

High Resolution EC Earth Porting, scaling on Curie

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High-res EC-EARTH configuration

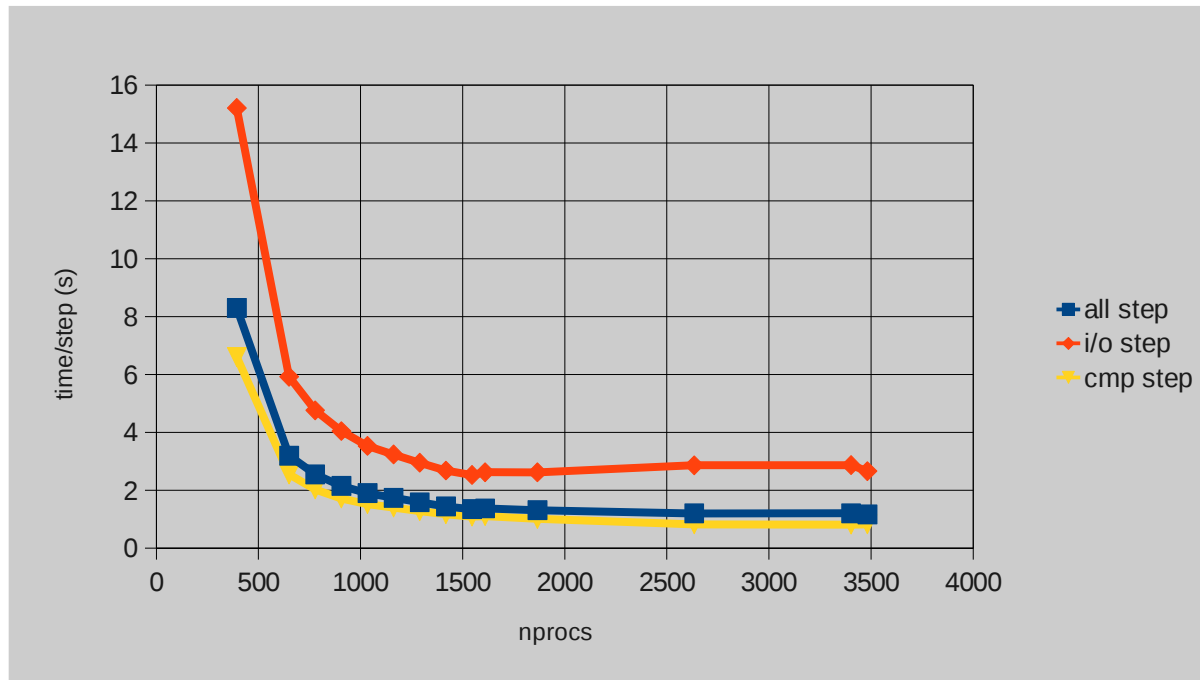
- Software
 - EC-EARTH – v3
 - Nemo – 3.2
 - IFS – 36r1
 - OASIS – v3
- Ocean grid : ORCA025
- Atmospheric grid : T799

High-res EC-EARTH configuration

Some “scientific” limitations of the hres version on Curie

- The ifs ifs-36r4 version is more interesting
 - At the time of porting this configuration was not ready
 - For scaling analysis the slightly older version should be ok
- Runoff is disabled

Scaling of EC-EARTH



Scaling of EC-EARTH

total procs	oasis procs	nemo procs	ifs procs	Time / step (s)		
				all step avg	i/o step avg	cmp step avg
394	10	256	128	8.30	15.21	6.61
650	10	256	384	3.20	5.92	2.55
778	10	256	512	2.55	4.76	2.03
906	10	256	640	2.15	4.05	1.72
1034	10	256	768	1.90	3.54	1.53
1162	10	256	896	1.74	3.24	1.40
1290	10	256	1024	1.59	2.95	1.28
1418	10	256	1152	1.44	2.68	1.17
1546	10	256	1280	1.35	2.53	1.09
1610	10	320	1280	1.38	2.62	1.11
1866	10	320	1536	1.31	2.62	1.02
2634	10	320	2304	1.20	2.86	0.83

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Scaling of EC-EARTH



Efficiency = $394 * (\text{time for 394 proc. Job} / \text{time for n proc. Job}) / n$

Scaling of EC-EARTH



Efficiency = $1034 * (\text{time for 1034 proc. Job} / \text{time for n proc. Job}) / n$

Profiling of EC-EARTH with Tau

- Tau is a advanced profiling and tracing tool
- The run can be profiled in different ways
 - Source code instrumentation is most advanced
 - User functions are instrumented by inserting timer in source code files
 - MPI calls are preloaded with PMPI calls
- Very light weight timer
 - Not statistical sampling
 - Timing is accurate
 - Very little or no impact on run time
- Several tools for post-processing profile data
 - pprof – text based
 - paraprof – GUI based