Raxml repeats benchmarks

April 12, 2017

1 Execution time

We run raxml for each dataset with and without the repeats option, and compare the execution times.

Speedup is calculated as follow :

$$speedup = \frac{time_{tipinner}}{time_{repeats}}$$

When we don't indicate times, the cluster cancelled the jobs before the end (after 24h). We then compare the speedup at the last reached step.

When we write "diverged", the runs diverged. In this case we write the speedup at the last common step.

Raxml commands used (repeats, repeats with jemalloc, tipinner):

```
$ LD_PRELOAD=libjemalloc.so mpirun ./raxml-ng-mpi --seed=42 --msa data.ph
  --simd AVX --threads 1  --search --repeats on
$ LD_PRELOAD=libjemalloc.so mpirun ./raxml-ng-mpi --seed=42 --msa data.ph
  --simd AVX --threads 1  --search
```

dataset	taxas	sites	partitions	type	threads	$time_{reps}$	$time_{ti}$	speedup
404	404	7444	11	DNA	16	457s	755s	1.65
1kite_science	144	371434	50	DNA	16	9351s	13311s	1.42
1kite_hyme	174	2248590	4116	DNA	64	21663s	29971s	1.38
Antl_1_1_nt	40	522173	658	DNA	16	1254s	1668s	1.3
Antl_1_1_aa	40	762438	659	prot	32	4966s	6080s	1.2
para_1_nt	193	1514275	3714	DNA	64	diverged	diverged	1.35

2 Scalability and load balancing

404

threads	sites/thread	seq time	seq time rep	time lost	time lost rep	speedup
4	1861	7816s	5100s	2.37%	2.83%	1.53
8	930	11608s	6472s	5.14%	4.43%	1.79
16	465	12016s	7392s	5.73%	6.49%	1.62

antl_1_1_nt2

threads	sites/thread	seq time	seq time rep	time lost	time lost rep	speedup
16	32635	26416s	20080s	0.43%	0.90%	1.31
64	8158	25216s	19008s	2.04%	2.25%	1.32
256	2039	30208s	1414144s	4.36%	0.06%	0.02
512	1019	47104s	96256s	5.04%	1.54%	0.48

kyte

threads	sites/thread	seq time	seq time rep	time lost	time lost rep	speedup
64	5803	143744s	105984s	2.02%	8.35%	1.35
128	2901	135040s	105984s	3.33%	10.7%	1.27
256	1450	183552s	133120s	4.19%	10.1%	1.37

1kyte_hyme

threads	sites/thread	seq time	seq time rep	time lost	time lost rep	speedup
64	35134	2002880s	1457920s	0.78%	1.43%	1.37
128	17567	2120960s	1520640s	1.23%	1.47%	1.39
512	4391	2563072s	2049024s	2.70%	2.00%	1.25

para_1_nt

threads	sites/thread	seq time	seq time rep	time lost	time lost rep	speedup
256	5915	1565184s	1159424s	2.21%	2.24%	1.34
512	2957	1842688s	1448960s	2.51%	2.50%	1.27
1024	1478	2863104s	2397184s	3.91%	2.28%	1.19