

LAM models in the OOPS framework ?

Claude FISCHER



METEO FRANCE
Toujours un temps d'avance

Content of talk

- Present activities & LAM impacts in the Fortran code
- Challenges for the LAM community
- Some naive views about deriving models ...
LAM v/s global in OO-thinking [?]



Present activities & LAM impacts:

- on the IFS/Fortran side:
 - complete the overhaul of Full-Pos/e927: remove the internal I/O part of any Full-Pos configuration,
 - encapsulate LBC code for what is purely relaxation
 - definition of "fieldset" versus "state": ALLOC =>PTRS ; for instantiation of LAM, should be reflected into GMVCPL/GFLCPL
 - LAM/Jo: handling of geometry in interpolation operators, in observation operators (this can be studied using the 3D-VAR prototype)
 - LAM/Jb: code the LAM counterpart to the encapsulated Jb
 - LAM/Jk: study the impact of the previous bullet on the Jk code
 - assess impact of encapsulated obs operators (HOP, OBSHOR) on Arpège and AAAH versions => derived-type GOMS (includes 2D)
 - CANARI surface OI code
 - impacts on LAM scientific developments:
 - heterogeneous B matrices;
 - extra terms in the control to feed the hybrid 3D-VAR/LETKF system (Hirlam)

Wed, April 6
2011

Aladin/Hirlam all
staff meeting

Challenges for the LAM community



Wed, April 6
2011

Aladin/Hirlam all
staff meeting



METEO FRANCE
Toujours un temps d'avance

Challenges for the LAM community

- **learn and use OO thinking for cleaning the IFS (and LAM) code:**
 - Think in terms of service-provider rather than functional code: objects, interfaces
 - On Fortran side: remove global variables / split the present Setup & encapsulate
- **benefits of OO for the LAM code :**
 - assess those expected benefits that are common with the global code: easier maintenance, simpler code for the data assimilation algorithms with more possibilities for R&D, single binary for incremental 4D-VAR & EPS
 - Detect those areas where class derivation can help make LAM v/s global code simpler: will require some good experience with OO-thinking and “on the paper” analysis; may only come later in the course of OOPS (?)
- **Constraints or drawbacks:**
 - Legibility and learning/training of C++
 - what are the key features needed for tidying up the IFS ?; should we arguably go beyond encapsulation, towards polymorphism and inheritance ?
 - Is a full OOPS eventually “adding complexity over complexity” ?

Wed, April 6

Aladin/Hirlam all

2011

staff meeting



METEO FRANCE
Toujours un temps d'avance

**Tell the object what you'd
like it to do for you ...**



FANTASIA
2000

©2000 Walt Disney Pictures

www.charlotte.com/justgotmovies/

Some naïve views about LAM v/s global and the derivation of objects:

- « strong top-down » design: virtual H => global H / LAM H; virtual B => global B / LAM B; virtual State => global State / LAM State; etc.
- « selective top-down » design:
 - keep common (virtual) objects & instantiation wherever the global v/s LAM implies no difference
 - Have different instantiations where LAM and global objects differ significantly
- « conservative top-down/bottom-up » design: a pragmatic approach ... to start with, essentially keep common objects => all LAM switches would be seen by the global configurations

Possible "LAM activities":

- on the OO/toy model & prototyping side:
 - plug a 1D shallow water code in the toy model
 - code a LAM version of QG model
 - Install and understand the global 3D-VAR prototype
 - using a LAM-version of an encapsulated Jb + the new obs operator interfaces and interpolator code from the global prototype => develop and install a LAM 3D-VAR prototype (this action is thus in link with LAM/Jb and LAM/Jo on the IFS/Fortran side) ?

Requires some start-up investment (C++, get familiar with OO-analysis)

Info

- Web information about IFS-Arpège coordination in general: on the “partners' only” page (accessible for all LTMs and Hirlam System Experts via user & password / otherwise check with the webmaster – Patricia Pottier):

<http://www.cnrm.meteo.fr/aladin/spip.php?rubrique39>

- OOPS specific link:

<http://www.cnrm.meteo.fr/aladin/spip.php?rubrique57>