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 0.02 - 2026-08-21 09:06:52 - 0.0.0.0:8155

This epoch 986 / 986 cells. Recorded 986 results. Learning rate 0.02.
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 - cameralx1 - tinyshakespeare - 4096 windows - seq 32 - causal MHA - A->B->A2 - SIMD

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	float32|none|sgd|single|simd	3.26	3.3	11.4	116.7	24.5
throughput	float32|none|[T][S][L]Cache|single|simd	2.64	1.5	2.7	248.3	39.1
availability	float64|none|[T][S][L]Cache|single|simd	1.72	1.5	2.1	209.5	39.2
lucy score	float32|none|step_sgd|single|simd	5.99	3.3	11.1	182.9	29.6
mobile score (trap)	binary|none|[T][S][L]Cache|single|simd	1.13	1.5	1.3	228.5	38.5
t->50%	uint|none|tween_chain|single|simd	1.67	1.6	7.9	85.0	24.9
acc/sec	float32|none|step_sgd|single|simd	5.99	3.3	11.1	182.9	29.6

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	MeshBP	bfloat16	singlex1	12.79
throughput	[T][S][L]Cache	float32	singlex1	248.26
availability	[T][S][L]Cache	float64	singlex1	39.21
score	step_sgd	float32	singlex1	5.99
soft_acc	sgd	float32	singlex1	3.34
acc_thru	step_sgd	float32	singlex1	20.27
realtime	[T][S][L]Cache	float32	singlex1	97.02
adapt	step_sgd	float32	singlex1	2.54
keep_learn	step_tween_chain	fp4	singlex1	10.15
acc_per_sec	step_sgd	float32	singlex1	0.25
time_to_50	tween_chain	uint	singlex1	96.16
consistency	Mesh[T]Chain	float64	singlex1	1.32
stability	sgd	fp4	singlex1	100.00
mobile_score	[T][S][L]Cache	binary	singlex1	130.75
lpd	step_sgd	float16	singlex1	0.88
mspeed	step_sgd	float32	singlex1	1.00
mavail	step_sgd	float64	singlex1	1.00
mix	step_sgd	float32	singlex1	0.95
gold_std	step_sgd	float16	singlex1	142.06

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
step_sgd	float32	none	6.0	3.3	11.1	29.6	34
[T][S][L]	bfloat16	none	5.0	1.5	7.5	37.9	34
step_tween_chain	float32	none	4.6	2.8	9.4	29.5	34
[T][S][L]Cache	bfloat16	none	4.2	1.5	5.3	38.9	34
[T][S]Sparse	float32	none	4.2	1.5	6.4	33.5	34
tween_chain	float32	none	3.8	2.9	10.7	25.1	34
Mesh[T][S]Sparse	bfloat16	none	3.8	1.6	8.5	32.5	34
MeshBP	float32	none	3.5	3.1	11.0	24.8	34
Mesh[T]Chain	float32	none	3.4	2.8	10.5	25.4	34

sgd	float32	none	3.3	3.3	11.4	24.5	34
[T][S][HP]	bfloat16	none	3.0	1.5	8.6	28.7	34
[T][S][FP]	float32	none	2.9	1.5	6.5	29.4	34
[T][S][HP]Async	bfloat16	none	2.9	1.6	8.3	28.6	34
Mesh[T][S][FP]	bfloat16	none	2.8	1.6	8.5	28.4	34
Step[T][S][L]	bfloat16	none	2.5	1.5	5.9	31.5	34
Step[T][S][L]Cache	bfloat16	none	2.0	1.5	4.7	31.5	34
Mesh[T][S]	bfloat16	none	1.9	1.5	5.2	29.3	34
[T][S]	bfloat16	none	1.8	1.5	4.5	29.2	34
Step[T][S]	bfloat16	none	1.7	1.5	6.4	25.2	34
Step[T][S][HP]Async	bfloat16	none	1.4	1.5	5.9	24.8	34
Step[T][S][FP]	bfloat16	none	1.4	1.5	5.7	24.8	34
tween	bfloat16	none	1.3	1.5	6.0	22.1	34
step_tween	bfloat16	none	1.3	1.5	4.6	25.1	34
Step[T][S][HP]	bfloat16	none	1.0	1.5	4.5	24.9	34
Mesh[T]	bfloat16	none	1.0	1.5	5.2	21.9	34
Step[T]Alt	bfloat16	none	1.0	1.5	7.9	18.2	34
[T]Alt	bfloat16	none	0.8	1.5	8.1	16.5	34
Step[T][S]Sparse	bfloat16	none	0.8	1.5	3.5	24.6	34
Mesh[T]Alt	bfloat16	none	0.7	1.5	8.1	16.2	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
step_sgd	float32	6.0	3.3	11.1
[T][S][L]	bfloat16	5.0	1.5	7.5
step_tween_chain	float32	4.6	2.8	9.4
[T][S][L]Cache	bfloat16	4.2	1.5	5.3
[T][S]Sparse	float32	4.2	1.5	6.4
tween_chain	float32	3.8	2.9	10.7
Mesh[T][S]Sparse	bfloat16	3.8	1.6	8.5
MeshBP	float32	3.5	3.1	11.0
Mesh[T]Chain	float32	3.4	2.8	10.5
sgd	float32	3.3	3.3	11.4
[T][S][HP]	bfloat16	3.0	1.5	8.6
[T][S][FP]	float32	2.9	1.5	6.5
[T][S][HP]Async	bfloat16	2.9	1.6	8.3
Mesh[T][S][FP]	bfloat16	2.8	1.6	8.5
Step[T][S][L]	bfloat16	2.5	1.5	5.9
Step[T][S][L]Cache	bfloat16	2.0	1.5	4.7
Mesh[T][S]	bfloat16	1.9	1.5	5.2
[T][S]	bfloat16	1.8	1.5	4.5
Step[T][S]	bfloat16	1.7	1.5	6.4
Step[T][S][HP]Async	bfloat16	1.4	1.5	5.9
Step[T][S][FP]	bfloat16	1.4	1.5	5.7
tween	bfloat16	1.3	1.5	6.0
step_tween	bfloat16	1.3	1.5	4.6
Step[T][S][HP]	bfloat16	1.0	1.5	4.5
Mesh[T]	bfloat16	1.0	1.5	5.2
Step[T]Alt	bfloat16	1.0	1.5	7.9
[T]Alt	bfloat16	0.8	1.5	8.1
Step[T][S]Sparse	bfloat16	0.8	1.5	3.5
Mesh[T]Alt	bfloat16	0.7	1.5	8.1

Best mode per dtype

DType	Winner mode	Score	Soft	Acc
float32	step_sgd	6.0	3.3	11.1
float64	step_sgd	5.0	3.0	10.9
bfloat16	[T][S][L]	5.0	1.5	7.5
float16	step_sgd	4.7	3.1	11.1
int64	step_sgd	3.9	3.1	10.8
int	step_sgd	3.7	3.3	11.3
int8	step_sgd	3.5	1.5	7.1
int32	step_sgd	3.5	1.7	9.4
uint32	step_sgd	3.3	1.6	9.0
complex64	step_sgd	3.3	3.1	10.0
uint64	step_sgd	3.3	1.6	9.0
uint8	step_sgd	3.2	1.5	6.6
uint16	step_sgd	3.2	1.6	8.8
complex128	step_sgd	3.1	2.8	9.5
int16	step_sgd	2.7	1.7	7.4
uintptr	step_sgd	2.6	1.6	8.1
uint	step_sgd	2.5	1.6	7.8
fp4	[T][S][L]Cache	2.0	1.5	2.8
int2	[T][S][L]	1.7	1.5	2.2
ternary	[T][S][L]Cache	1.6	1.5	1.7
uint4	[T][S][L]Cache	1.5	1.5	2.3
int4	[T][S][L]	1.3	1.5	1.8
binary	[T][S][L]Cache	1.1	1.5	1.3
fp8e5m2	[T][S][L]Cache	1.1	1.5	1.6
nf4	[T][S][L]Cache	0.9	1.5	1.6
uint2	[T][S][L]	0.9	1.5	1.6
fp8e4m3	[T][S][L]	0.9	1.5	1.6
int5	[T][S]	0.8	1.5	3.9
int3	[T][S][L]Cache	0.7	1.5	1.7
int6	[T][S]Sparse	0.7	1.5	3.0
fp6	tween_chain	0.6	1.5	4.9
uint6	[T][S][L]Cache	0.6	1.5	1.8
uint5	[T][S][L]	0.6	1.5	1.9
uint3	[T][S][L]Cache	0.6	1.5	1.3

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	float32|none|step_sgd|single|simd	6.0	3.3	11.1	182.9	29.6
2	float64|none|step_sgd|single|simd	5.0	3.0	10.9	155.9	29.6
3	bfloat16|none|[T][S][L]|single|simd	5.0	1.5	7.5	176.5	37.9
4	float16|none|step_sgd|single|simd	4.7	3.1	11.1	154.4	27.8
5	float32|none|step_tween_chain|single|simd	4.6	2.8	9.4	167.7	29.5
6	bfloat16|none|step_sgd|single|simd	4.6	3.1	11.0	144.6	29.0
7	float64|none|step_tween_chain|single|simd	4.6	3.1	11.0	141.2	29.5
8	bfloat16|none|step_tween_chain|single|simd	4.4	3.3	11.6	131.8	28.9
9	bfloat16|none|[T][S][L]Cache|single|simd	4.2	1.5	5.3	201.4	38.9
10	float32|none|[T][S]Sparse|single|simd	4.2	1.5	6.4	195.9	33.5
11	float64|none|[T][S]Sparse|single|simd	4.1	1.6	7.4	167.3	33.6
12	int64|none|step_sgd|single|simd	3.9	3.1	10.8	124.8	29.2
13	bfloat16|none|[T][S]Sparse|single|simd	3.9	1.5	7.6	155.0	32.7

14	float32|none|tween_chain|single|simd	3.8	2.9	10.7	142.1	25.1
15	bfloat16|none|Mesh[T][S]Sparse|single|simd	3.8	1.6	8.5	137.2	32.5
16	float16|none|step_tween_chain|single|simd	3.8	2.8	9.7	139.8	27.8
17	int|none|step_sgd|single|simd	3.7	3.3	11.3	110.8	29.2
18	int8|none|step_sgd|single|simd	3.5	1.5	7.1	174.3	28.8
19	float32|none|MeshBP|single|simd	3.5	3.1	11.0	129.4	24.8
20	int32|none|step_sgd|single|simd	3.5	1.7	9.4	126.6	29.4

Leaderboard (SoftAcc)

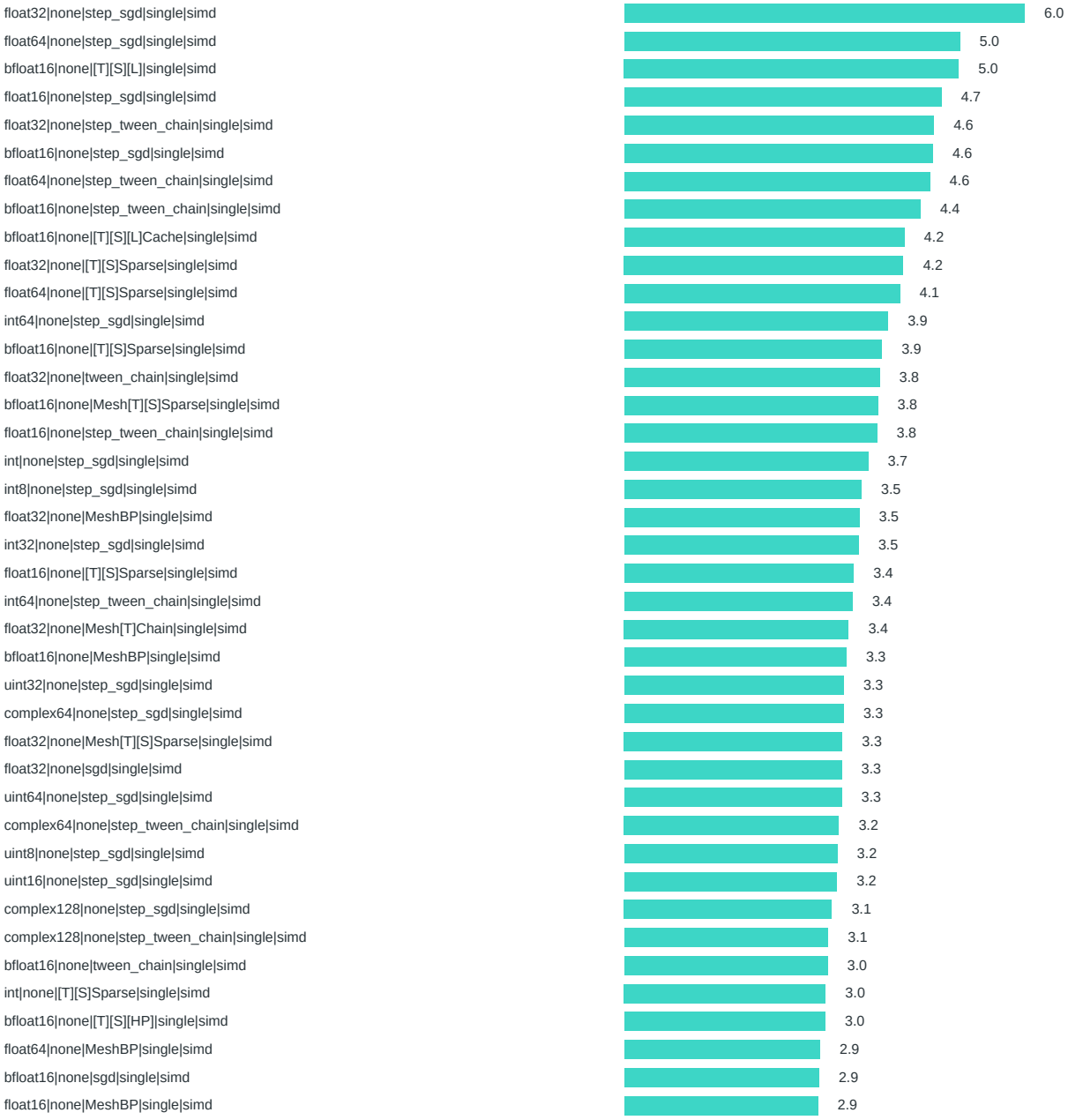
#	Cell	Score	Soft	Acc	Thru	Avail
1	float32|none|sgd|single|simd	3.3	3.3	11.4	116.7	24.5
2	bfloat16|none|step_tween_chain|single|simd	4.4	3.3	11.6	131.8	28.9
3	int|none|step_sgd|single|simd	3.7	3.3	11.3	110.8	29.2
4	float32|none|step_sgd|single|simd	6.0	3.3	11.1	182.9	29.6
5	int64|none|step_tween_chain|single|simd	3.4	3.2	10.4	113.1	29.2
6	bfloat16|none|sgd|single|simd	2.9	3.2	11.8	100.7	24.5
7	float32|none|MeshBP|single|simd	3.5	3.1	11.0	129.4	24.8
8	complex64|none|step_tween_chain|single|simd	3.2	3.1	11.1	100.0	29.0
9	bfloat16|none|MeshBP|single|simd	3.3	3.1	12.8	104.1	25.0
10	complex64|none|step_sgd|single|simd	3.3	3.1	10.0	111.8	29.2
11	float64|none|step_tween_chain|single|simd	4.6	3.1	11.0	141.2	29.5
12	float16|none|step_sgd|single|simd	4.7	3.1	11.1	154.4	27.8
13	bfloat16|none|step_sgd|single|simd	4.6	3.1	11.0	144.6	29.0
14	complex128|none|step_tween_chain|single|simd	3.1	3.1	10.5	99.8	29.1
15	int64|none|step_sgd|single|simd	3.9	3.1	10.8	124.8	29.2
16	float64|none|step_sgd|single|simd	5.0	3.0	10.9	155.9	29.6
17	bfloat16|none|tween_chain|single|simd	3.0	3.0	10.9	112.5	24.8
18	float64|none|MeshBP|single|simd	2.9	3.0	10.4	111.1	25.3
19	float16|none|MeshBP|single|simd	2.9	2.9	10.8	112.0	23.9
20	float32|none|tween_chain|single|simd	3.8	2.9	10.7	142.1	25.1

Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|MeshBP|single|simd	3.3	3.1	12.8	104.1	25.0
2	bfloat16|none|sgd|single|simd	2.9	3.2	11.8	100.7	24.5
3	bfloat16|none|step_tween_chain|single|simd	4.4	3.3	11.6	131.8	28.9
4	float32|none|sgd|single|simd	3.3	3.3	11.4	116.7	24.5
5	int|none|step_sgd|single|simd	3.7	3.3	11.3	110.8	29.2
6	float32|none|step_sgd|single|simd	6.0	3.3	11.1	182.9	29.6
7	float16|none|step_sgd|single|simd	4.7	3.1	11.1	154.4	27.8
8	complex64|none|step_tween_chain|single|simd	3.2	3.1	11.1	100.0	29.0
9	bfloat16|none|step_sgd|single|simd	4.6	3.1	11.0	144.6	29.0
10	float64|none|step_tween_chain|single|simd	4.6	3.1	11.0	141.2	29.5
11	float32|none|MeshBP|single|simd	3.5	3.1	11.0	129.4	24.8
12	bfloat16|none|tween_chain|single|simd	3.0	3.0	10.9	112.5	24.8
13	float64|none|step_sgd|single|simd	5.0	3.0	10.9	155.9	29.6
14	float16|none|MeshBP|single|simd	2.9	2.9	10.8	112.0	23.9
15	int64|none|step_sgd|single|simd	3.9	3.1	10.8	124.8	29.2
16	float32|none|tween_chain|single|simd	3.8	2.9	10.7	142.1	25.1
17	complex128|none|step_tween_chain|single|simd	3.1	3.1	10.5	99.8	29.1
18	float32|none|Mesh[T]Chain|single|simd	3.4	2.8	10.5	126.1	25.4
19	float64|none|MeshBP|single|simd	2.9	3.0	10.4	111.1	25.3

20	int64|none|step_tween_chain|single|simd	3.4	3.2	10.4	113.1	29.2

Top scores



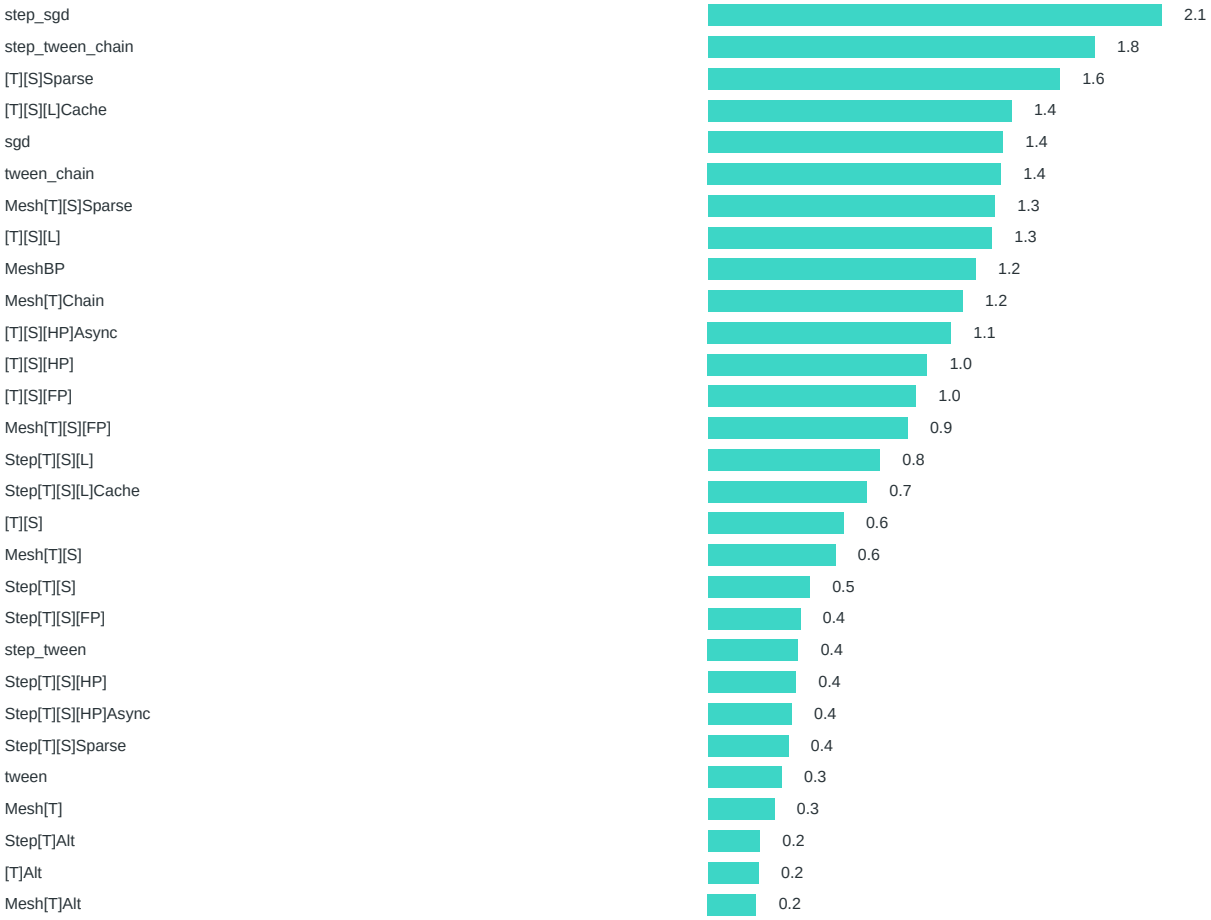
Best settings per mode



Best settings per mode



Mean Score by train mode



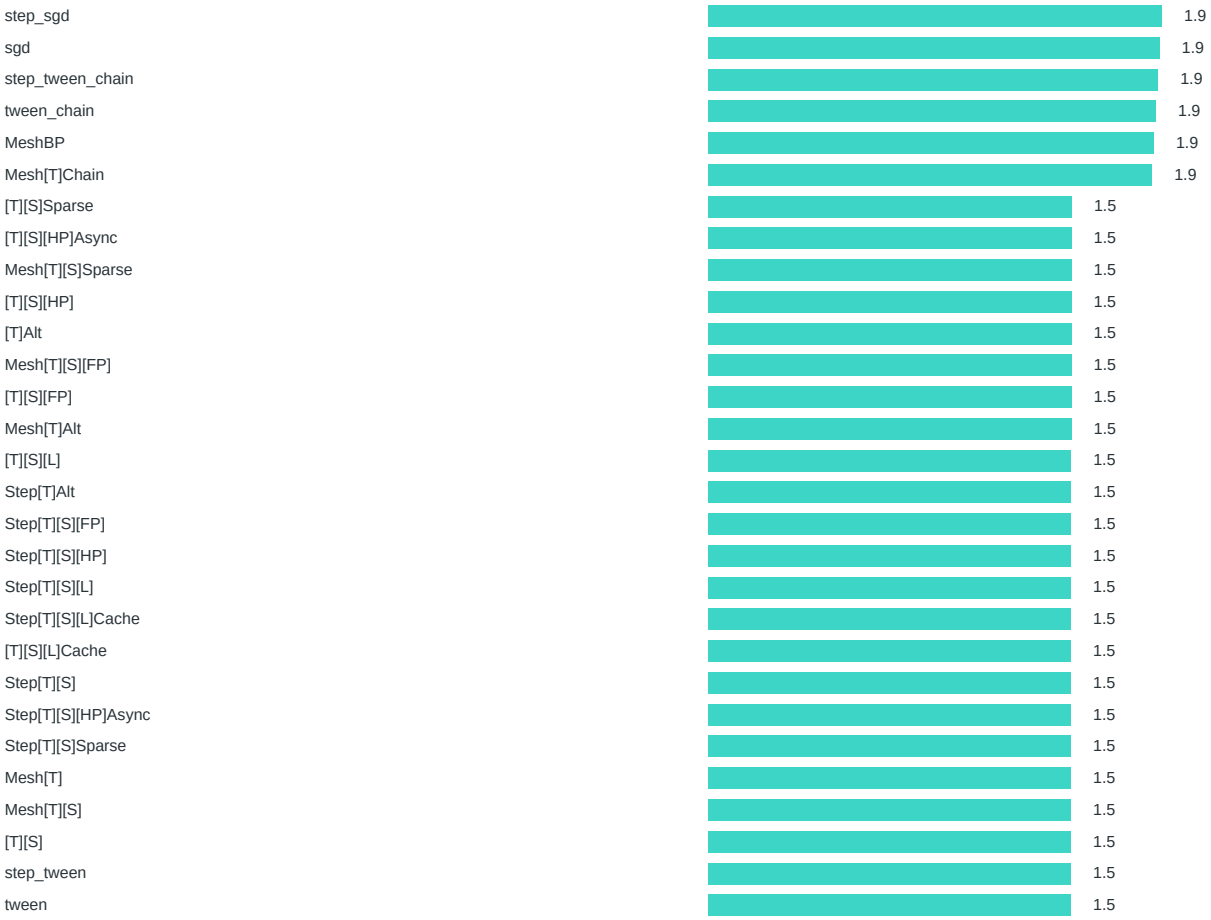
Mean hard Acc by train mode



Mean hard Acc by train mode



Mean SoftAcc by train mode



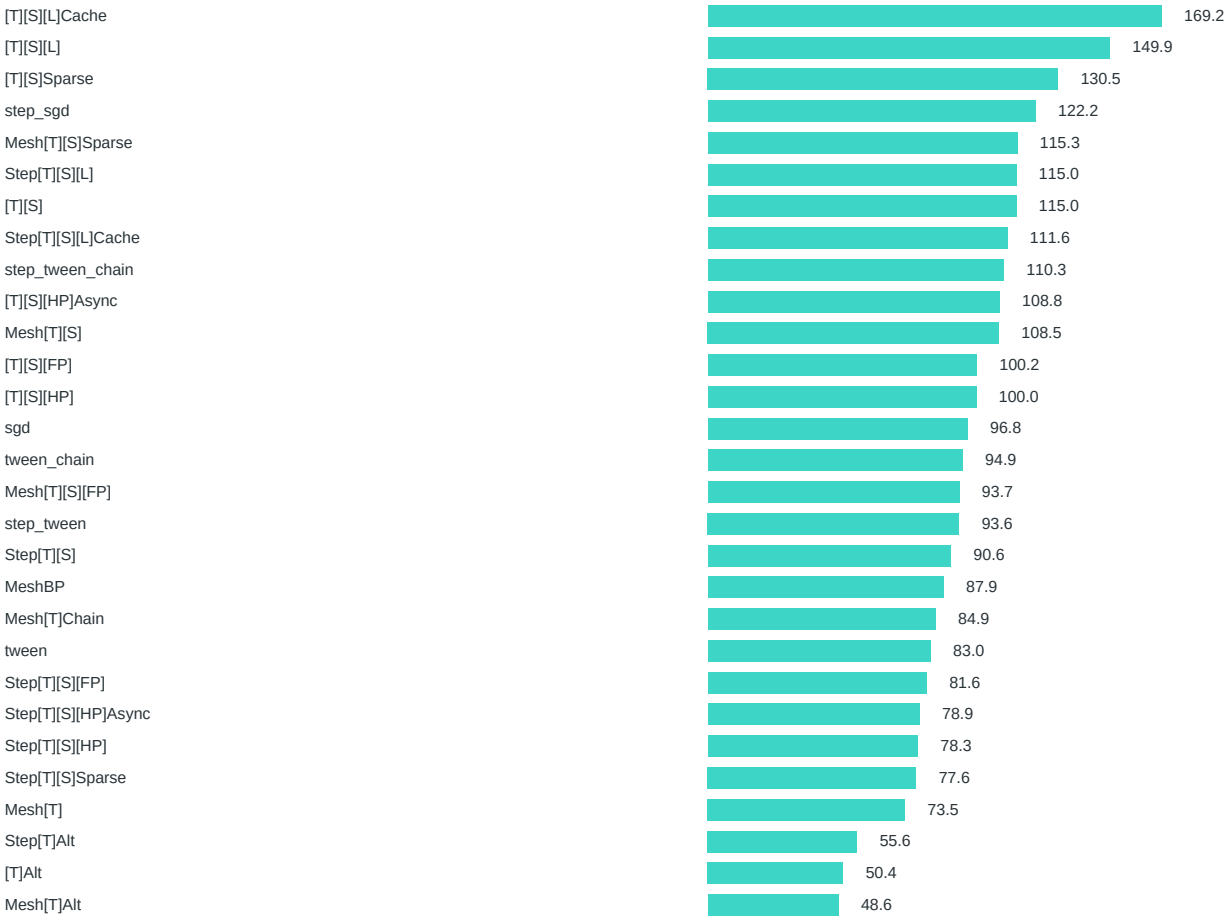
Mean Availability by train mode



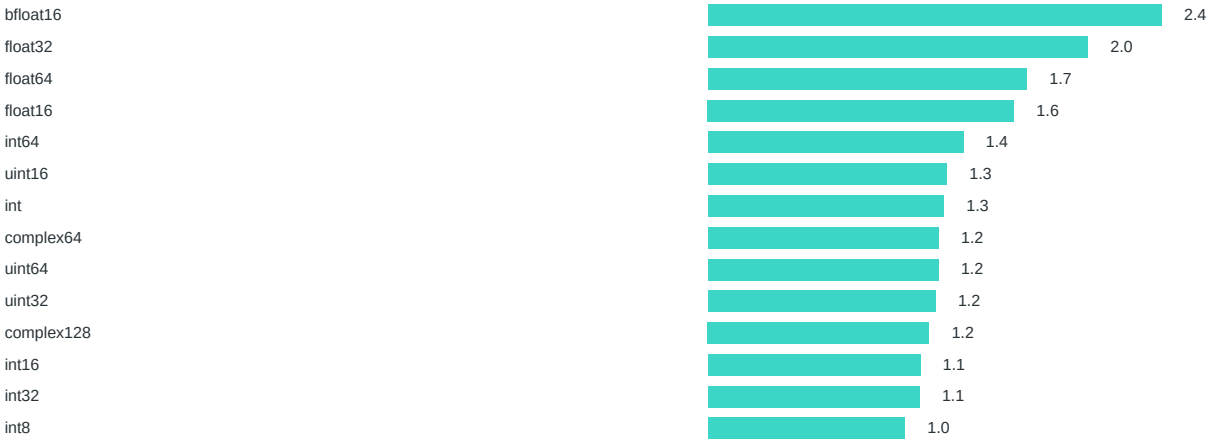
Mean Availability by train mode



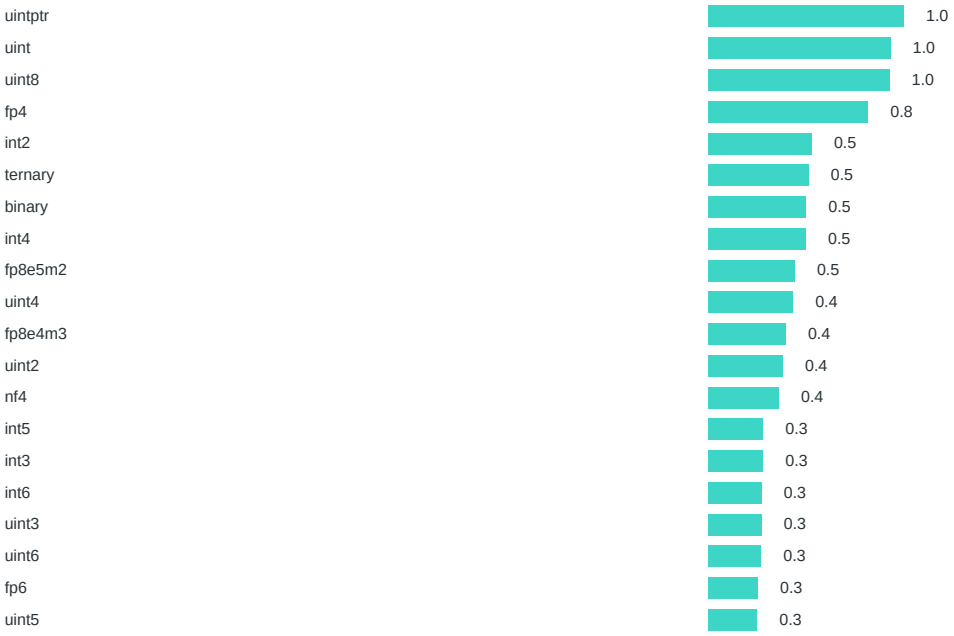
Mean Throughput by train mode



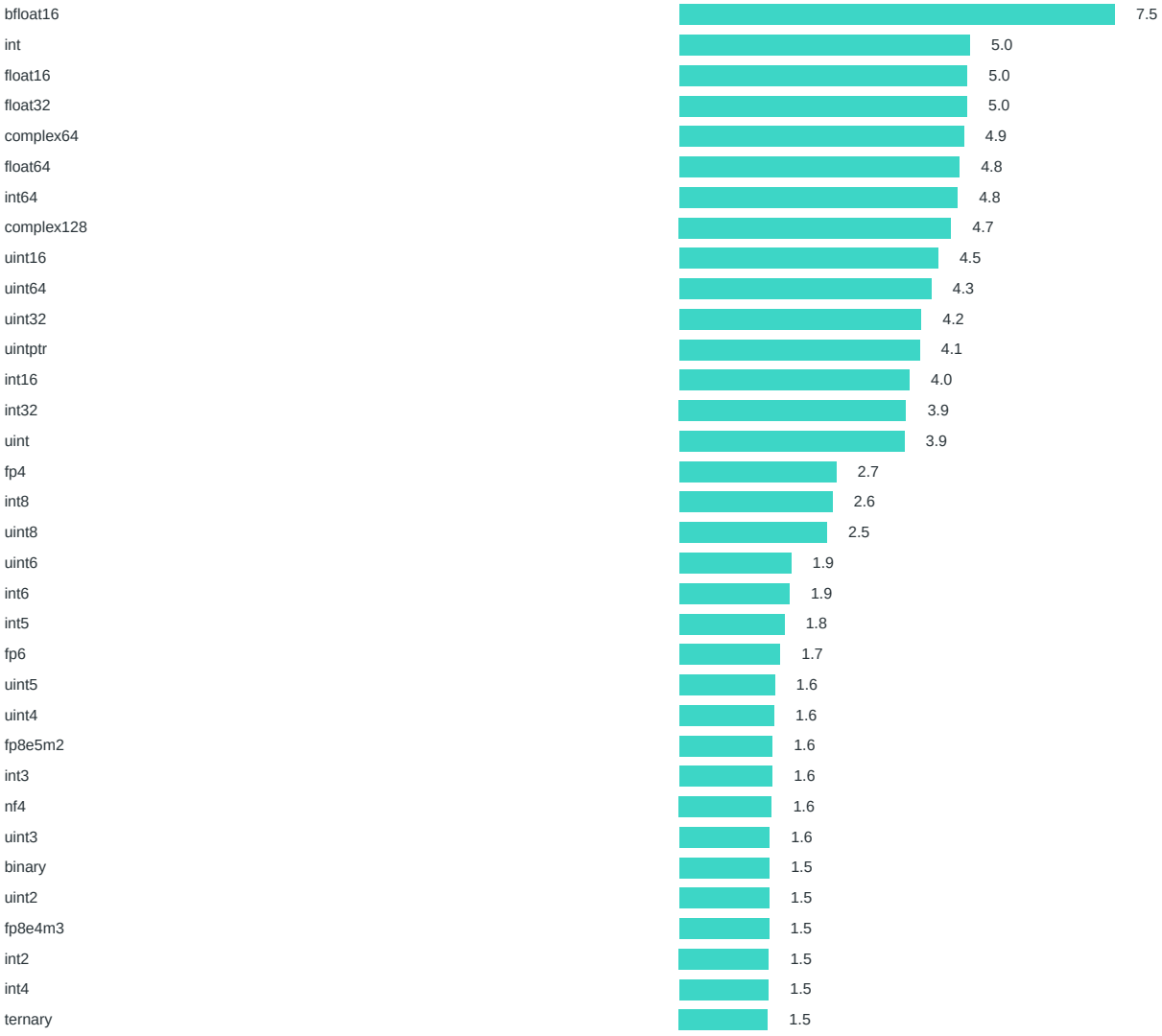
Mean Score by dtype



Mean Score by dtype



Mean hard Acc by dtype



Mean Score by arch



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

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

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	2	0	0	2	0	0	0	2	1	2
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	2	0	0	2	0	0	0	2	1	1
Mesh[T][S]	1	1	0	1	0	0	0	1	1	1
Mesh[T][S][FP]	1	0	0	1	1	0	0	1	1	1
Mesh[T][S]Sparse	2	0	0	2	0	0	0	2	1	2
Step[T]Alt	0	0	0	0	0	0	0	0	0	0
Step[T][S]	1	0	0	0	0	0	0	0	1	1
Step[T][S][FP]	1	0	0	1	0	0	0	0	0	0
Step[T][S][HP]	0	0	0	0	0	0	0	0	0	0
Step[T][S][HP]Async	1	0	0	0	0	0	0	1	0	0
Step[T][S][L]	1	1	0	1	1	0	0	1	1	1
Step[T][S][L]Cache	1	1	0	1	1	0	0	1	1	1
Step[T][S]Sparse	0	0	0	0	0	0	0	1	0	0
[T]Alt	0	0	0	0	0	0	0	0	0	0
[T][S]	1	0	0	1	1	0	0	1	1	1
[T][S][FP]	2	0	0	1	0	0	0	1	1	1
[T][S][HP]	2	0	0	1	1	0	0	2	1	1
[T][S][HP]Async	2	1	0	2	1	0	0	2	1	1
[T][S][L]	1	1	1	2	1	1	0	1	2	1
[T][S][L]Cache	2	1	1	2	1	1	1	1	2	2
[T][S]Sparse	3	1	0	3	1	0	0	2	1	2
sgd	3	0	0	2	0	0	0	2	2	2
step_sgd	3	1	0	3	1	0	0	3	3	3
step_tween	0	0	0	0	0	0	0	0	0	0
step_tween_chain	3	0	0	3	0	0	1	2	3	2
tween	0	0	0	0	0	0	0	0	0	0
tween_chain	2	0	0	2	0	0	0	2	2	2

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

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

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	9	2	2	8	2	2	4	9	5	9
Mesh[T]	2	2	1	2	2	2	2	2	1	2
Mesh[T]Alt	3	1	2	3	1	2	1	2	1	2
Mesh[T]Chain	9	1	1	7	2	2	3	8	3	8
Mesh[T][S]	2	2	1	2	2	2	1	2	1	2
Mesh[T][S][FP]	6	1	2	4	2	1	2	6	2	5
Mesh[T][S]Sparse	5	1	1	5	1	2	2	6	2	5
Step[T]Alt	3	2	2	3	2	2	2	4	2	3
Step[T][S]	2	2	2	2	2	2	1	2	2	3
Step[T][S][FP]	3	2	2	3	1	1	1	2	1	3
Step[T][S][HP]	2	1	2	2	2	2	1	3	2	2
Step[T][S][HP]Async	3	1	1	2	2	1	1	3	1	3
Step[T][S][L]	3	2	1	2	1	2	1	3	1	3
Step[T][S][L]Cache	2	2	1	4	2	1	2	2	1	3
Step[T][S]Sparse	3	2	2	2	2	1	1	3	2	2
[T]Alt	4	2	1	2	2	2	4	3	1	3
[T][S]	2	1	1	2	2	1	2	2	2	2
[T][S][FP]	5	1	2	4	1	1	1	5	2	5
[T][S][HP]	5	1	2	5	2	1	2	7	2	5
[T][S][HP]Async	6	2	1	6	2	2	2	6	3	4
[T][S][L]	2	2	1	3	2	2	2	3	2	3
[T][S][L]Cache	3	1	1	3	2	2	2	2	2	3
[T][S]Sparse	6	1	1	6	1	2	2	6	2	5
sgd	10	2	2	9	1	2	2	8	5	8
step_sgd	9	2	2	9	2	2	2	9	7	8
step_tween	2	2	2	2	2	2	1	2	1	2
step_tween_chain	8	1	2	8	2	2	3	7	6	8
tween	2	2	1	2	1	1	2	1	2	2
tween_chain	9	1	2	8	2	2	4	8	8	9

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

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

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	2	2	2	2	2	2	2	2	2	2
Mesh[T]	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	2	2	2	2	2	2	2	2	2	2
Mesh[T]Chain	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]	2	2	2	2	2	2	2	2	2	2
Mesh[T][S][FP]	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
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	2	2	2	2	2	2	2	2	2	2
[T][S]	2	2	2	2	2	2	2	2	2	2
[T][S][FP]	2	2	2	2	2	2	2	2	2	2
[T][S][HP]	2	2	2	2	2	2	2	2	2	2
[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2
[T][S][L]	2	2	2	2	2	2	2	2	2	2
[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2
[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
sgd	2	2	2	2	2	2	2	2	2	2
step_sgd	2	2	2	2	2	2	2	2	2	2
step_tween	2	2	2	2	2	2	2	2	2	2
step_tween_chain	2	2	2	2	2	2	2	2	2	2
tween	2	2	2	2	2	2	2	2	2	2
tween_chain	2	2	2	2	2	2	2	2	2	2

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	25	23	25	25	24	25	25	24	25	25	25	25
Mesh[T]	22	21	22	22	21	22	22	22	22	22	22	22
Mesh[T]Alt	16	15	16	17	16	17	17	16	16	17	17	17
Mesh[T]Chain	25	23	25	25	24	25	25	24	24	25	25	25
Mesh[T][S]	29	28	29	30	28	29	30	29	29	30	29	30
Mesh[T][S][FP]	28	26	29	29	27	29	29	28	28	28	28	29
Mesh[T][S]Sparse	32	31	33	33	32	33	34	32	32	32	33	33
Step[T]Alt	18	16	18	18	17	19	19	18	18	18	18	18
Step[T][S]	25	24	26	26	25	25	26	25	25	26	25	25
Step[T][S][FP]	25	23	25	25	24	25	25	24	24	25	25	25
Step[T][S][HP]	25	23	25	25	24	25	25	24	24	25	25	25
Step[T][S][HP]Async	25	23	25	25	24	25	25	24	24	25	25	25
Step[T][S][L]	32	31	31	31	31	32	32	31	30	31	31	31
Step[T][S][L]Cache	31	31	31	31	31	32	32	31	30	31	31	31
Step[T][S]Sparse	25	23	25	25	24	25	25	24	25	25	25	25
[T]Alt	16	15	17	17	16	17	17	16	16	17	17	17
[T][S]	29	28	30	30	28	29	30	29	30	30	29	30
[T][S][FP]	29	27	29	29	27	29	29	28	28	29	29	29
[T][S][HP]	29	26	29	29	27	29	29	28	28	29	29	29
[T][S][HP]Async	29	27	29	29	28	29	30	28	28	29	29	29
[T][S][L]	38	37	38	38	37	39	39	37	36	37	38	38
[T][S][L]Cache	39	39	39	39	39	39	39	38	38	39	39	39
[T][S]Sparse	33	31	33	33	32	33	34	32	32	33	33	33
sgd	24	23	25	25	24	24	25	24	25	25	25	25
step_sgd	29	27	29	29	28	30	30	28	29	29	29	29
step_tween	25	23	25	25	24	26	26	25	25	25	25	25
step_tween_chain	29	27	29	29	28	29	30	28	29	29	29	29
tween	22	21	22	22	21	22	22	22	22	22	22	22
tween_chain	25	23	25	25	24	25	25	24	25	25	25	25

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	25	23	25	25	23	25	24	25	25	25	23	25
Mesh[T]	22	21	22	22	21	22	21	22	22	22	20	22
Mesh[T]Alt	17	15	16	17	15	16	16	17	16	16	15	16
Mesh[T]Chain	25	23	25	25	23	24	24	25	24	25	23	25
Mesh[T][S]	29	28	30	29	27	30	29	30	29	29	28	29
Mesh[T][S][FP]	29	27	28	29	26	28	28	29	28	29	26	28
Mesh[T][S]Sparse	33	31	32	33	31	32	32	33	32	32	30	32
Step[T]Alt	18	17	18	18	17	18	18	18	18	18	16	18
Step[T][S]	25	24	25	26	24	25	25	26	25	25	24	25
Step[T][S][FP]	25	23	25	25	23	25	24	25	24	25	23	25
Step[T][S][HP]	25	23	25	25	22	24	24	25	24	25	23	25
Step[T][S][HP]Async	25	24	25	25	23	24	25	25	25	25	23	25
Step[T][S][L]	32	31	31	31	30	30	30	32	31	31	31	31
Step[T][S][L]Cache	31	31	31	31	31	30	30	32	31	31	31	31
Step[T][S]Sparse	25	24	24	25	23	24	24	25	24	25	23	25
[T]Alt	17	15	16	17	15	16	16	17	16	17	15	16
[T][S]	30	28	29	30	28	29	29	30	29	29	28	29
[T][S][FP]	29	27	29	29	26	28	28	29	28	29	27	28
[T][S][HP]	29	27	29	29	27	28	28	29	29	29	26	29
[T][S][HP]Async	29	27	29	29	27	28	29	29	28	29	27	29
[T][S][L]	38	37	37	38	37	37	37	38	38	37	37	37
[T][S][L]Cache	39	39	38	39	39	38	38	39	39	38	39	39
[T][S]Sparse	33	31	32	33	31	32	32	33	32	32	31	33
sgd	25	23	25	25	23	25	25	25	25	25	23	25
step_sgd	29	27	29	29	27	29	29	29	29	29	27	29
step_tween	25	24	25	25	23	25	25	25	25	25	23	25
step_tween_chain	29	27	29	29	27	29	28	29	29	29	26	29
tween	22	21	22	22	21	22	22	22	22	22	21	22
tween_chain	25	23	25	25	23	25	25	25	25	25	23	25

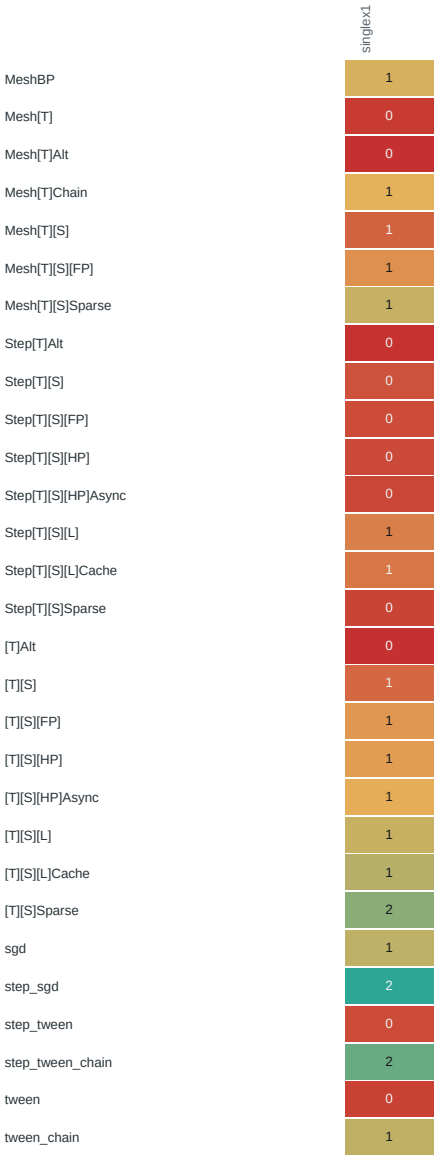
Honesty - mean Avail, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	25	25	24	25	25	24	24	25	25	25
Mesh[T]	22	22	22	22	22	21	21	22	22	22
Mesh[T]Alt	17	17	16	17	16	16	16	16	17	16
Mesh[T]Chain	25	25	24	25	25	24	24	25	25	25
Mesh[T][S]	29	29	29	29	29	29	29	29	29	29
Mesh[T][S][FP]	28	28	28	28	29	28	28	28	28	29
Mesh[T][S]Sparse	33	33	32	33	33	32	32	33	33	32
Step[T]Alt	18	18	18	18	18	18	18	18	18	18
Step[T][S]	25	25	25	25	25	25	25	25	25	25
Step[T][S][FP]	25	25	24	25	25	24	24	25	25	25
Step[T][S][HP]	25	24	25	24	25	24	24	24	25	25
Step[T][S][HP]Async	25	25	24	25	25	24	24	25	25	25
Step[T][S][L]	31	31	31	31	31	30	30	31	31	31
Step[T][S][L]Cache	31	31	31	31	31	30	30	31	31	31
Step[T][S]Sparse	25	25	24	25	25	24	24	25	25	25
[T]Alt	17	16	16	16	16	16	16	16	17	16
[T][S]	29	29	29	30	29	29	29	29	29	29
[T][S][FP]	29	29	28	29	29	28	28	28	28	29
[T][S][HP]	29	29	28	29	28	28	28	29	29	29
[T][S][HP]Async	29	29	28	29	29	28	28	29	29	29
[T][S][L]	38	37	37	38	38	37	36	38	38	38
[T][S][L]Cache	39	39	38	39	39	38	38	39	39	39
[T][S]Sparse	33	33	32	33	33	32	32	33	33	33
sgd	25	25	25	25	25	25	25	25	25	25
step_sgd	29	29	29	29	29	29	29	29	29	29
step_tween	25	25	25	25	25	25	25	25	25	25
step_tween_chain	29	29	28	29	29	28	28	29	29	29
tween	22	22	22	22	22	22	22	22	22	22
tween_chain	25	25	25	25	25	24	24	25	25	25

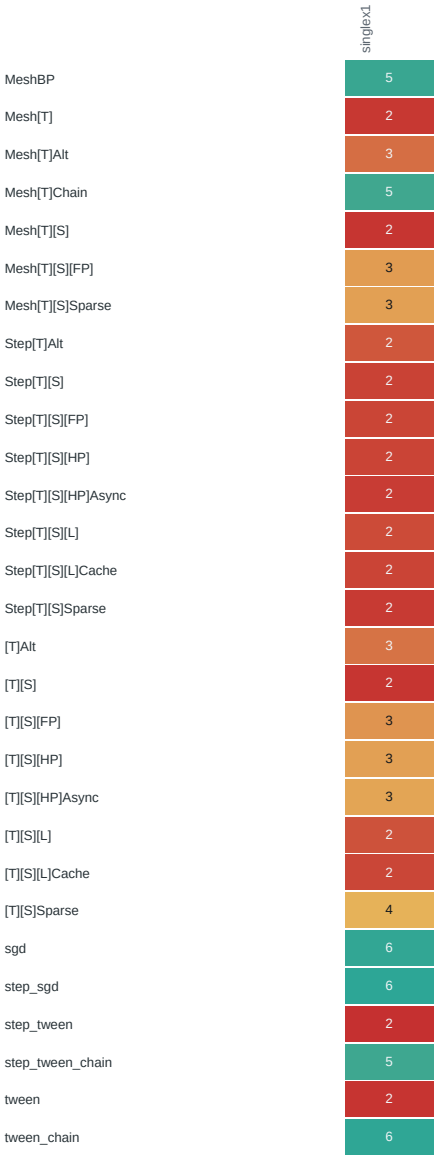
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

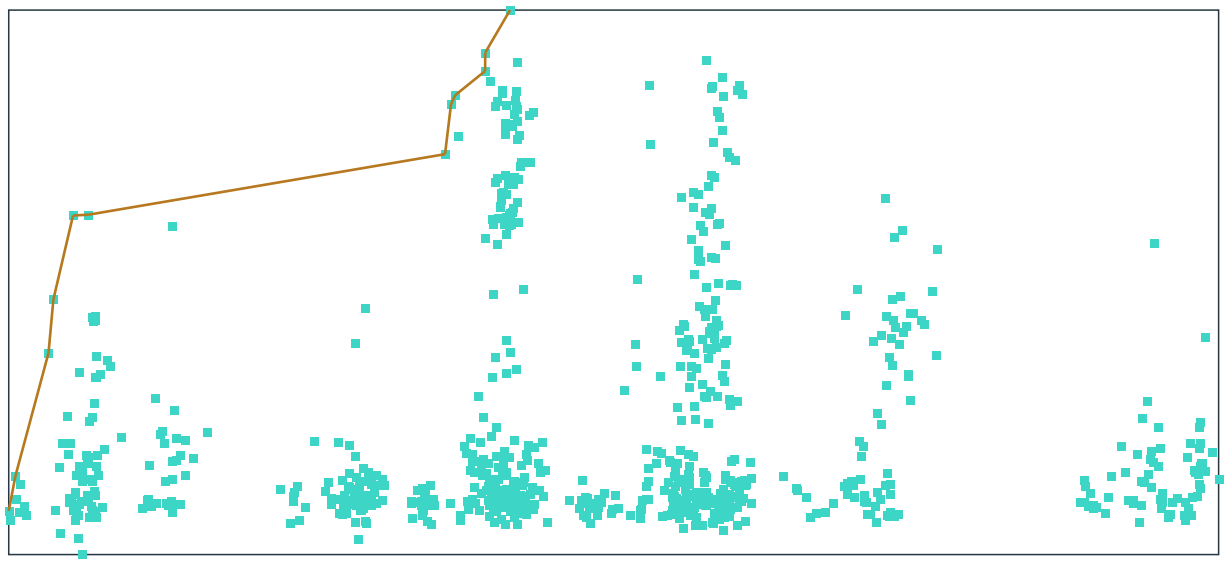


Mean Avail, every mode x arch

Mean Avail, every mode x arch

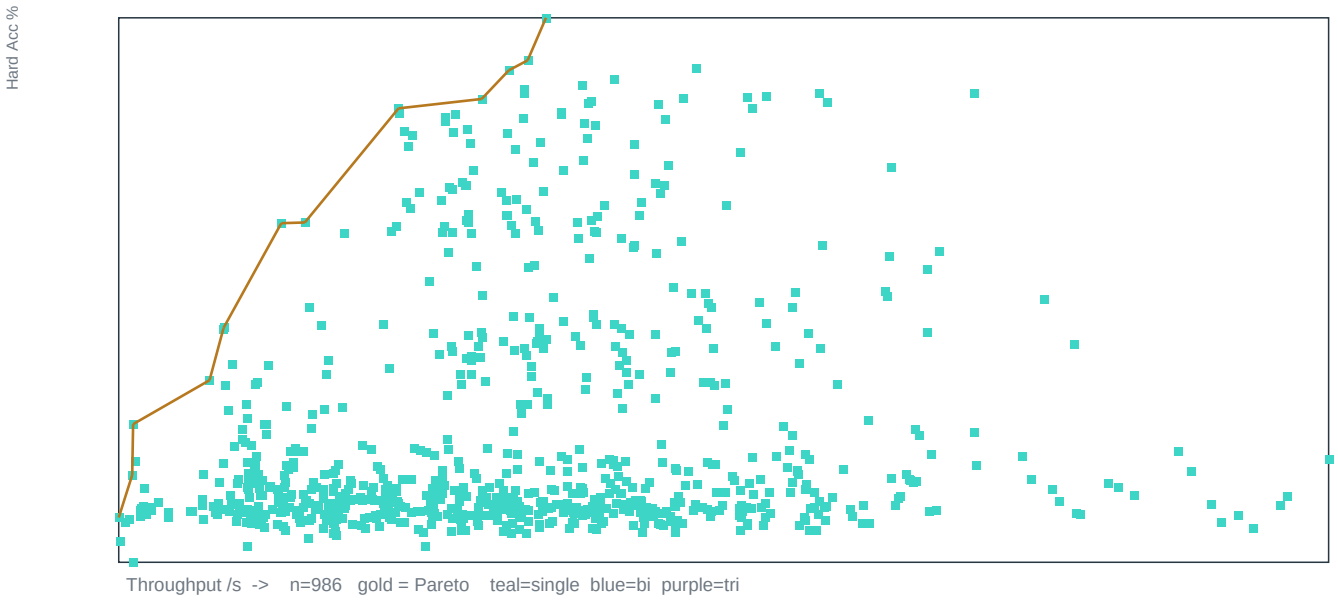
	singlex1
MeshBP	25
Mesh[T]	22
Mesh[T]Alt	16
Mesh[T]Chain	24
Mesh[T][S]	29
Mesh[T][S][FP]	28
Mesh[T][S]Sparse	32
Step[T]Alt	18
Step[T][S]	25
Step[T][S][FP]	25
Step[T][S][HP]	24
Step[T][S][HP]Async	25
Step[T][S][L]	31
Step[T][S][L]Cache	31
Step[T][S]Sparse	24
[T]Alt	16
[T][S]	29
[T][S][FP]	28
[T][S][HP]	28
[T][S][HP]Async	29
[T][S][L]	37
[T][S][L]Cache	39
[T][S]Sparse	32
sgd	25
step_sgd	29
step_tween	25
step_tween_chain	29
tween	22
tween_chain	25

Pillars - Availability vs hard Acc

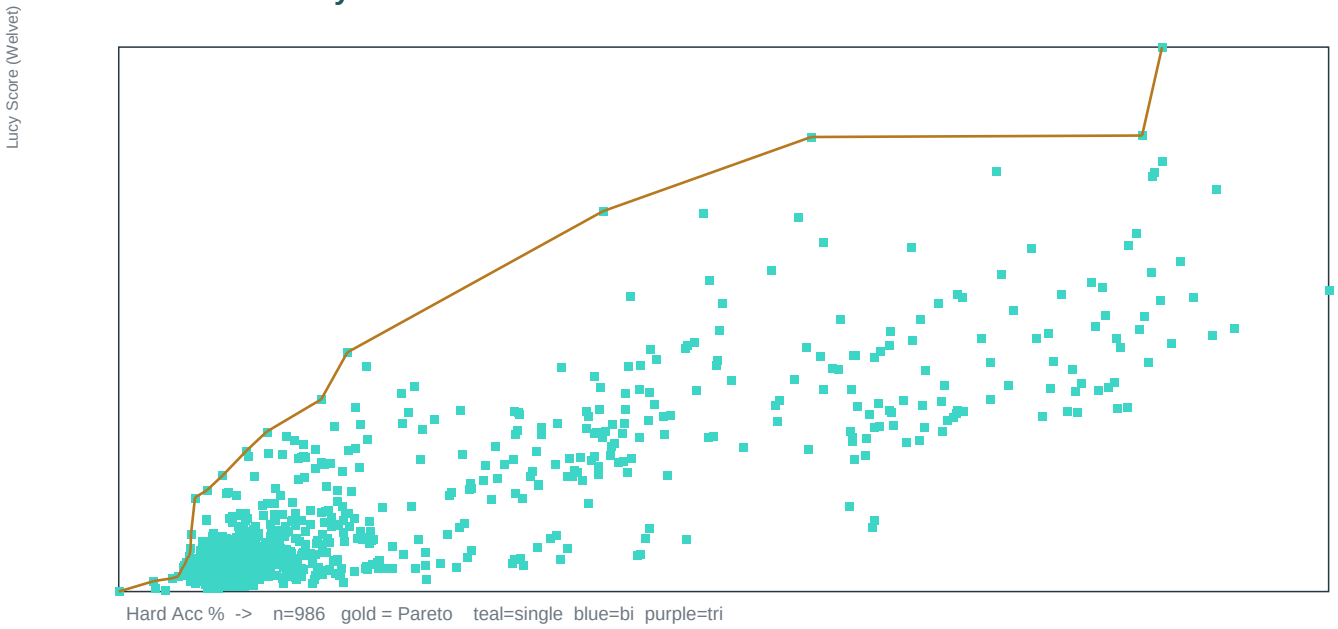



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

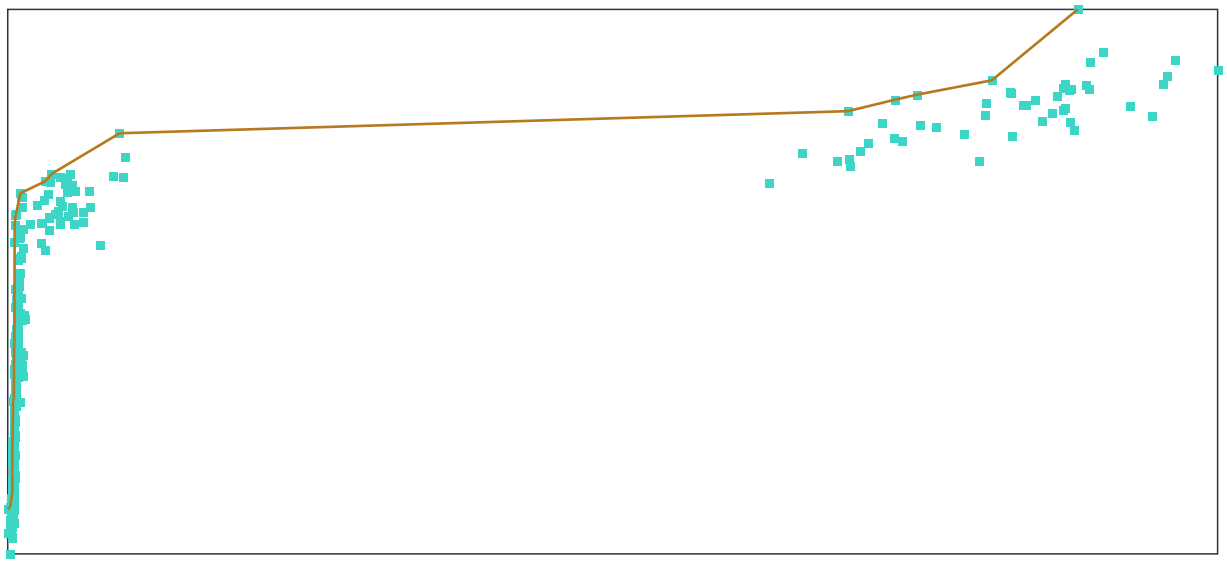
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

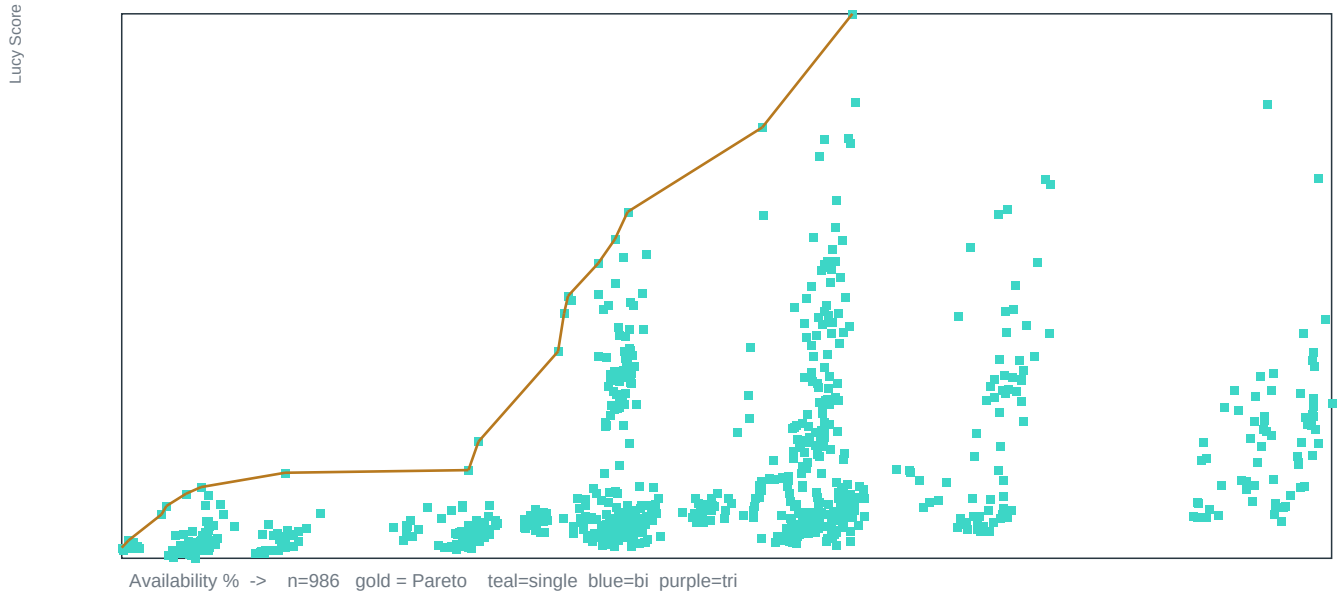


SoftAcc (serve-confidence) vs hard Acc

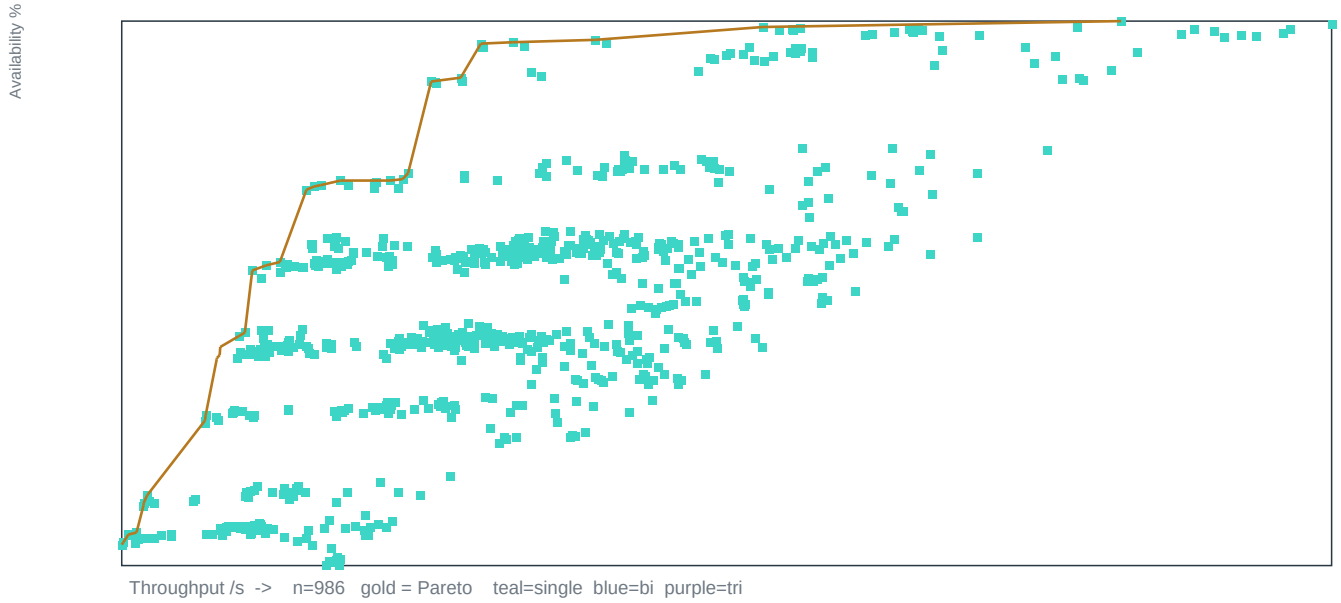



SoftAcc % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

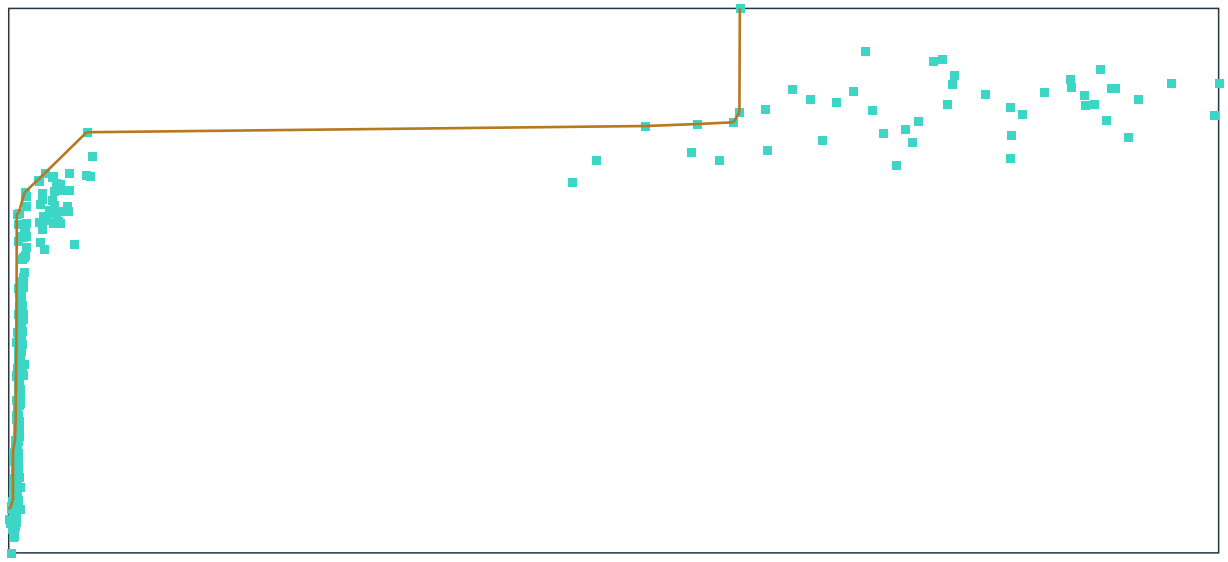
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



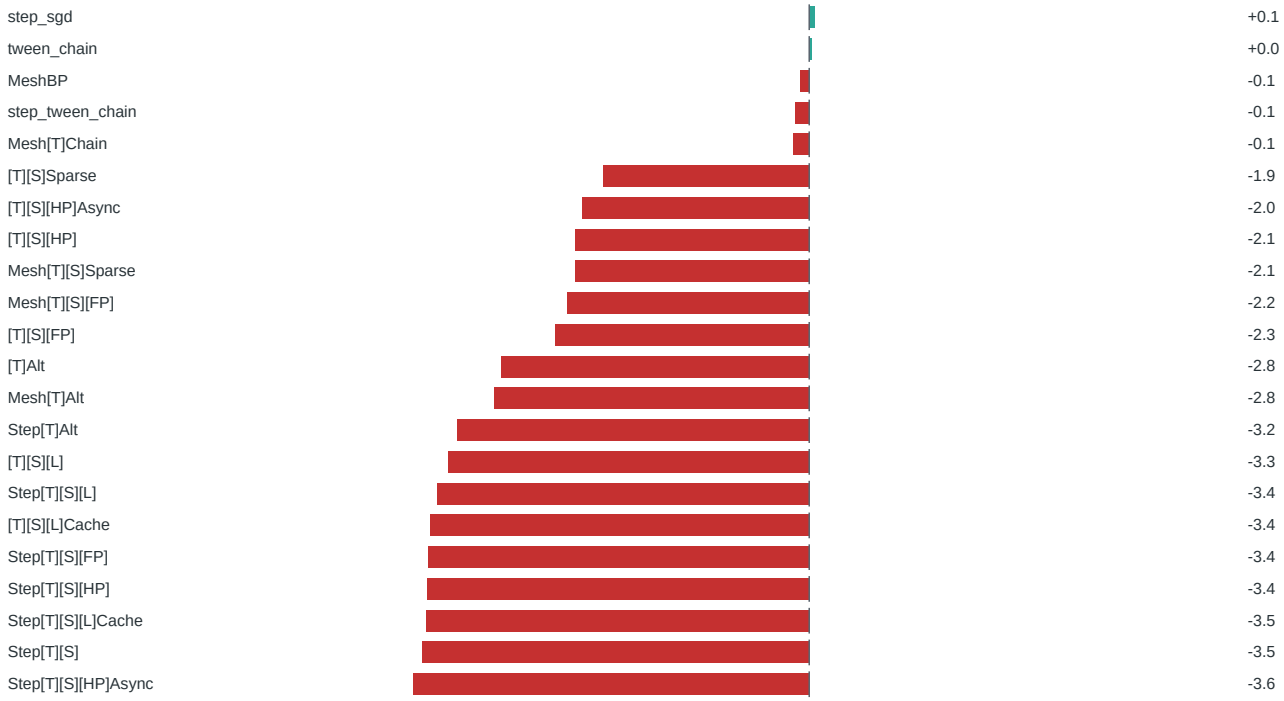

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

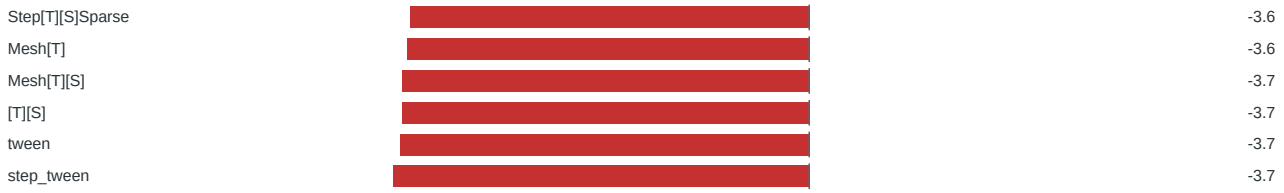
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
step_sgd	34	+0.1	21	+0.0	+4.1	+25	+0.7	29
tween_chain	34	+0.0	21	-0.0	-0.0	-2	-0.0	0
MeshBP	34	-0.1	21	-0.0	-0.1	-9	-0.1	0
step_tween_chain	34	-0.1	18	-0.0	+3.9	+13	+0.4	12
Mesh[T]Chain	34	-0.1	24	-0.0	-0.2	-12	-0.2	0
[T][S]Sparse	34	-1.9	6	-0.4	+7.7	+34	+0.3	6
[T][S][HP]Async	34	-2.0	0	-0.4	+3.9	+12	-0.2	0
[T][S][HP]	34	-2.1	0	-0.4	+3.7	+3	-0.4	0
Mesh[T][S]Sparse	34	-2.1	3	-0.4	+7.7	+19	-0.0	0
Mesh[T][S][FP]	34	-2.2	12	-0.4	+3.5	-3	-0.4	0
[T][S][FP]	34	-2.3	0	-0.4	+3.7	+3	-0.4	0
[T]Alt	34	-2.8	6	-0.4	-8.4	-46	-1.1	0
Mesh[T]Alt	34	-2.8	6	-0.4	-8.4	-48	-1.1	0
Step[T]Alt	34	-3.2	0	-0.4	-6.8	-41	-1.1	0
[T][S][L]	34	-3.3	3	-0.4	+12.7	+53	-0.1	9
Step[T][S][L]	34	-3.4	0	-0.4	+6.4	+18	-0.6	0
[T][S][L]Cache	34	-3.4	3	-0.4	+14.0	+72	+0.0	12
Step[T][S][FP]	34	-3.4	0	-0.4	-0.1	-15	-0.9	0
Step[T][S][HP]	34	-3.4	3	-0.4	-0.2	-19	-1.0	0
Step[T][S][L]Cache	34	-3.5	0	-0.4	+6.4	+15	-0.6	0
Step[T][S]	34	-3.5	0	-0.4	+0.5	-6	-0.9	0
Step[T][S][HP]Async	34	-3.6	0	-0.4	-0.1	-18	-1.0	0
Step[T][S]Sparse	34	-3.6	0	-0.4	-0.2	-19	-1.0	0
Mesh[T]	34	-3.6	3	-0.4	-3.0	-23	-1.1	0
Mesh[T][S]	34	-3.7	6	-0.4	+4.5	+12	-0.8	0
[T][S]	34	-3.7	6	-0.4	+4.5	+18	-0.7	0
tween	34	-3.7	3	-0.4	-2.8	-14	-1.0	0
step_tween	34	-3.7	3	-0.4	+0.1	-3	-0.9	0

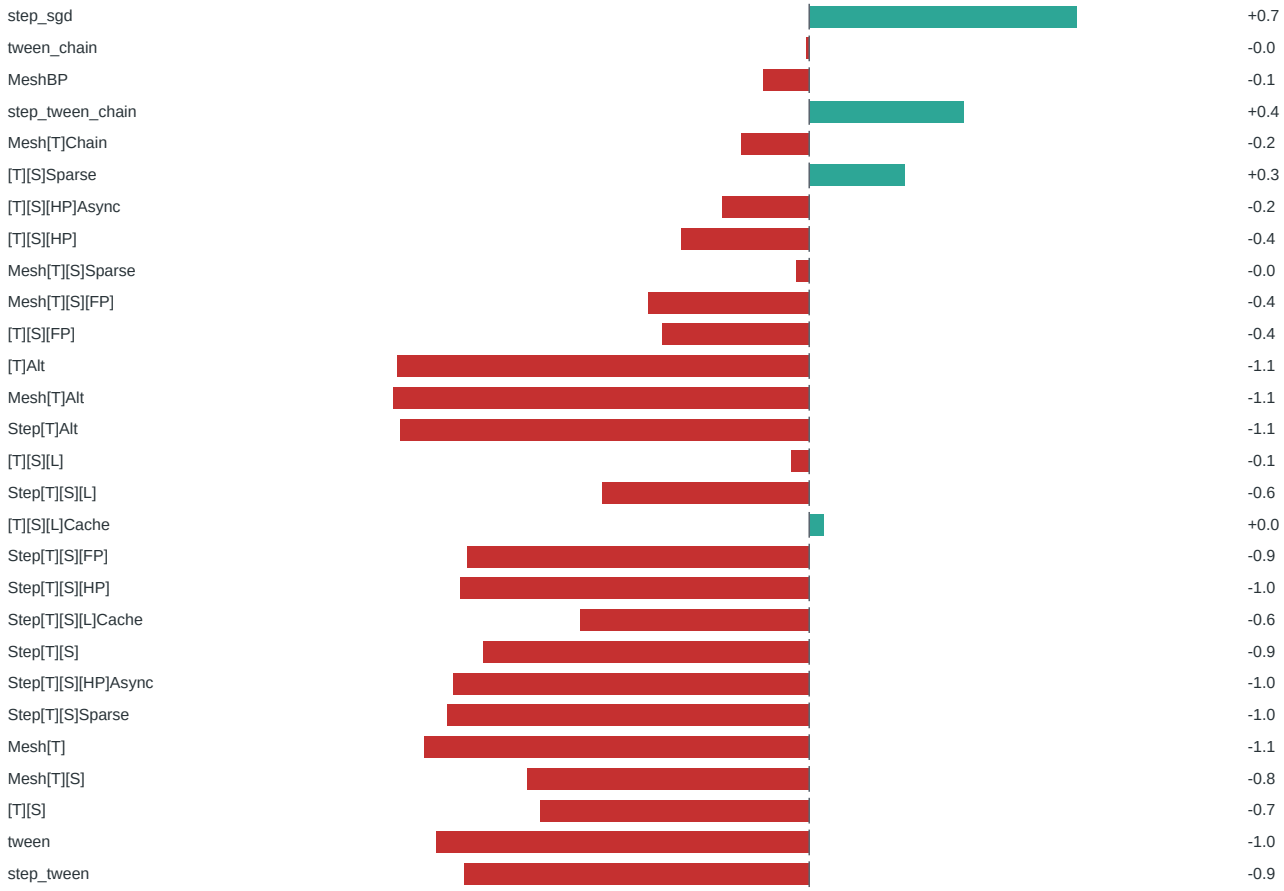
mean AccD vs sgd



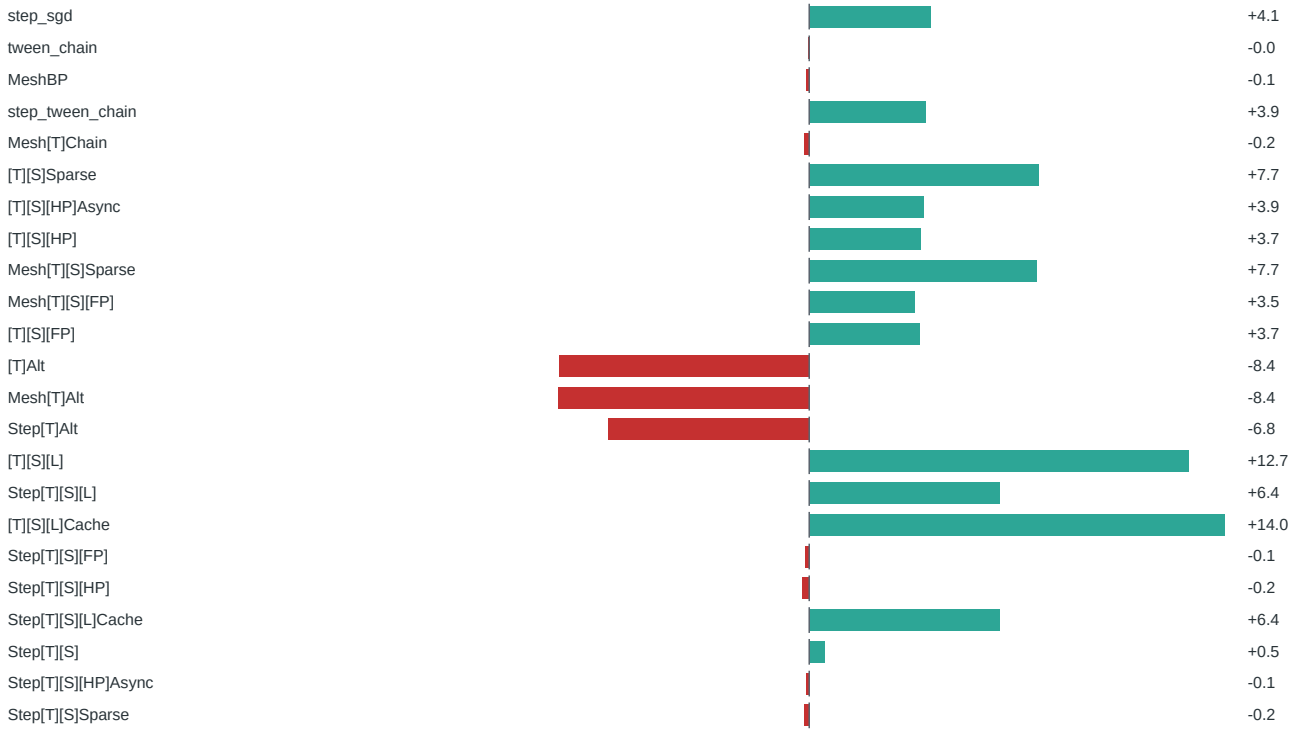
mean AccD vs sgd



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

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

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

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

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

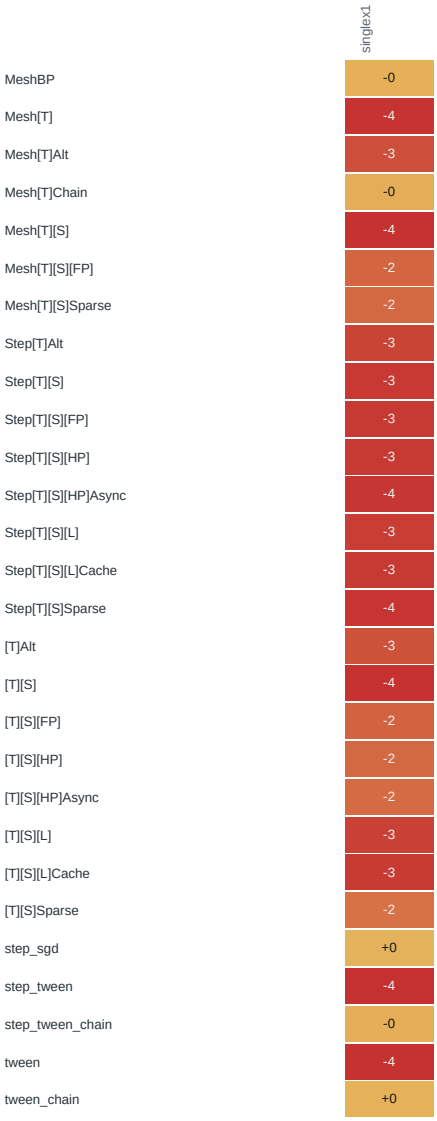
AvailD vs sgd, every mode x dtype (cols 25-34)

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

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

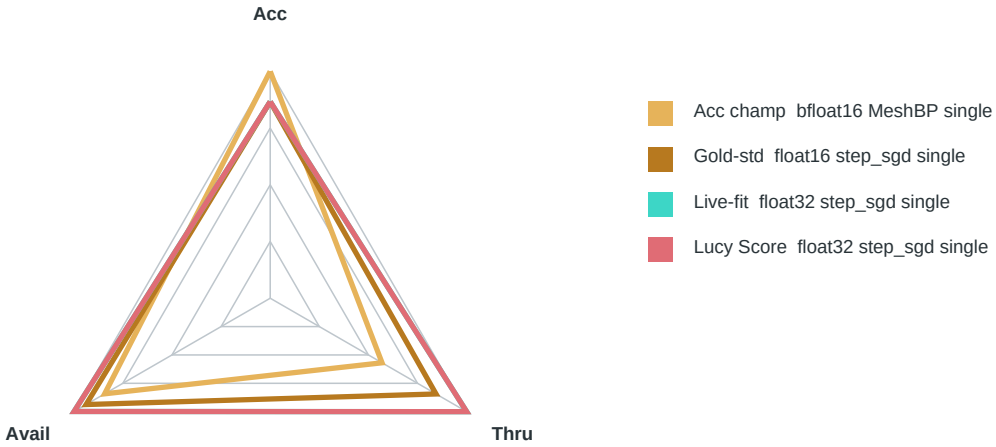
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	0.83
Step[T][S]	[T][S]	34	0.46
Step[T][S][FP]	[T][S][FP]	34	1.29
Step[T][S][HP]	[T][S][HP]	34	1.50
Step[T][S][HP]Async	[T][S][HP]Async	34	1.59
Step[T][S][L]	[T][S][L]	34	0.46
Step[T][S][L]Cache	[T][S][L]Cache	34	0.30
Step[T][S]Sparse	[T][S]Sparse	34	1.83
step_sgd	sgd	34	0.54
step_tween	tween	34	0.40
step_tween_chain	tween_chain	34	0.51

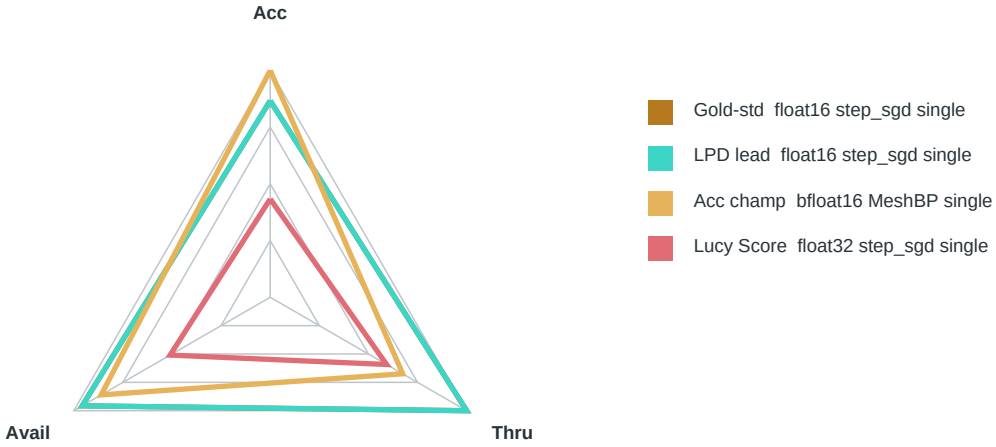
Consciousness - Acc, Throughput, Availability

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 bfloat16|none|MeshBP|single|simd Acc 12.8 Thru 104 Avail 25.0% 142.1 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) float32|none|step_sgd|single|simd Score 6.0 Acc 11.1 Soft 3 284.1 KiB
Live-fit champ (best Q) float32|none|step_sgd|single|simd Acc 11.1 Thru 183 Avail 29.6% 284.1 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): float16|none|step_sgd|single|simd mode step_sgd Acc 11.1 Thru 154 142.1 KiB
Board fastest float32|none|[T][S][L]Cache|single|simd Thru 248 (traps may own this) Best availability float64|none|[T][S][L]Cache|single|simd 39.2%
Learner Thru peak 183 learner Avail peak 29.6%

Consciousness radar - Acc / Thru / Avail vs learner peaks



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



No gold cell yet. Need all three pillars at 80% of learner peaks in one fifth of Acc-champ RAM.

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

Mode	n	Acc	KiB	Thru	Cell
step_sgd	6	11.3	142.1	183	float16 step_sgd single / float32 step_sgd single
tween_chain	5	10.9	142.1	142	bfloat16 tween_chain single / float32 tween_chain single

Mode	n	Acc	KiB	Thru	Cell
step_tween_chain	5	11.6	142.1	141	bfloat16 step_tween_chain single / float64 step_tween_chain single
MeshBP	5	12.8	142.1	129	float16 MeshBP single / float32 MeshBP single
Mesh[T]Chain	5	11.2	142.1	126	float16 Mesh[T]Chain single / float32 Mesh[T]Chain single
sgd	5	11.8	142.1	117	bfloat16 sgd single / float32 sgd single

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
keep	float16 step_sgd single	87	84	94	88	100	1.0	0.88	11.1	154	142.1
keep	bfloat16 step_sgd single	86	79	98	87	100	1.0	0.87	11.0	145	142.1
keep	bfloat16 step_tween_chain single	91	72	98	86	100	1.0	0.86	11.6	132	142.1
-	float16 step_tween_chain single	76	76	94	82	100	1.0	0.82	9.7	140	142.1
keep	bfloat16 MeshBP single	100	57	84	78	100	1.0	0.78	12.8	104	142.1
keep	bfloat16 tween_chain single	85	61	84	76	100	1.0	0.76	10.9	112	142.1
keep	bfloat16 sgd single	92	55	83	75	100	1.0	0.75	11.8	101	142.1
keep	float16 MeshBP single	85	61	81	75	100	1.0	0.75	10.8	112	142.1
-	float16 tween_chain single	77	66	81	74	100	1.0	0.74	9.9	120	142.1
keep	bfloat16 Mesh[T]Chain single	87	55	83	73	100	1.0	0.73	11.2	100	142.1
keep	float16 Mesh[T]Chain single	83	58	80	73	100	1.0	0.73	10.6	107	142.1
-	uint16 sgd single	78	56	84	72	100	1.0	0.72	10.0	103	142.1
-	float16 sgd single	74	56	80	69	100	1.0	0.69	9.5	102	142.1
-	uint16 MeshBP single	70	49	83	66	100	1.0	0.66	9.0	89	142.1
keep	float32 step_sgd single	87	100	100	95	200	0.5	0.48	11.1	183	284.1
-	float32 step_tween_chain single	73	92	100	87	200	0.5	0.44	9.4	168	284.1
keep	float32 tween_chain single	84	78	85	82	200	0.5	0.41	10.7	142	284.1
keep	float32 MeshBP single	86	71	84	80	200	0.5	0.40	11.0	129	284.1
-	int32 step_sgd single	74	69	99	80	200	0.5	0.40	9.4	127	284.1
keep	float32 Mesh[T]Chain single	82	69	86	79	200	0.5	0.39	10.5	126	284.1

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

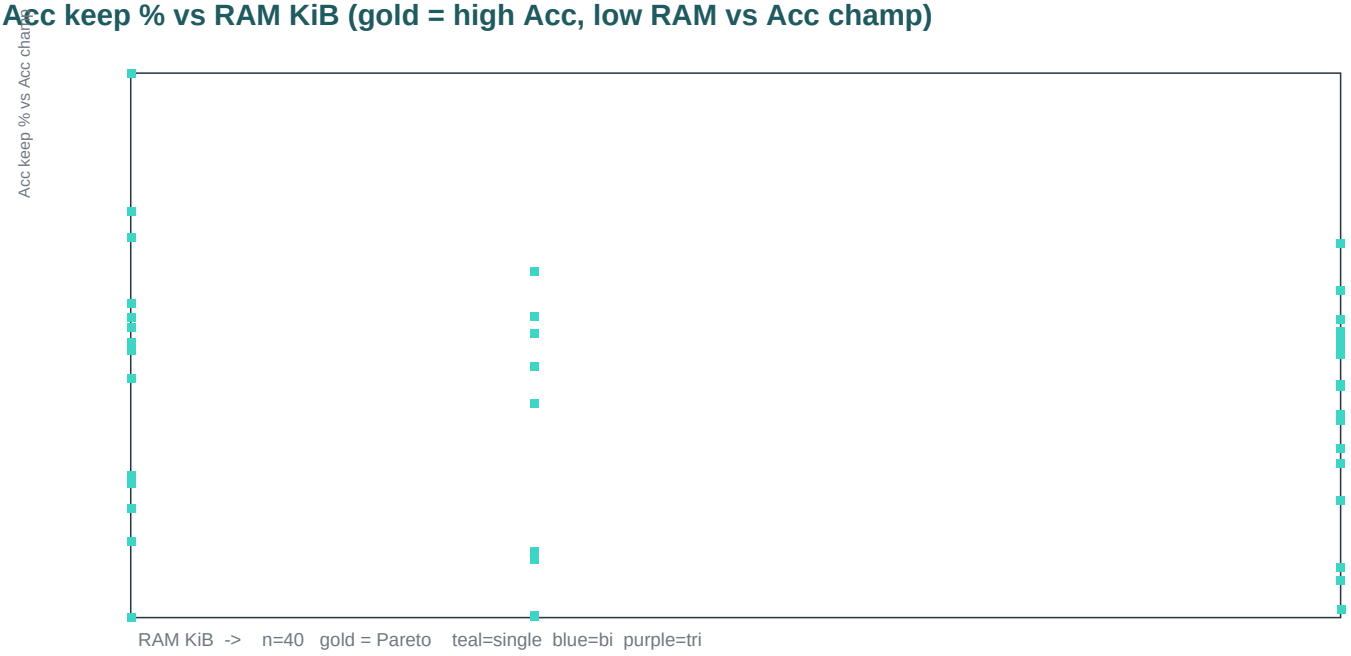
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
keep	float32 step_sgd single	87	100	100	95	0.48	183	29.6
keep	float64 step_sgd single	85	85	100	90	0.22	156	29.6
keep	float16 step_sgd single	87	84	94	88	0.88	154	27.8
-	float32 step_tween_chain single	73	92	100	87	0.44	168	29.5
keep	bfloat16 step_sgd single	86	79	98	87	0.87	145	29.0
keep	float64 step_tween_chain single	86	77	100	87	0.22	141	29.5
keep	bfloat16 step_tween_chain single	91	72	98	86	0.86	132	28.9
keep	int64 step_sgd single	85	68	99	83	0.21	125	29.2
keep	float32 tween_chain single	84	78	85	82	0.41	142	25.1
-	float16 step_tween_chain single	76	76	94	82	0.82	140	27.8

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

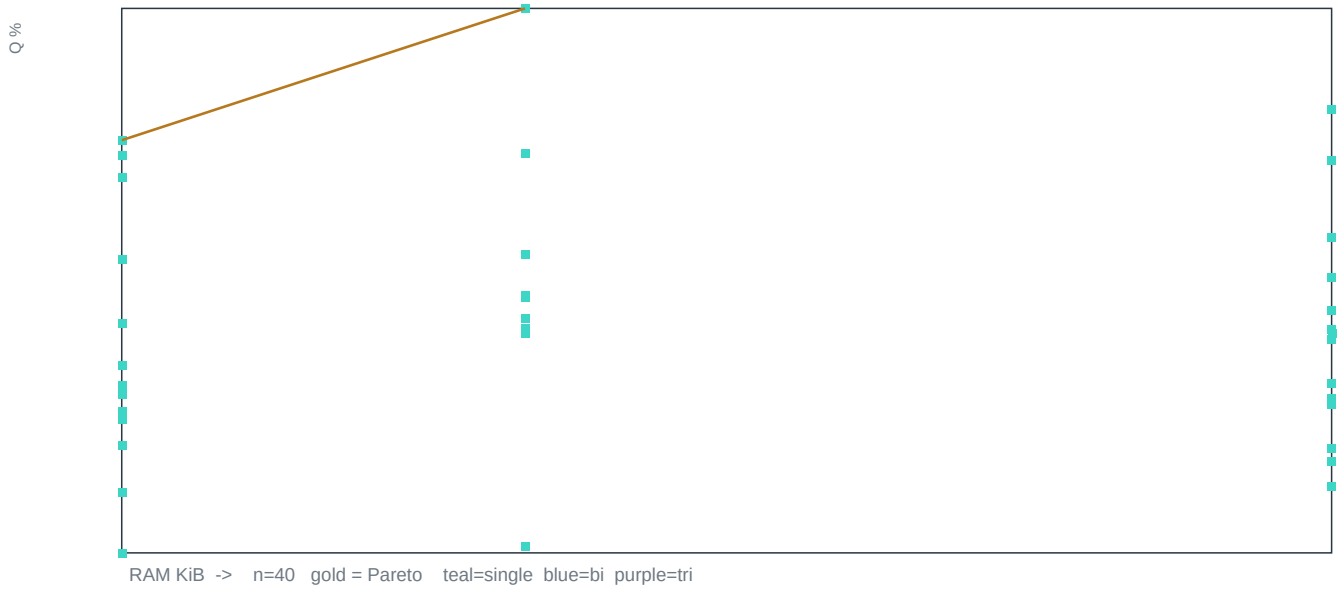
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd single	15	70	78	43	6	16.0	0.00	1.9	128	8.9
trap	binary step_sgd single	14	84	91	47	6	16.0	0.00	1.8	154	8.9
trap	binary tween single	9	59	70	33	6	16.0	0.00	1.2	108	8.9
trap	binary tween_chain single	8	67	79	35	6	16.0	0.00	1.1	122	8.9
trap	binary step_tween single	12	66	79	40	6	16.0	0.00	1.5	121	8.9
trap	binary step_tween_chain single	9	76	90	39	6	16.0	0.00	1.1	140	8.9
trap	binary MeshBP single	11	62	78	37	6	16.0	0.00	1.4	113	8.9
trap	binary Mesh[T] single	12	52	70	36	6	16.0	0.00	1.6	96	8.9

trap	binary Mesh[T]Chain single	12	60	78	38	6	16.0	0.00	1.5	109	8.9
trap	binary [T][S] single	16	83	94	50	6	16.0	0.00	2.1	152	8.9

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

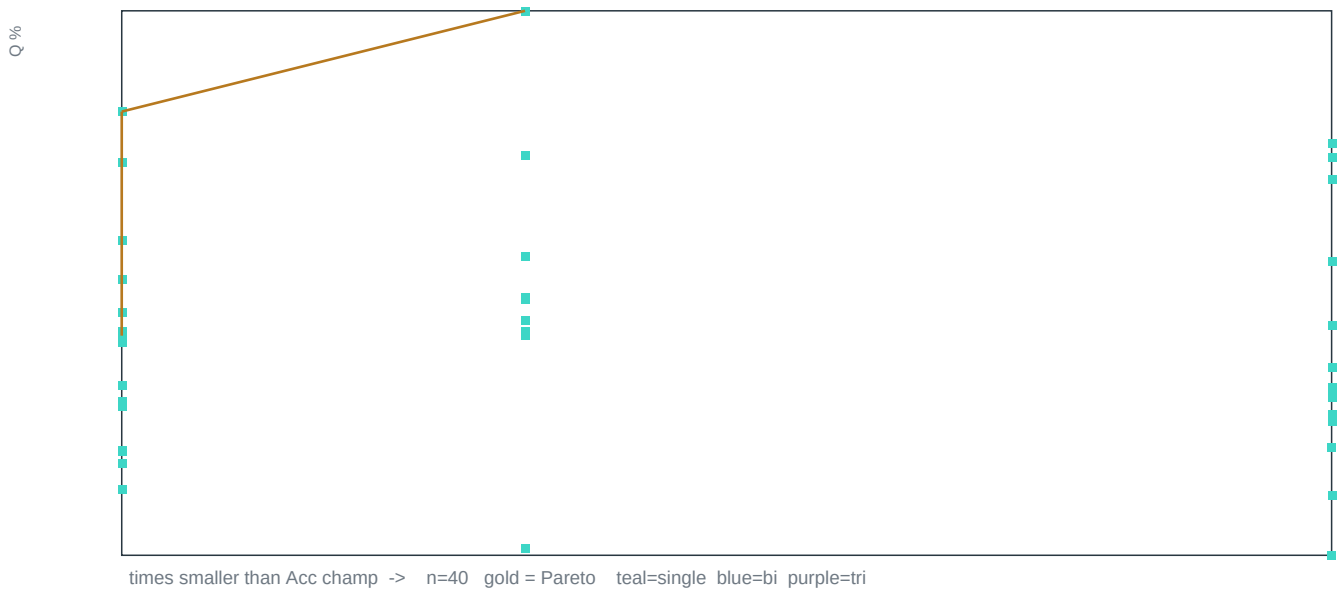


Q% vs RAM KiB (gold = high consciousness, low RAM)



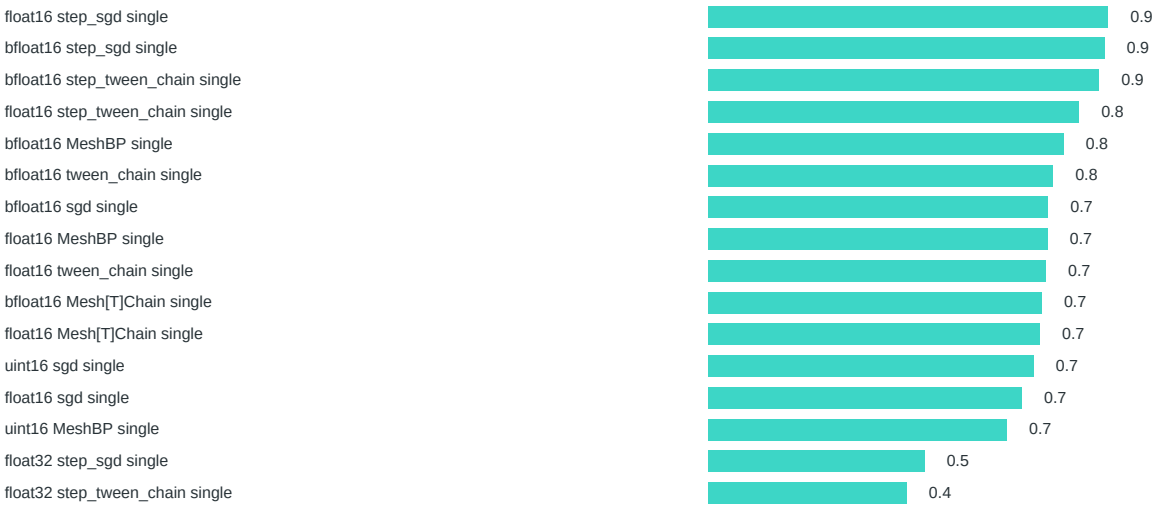
Q% vs shrink vs Acc champ (gold = upper right)

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

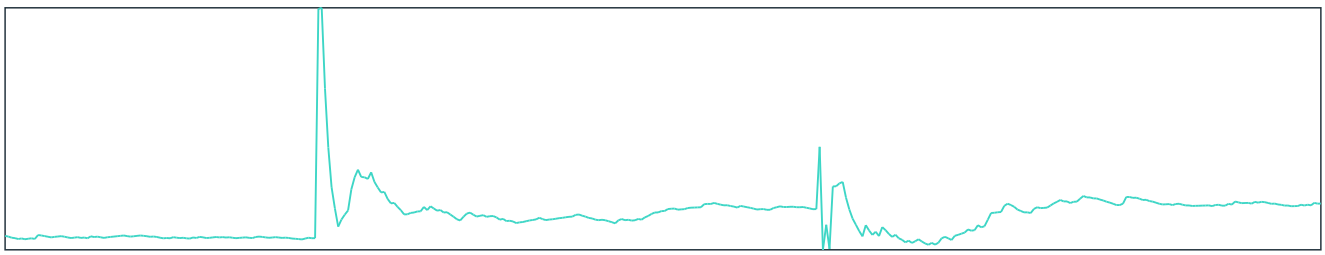


times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Top Lucy density (LPD)

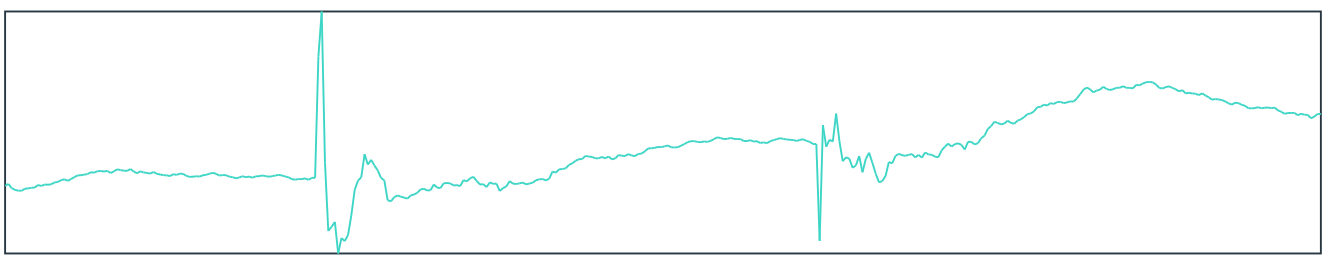


Live pulse (Score)



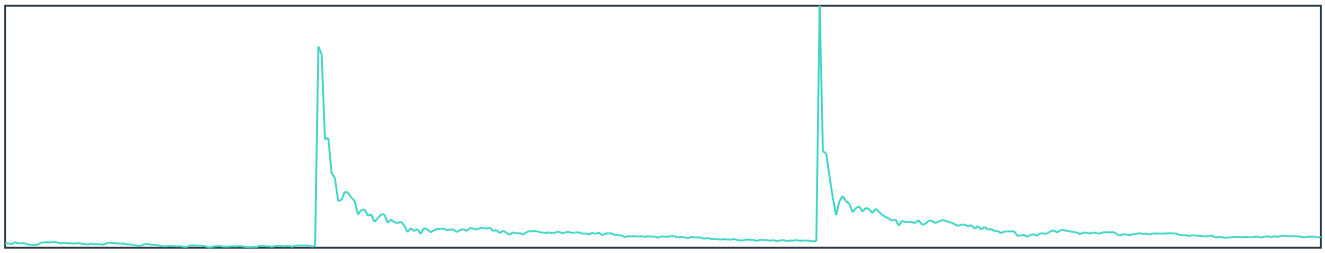
n=400 min=0.11 max=0.65

Live pulse (SoftAcc)



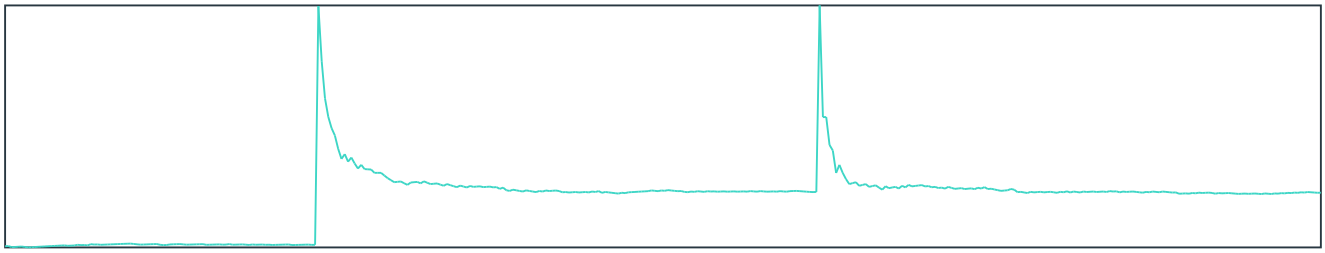
n=400 min=1.54 max=1.54

Live pulse (Availability)



n=400 min=24.04 max=34.12

Live pulse (Throughput)



n=400 min=45.39 max=79.77

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