Real Applications on Parallel Systems — RAPS
A European Community Benchmark Effort

Luis Kornblueh

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What is RAPS?

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A chairman is elected every second year at the ECMWF HPC workshop.
Who participates?

The European NWP and Climate research community and vendors:

- DWD
- ECMWF
- IPSL
- MPIM
- UKMO
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- IPSL
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- UKMO
- Bull
- Cray
- Fujitsu
- IBM
- Intel
- Mellanox
- NEC
- SGI
What should be done?

Original aim

- Centers provide benchmarks
- Vendors provide benchmark results
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#### New initiative: Standards
- Fortran standard test kernels
- DWD, ECMWF, MPIM
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- Simple profiling library
  like DrHook, libsct, ...

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New initiative: Standards

- Fortran standard test kernels
  DWD, ECMWF, MPIM
- Simple profiling library
  like DrHook, libsct, ...
- Portable binding library on top of hwloc?
Latest news

IS-ENES2 offers to support RAPS

- two communities
- close to identical applications
- NWP weak scaling — Climate strong scaling
- NWP big data with large single sets — Climate big data with many, many single sets
- NWP constraints on maximum run time — Climate as little as possible wallclock time
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Open to other communities on request.
IS-ENES2 funded by EU FP7 to help

1. develop/select metrics for comparing benchmark results
2. maintain a central repository for easier access for vendors
3. provide documents on how to do specific benchmarks (not necessarily write those)
4. present results of benchmarks if made available
5. provide kernels for the asynchronous behaviour of systems (e.g., a model coupling benchmark)

DKRZ is leading this effort for IS-ENES2.
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Initial model set

Support will be made available for:

- MPIESM
- ICON
- NEMO/CAM
- IPSL-CM5
- eventually EC-Earth
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Possible interesting side effect: code convergence — positive?
## Fostering standards

### RAPS currently requested standards

- Fortran 2003 (soon to update to Fortran 2008),
- MPI, and
- OpenMP

### Interest in standards for

- mpi compiler common interface for retrieving version, include, and linkage information
- compiler standard for profiling library interception to allow users to add own routines
- unified interfaces for profiling tools (like hpct, pat, ...)
- unified standard for process/thread binding - hwloc?
Fostering standards

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- put more effort into being better prepared for a future with hardly visible development paths