T1-B

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Para compilar: make

Para executar a parteB faça:

./roda-ParteB <nElementos> <nQueries>

O algoritmo da parte B se mostrou bem mais eficiente quanto a busca, a seguir está a representação de dados que coletamos onde podemos ver as métricas para comparação. Podemos observar que quanto maior o número de threads mais rápida fica a execução, e por consequência maior fica o número da vazão médio

n = número de elementos do vetor de entrada

Q = número de consultas a serem realizadas.

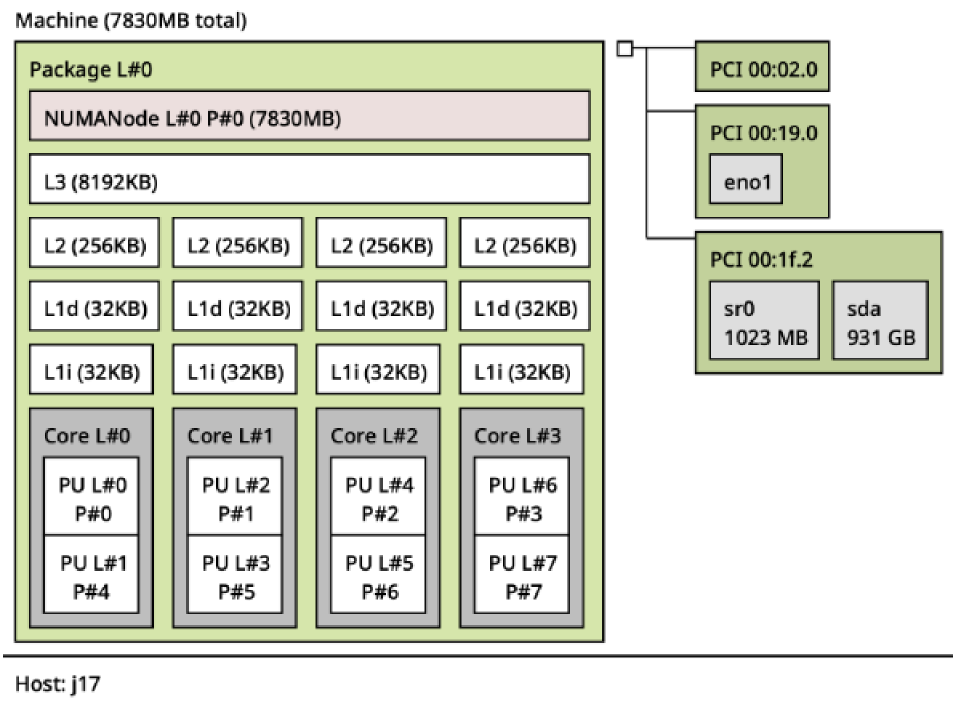
Utilizamos a mesma máquina, tanto para parteA quanto para parte B

Saída lscpu

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 39 bits physical, 48 bits virtual
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Vendor ID: GenuineIntel
Model name: Intel(R) Core(TM) i7-4770 CPU @ 3.40GHz
CPU family: 6
Model: 60
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
Stepping: 3
CPU(s) scaling MHz: 37%
CPU max MHz: 3900,0000
CPU min MHz: 800,0000
BogoMIPS: 6783,97
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_ts
c arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm p
cid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm abm cpui
d_fault epb invpcid_single pti tpr_shadow vnmi flexpriority ept vpid ept_ad fsgs
base tsc_adjust bmi1 avx2 smep bmi2 erms invpcid xsaveopt dtherm ida arat pln pt
s
Virtualization features:

Virtualization: VT-x
Caches (sum of all):
T1: A2L1d: 128 KiB (4 instances)
L1i: 128 KiB (4 instances)
L2: 1 MiB (4 instances)
L3: 8 MiB (1 instance)
NUMA:
NUMA node(s): 1
NUMA node0 CPU(s): 0-7
Vulnerabilities:
Gather data sampling: Not affected
Itlb multihit: KVM: Mitigation: VMX disabled
L1tf: Mitigation; PTE Inversion; VMX conditional cache flushes, SMT vulnerable
Mds: Vulnerable: Clear CPU buffers attempted, no microcode; SMT vulnerable
Meltdown: Mitigation; PTI
Mmio stale data: Unknown: No mitigations
Reg file data sampling: Not affected
Retbleed: Not affected
Spec rstack overflow: Not affected
Spec store bypass: Vulnerable
Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Spectre v2: Mitigation; Retpolines; STIBP disabled; RSB filling; PBRSB-eIBRS Not affected; B
HI Not affected
Srbds: Vulnerable: No microcode
Tsx async abort: Not affected

Saída lstopo



n = 4000000

Q = 50000

Número de Threads	Tempo Médio (s)	Vazão Média (op/s)
1	0.0199153	2512314.5436759000
2	0.0101330	4940875.7944589000
3	0.0068944	7256623.3623912000
4	0.0057547	8697917.0579111000
5	0.0048921	10240682.8324060000
6	0.0041872	11946066.3042485000
7	0.0038106	13126132.8592869000
8	0.0036709	13650947.9790795000

n = 4000000

Q = 100000

Threads	Tempo Médio (s)	Vazão Média (op/s)
1	0.0379832	2633356.3015383
2	0.0193753	5162510.3566719
3	0.0133059	7517944.1957029
4	0.0107749	9289823.3238829
5	0.0089389	11190518.5319026
6	0.0077716	12871930.2697759
7	0.0069304	14433241.2391659
8	0.0064352	15551355.3299265

n = 4000000

Q = 200000

Threads	Tempo Médio (s)	Vazão Média (op/s)
1	0.0741585	2697299.3618725
2	0.0377948	5292202.9408318
3	0.0253133	7901330.4468663
4	0.0201437	9931114.1452768
5	0.0168881	11848542.0496406
6	0.0145981	13704925.0776044
7	0.0130755	15299734.5662362
8	0.0119327	16764178.6007045

n = 4000000

Q = 400000

Número de Threads	**Tempo Médio (s)**	**Vazão Média (op/s)**
1	0.1449938	2758914.5461419000
2	0.0735780	5436725.5733830000
3	0.0497231	8045028.3714068000
4	0.0391118	10229894.7875529000
5	0.0329207	12153622.5341755000
6	0.0284464	14062284.5885225000
7	0.0252472	15844936.8367259000
8	0.0233927	17120107.5171221000

n = 4000000

Q = 800000

Número de Threads	**Tempo Médio (s)**	**Vazão Média (op/s)**
1	0.2820973	2836186.5290523000
2	0.1438440	5562242.4259651000
3	0.0976305	8194676.6575587000
4	0.0778333	10279770.6009878000
5	0.0644838	12407679.3715882000
6	0.0560985	14263900.8944605000
7	0.0507999	15754874.5966074000
8	0.0455633	17563918.4633242000

n=8000000

Q = 800000

Número de Threads	Tempo Médio (s)	Vazão Média (op/s)
1	0.3182235	2514176.7991683
2	0.1614718	4954599.6758586
3	0.1101004	7267161.3389935
4	0.0865248	9250379.9522549
5	0.0736873	10860357.8284861
6	0.0635775	12587986.4383007
7	0.0565438	14151919.1712013
8	0.0525618	15227111.0611226

n=1600000

Q = 800000

Número de Threads	Tempo Médio (s)	Vazão Média (op/s)
1	0.3509191	2279961.4936354
2	0.1786678	4477785.9971441
3	0.1219412	6560626.9442531
4	0.0980388	8163447.0174078
5	0.0825056	9699627.9272240
6	0.0720633	11103171.4205028
7	0.0638531	12532350.6920322
8	0.0586502	13648026.4174038

Como podemos observar, devido à busca binária o número de pesquisas se mostra muito mais relevante no tempo de execução do que o número de elementos do vetor de entrada quando paralelizamos cada consulta.