4	6	4
Mesh[T][S][FP]	6	8	4	5	9	3	3	2	7	5	7	6
Mesh[T][S]Sparse	11	22	7	11	21	6	6	5	17	10	18	11
Step[T]Alt	1	1	1	1	1	1	1	2	2	1	1	1
Step[T][S]	4	2	1	3	5	1	1	6	5	2	2	3
Step[T][S][FP]	3	2	1	3	5	2	1	6	5	2	2	3
Step[T][S][HP]	3	2	1	3	5	2	1	6	5	1	1	3
Step[T][S][HP]Async	3	2	1	3	4	2	1	6	4	2	2	3
Step[T][S][L]	5	4	3	5	9	2	2	12	9	3	6	5
Step[T][S][L]Cache	6	5	2	5	8	3	2	10	10	3	4	5
Step[T][S]Sparse	4	2	1	3	4	2	2	6	4	2	2	2
[T]Alt	2	2	1	2	2	1	1	1	3	1	2	1
[T][S]	5	6	3	4	7	3	3	4	9	4	7	4
[T][S][FP]	6	8	4	5	9	3	3	3	9	6	5	4
[T][S][HP]	6	8	3	4	8	3	3	3	8	3	7	5
[T][S][HP]Async	5	9	4	5	7	3	3	2	8	4	6	5
[T][S][L]	12	20	7	11	19	6	5	6	19	9	20	10
[T][S][L]Cache	15	28	10	16	29	8	7	6	33	12	30	16
[T][S]Sparse	12	22	7	12	19	6	5	4	23	9	17	10
sgd	4	6	2	4	5	2	2	3	4	3	3	3
step_sgd	6	7	3	5	7	3	3	2	8	4	5	4
step_tween	3	2	1	3	3	2	1	5	6	2	2	3
step_tween_chain	4	7	4	4	8	3	2	2	10	5	7	5
tween	2	2	1	2	2	1	1	4	4	1	1	2
tween_chain	4	6	2	4	5	2	2	3	7	3	3	4

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	4	4	3	5	4	2	2	5	6	4
Mesh[T]	2	1	1	2	2	1	1	2	4	2
Mesh[T]Alt	2	2	1	2	2	1	1	2	3	1
Mesh[T]Chain	4	4	2	3	4	2	2	4	3	3
Mesh[T][S]	5	5	3	5	5	2	3	5	8	4
Mesh[T][S][FP]	5	5	4	6	5	4	3	6	8	5
Mesh[T][S]Sparse	12	13	7	12	9	6	6	12	19	10
Step[T]Alt	1	1	1	1	1	1	1	1	2	1
Step[T][S]	3	1	2	3	2	2	1	3	5	3
Step[T][S][FP]	4	1	1	3	3	2	1	3	4	3
Step[T][S][HP]	3	1	1	3	3	1	1	3	5	2
Step[T][S][HP]Async	3	2	1	3	3	2	2	3	5	3
Step[T][S][L]	6	3	3	6	6	3	3	6	9	5
Step[T][S][L]Cache	6	3	3	7	6	3	2	5	8	5
Step[T][S]Sparse	3	2	2	3	3	1	2	3	5	3
[T]Alt	2	1	1	2	2	1	1	2	3	1
[T][S]	5	5	3	6	6	3	2	5	7	5
[T][S][FP]	6	5	3	6	7	3	3	6	9	4
[T][S][HP]	6	6	4	7	5	3	3	6	8	5
[T][S][HP]Async	5	5	3	5	5	3	3	5	9	4
[T][S][L]	13	12	7	12	12	6	6	14	19	11
[T][S][L]Cache	16	16	10	20	20	9	8	18	27	16
[T][S]Sparse	12	10	8	12	13	6	5	11	22	9
sgd	4	4	3	4	5	2	2	4	6	2
step_sgd	4	4	3	5	5	3	3	5	10	5
step_tween	3	1	1	3	3	2	1	3	5	3
step_tween_chain	5	5	3	6	5	3	3	6	9	6
tween	2	1	1	2	2	1	1	3	4	2
tween_chain	4	4	1	4	4	2	2	4	5	3

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	5	7	5	6	5	5	6	3	6	4	5	5
Mesh[T]	9	2	9	10	8	9	8	2	5	9	8	10
Mesh[T]Alt	3	7	2	2	3	3	3	6	7	3	3	5
Mesh[T]Chain	6	7	5	4	6	5	5	3	6	4	5	5
Mesh[T][S]	3	5	3	3	3	3	3	4	5	4	3	5
Mesh[T][S][FP]	2	7	2	3	3	3	3	2	6	3	3	3
Mesh[T][S]Sparse	3	6	2	3	3	3	3	3	6	3	2	3
Step[T]Alt	9	3	8	9	11	8	10	2	5	7	8	8
Step[T][S]	10	4	8	8	8	9	8	3	5	7	8	10
Step[T][S][FP]	7	4	10	9	9	10	9	3	6	8	9	10
Step[T][S][HP]	10	3	9	9	10	9	8	3	4	8	8	9
Step[T][S][HP]Async	9	5	10	10	8	10	9	3	5	9	10	9
Step[T][S][L]	11	4	9	9	8	8	9	3	4	8	8	9
Step[T][S][L]Cache	8	3	8	9	9	9	8	3	5	9	8	10
Step[T][S]Sparse	10	4	9	9	10	8	9	3	5	9	8	9
[T]Alt	3	7	2	3	2	2	3	6	7	4	3	5
[T][S]	3	6	3	3	2	3	3	4	5	5	3	5
[T][S][FP]	2	6	2	3	3	3	3	3	6	3	3	3
[T][S][HP]	3	7	2	3	3	3	3	3	6	3	3	3
[T][S][HP]Async	3	7	2	3	3	3	3	3	7	2	3	3
[T][S][L]	3	7	3	3	3	2	3	3	7	5	3	3
[T][S][L]Cache	3	9	3	3	3	3	2	2	9	2	2	2
[T][S]Sparse	3	7	3	3	3	3	3	3	6	3	3	3
sgd	5	4	6	4	5	5	5	3	6	4	5	6
step_sgd	2	7	3	3	2	3	3	3	6	3	2	3
step_tween	10	2	8	9	9	9	9	3	5	8	7	8
step_tween_chain	2	7	3	2	3	3	2	3	7	3	3	2
tween	10	2	9	9	9	9	10	2	4	8	8	8
tween_chain	5	5	5	5	5	6	6	3	4	4	4	5

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	7	7	8	6	7	7	7	5	8	7	7	7
Mesh[T]	4	3	3	5	4	5	5	9	5	4	2	5
Mesh[T]Alt	7	7	8	7	7	8	6	5	8	8	8	7
Mesh[T]Chain	5	7	6	7	6	7	7	6	6	7	7	7
Mesh[T][S]	5	5	6	5	6	6	6	5	6	5	5	5
Mesh[T][S][FP]	7	7	6	6	7	6	6	2	5	6	6	7
Mesh[T][S]Sparse	6	7	6	6	7	6	6	3	5	7	6	7
Step[T]Alt	4	2	4	5	4	5	5	8	5	4	3	5
Step[T][S]	5	2	3	5	5	4	5	9	5	5	2	5
Step[T][S][FP]	5	2	3	5	5	5	5	9	4	4	2	5
Step[T][S][HP]	5	2	4	5	6	5	5	10	5	3	2	5
Step[T][S][HP]Async	5	2	4	5	5	5	4	10	4	4	2	5
Step[T][S][L]	5	2	4	4	4	4	5	11	4	4	3	5
Step[T][S][L]Cache	6	3	4	4	4	5	5	9	5	4	2	5
Step[T][S]Sparse	5	3	3	5	4	5	6	9	5	5	3	4
[T]Alt	7	8	7	7	6	7	7	5	8	8	7	7
[T][S]	5	5	6	5	6	6	5	4	6	6	5	5
[T][S][FP]	6	7	6	5	7	5	7	3	6	7	4	5
[T][S][HP]	6	7	5	5	6	6	7	3	5	4	6	6
[T][S][HP]Async	5	7	7	6	6	5	6	2	6	5	5	5
[T][S][L]	7	7	7	6	6	7	7	3	7	7	7	6
[T][S][L]Cache	8	8	8	8	8	8	8	3	9	8	9	9
[T][S]Sparse	7	7	7	7	6	6	5	2	7	6	5	6
sgd	7	7	7	7	6	6	7	5	4	7	4	5
step_sgd	7	7	6	6	6	7	7	3	5	7	5	6
step_tween	6	2	3	5	4	5	5	9	6	3	2	6
step_tween_chain	5	7	7	5	7	6	6	2	7	7	7	6
tween	6	3	3	5	4	5	5	10	6	4	2	6
tween_chain	7	7	7	7	6	7	7	5	7	6	4	7

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	7	6	7	7	6	7	7	7	7	7
Mesh[T]	5	2	2	5	4	5	6	5	6	5
Mesh[T]Alt	8	7	8	7	7	7	8	7	8	7
Mesh[T]Chain	7	6	7	6	7	7	7	6	3	6
Mesh[T][S]	5	6	5	5	6	5	6	5	5	5
Mesh[T][S][FP]	5	5	6	6	5	7	5	6	6	6
Mesh[T][S]Sparse	6	7	6	6	5	6	7	6	7	6
Step[T]Alt	5	2	3	4	4	5	5	5	5	4
Step[T][S]	5	2	4	4	4	5	4	4	5	4
Step[T][S][FP]	5	2	3	4	4	5	4	5	5	5
Step[T][S][HP]	4	2	4	5	4	4	4	5	5	4
Step[T][S][HP]Async	5	2	3	5	4	4	5	5	5	5
Step[T][S][L]	5	2	4	5	5	5	5	5	5	5
Step[T][S][L]Cache	5	2	4	6	5	4	5	4	4	5
Step[T][S]Sparse	5	3	4	5	4	4	6	5	5	5
[T]Alt	8	7	8	8	7	7	8	7	7	8
[T][S]	5	5	6	6	6	5	5	5	5	5
[T][S][FP]	6	5	6	7	7	5	5	6	6	5
[T][S][HP]	7	6	6	7	5	6	7	6	5	6
[T][S][HP]Async	5	5	5	6	6	6	6	6	7	5
[T][S][L]	7	7	7	6	7	7	7	8	7	7
[T][S][L]Cache	8	8	8	9	10	8	8	8	8	8
[T][S]Sparse	6	6	7	6	7	6	5	6	8	6
sgd	7	7	7	7	7	7	6	7	7	4
step_sgd	5	5	6	6	6	7	7	6	7	6
step_tween	5	3	2	5	4	5	5	5	5	6
step_tween_chain	5	7	6	6	6	6	7	7	6	7
tween	5	2	2	6	4	4	5	6	6	5
tween_chain	7	7	3	7	6	7	6	6	5	6

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	5	4	5	6	5	5	6	2	4	4	5	5
Mesh[T]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	0	6	0	0	0	0	0	5	6	3	0	5
Mesh[T]Chain	6	4	5	4	6	5	5	2	4	4	5	5
Mesh[T][S]	0	4	0	0	0	0	0	4	4	4	0	5
Mesh[T][S][FP]	0	5	0	0	0	0	0	2	4	2	0	2
Mesh[T][S]Sparse	0	4	0	0	0	0	0	2	4	2	0	2
Step[T]Alt	2	2	2	2	3	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
[T]Alt	0	5	0	0	0	0	0	5	6	4	0	5
[T][S]	0	4	0	0	0	0	0	4	4	5	0	5
[T][S][FP]	0	4	0	0	0	0	0	2	4	2	0	2
[T][S][HP]	0	4	0	0	0	0	0	2	4	2	0	2
[T][S][HP]Async	0	4	0	0	0	0	0	2	4	2	0	2
[T][S][L]	0	4	0	0	0	0	0	2	4	5	0	2
[T][S][L]Cache	0	5	0	0	0	0	0	2	5	2	0	2
[T][S]Sparse	0	4	0	0	0	0	0	2	4	2	0	2
sgd	5	3	6	4	5	5	5	2	4	4	4	6
step_sgd	0	4	0	0	0	0	0	2	4	2	0	2
step_tween	2	2	2	2	2	2	2	2	2	2	2	2
step_tween_chain	0	4	0	0	0	0	0	2	4	2	0	2
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	5	3	5	5	5	6	6	2	2	4	3	5

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	4	5	5	3	4	4	4	5	4	4	4	4
Mesh[T]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	6	5	6	6	6	6	5	5	7	6	6	6
Mesh[T]Chain	2	5	5	4	4	4	4	6	4	4	5	4
Mesh[T][S]	4	4	4	4	4	4	4	5	4	4	4	4
Mesh[T][S][FP]	5	5	4	4	4	4	4	2	3	4	4	4
Mesh[T][S]Sparse	4	4	4	4	4	4	4	2	3	4	3	4
Step[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
[T]Alt	6	6	6	6	6	5	6	5	6	6	6	6
[T][S]	4	4	4	4	4	4	4	4	4	4	4	4
[T][S][FP]	4	4	4	3	4	3	5	2	4	5	2	3
[T][S][HP]	3	4	4	3	4	4	4	2	4	3	3	4
[T][S][HP]Async	3	5	5	3	3	3	3	2	3	3	2	3
[T][S][L]	5	5	4	4	5	5	5	2	4	5	4	4
[T][S][L]Cache	5	5	4	5	5	5	5	2	5	4	5	5
[T][S]Sparse	4	5	4	4	4	3	3	2	4	4	3	4
sgd	4	4	4	4	3	4	4	5	2	4	2	3
step_sgd	4	5	4	4	4	4	4	2	3	4	3	4
step_tween	2	2	2	2	2	2	2	2	2	2	2	2
step_tween_chain	3	4	4	3	4	4	4	2	4	4	4	3
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	4	5	4	4	4	4	5	5	4	4	2	4

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	5	4	4	4	4	4	4	5	4	4
Mesh[T]	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	6	6	7	6	6	5	6	6	6	6
Mesh[T]Chain	4	4	4	4	4	5	4	4	1	3
Mesh[T][S]	4	4	4	4	4	4	4	4	4	4
Mesh[T][S][FP]	3	3	3	3	3	4	3	3	4	4
Mesh[T][S]Sparse	4	4	4	4	3	4	4	3	3	4
Step[T]Alt	2	2	2	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
[T]Alt	6	5	6	6	6	6	6	6	6	6
[T][S]	4	4	4	4	4	4	4	4	4	4
[T][S][FP]	4	3	4	4	4	3	3	4	4	3
[T][S][HP]	4	4	4	4	4	4	4	4	3	4
[T][S][HP]Async	2	3	3	3	3	3	3	3	4	3
[T][S][L]	4	5	4	4	5	5	5	5	5	4
[T][S][L]Cache	4	5	5	5	5	5	5	5	5	5
[T][S]Sparse	3	3	4	4	4	4	3	4	4	3
sgd	4	4	4	4	4	4	4	4	4	2
step_sgd	3	3	4	4	4	4	4	3	4	3
step_tween	2	2	2	2	2	2	2	2	2	2
step_tween_chain	3	4	3	4	3	4	4	4	4	4
tween	2	2	2	2	2	2	2	2	2	2
tween_chain	4	4	1	4	4	4	4	4	3	4

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	21	18	22	21	21	20	21	20	21	20	20	21
Mesh[T]	18	16	19	19	18	18	18	17	19	18	18	19
Mesh[T]Alt	21	11	20	21	21	21	20	13	14	15	21	14
Mesh[T]Chain	20	18	21	20	21	21	22	20	21	22	21	21
Mesh[T][S]	25	22	26	26	25	24	25	23	27	26	25	26
Mesh[T][S][FP]	24	22	26	26	25	24	26	24	27	26	25	27
Mesh[T][S]Sparse	33	32	34	34	34	33	34	33	35	34	33	34
Step[T]Alt	14	11	15	15	15	15	15	14	15	14	14	15
Step[T][S]	21	19	22	22	21	21	22	21	22	23	21	22
Step[T][S][FP]	21	19	22	23	22	21	22	20	22	22	21	22
Step[T][S][HP]	20	17	22	21	21	20	22	20	21	21	21	21
Step[T][S][HP]Async	21	19	22	23	22	21	22	21	22	23	22	22
Step[T][S][L]	28	27	28	28	28	28	28	27	28	28	28	27
Step[T][S][L]Cache	28	27	28	28	28	28	28	27	27	28	27	28
Step[T][S]Sparse	21	20	22	23	22	20	22	21	21	23	21	22
[T]Alt	21	11	20	20	21	20	20	13	14	15	21	14
[T][S]	24	23	26	26	25	24	25	24	26	25	26	27
[T][S][FP]	24	23	26	26	25	24	26	24	27	26	25	26
[T][S][HP]	24	22	26	26	25	24	25	24	27	25	25	27
[T][S][HP]Async	24	22	26	26	25	23	25	24	26	25	26	27
[T][S][L]	33	31	34	34	34	34	34	34	33	34	33	35
[T][S][L]Cache	33	34	34	34	34	34	34	34	35	35	33	36
[T][S]Sparse	33	33	34	33	34	33	33	33	35	34	33	34
sgd	20	18	21	21	20	20	20	20	21	20	21	21
step_sgd	23	22	24	25	23	24	25	22	25	24	24	25
step_tween	20	17	21	21	21	20	21	20	21	21	20	21
step_tween_chain	22	21	25	25	24	24	25	22	25	25	24	25
tween	17	15	18	18	18	17	18	17	18	18	18	19
tween_chain	19	19	21	21	20	20	21	21	21	21	21	20

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	21	18	21	22	19	22	21	21	21	21	18	21
Mesh[T]	18	16	19	19	16	19	18	19	18	19	15	18
Mesh[T]Alt	14	11	14	14	12	14	14	14	13	14	11	14
Mesh[T]Chain	21	18	21	21	19	22	22	21	20	21	18	21
Mesh[T][S]	26	22	27	26	22	26	26	25	25	26	22	26
Mesh[T][S][FP]	26	22	27	26	22	27	27	26	24	26	22	26
Mesh[T][S]Sparse	34	32	35	34	33	35	35	34	33	34	33	34
Step[T]Alt	15	12	15	16	12	14	15	15	14	15	11	15
Step[T][S]	22	19	22	22	20	22	22	22	20	21	19	22
Step[T][S][FP]	22	19	22	22	19	22	22	22	21	22	19	22
Step[T][S][HP]	22	18	21	21	18	21	21	22	20	21	17	21
Step[T][S][HP]Async	22	19	22	22	19	22	22	22	20	22	19	22
Step[T][S][L]	28	25	28	28	27	27	27	28	27	27	27	27
Step[T][S][L]Cache	28	26	27	28	27	28	27	28	28	27	26	28
Step[T][S]Sparse	23	19	22	22	19	22	22	22	20	22	19	22
[T]Alt	15	11	14	14	12	14	14	14	13	14	11	13
[T][S]	27	22	26	26	22	27	27	26	24	26	22	26
[T][S][FP]	26	22	26	26	23	27	27	27	24	26	23	26
[T][S][HP]	26	22	27	26	23	27	27	27	24	26	22	26
[T][S][HP]Async	26	22	27	26	23	27	27	26	24	26	22	26
[T][S][L]	33	31	33	33	32	32	33	34	32	32	31	33
[T][S][L]Cache	35	34	35	35	34	35	35	35	34	34	34	35
[T][S]Sparse	33	33	34	34	32	34	34	34	34	34	33	34
sgd	21	18	21	21	19	21	22	21	20	21	18	21
step_sgd	25	20	25	25	21	25	25	25	24	25	20	24
step_tween	21	18	21	21	19	21	21	21	21	21	17	21
step_tween_chain	25	20	25	25	21	25	25	25	24	25	21	25
tween	18	16	18	18	16	18	18	18	17	18	14	18
tween_chain	21	18	21	22	19	22	22	21	20	21	18	21

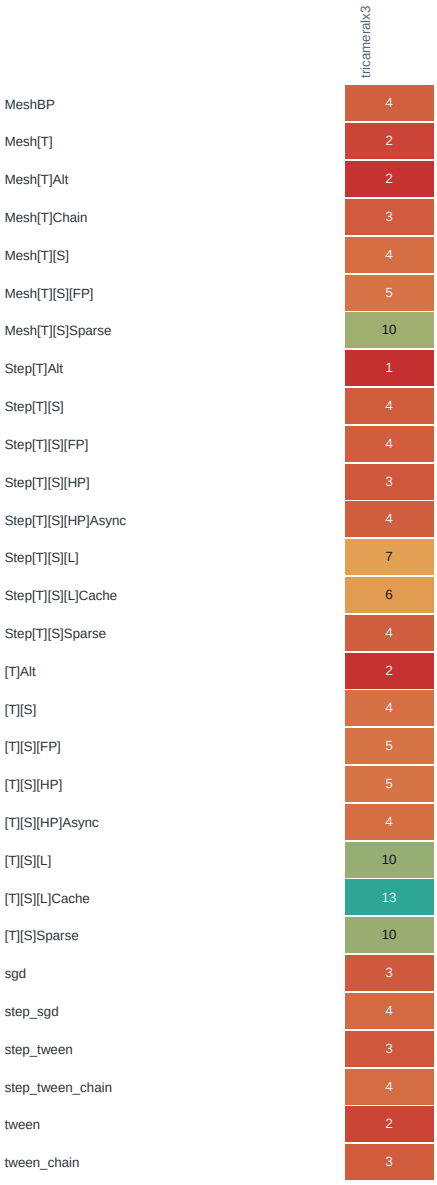
Honesty - mean Avail, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	21	21	21	22	21	21	22	21	21	21
Mesh[T]	19	18	18	18	18	18	18	18	18	18
Mesh[T]Alt	14	14	14	14	13	14	14	14	14	14
Mesh[T]Chain	21	21	21	20	21	21	21	21	21	21
Mesh[T][S]	26	25	26	26	26	26	27	26	25	26
Mesh[T][S][FP]	26	26	27	26	26	27	27	26	25	26
Mesh[T][S]Sparse	34	34	34	34	34	35	34	34	34	34
Step[T]Alt	15	14	15	15	15	15	14	15	15	15
Step[T][S]	22	21	22	22	22	21	22	22	21	22
Step[T][S][FP]	22	21	22	22	22	22	22	21	21	22
Step[T][S][HP]	21	21	21	21	21	21	21	21	21	21
Step[T][S][HP]Async	22	22	22	21	22	22	22	22	21	23
Step[T][S][L]	28	28	27	28	29	28	28	28	28	28
Step[T][S][L]Cache	28	28	27	28	29	27	27	29	27	28
Step[T][S]Sparse	22	21	22	22	22	22	22	22	21	22
[T]Alt	14	13	13	13	13	14	14	13	13	13
[T][S]	26	25	26	26	26	26	26	26	25	26
[T][S][FP]	26	26	26	26	26	27	27	26	25	27
[T][S][HP]	26	26	26	26	26	26	27	26	25	26
[T][S][HP]Async	26	25	26	26	26	26	26	25	24	26
[T][S][L]	34	33	33	33	34	33	33	34	32	34
[T][S][L]Cache	35	35	35	35	35	35	35	35	35	36
[T][S]Sparse	34	34	34	34	34	34	34	34	33	34
sgd	21	21	21	21	21	21	21	21	21	21
step_sgd	24	24	24	24	24	25	25	25	24	25
step_tween	21	21	21	21	21	20	21	21	21	21
step_tween_chain	24	24	25	24	24	24	25	25	25	25
tween	18	18	18	18	18	18	18	18	18	18
tween_chain	21	21	21	21	21	21	21	20	21	21

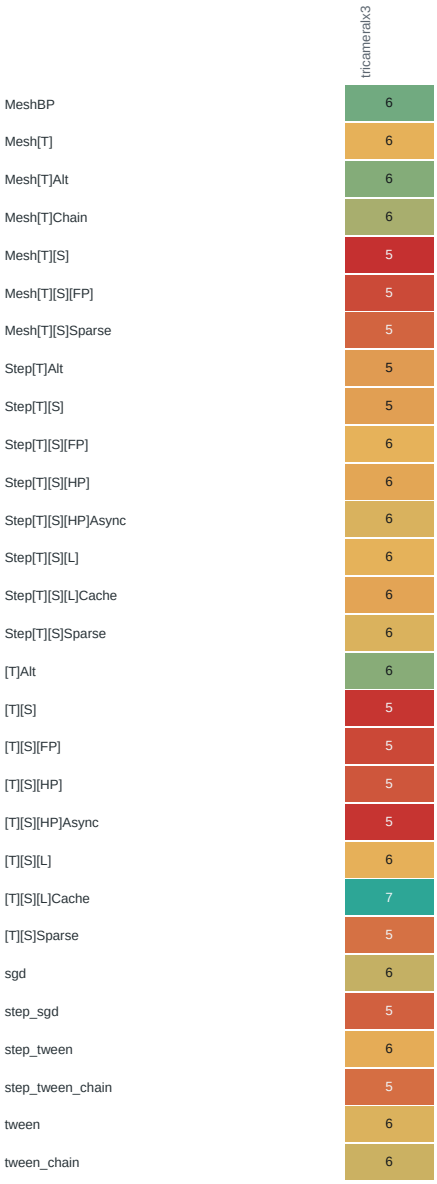
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

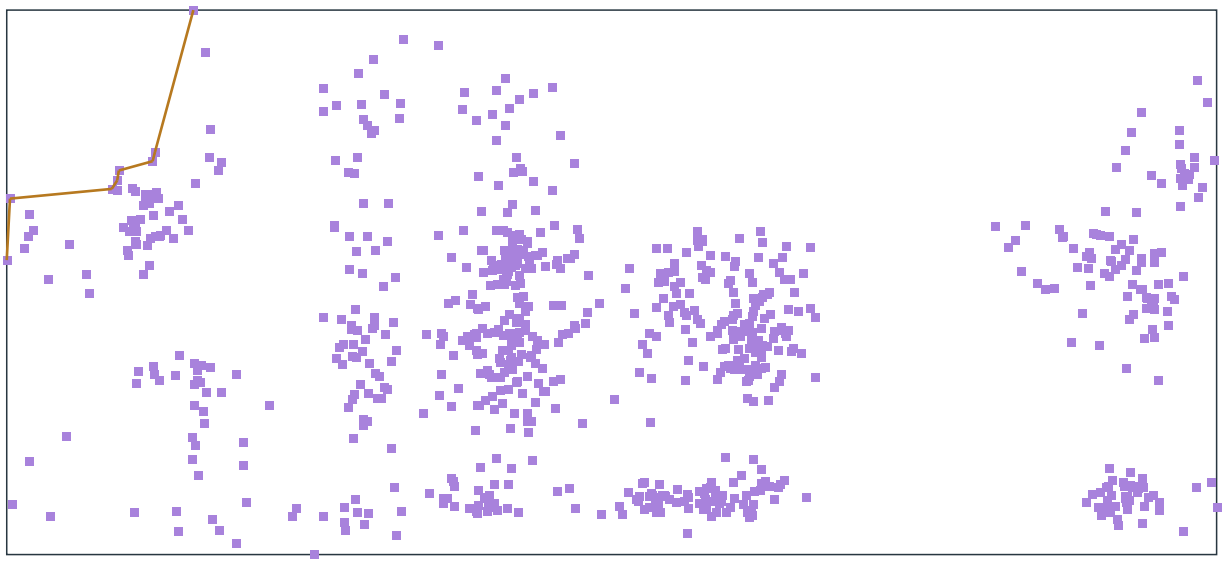


Mean Avail, every mode x arch

Mean Avail, every mode x arch

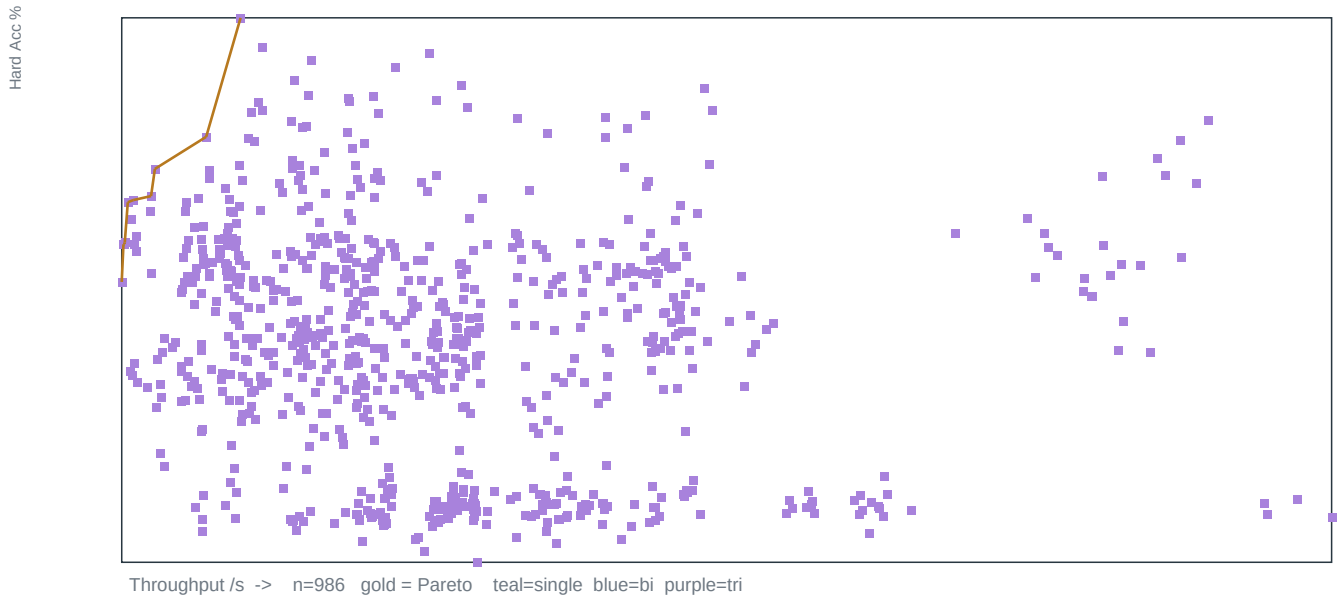
	tricameratx3
MeshBP	21
Mesh[T]	18
Mesh[T]Alt	15
Mesh[T]Chain	21
Mesh[T][S]	25
Mesh[T][S][FP]	25
Mesh[T][S]Sparse	34
Step[T]Alt	14
Step[T][S]	21
Step[T][S][FP]	21
Step[T][S][HP]	21
Step[T][S][HP]Async	21
Step[T][S][L]	28
Step[T][S][L]Cache	28
Step[T][S]Sparse	21
[T]Alt	15
[T][S]	25
[T][S][FP]	25
[T][S][HP]	25
[T][S][HP]Async	25
[T][S][L]	33
[T][S][L]Cache	35
[T][S]Sparse	34
sgd	21
step_sgd	24
step_tween	20
step_tween_chain	24
tween	18
tween_chain	21

Pillars - Availability vs hard Acc

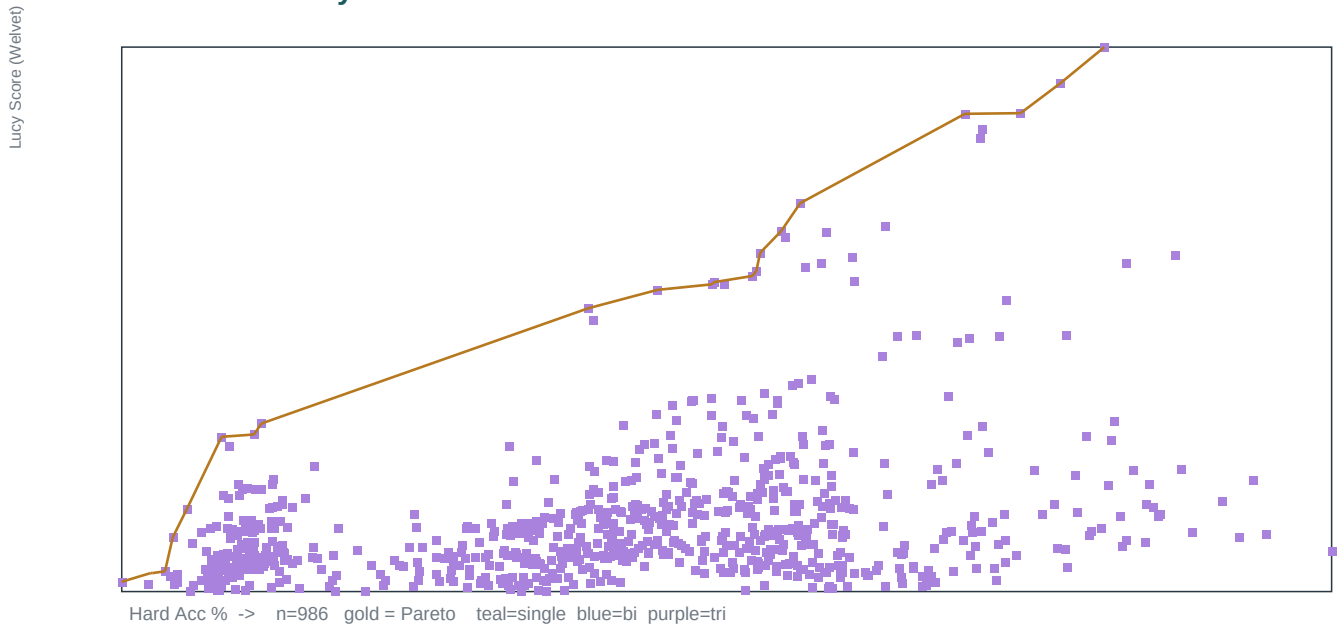



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

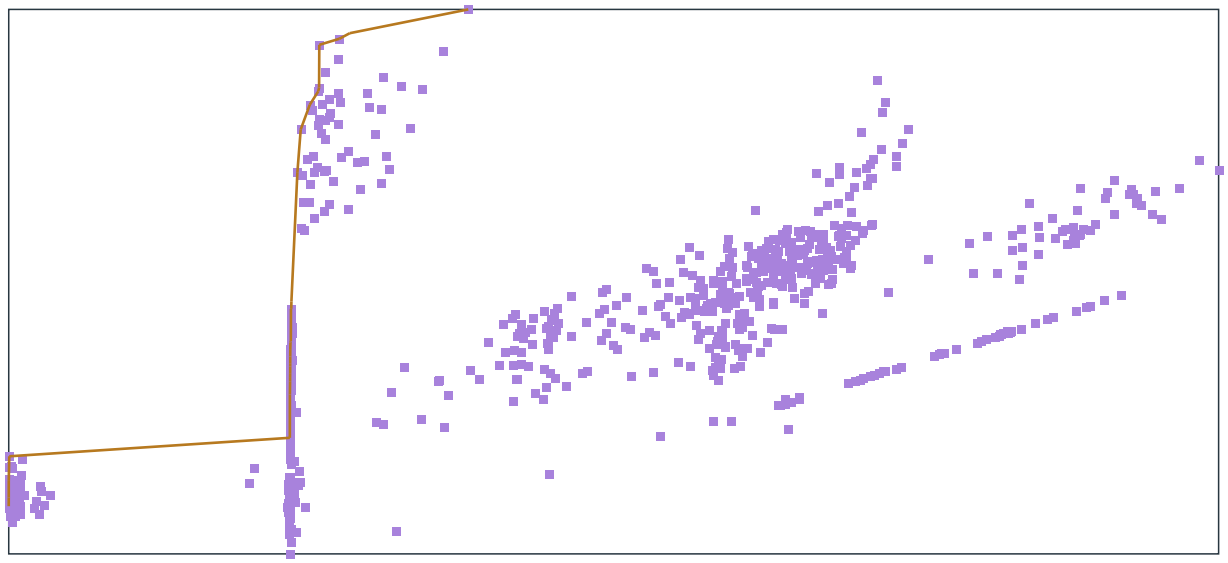
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

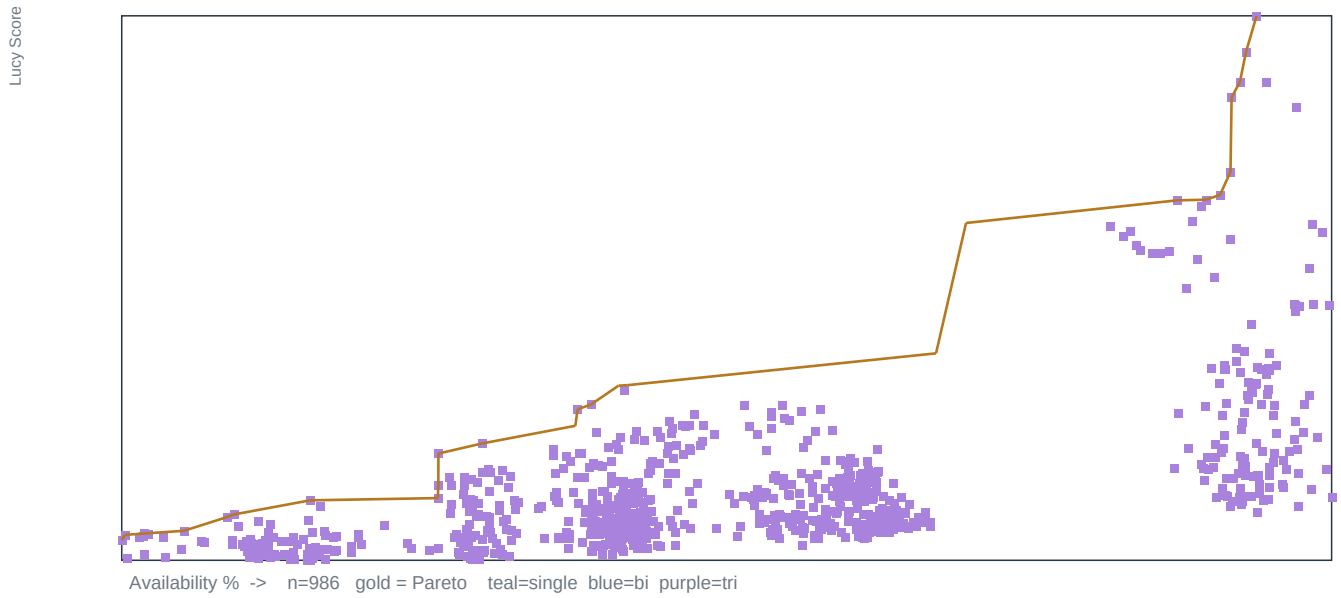


SoftAcc (serve-confidence) vs hard Acc

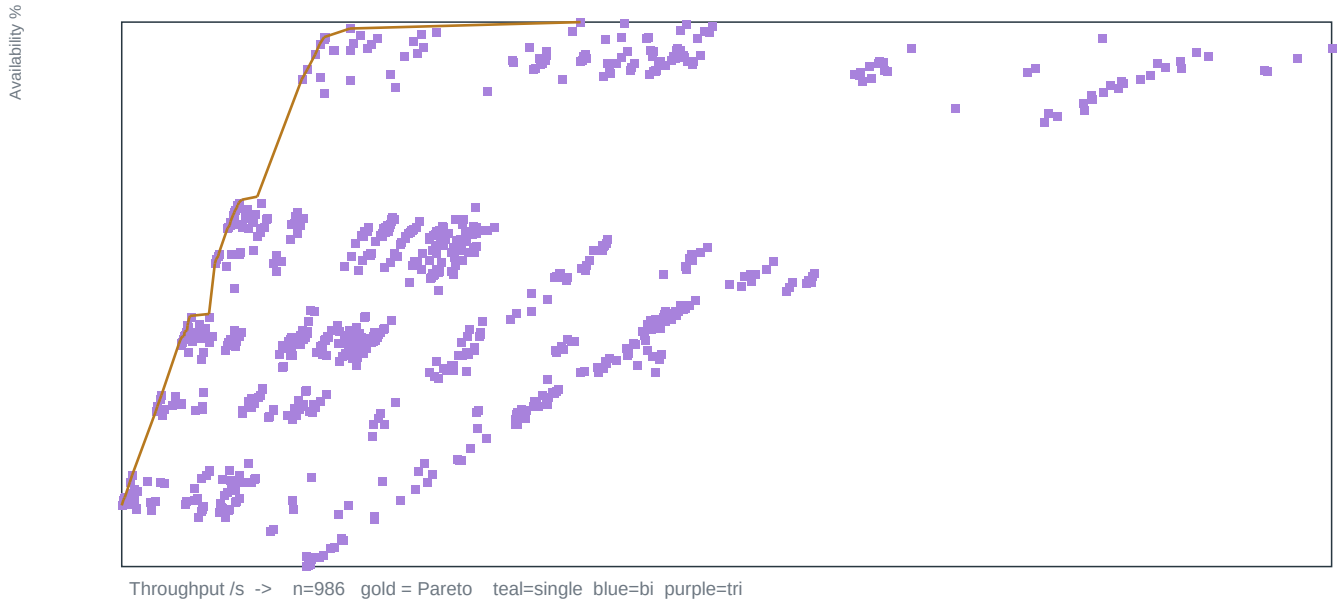



SoftAcc % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

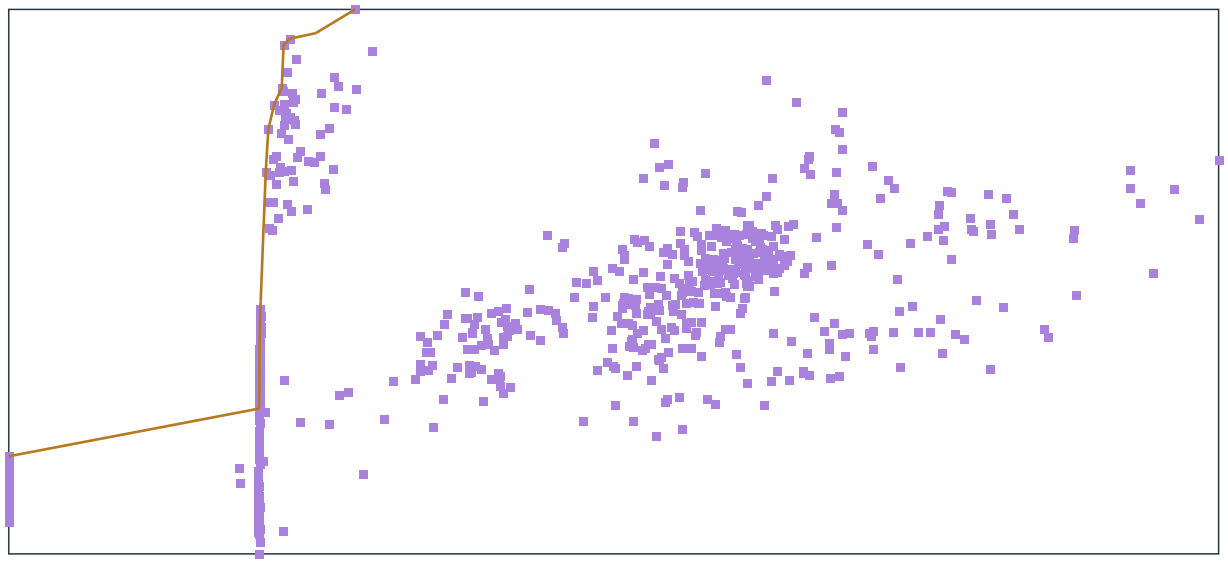
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



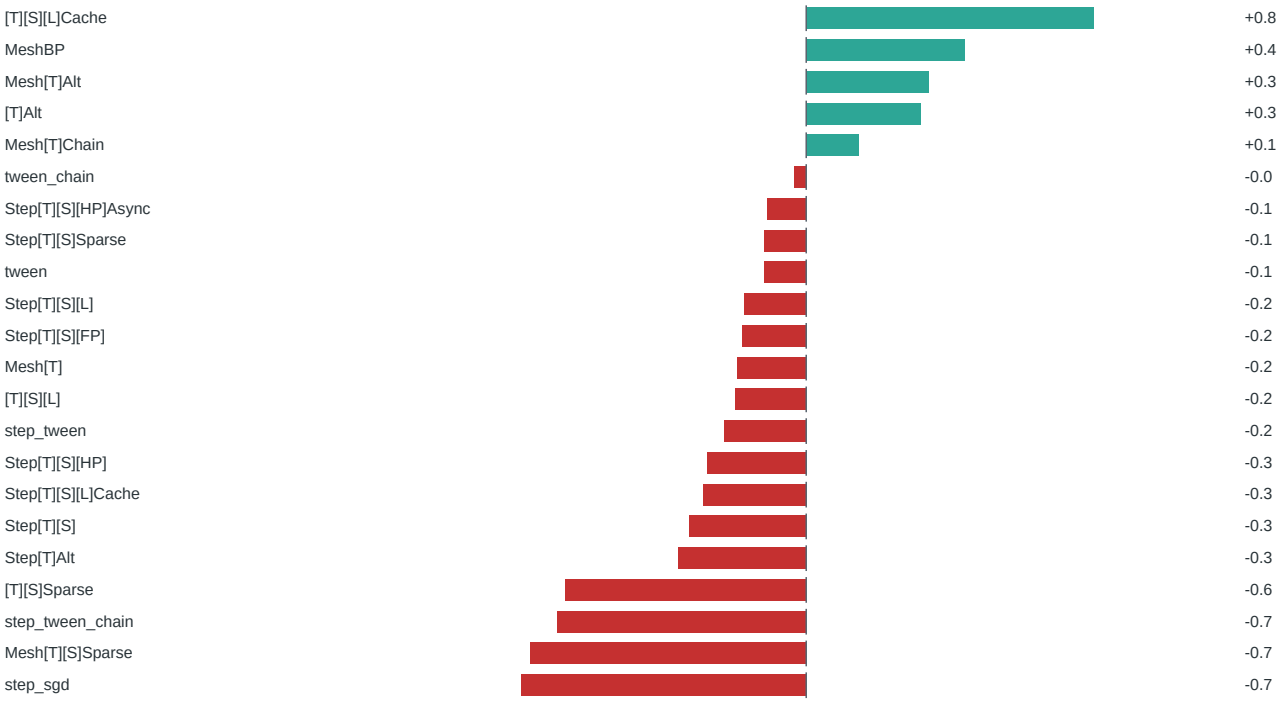

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

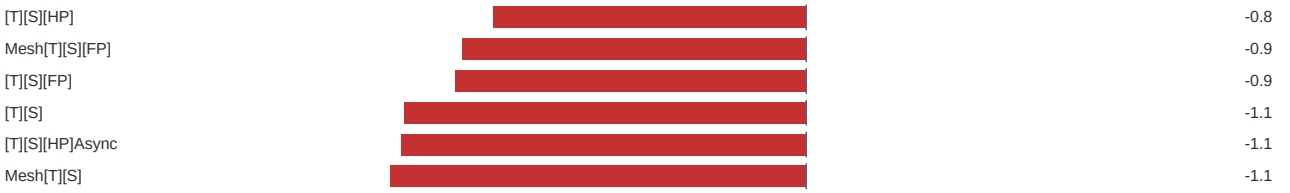
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
[T][S][L]Cache	34	+0.8	68	-0.7	+14.0	+306	+10.1	100
MeshBP	34	+0.4	29	+0.3	+0.2	-1	+0.3	15
Mesh[T]Alt	34	+0.3	47	+0.4	-5.7	-96	-1.8	0
[T]Alt	34	+0.3	59	+0.4	-5.8	-95	-1.8	0
Mesh[T]Chain	34	+0.1	26	+0.2	+0.1	-3	+0.1	12
tween_chain	34	-0.0	21	+0.0	+0.1	-1	+0.1	9
Step[T][S][HP]Async	34	-0.1	32	-2.4	+0.9	+5	+0.3	29
Step[T][S]Sparse	34	-0.1	32	-2.5	+0.9	+5	+0.2	29
tween	34	-0.1	35	-2.5	-2.9	-56	-1.0	15
Step[T][S][L]	34	-0.2	32	-2.5	+7.0	+133	+3.2	68
Step[T][S][FP]	34	-0.2	32	-2.5	+0.9	+6	+0.2	29
Mesh[T]	34	-0.2	35	-2.5	-2.6	-51	-0.9	9
[T][S][L]	34	-0.2	35	-0.8	+12.6	+272	+6.7	97
step_tween	34	-0.2	35	-2.5	-0.1	-8	-0.1	32
Step[T][S][HP]	34	-0.3	32	-2.5	+0.0	-11	-0.1	32
Step[T][S][L]Cache	34	-0.3	32	-2.5	+7.1	+134	+3.0	68
Step[T][S]	34	-0.3	32	-2.5	+0.8	+6	+0.1	29
Step[T]Alt	34	-0.3	35	-2.4	-6.2	-111	-1.9	0
[T][S]Sparse	34	-0.6	21	-1.4	+13.1	+286	+6.6	97
step_tween_chain	34	-0.7	21	-1.3	+3.5	+65	+0.9	41
Mesh[T][S]Sparse	34	-0.7	18	-1.4	+13.3	+287	+6.4	97
step_sgd	34	-0.7	21	-1.3	+3.4	+64	+0.8	38
[T][S][HP]	34	-0.8	18	-1.4	+4.9	+87	+1.2	53
Mesh[T][S][FP]	34	-0.9	15	-1.5	+4.9	+84	+1.1	50
[T][S][FP]	34	-0.9	12	-1.4	+4.9	+87	+1.2	50
[T][S]	34	-1.1	18	-0.9	+4.8	+88	+1.1	47
[T][S][HP]Async	34	-1.1	12	-1.8	+4.7	+81	+0.9	35
Mesh[T][S]	34	-1.1	18	-0.9	+4.7	+81	+0.9	35

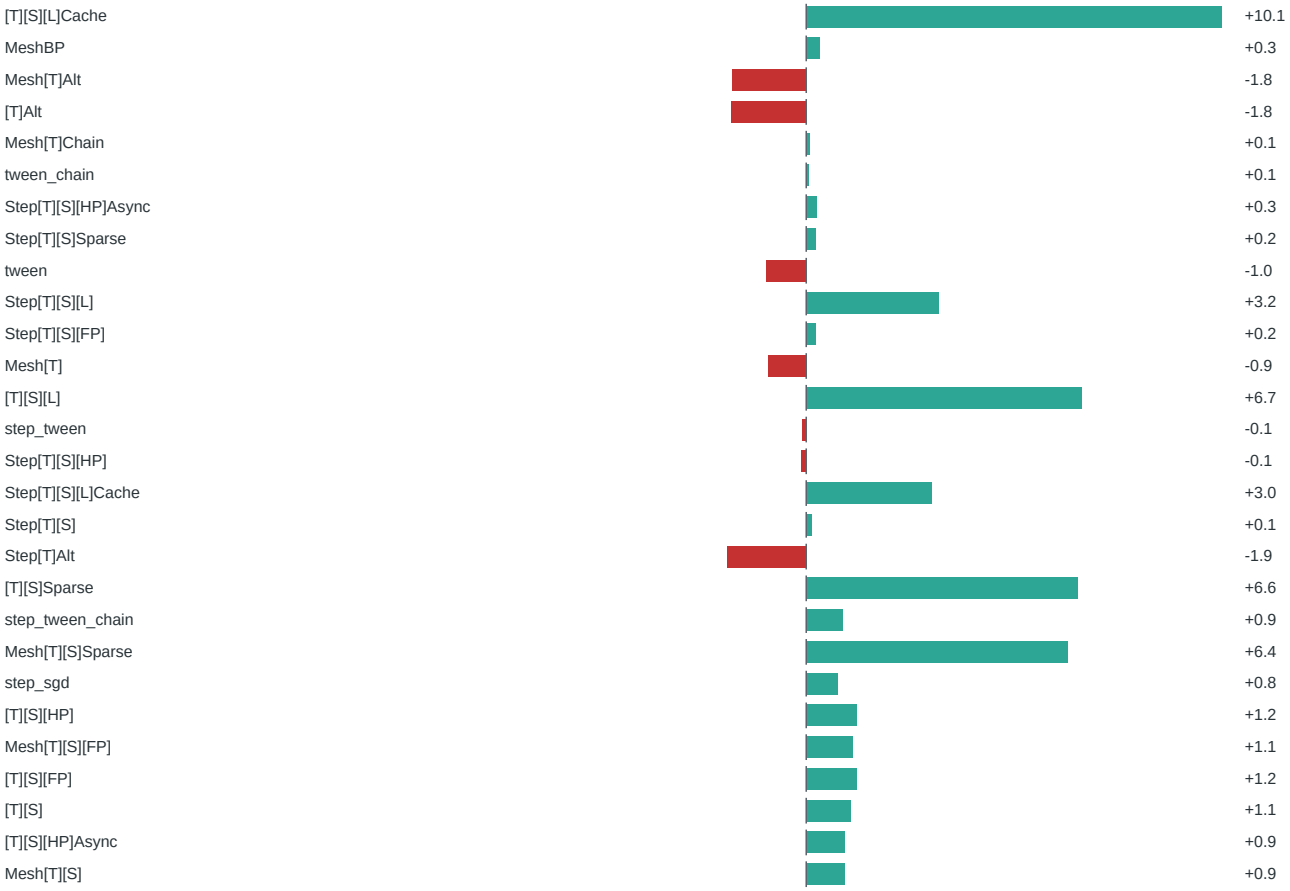
mean AccD vs sgd



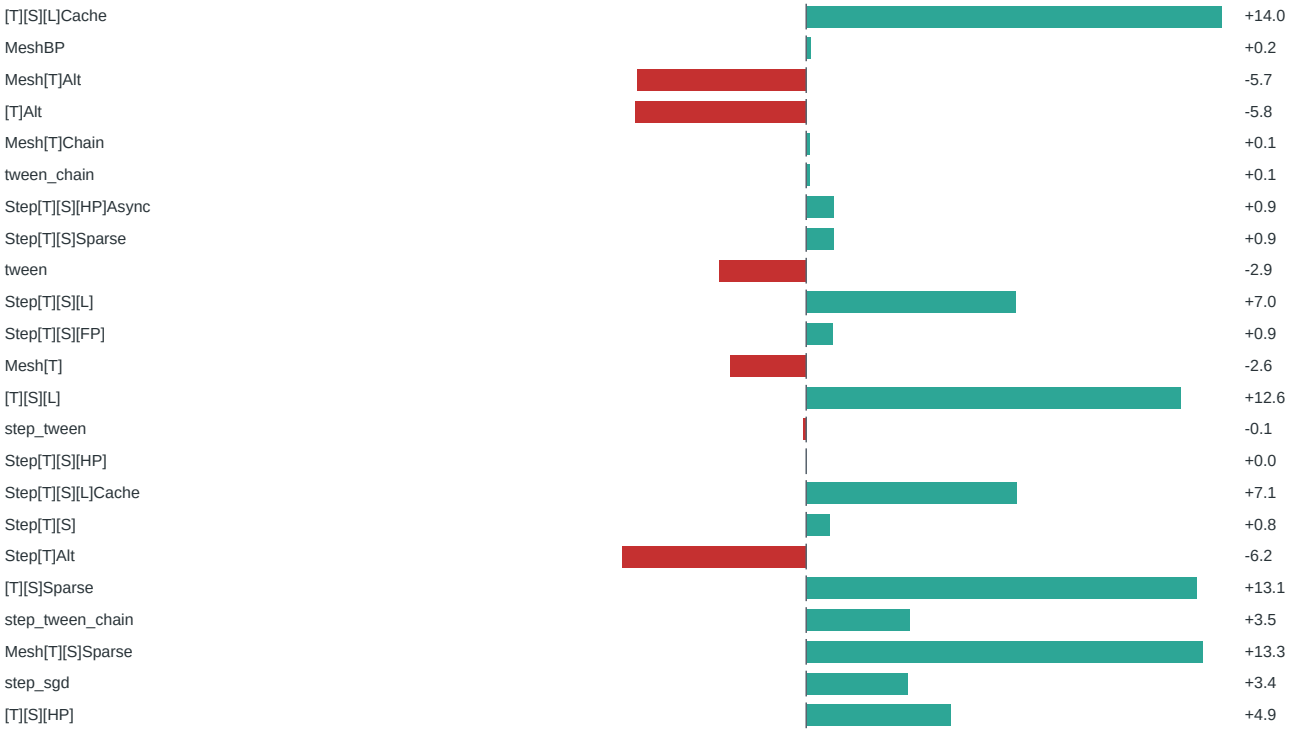
mean AccD vs sgd



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	+2	-1	+2	+0	+0	+0	-0	+0	+0	+1	-1
Mesh[T]	+4	-3	+4	+6	+3	+4	+3	-1	-2	+5	+3	+4
Mesh[T]Alt	-2	+2	-3	-2	-3	-2	-3	+3	+1	-1	-2	-1
Mesh[T]Chain	+0	+3	-0	-0	+1	+0	-1	-0	-0	+0	-0	-0
Mesh[T][S]	-3	+1	-3	-2	-3	-3	-3	+1	-1	+1	-2	-0
Mesh[T][S][FP]	-3	+3	-3	-1	-2	-3	-3	-1	-1	-1	-2	-3
Mesh[T][S]Sparse	-2	+2	-3	-2	-3	-3	-3	-0	-1	-1	-2	-3
Step[T]Alt	+3	-1	+3	+5	+6	+3	+5	-1	-1	+4	+3	+3
Step[T][S]	+4	-0	+2	+4	+3	+4	+2	-0	-1	+3	+3	+4
Step[T][S][FP]	+2	-0	+4	+5	+4	+4	+4	+0	-1	+5	+4	+4
Step[T][S][HP]	+4	-1	+4	+5	+5	+4	+2	-0	-3	+4	+3	+3
Step[T][S][HP]Async	+4	+0	+5	+5	+3	+4	+3	-0	-2	+5	+5	+3
Step[T][S][L]	+5	-1	+4	+5	+3	+3	+3	-0	-2	+4	+3	+3
Step[T][S][L]Cache	+3	-2	+2	+5	+4	+4	+3	-0	-1	+5	+3	+4
Step[T][S]Sparse	+4	-0	+3	+5	+4	+3	+3	-0	-1	+5	+3	+4
[T]Alt	-3	+3	-3	-1	-3	-3	-3	+3	+1	-0	-2	-1
[T][S]	-3	+2	-2	-1	-3	-2	-3	+1	-1	+1	-2	-1
[T][S][FP]	-3	+1	-3	-2	-2	-3	-2	-0	-0	-1	-2	-3
[T][S][HP]	-3	+2	-3	-1	-2	-3	-3	-0	+0	-1	-2	-3
[T][S][HP]Async	-3	+2	-3	-2	-3	-3	-3	-0	+0	-1	-2	-3
[T][S][L]	-3	+3	-3	-1	-2	-3	-3	-0	+0	+1	-2	-3
[T][S][L]Cache	-3	+4	-3	-2	-2	-3	-3	-1	+2	-2	-2	-3
[T][S]Sparse	-3	+2	-3	-1	-2	-3	-3	-0	-1	-1	-2	-3
step_sgd	-3	+2	-3	-2	-3	-3	-3	-0	-0	-1	-2	-3
step_tween	+5	-3	+3	+5	+4	+4	+4	-0	-1	+4	+2	+2
step_tween_chain	-3	+2	-3	-2	-2	-3	-3	-0	+1	-1	-2	-4
tween	+4	-2	+3	+5	+4	+4	+5	-1	-2	+4	+4	+2
tween_chain	+0	+0	-0	+1	+0	+1	+1	-0	-2	+0	-0	-0

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	+0	-0	+1	-1	+1	+1	+0	-0	+3	-0	+3	+1
Mesh[T]	-2	-4	-4	-2	-1	-1	-2	+4	+1	-3	-2	-0
Mesh[T]Alt	+0	-0	+1	-0	+1	+2	-0	-1	+4	+1	+4	+2
Mesh[T]Chain	-2	+0	-0	-0	+1	+1	+1	+0	+2	-0	+3	+2
Mesh[T][S]	-2	-2	-1	-2	-0	-0	-1	-1	+1	-2	+1	-1
Mesh[T][S][FP]	+0	-0	-0	-1	+1	+0	-1	-3	+0	-1	+2	+1
Mesh[T][S]Sparse	-1	+0	-1	-1	+1	-0	-0	-3	+1	+0	+2	+1
Step[T]Alt	-2	-5	-3	-2	-2	-2	-2	+3	+1	-3	-1	-0
Step[T][S]	-1	-5	-3	-3	-1	-2	-2	+3	+0	-2	-1	-0
Step[T][S][FP]	-2	-5	-3	-2	-1	-2	-2	+4	+0	-3	-2	-0
Step[T][S][HP]	-1	-5	-3	-2	+0	-1	-1	+4	+1	-4	-2	-0
Step[T][S][HP]Async	-2	-5	-3	-2	-1	-1	-2	+4	-0	-3	-2	-1
Step[T][S][L]	-2	-5	-3	-3	-1	-2	-2	+5	-0	-3	-1	-1
Step[T][S][L]Cache	-1	-4	-3	-3	-2	-2	-2	+4	+0	-3	-2	-1
Step[T][S]Sparse	-1	-4	-3	-2	-1	-1	-1	+3	+0	-2	-1	-1
[T]Alt	+1	+1	-0	-0	+1	+1	+1	-1	+4	+1	+3	+2
[T][S]	-1	-2	-1	-3	+0	-1	-1	-1	+1	-1	+1	-0
[T][S][FP]	-1	-0	-1	-2	+1	-2	+0	-3	+2	+0	+0	-0
[T][S][HP]	-1	-0	-1	-3	+1	+0	+0	-3	+1	-3	+2	+1
[T][S][HP]Async	-2	-0	+0	-2	-0	-1	-1	-3	+1	-2	+1	+0
[T][S][L]	+1	+0	+0	-1	+1	+1	+0	-2	+2	+0	+3	+1
[T][S][L]Cache	+1	+1	+2	+1	+3	+2	+1	-3	+5	+1	+5	+4
[T][S]Sparse	+0	-0	+0	-1	+1	-0	-1	-3	+3	-1	+1	+1
step_sgd	+0	-0	-0	-1	+1	+0	+1	-3	+1	-0	+1	+1
step_tween	-1	-4	-4	-2	-2	-1	-2	+4	+1	-4	-2	+0
step_tween_chain	-2	+0	+0	-2	+1	+0	-0	-3	+2	+0	+3	+1
tween	-1	-4	-4	-2	-2	-1	-1	+4	+1	-3	-2	+0
tween_chain	+0	+0	-0	-0	+1	+0	+0	-0	+2	-1	+0	+2

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	-0	-0	-0	+0	-1	+0	+0	+0	+0	+3
Mesh[T]	-2	-5	-5	-2	-3	-2	-1	-2	-1	+1
Mesh[T]Alt	+1	+0	+1	+1	-0	+0	+1	+0	+1	+3
Mesh[T]Chain	+0	-1	-1	-1	-0	-0	+0	-0	-3	+2
Mesh[T][S]	-1	-1	-2	-2	-2	-2	-1	-2	-1	+1
Mesh[T][S][FP]	-2	-2	-2	-1	-2	-0	-1	-1	-1	+2
Mesh[T][S]Sparse	-1	-0	-1	-1	-2	-0	+0	-1	+0	+2
Step[T]Alt	-2	-4	-4	-3	-3	-2	-1	-2	-2	+1
Step[T][S]	-2	-4	-3	-3	-3	-2	-2	-3	-2	+1
Step[T][S][FP]	-1	-5	-4	-2	-3	-2	-2	-2	-2	+1
Step[T][S][HP]	-3	-4	-3	-2	-3	-2	-2	-2	-2	-0
Step[T][S][HP]Async	-2	-4	-4	-2	-3	-2	-2	-2	-2	+1
Step[T][S][L]	-2	-5	-3	-2	-2	-1	-2	-2	-1	+1
Step[T][S][L]Cache	-2	-4	-3	-1	-2	-2	-2	-3	-2	+1
Step[T][S]Sparse	-2	-4	-3	-2	-3	-3	-1	-2	-1	+1
[T]Alt	+1	-0	+1	+1	+0	+1	+1	+1	+1	+4
[T][S]	-2	-2	-2	-1	-2	-1	-2	-2	-2	+1
[T][S][FP]	-0	-2	-1	-0	-0	-2	-1	-1	-0	+1
[T][S][HP]	+0	-1	-1	-0	-2	-1	+0	-0	-1	+2
[T][S][HP]Async	-2	-1	-2	-1	-1	-1	-0	-1	+0	+1
[T][S][L]	+0	-0	-0	-0	-1	-0	+1	+1	+1	+3
[T][S][L]Cache	+1	+1	+1	+3	+3	+2	+1	+2	+2	+5
[T][S]Sparse	-1	-1	-0	-1	-0	-0	-1	-1	+1	+2
step_sgd	-2	-2	-1	-1	-1	-0	+0	-1	+0	+2
step_tween	-2	-4	-5	-2	-3	-1	-1	-1	-2	+2
step_tween_chain	-1	-0	-2	-0	-1	-0	+0	-0	-0	+3
tween	-2	-5	-5	-1	-3	-2	-1	-1	-1	+1
tween_chain	-0	-0	-4	+0	-1	+0	-0	-1	-1	+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	-0	+2	-0	+1	+0	+0	+1	-0	+0	+0	+0	-0
Mesh[T]	+1	-2	+1	+2	+1	+2	+0	-1	-1	+1	+0	+1
Mesh[T]Alt	-1	-2	-2	-1	-1	-3	-2	-1	-1	-1	-1	-2
Mesh[T]Chain	+1	+2	-0	-0	+1	+0	-0	-0	-0	+0	-0	-0
Mesh[T][S]	-1	+3	-0	-0	-0	-1	-1	+2	+1	+2	-0	+1
Mesh[T][S][FP]	-1	+5	-1	+0	-0	-2	-1	+1	+1	+1	-0	-0
Mesh[T][S]Sparse	+4	+15	+1	+2	+2	+4	+3	+4	+3	+3	+2	+1
Step[T]Alt	-1	-3	-1	-0	+0	-2	-0	-1	-1	-1	-1	-1
Step[T][S]	+4	+0	+1	+3	+2	+5	+3	-0	-0	+2	+2	+2
Step[T][S][FP]	+2	-0	+2	+3	+3	+5	+3	+0	-0	+2	+2	+2
Step[T][S][HP]	+3	-1	+2	+2	+3	+4	+2	-0	-1	+2	+2	+2
Step[T][S][HP]Async	+4	+0	+3	+3	+2	+5	+3	-0	-0	+3	+3	+2
Step[T][S][L]	+13	+3	+6	+6	+6	+13	+9	+2	+0	+5	+6	+5
Step[T][S][L]Cache	+8	+2	+5	+6	+8	+15	+8	+2	+1	+6	+5	+6
Step[T][S]Sparse	+4	+0	+2	+3	+3	+3	+3	-0	-0	+3	+2	+2
[T]Alt	-2	-1	-2	-1	-1	-3	-2	-1	-1	-1	-1	-2
[T][S]	-1	+5	-0	+0	-0	-1	-1	+2	+0	+2	-0	+1
[T][S][FP]	-1	+4	-1	-0	-0	-1	+0	+1	+1	+1	-1	-1
[T][S][HP]	-1	+5	-1	+0	-0	-1	-1	+1	+1	+1	-0	-1
[T][S][HP]Async	-1	+4	-1	+0	-0	-2	-1	+1	+1	+0	-0	-1
[T][S][L]	+3	+16	+1	+2	+3	+4	+3	+4	+4	+6	+2	+2
[T][S][L]Cache	+2	+25	+1	+2	+3	+5	+2	+3	+6	+2	+1	+1
[T][S]Sparse	+3	+18	+1	+2	+3	+3	+2	+5	+3	+4	+2	+1
step_sgd	-1	+4	-1	-0	-1	-1	-1	+0	+1	+0	-1	-1
step_tween	+3	-2	+1	+2	+2	+4	+4	-0	-0	+1	+1	+1
step_tween_chain	-2	+4	-1	-0	-0	-1	-1	+0	+1	+0	-1	-1
tween	+1	-2	+0	+1	+1	+1	+2	-1	-1	+1	+1	-0
tween_chain	-0	+0	-0	+1	+0	+1	+1	-0	-0	+0	-0	-0

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	+0	-0	+0	-1	+1	+0	+0	-0	+4	-0	+2	+1
Mesh[T]	-2	-4	-2	-2	-2	-1	-1	+1	-0	-2	-2	-1
Mesh[T]Alt	-2	-4	-1	-2	-3	-1	-1	-2	-1	-2	-1	-1
Mesh[T]Chain	-1	-0	-0	-0	+1	+0	+0	+0	+2	-0	+2	+1
Mesh[T][S]	+1	+0	+1	+0	+2	+1	+1	+1	+5	+0	+3	+1
Mesh[T][S][FP]	+2	+2	+1	+1	+4	+1	+1	-1	+3	+1	+4	+3
Mesh[T][S]Sparse	+7	+16	+5	+7	+16	+4	+4	+1	+13	+7	+15	+8
Step[T]Alt	-3	-5	-2	-3	-4	-1	-1	-1	-2	-2	-2	-2
Step[T][S]	-0	-4	-1	-1	-0	-1	-0	+2	+0	-1	-1	+0
Step[T][S][FP]	-1	-4	-1	-1	-0	-0	-0	+3	+1	-1	-1	-0
Step[T][S][HP]	-1	-4	-1	-1	-0	-0	-0	+2	+1	-2	-2	-0
Step[T][S][HP]Async	-1	-4	-1	-1	-1	-0	-1	+3	+0	-1	-1	-0
Step[T][S][L]	+1	-2	+0	+1	+4	+0	+0	+8	+5	-0	+2	+2
Step[T][S][L]Cache	+2	-1	-0	+1	+3	+1	+0	+7	+5	+0	+1	+2
Step[T][S]Sparse	-0	-3	-1	-1	-1	-0	-0	+2	+0	-1	-1	-0
[T]Alt	-2	-4	-1	-3	-3	-1	-1	-2	-1	-2	-1	-1
[T][S]	+1	+1	+1	+0	+2	+1	+1	+1	+5	+1	+3	+1
[T][S][FP]	+2	+2	+1	+1	+4	+1	+1	-0	+5	+2	+2	+1
[T][S][HP]	+2	+3	+1	+0	+4	+1	+1	-1	+4	-0	+4	+2
[T][S][HP]Async	+1	+3	+2	+1	+2	+1	+1	-1	+4	+0	+3	+2
[T][S][L]	+8	+15	+5	+7	+14	+4	+3	+2	+15	+6	+16	+7
[T][S][L]Cache	+11	+22	+7	+11	+24	+6	+5	+3	+28	+9	+27	+13
[T][S]Sparse	+8	+16	+5	+7	+14	+4	+3	+1	+19	+5	+13	+7
step_sgd	+2	+1	+1	+1	+2	+1	+1	-1	+4	+1	+2	+2
step_tween	-1	-4	-1	-1	-2	-0	-1	+2	+2	-2	-2	+0
step_tween_chain	-0	+1	+1	+0	+3	+1	+1	-1	+5	+2	+4	+2
tween	-2	-4	-2	-2	-3	-1	-1	+1	-0	-2	-2	-1
tween_chain	-0	+0	-0	+0	+0	+0	+0	-0	+3	-0	+0	+1

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	-0	-0	-0	+0	-1	-0	+0	+0	+0	+2
Mesh[T]	-2	-3	-2	-2	-3	-1	-1	-2	-2	-0
Mesh[T]Alt	-2	-2	-1	-2	-3	-1	-1	-3	-3	-1
Mesh[T]Chain	+0	-0	-0	-1	-0	-0	+0	-0	-3	+1
Mesh[T][S]	+1	+1	+0	+1	+1	+0	+1	+1	+1	+2
Mesh[T][S][FP]	+0	+1	+1	+2	+1	+1	+1	+1	+2	+3
Mesh[T][S]Sparse	+7	+9	+4	+8	+5	+4	+4	+8	+13	+8
Step[T]Alt	-3	-3	-2	-3	-3	-1	-1	-3	-4	-1
Step[T][S]	-1	-2	-1	-1	-2	-0	-0	-1	-1	+1
Step[T][S][FP]	-0	-3	-1	-1	-2	-1	-1	-1	-2	+1
Step[T][S][HP]	-2	-2	-1	-2	-2	-1	-1	-1	-2	-0
Step[T][S][HP]Async	-1	-2	-1	-1	-2	-1	-0	-1	-2	+1
Step[T][S][L]	+2	-1	+0	+2	+1	+1	+1	+2	+3	+3
Step[T][S][L]Cache	+1	-1	+0	+3	+1	+0	+0	+1	+1	+3
Step[T][S]Sparse	-1	-2	-1	-1	-2	-1	-0	-1	-1	+1
[T]Alt	-2	-2	-2	-2	-3	-1	-1	-3	-4	-1
[T][S]	+1	+1	+1	+1	+1	+1	+0	+1	+1	+3
[T][S][FP]	+2	+1	+1	+2	+3	+0	+1	+2	+3	+2
[T][S][HP]	+2	+2	+1	+2	+1	+1	+1	+2	+2	+3
[T][S][HP]Async	+0	+1	+1	+1	+1	+1	+1	+1	+3	+2
[T][S][L]	+9	+8	+4	+8	+8	+4	+4	+10	+13	+9
[T][S][L]Cache	+11	+12	+8	+16	+16	+7	+6	+13	+21	+14
[T][S]Sparse	+8	+6	+5	+8	+8	+4	+3	+7	+16	+7
step_sgd	+0	-0	+1	+1	+1	+1	+1	+1	+4	+2
step_tween	-1	-2	-2	-1	-2	-1	-0	-1	-2	+1
step_tween_chain	+0	+2	+0	+1	+0	+0	+1	+2	+3	+4
tween	-2	-3	-2	-2	-3	-1	-1	-2	-2	-0
tween_chain	+0	-0	-2	+0	-1	+0	-0	-1	-1	+1

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	+1	-0	+0	+0	+1	+1	+2	+0	+0	+0	-0	-0
Mesh[T]	-2	-2	-3	-2	-2	-1	-2	-3	-2	-2	-2	-3
Mesh[T]Alt	+1	-7	-1	+0	+1	+1	+0	-7	-7	-6	+0	-7
Mesh[T]Chain	+1	-0	-0	-1	+1	+1	+2	-0	-0	+1	+0	-0
Mesh[T][S]	+5	+4	+4	+5	+5	+4	+6	+3	+6	+6	+5	+5
Mesh[T][S][FP]	+4	+4	+5	+5	+5	+4	+6	+4	+6	+6	+5	+5
Mesh[T][S]Sparse	+14	+14	+13	+13	+14	+14	+14	+13	+14	+13	+13	+13
Step[T]Alt	-6	-7	-6	-6	-5	-5	-5	-6	-6	-6	-6	-6
Step[T][S]	+1	+1	+0	+1	+1	+1	+2	+1	+1	+2	+1	+1
Step[T][S][FP]	+1	+1	+0	+2	+2	+1	+2	+0	+0	+2	+1	+1
Step[T][S][HP]	+0	-1	+1	+0	+1	+0	+2	-0	-0	+0	+1	+0
Step[T][S][HP]Async	+1	+1	+1	+2	+2	+1	+2	+1	+1	+2	+1	+0
Step[T][S][L]	+9	+9	+6	+7	+8	+9	+8	+7	+6	+7	+7	+6
Step[T][S][L]Cache	+8	+9	+7	+7	+8	+8	+8	+7	+6	+7	+7	+7
Step[T][S]Sparse	+1	+2	+1	+1	+2	+0	+2	+1	+0	+2	+1	+1
[T]Alt	+1	-7	-1	-1	+1	+1	+0	-7	-7	-6	+0	-7
[T][S]	+5	+5	+5	+5	+5	+4	+6	+4	+5	+5	+5	+5
[T][S][FP]	+4	+5	+5	+5	+5	+4	+6	+4	+6	+6	+4	+5
[T][S][HP]	+5	+4	+5	+5	+5	+4	+5	+4	+6	+5	+5	+5
[T][S][HP]Async	+4	+4	+5	+5	+5	+4	+6	+4	+5	+5	+5	+5
[T][S][L]	+13	+13	+12	+13	+14	+15	+15	+14	+12	+13	+13	+14
[T][S][L]Cache	+13	+16	+12	+13	+14	+14	+14	+14	+14	+14	+13	+14
[T][S]Sparse	+14	+15	+12	+12	+14	+14	+13	+13	+13	+13	+13	+13
step_sgd	+3	+4	+3	+4	+3	+4	+5	+2	+4	+4	+4	+4
step_tween	-0	-1	-0	-0	+1	+1	+2	-0	-0	+0	-0	-0
step_tween_chain	+3	+3	+4	+4	+4	+4	+6	+2	+4	+4	+4	+3
tween	-2	-3	-3	-3	-2	-2	-1	-3	-3	-2	-3	-3
tween_chain	-0	+1	-0	+0	+0	+0	+2	+1	+0	+0	+0	-1

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	-0	-0	+0	+1	-0	+0	-0	+0	+1	-0	-0	-0
Mesh[T]	-3	-3	-2	-2	-3	-3	-3	-2	-2	-3	-3	-3
Mesh[T]Alt	-7	-8	-7	-7	-7	-7	-8	-8	-7	-7	-7	-8
Mesh[T]Chain	+0	-1	-0	+0	+0	+0	+0	+0	+0	+0	-1	+0
Mesh[T][S]	+5	+3	+6	+5	+4	+5	+5	+4	+5	+4	+4	+5
Mesh[T][S][FP]	+5	+4	+6	+5	+4	+6	+6	+5	+4	+5	+4	+5
Mesh[T][S]Sparse	+13	+14	+14	+13	+14	+13	+13	+12	+13	+13	+15	+13
Step[T]Alt	-6	-7	-6	-5	-7	-7	-7	-6	-6	-6	-7	-6
Step[T][S]	+1	+0	+0	+1	+1	+0	+1	+1	+0	-0	+1	+0
Step[T][S][FP]	+0	+0	+1	+1	+1	+1	+1	+1	+1	+0	+1	+1
Step[T][S][HP]	+0	-1	-0	+0	-0	-0	-0	+0	+1	-0	-1	-0
Step[T][S][HP]Async	+0	+0	+1	+1	+0	+1	+1	+1	+1	+1	+0	+1
Step[T][S][L]	+6	+7	+6	+7	+9	+6	+5	+7	+8	+5	+8	+6
Step[T][S][L]Cache	+7	+7	+6	+7	+8	+6	+6	+7	+8	+6	+8	+7
Step[T][S]Sparse	+1	+1	+1	+1	+1	+1	+1	+1	+0	+1	+1	+1
[T]Alt	-7	-7	-7	-7	-7	-7	-8	-8	-7	-7	-7	-8
[T][S]	+5	+3	+5	+5	+3	+5	+5	+5	+5	+5	+4	+5
[T][S][FP]	+5	+3	+5	+5	+4	+6	+6	+5	+4	+5	+4	+5
[T][S][HP]	+5	+4	+6	+5	+4	+5	+5	+6	+4	+5	+4	+4
[T][S][HP]Async	+5	+4	+6	+5	+4	+5	+6	+4	+4	+5	+4	+5
[T][S][L]	+12	+13	+12	+12	+13	+11	+11	+13	+12	+11	+13	+12
[T][S][L]Cache	+14	+15	+14	+14	+15	+14	+13	+14	+14	+13	+16	+14
[T][S]Sparse	+12	+15	+13	+13	+13	+13	+13	+12	+14	+13	+14	+13
step_sgd	+3	+2	+3	+4	+2	+4	+3	+4	+4	+3	+2	+3
step_tween	-0	-1	-0	+0	-0	+0	-1	-0	+1	-0	-1	+0
step_tween_chain	+3	+1	+4	+4	+3	+4	+3	+3	+4	+4	+3	+4
tween	-3	-3	-3	-3	-3	-3	-3	-3	-2	-3	-4	-3
tween_chain	-0	-0	-0	+1	-0	+1	-0	-0	+1	-0	-0	-0

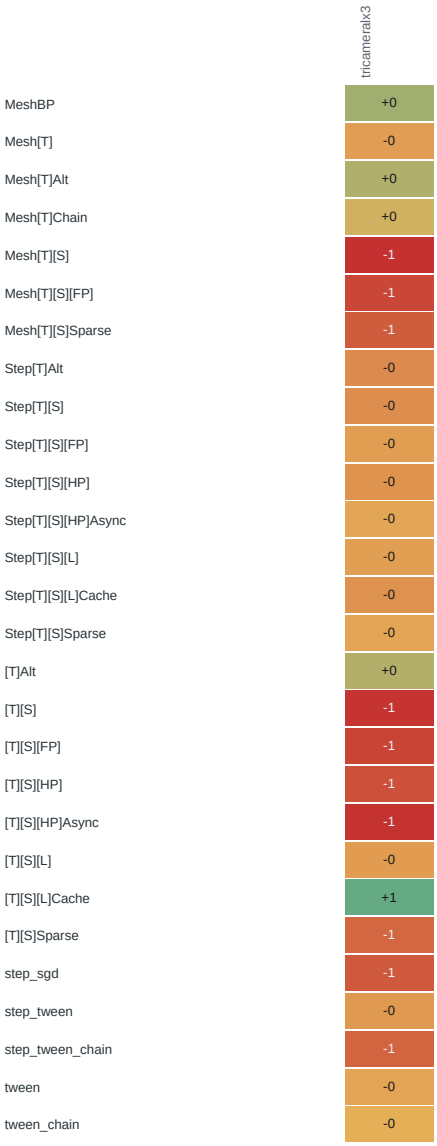
AvailD vs sgd, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	-0	+0	+0	+0	-0	-0	+0	+0	+0	-0
Mesh[T]	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3
Mesh[T]Alt	-8	-7	-7	-7	-8	-8	-7	-7	-7	-8
Mesh[T]Chain	+0	+0	+0	-1	-0	+0	+0	+0	+1	-1
Mesh[T][S]	+5	+5	+5	+5	+4	+5	+6	+5	+4	+4
Mesh[T][S][FP]	+4	+5	+6	+5	+5	+6	+6	+5	+4	+5
Mesh[T][S]Sparse	+13	+14	+13	+13	+13	+14	+13	+13	+13	+13
Step[T]Alt	-6	-6	-6	-6	-7	-6	-7	-6	-6	-6
Step[T][S]	+1	+1	+0	+1	+0	+0	+1	+1	+1	+1
Step[T][S][FP]	+1	+1	+1	+1	+1	+1	+1	+0	+0	+1
Step[T][S][HP]	+0	+0	-0	-0	-1	-0	+0	-0	+0	-0
Step[T][S][HP]Async	+1	+1	+1	+0	+1	+1	+1	+1	+0	+1
Step[T][S][L]	+7	+7	+6	+7	+7	+7	+7	+7	+7	+7
Step[T][S][L]Cache	+7	+7	+6	+7	+7	+6	+6	+8	+7	+7
Step[T][S]Sparse	+1	+1	+1	+1	+0	+1	+1	+1	+1	+1
[T]Alt	-7	-7	-8	-8	-8	-8	-7	-8	-7	-8
[T][S]	+5	+5	+5	+5	+5	+5	+5	+5	+4	+5
[T][S][FP]	+5	+5	+5	+5	+5	+6	+6	+5	+5	+5
[T][S][HP]	+4	+5	+5	+5	+4	+5	+6	+5	+5	+5
[T][S][HP]Async	+5	+5	+5	+4	+4	+5	+5	+4	+4	+5
[T][S][L]	+13	+13	+12	+12	+12	+12	+12	+13	+11	+13
[T][S][L]Cache	+14	+15	+14	+14	+14	+14	+14	+14	+14	+14
[T][S]Sparse	+13	+14	+13	+13	+12	+13	+13	+13	+13	+13
step_sgd	+3	+3	+3	+3	+3	+4	+4	+4	+4	+4
step_tween	+0	-0	-0	-0	-1	-1	-1	+0	+0	-0
step_tween_chain	+3	+4	+4	+3	+3	+2	+3	+4	+4	+4
tween	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
tween_chain	+0	+0	+0	+0	-0	+0	+0	-1	+1	+0

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

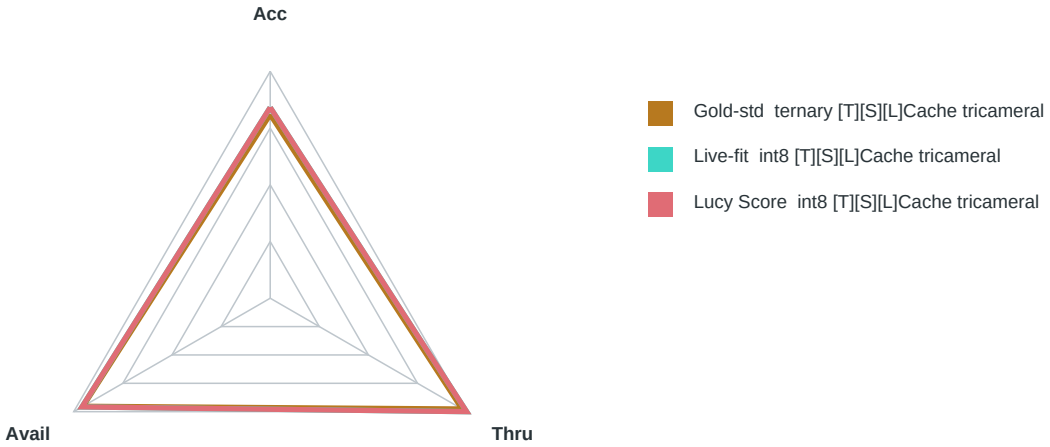
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	3.92
Step[T][S]	[T][S]	34	2.37
Step[T][S][FP]	[T][S][FP]	34	2.96
Step[T][S][HP]	[T][S][HP]	34	3.09
Step[T][S][HP]Async	[T][S][HP]Async	34	3.02
Step[T][S][L]	[T][S][L]	34	3.50
Step[T][S][L]Cache	[T][S][L]Cache	34	4.67
Step[T][S]Sparse	[T][S]Sparse	34	3.10
step_sgd	sgd	34	1.31
step_tween	tween	34	0.39
step_tween_chain	tween_chain	34	1.54

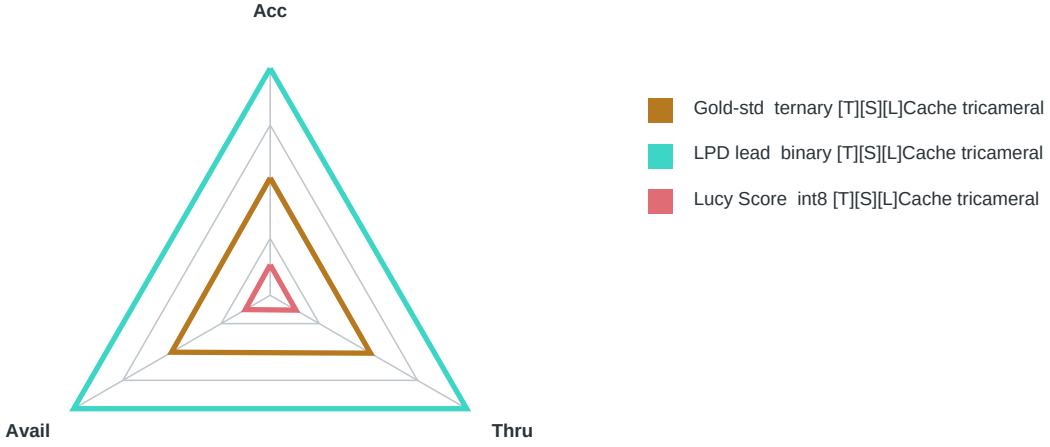
Consciousness - Acc, Throughput, Availability

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 float16|none|Step[T]Alt|tricameral|simd Acc 11.0 Thru 180 Avail 14.7% 172.2 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) int8|none|[T][S][L]Cache|tricameral|simd Score 32.6 Acc 9.3 Soft 5 86.1 KiB
Live-fit champ (best Q) int8|none|[T][S][L]Cache|tricameral|simd Acc 9.3 Thru 1036 Avail 34.1% 86.1 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): ternary|none|[T][S][L]Cache|tricameral|simd mode [T][S][L]Cache Acc 8.9 Thru 1011 21.5 KiB
Board fastest float32|none|[T][S][L]|tricameral|simd Thru 1145 (traps may own this) Best availability int|none|[T][S][L]Cache|tricameral|simd 35.6%
Learner Thru peak 1036 learner Avail peak 35.5%

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	ternary [T][S][L]Cache tricameral	81	98	95	91	12	8.0	7.28	8.9	1011	21.5

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

Mode	n	Acc	KiB	Thru	Cell
[T][S][L]Cache	5	9.8	21.5	1036	ternary [T][S][L]Cache tricameral / int8 [T][S][L]Cache tricameral

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

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
near	uint4 [T][S][L]Cache tricameral	89	57	99	80	25	4.0	3.18	9.8	590	43.1
near	int8 [T][S][L]Cache tricameral	84	100	96	93	50	2.0	1.86	9.3	1036	86.1

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
-	binary [T][S][L]Cache tricameral	78	96	95	89	6	16.0	14.27	8.6	991	10.8
gold	ternary [T][S][L]Cache tricameral	81	98	95	91	12	8.0	7.28	8.9	1011	21.5
-	int2 [T][S][L]Cache tricameral	76	96	94	88	12	8.0	7.06	8.3	998	21.5
-	uint2 [T][S][L]Cache tricameral	71	55	99	73	13	8.0	5.82	7.8	569	21.6
-	int4 [T][S][L]Cache tricameral	74	99	96	89	25	4.0	3.57	8.2	1025	43.0
-	uint3 [T][S][L]Cache tricameral	76	34	99	63	19	5.3	3.38	8.3	353	32.3
-	int3 [T][S][L]Cache tricameral	74	33	99	62	19	5.3	3.32	8.2	340	32.3
near	uint4 [T][S][L]Cache tricameral	89	57	99	80	25	4.0	3.18	9.8	590	43.1
-	ternary Mesh[T]Alt tricameral	71	23	31	37	12	8.0	2.96	7.8	240	21.5
-	nf4 [T][S][L]Cache tricameral	73	42	97	67	25	4.0	2.67	8.0	435	43.0
-	uint5 [T][S][L]Cache tricameral	76	29	98	60	31	3.2	1.92	8.4	301	53.8
-	int5 [T][S][L]Cache tricameral	74	28	99	59	31	3.2	1.87	8.1	286	53.8
near	int8 [T][S][L]Cache tricameral	84	100	96	93	50	2.0	1.86	9.3	1036	86.1
-	uint8 [T][S][L]Cache tricameral	75	91	98	88	50	2.0	1.75	8.3	942	86.1
-	uint3 Mesh[T]Alt tricameral	76	10	39	31	19	5.3	1.66	8.4	104	32.3
-	uint3 [T]Alt tricameral	72	10	38	30	19	5.3	1.59	8.0	101	32.3
-	uint6 [T][S][L]Cache tricameral	72	27	99	58	38	2.7	1.54	8.0	277	64.6
-	fp6 [T][S][L]Cache tricameral	79	25	98	58	38	2.7	1.53	8.7	254	64.6
-	int6 [T][S][L]Cache tricameral	73	25	98	56	38	2.7	1.49	8.0	254	64.6
-	nf4 Mesh[T]Alt tricameral	71	13	39	33	25	4.0	1.31	7.8	132	43.0

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

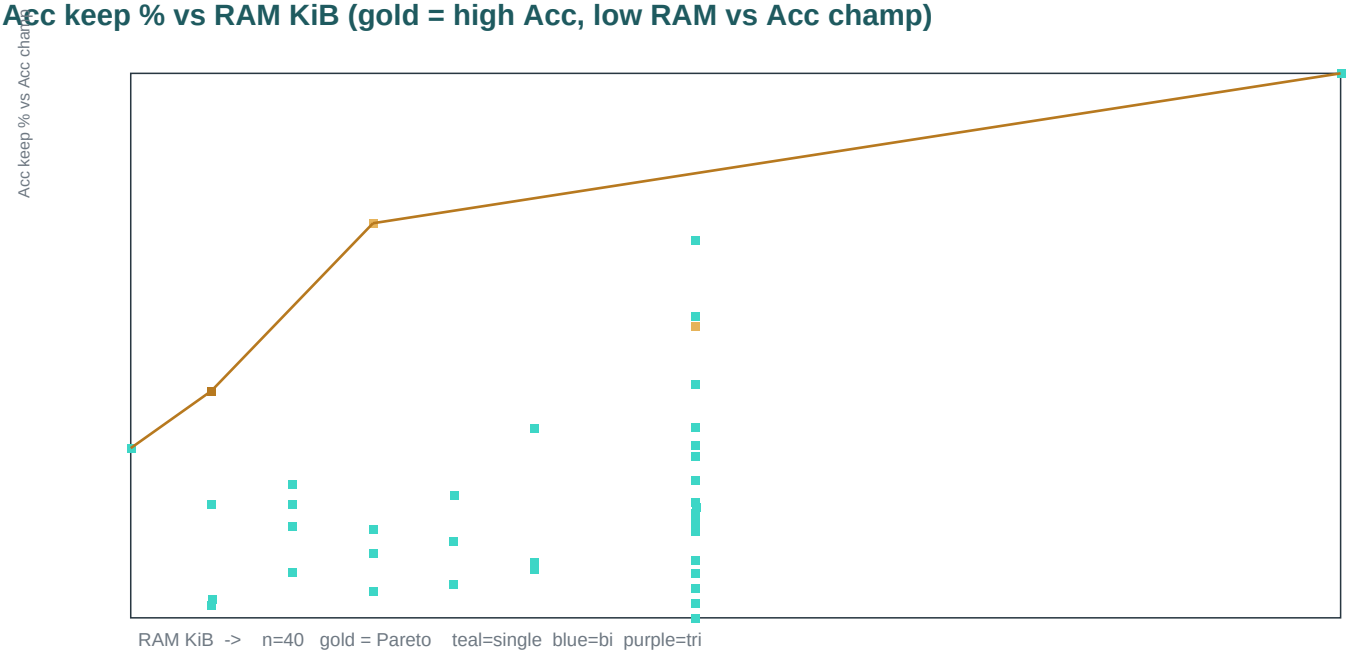
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
near	int8 [T][S][L]Cache tricameral	84	100	96	93	1.86	1036	34.1
gold	ternary [T][S][L]Cache tricameral	81	98	95	91	7.28	1011	33.8
-	binary [T][S][L]Cache tricameral	78	96	95	89	14.27	991	33.7
-	int4 [T][S][L]Cache tricameral	74	99	96	89	3.57	1025	34.2
-	int2 [T][S][L]Cache tricameral	76	96	94	88	7.06	998	33.5
-	uint8 [T][S][L]Cache tricameral	75	91	98	88	1.75	942	34.9
acc	float32 Step[T][S][L]Cache tricameral	84	76	79	80	0.40	784	28.1
near	uint4 [T][S][L]Cache tricameral	89	57	99	80	3.18	590	35.2
keep	uint32 [T][S][L]Cache tricameral	86	58	100	79	0.39	597	35.4
-	float32 Step[T][S][L] tricameral	75	76	80	77	0.38	790	28.3

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

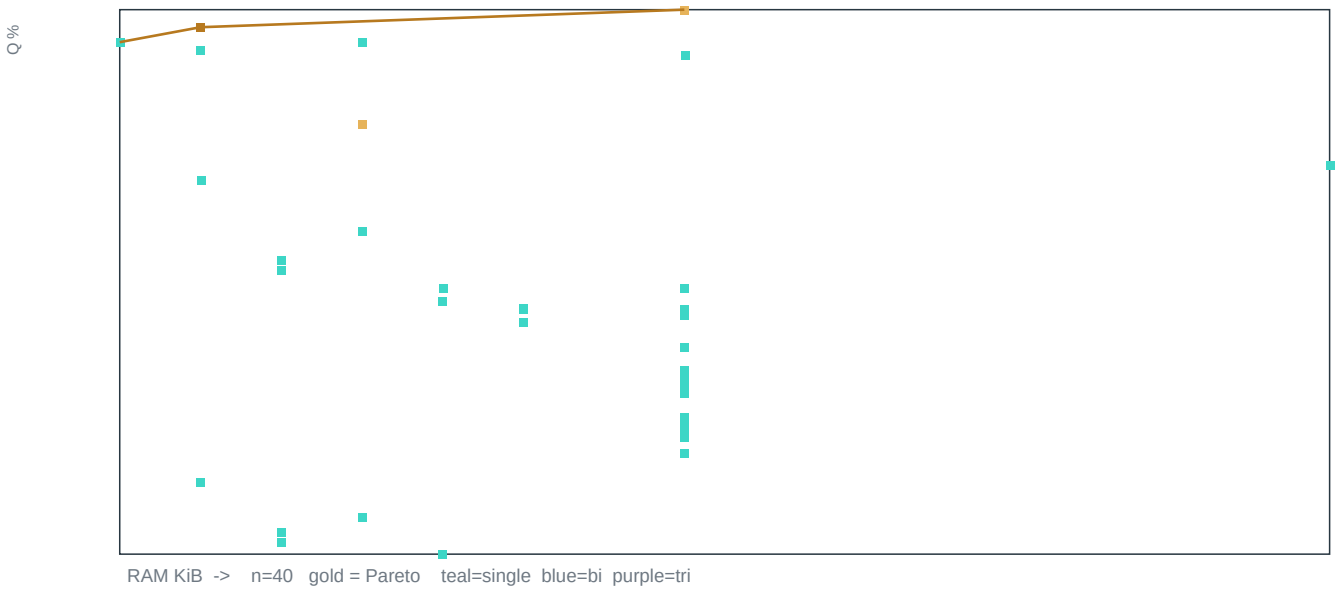
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd tricameral	40	42	51	44	6	16.0	0.00	4.4	432	10.8
trap	binary step_sgd tricameral	60	52	61	57	6	16.0	0.00	6.6	535	10.8
trap	binary tween tricameral	19	33	43	30	6	16.0	0.00	2.1	337	10.8
trap	binary tween_chain tricameral	41	43	52	45	6	16.0	0.00	4.5	450	10.8

trap	binary step_tween tricameral	15	38	48	30	6	16.0	0.00	1.7	389	10.8
trap	binary step_tween_chain tricameral	60	50	59	56	6	16.0	0.00	6.6	521	10.8
trap	binary MeshBP tricameral	60	41	50	50	6	16.0	0.00	6.6	424	10.8
trap	binary Mesh[T] tricameral	17	33	44	29	6	16.0	0.00	1.9	343	10.8
trap	binary Mesh[T]Chain tricameral	65	41	50	51	6	16.0	0.00	7.1	426	10.8
trap	binary [T][S] tricameral	54	56	65	58	6	16.0	0.00	6.0	582	10.8

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

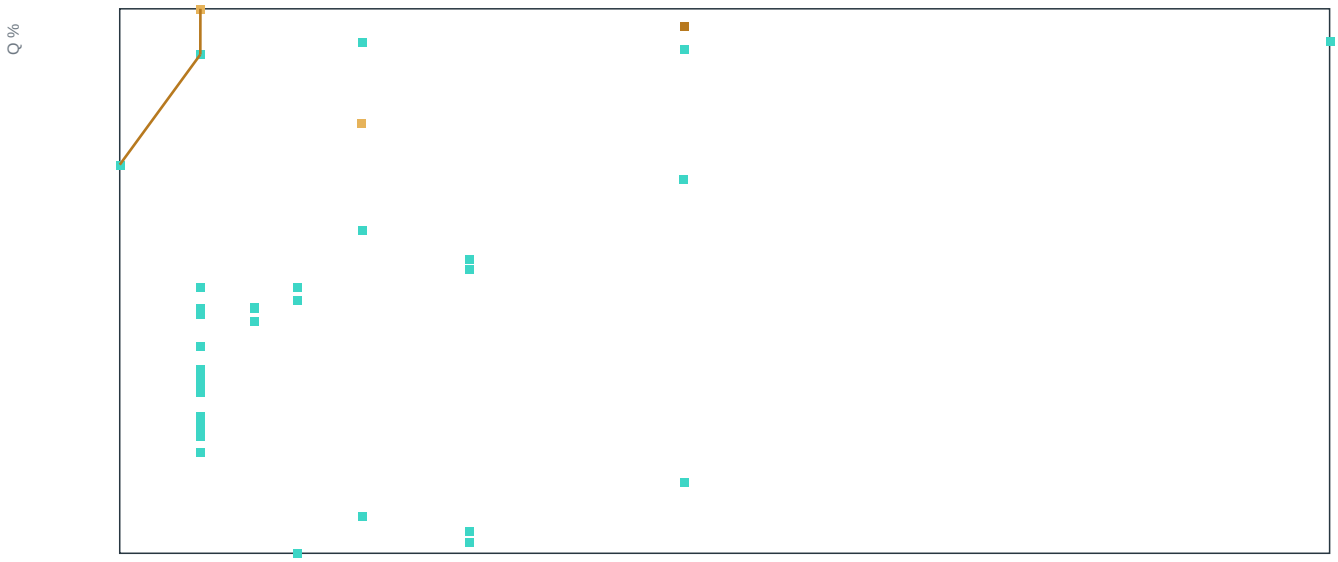


Q% vs RAM KiB (gold = high consciousness, low RAM)



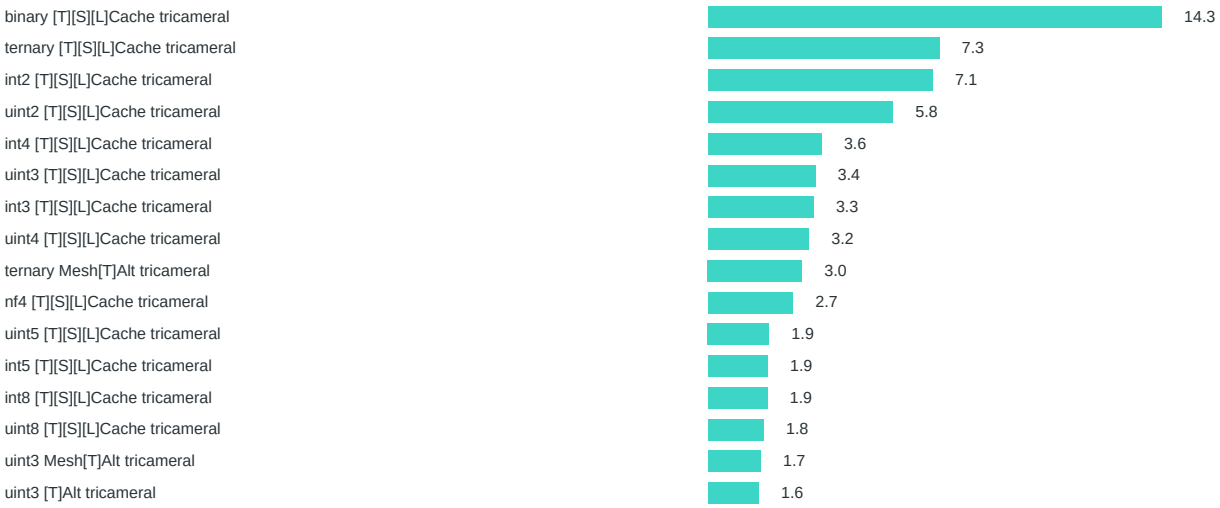
Q% vs shrink vs Acc champ (gold = upper right)

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

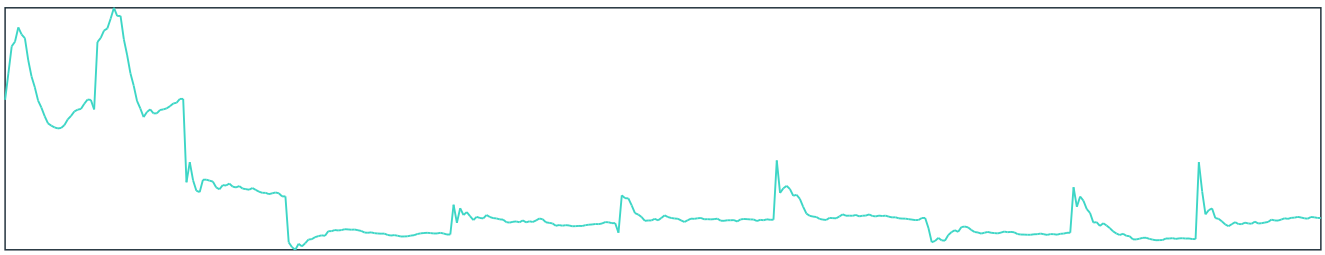


times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Top Lucy density (LPD)



Live pulse (Score)



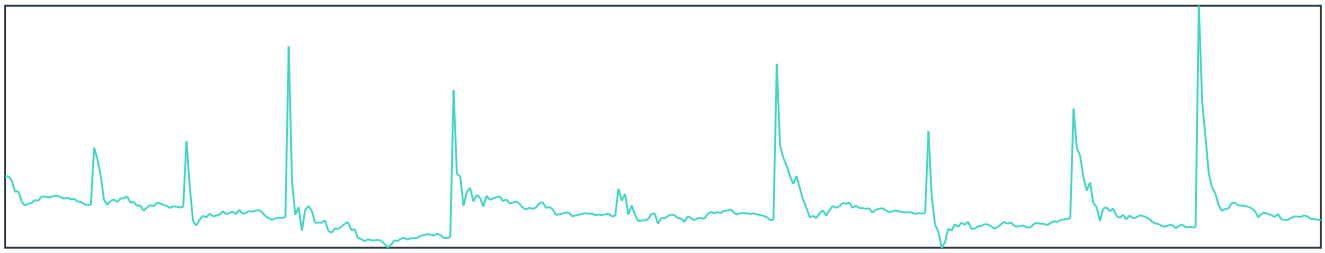
n=400 min=0.93 max=7.37

Live pulse (SoftAcc)



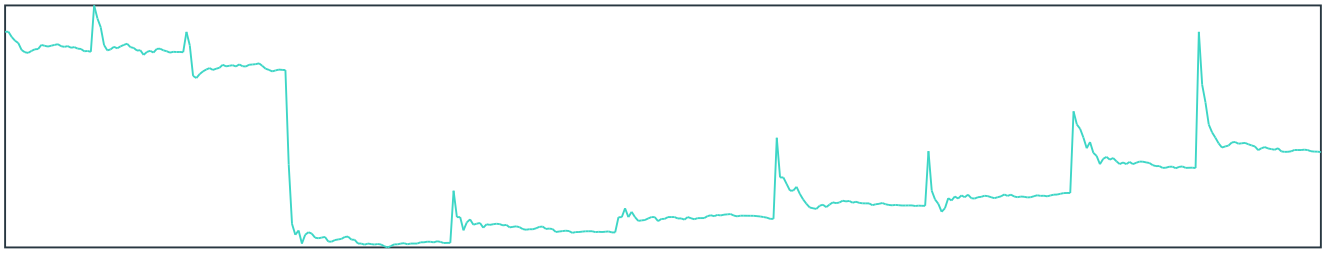
n=400 min=1.54 max=1.98

Live pulse (Availability)



n=400 min=20.96 max=29.65

Live pulse (Throughput)



n=400 min=125.67 max=271.83

Queue by train mode (this epoch)

Mode	Done	Run	Left	Total
sgd	34	0	0	34
step_sgd	34	0	0	34
tween	34	0	0	34
tween_chain	34	0	0	34
step_tween	34	0	0	34
step_tween_chain	34	0	0	34
MeshBP	34	0	0	34
Mesh[T]	34	0	0	34
Mesh[T]Chain	34	0	0	34
[T][S]	34	0	0	34
Step[T][S]	34	0	0	34
[T]Alt	34	0	0	34
Step[T]Alt	34	0	0	34
[T][S][HP]	34	0	0	34
[T][S][L]	34	0	0	34
[T][S][FP]	34	0	0	34
[T][S][L]Cache	34	0	0	34
[T][S][HP]Async	34	0	0	34
[T][S]Sparse	34	0	0	34
Mesh[T][S]	34	0	0	34
Mesh[T]Alt	34	0	0	34
Mesh[T][S][FP]	34	0	0	34
Mesh[T][S]Sparse	34	0	0	34
Step[T][S][HP]	34	0	0	34
Step[T][S][L]	34	0	0	34
Step[T][S][FP]	34	0	0	34
Step[T][S][L]Cache	34	0	0	34
Step[T][S][HP]Async	34	0	0	34

Step[T][S]Sparse	34	0	0	34