

WG6 Parallel session

Massimo Milelli and WG6 colleagues

Offenbach, 18th COSMO General Meeting - Monday, September 5th 2016

Agenda Monday

PARALLEL SESSION WG6

09:00 – 09:30 M. Milelli, Introduction and overview

09:30 – 10:30 U. Schättler, U. Blahak, SCA reports: COSMO, INT2LM, grib2

10:30 – 11:00 All COFFEE

11:00 – 11:30 C. Barbu, M. Bogdan, B. Maco, User Support activities

11:30 – 12:00 A. Montani, NWP test suite and COSMO LEPS update

12:30 – 14:00 All LUNCH

14:00 – 16:00 K. Osterried, U. Schättler, all, GIT/GITHUB session

NWP TEST SUITE SESSION WG6/WG5

16:30 – 17:30 All, discussion of problems and solutions, new ideas...

Agenda Tuesday

PP POMPA/WG2 SESSION (Tuesday)

14:00 – 14:40 X. Lapillonne, all, Presentation and discussion of the PT Evaluation of the Dynamical Core Parallel Phase (EDP2)

14:40 – 15:05 U. Schättler, Status and plan of reintegration of the POMPA work into the official code

15:05 – 15:30 P. Spörri, Status of the C++/STELLA dynamical core integration

15:30 – 16:00 O. Fuhrer, Overview of the GridTool library

16:00 – 16:30 All COFFEE

16:30 – 17:00 P. Spörri, C. Barbu, Tutorial: how to compile COSMO with the C++/STELLA dynamical core

17:00 – 18:00 All, POMPA project planning and discussion

Reporting

- Newsletter: July 2016 (6 contributions)
- Technical Reports:
 - 1) RADAR_MIE_LM and RADAR_MIELIB - Calculation of Radar Reflectivity from Model Output, Ulrich Blahak (TR28)
 - 2) A Stochastic Pattern Generator for ensemble applications, M. Tsyrlunikov and D. Gayfulin (TR29)
- NWP Test Suite report:
 - 1) v5.3 vs v5.1, September 2015
 - 2) v5.3 vs v5.4, August 2016 (not released officially)
- Common plot activity
- “COSMO OpenACC style guide” to be incorporated into the “COSMO Standards for Source Code Development”

Miscellaneous

- Special issue of the Newsletter: DWD research projects EWeLiNE and ORKA about the optimization of COSMO for wind and solar energy operations in Germany (Kristina Lundgren) *postponed*
- CORSO, COTEKINO and KENDA TR expected during this COSMO year
- Update of the web pages contents
- Anybody willing to add some post-processing to the COSMO software should inform TAG in advance. No rule can be decided a priori, but each case has to be analysed on its own and TAG has to address the developers towards the appropriate software
- New PT under WG6 area: EDP² (Evaluation of dynamical core Parallel Phase)

Open Discussion

- There are problems with the main web server (Swiss mirror is up and working at the moment). The setting up a new one is in progress, but in the meantime some activity is frozen:
 1. modification of web pages according to the decisions taken last year (software repository...)
 2. Bugzilla (but GIT/GitHub to be evaluated)
- NWP session will follow
- New PP/PT for next year ?

Strategy review

Short-term actions (2015-2017)

1) Consolidation of the results of the POMPA project and further developments:

...POMPA Priority Project results should be well established, documented and distributed among the partners in order to be used as a starting point for the successive developments. These include the single precision version and the asynchronous I/O in GRIB and NetCDF (already available in Version 5.1), but also the hybrid parallelization and re-implementation of the halo-exchange interface...

Strategy review

Short-term actions (2015-2017)

2) Consolidation of the GPU-version of COSMO and testing this and also other emerging architectures (as Intel XeonPhi):

a) The physical parameterisations (which remain in Fortran) are ported to GPU using OpenACC and will be implemented in the official version together with the COSMO-ICON physics

b) For the dynamical core only the stencil library is ported using CUDA. It will be integrated in the official version as an alternative dynamical core

c) The rest of the code (also Fortran) again is ported using OpenACC

...The hardware systems in fact are always evolving towards more advanced architectures, therefore there should be a considerable effort in COSMO to keep up with these changes. An example is the new Intel Xeon Phi, a range of coprocessors built with the new Many Integrated Core (MIC) architecture...

Strategy review

Short-term actions (2015-2017)

3) Organization of regular training courses for COSMO researchers on new architectures and programming languages/paradigms like DSEL:

The training of young researchers is a fundamental part of the work of a scientific community. Nowadays in the universities the most used (and taught) language is Fortran, at least inside the physics departments. This situation requires on the one hand to enforce the collaboration with informatics departments, where probably it is easier to find people with knowledge of C++ and DSEL and, on the other hand, the necessity to establish regular courses for present and new users

Strategy review

Short-term actions (2015-2017)

4) Automation of current procedures:

An automated test-suite for checking basic technical functionality of the code exists as a prototype and its use is recommended by the COSMO Standards for Source Code Development. This test-suite should be used throughout the Consortium and extended to contain a set of tests which encompasses many different configurations and a basic test of all operational applications for all members

Strategy review

Long-term actions (2017-2020)

1) Transfer of new programming paradigms (DSEL, C++) to ICON model:

The introduction of the ICON model forces the Consortium to think about transferring the knowledge from POMPA to ICON, in the view of an optimization of all the operational chains

Strategy review

Long-term actions (2017-2020)

2) Code Administration and maintenance:

The source code administration could be improved by using a distributed software development model with automatic testing as an integrated component for ensuring quality, but also by improving the awareness of developers of how to write more reliable and maintainable code.

In line with the development of the technical and meteorological test-suite, a further push towards fully automated testing should be made. Also, efforts should be undertaken to modularize code further, which would allow testing of individual components

Strategy review

Continuous actions (2015-2020)

1) Consolidation and increase of cooperation with the COSMO numerical aspects group, with Academia and with other Consortia

2) Various management issues

...new programming rules have to be defined. Moreover, the overall management of the web pages has to be addressed with the use of free tools which can provide dedicated software repositories, bug-tracker facilities, revision control system (RCS), forums, faqs and a better documentation handling...

3) Participation in European Projects

**Thanks for your attention and for
your work !**



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