

Parallel Training on CPU Threads

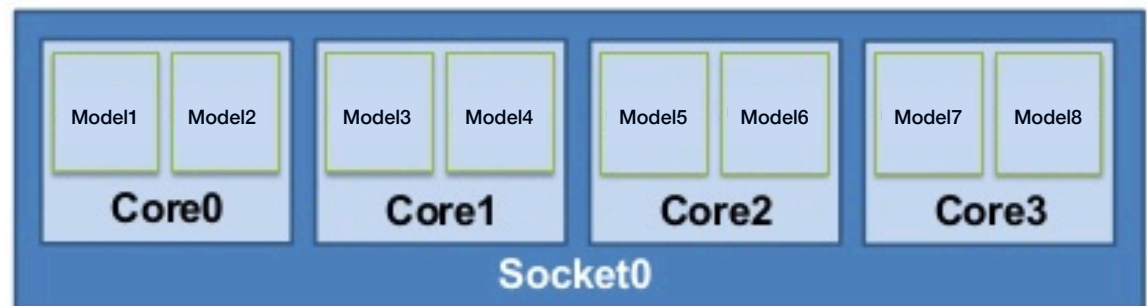
- Train one distinct model per thread
- Create as many Ray tasks as your CPU threads (24)
- 2hr scan evaluated **27 NNs**

On atlaslogin02

- CPU threads = 48
Although not all of them were running:
RuntimeError: Resource temporarily unavailable
- 2hr scan evaluated **67 NNs**

Ray Dashboard

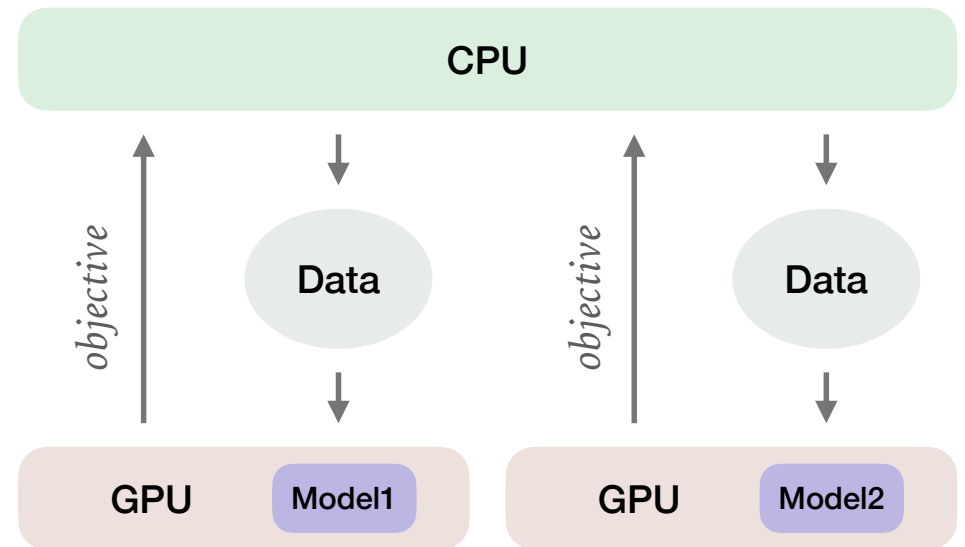
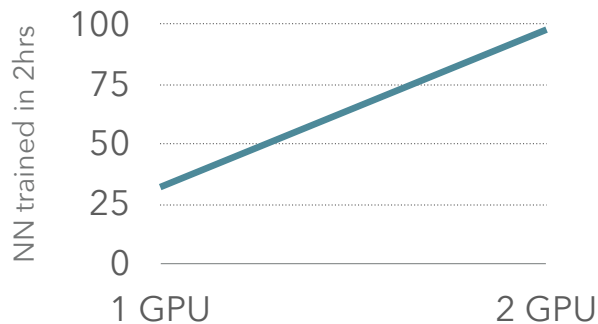
MACHINE VIEW	LOGICAL VIEW	RAY CONFIG
Host: atlasd60-hep.atl-prod (130.202.173.9)		
24 workers / 24 cores		
5d 20h 29m 05s		
CPU: 99.2%		
RAM: 21.1 GiB / 62.8 GiB (34%)		
Disk: 26.7 GiB / 115.4 GiB (23%)		
Sent: 0.1 MB/s		
Received: 0.0 MB/s		
Logs: View all logs (818 lines)		
Errors: No errors		
object_store_memory: 0 GiB / 12.74 GiB, memory: 0 GiB / 36.96 GiB, CPU: 0 / 24, GPU: 0 / 3, nodes:130,202,173,9: 0 / 1		
ray (PID: 30903)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 130.4%
ray (PID: 30904)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 117.5%
ray (PID: 30905)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 29.4%
ray (PID: 30906)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 76.7%
ray (PID: 30907)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 132.0%
ray (PID: 30908)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 132.0%
ray (PID: 30909)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 81.8%
ray (PID: 30910)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 122.6%
ray (PID: 30911)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 140.7%
ray (PID: 30912)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 48.4%
ray (PID: 30913)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 125.3%
ray (PID: 30914)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 23.4%
ray (PID: 30915)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 19.4%
ray (PID: 30916)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 111.1%
ray (PID: 30917)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 135.9%
ray (PID: 30918)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 46.0%
ray (PID: 30923)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 129.7%
ray (PID: 30924)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 136.7%
ray (PID: 30925)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 92.1%
ray (PID: 30927)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 31.8%
ray (PID: 30928)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 134.1%
ray (PID: 30929)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 148.4%
ray (PID: 30931)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 95.4%
ray (PID: 30932)	deephyper_evaluator_ray_evaluator_compute_objective()	00h 21m 16s 140.8%
Totals (1 host)	24 workers / 24 cores	N/A
99.2%		
21.1 GiB / 62.8 GiB (34%)		
26.7 GiB / 115.4 GiB (23%)		
0.1 MB/s		
0.0 MB/s		
818 lines		
No errors		



Parallel Training on GPUs

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- Parallelize the HPS – similar to the CPU threads – not the training
- Create as many Ray tasks as your GPUs
- Each task sees only 1 GPU
- Results are aggregated in CPU
- 2hr scan evaluated **98 NNs**
- Scaling “linear”:



Problem: TF is not cleaning the GPU memory after each Model training