

OOPS technical video-conference of November 20, 2013
meeting number 4 towards CY41

Participants (MF) : Claude Fischer, Karim Yessad, Louis-François Meunier, Stéphane Martinez

Participants (EC) : Deborah Salmond, Tomas Wilhelmsson, Alan Geer

Participants (LAM): Ulf Andrae (SMHI/Hirlam)

This meeting was the fourth one, planned for discussing the Fortran re-factoring until CY41, and perhaps a bit beyond until CY42.

1. wrap-up of actions from September 19:

1. Deborah and Stéphane shall liaise during the phasing process of CY41 in order to perform the rename/move changes of Appendix E in the most optimal way. The Aladin “ald” routines will be changed in MF during the same phasing.
2. Wrap-up discussion about the Geometry/Setup/OOPS-IFS forecast/STEPO_OOPS code changes, and work at MF on an OOPS-Arpège prototype forecast. => *the merged codes by Tomas, John and Karim (so-called TJK branch) based on CY40R1 has been sent to MF, who have installed it under GIT. Work at MF will start in order to port the OOPS/Arpège 3D-Var prototype on this version. MF also plan to try to install an Arpège forecast prototype based on this version. These actions will be debriefed internally by about mid-December. Tomas informed he had a few upgrades ready and would send them later to MF. Action: MF will give feedback about the Arpège prototype porting to EC at the next video-conf.*
3. MF/Full-POS: all technical consequences of pruning FP1 must be evaluated. At least one necessary condition before pruning FP1 was that the Boyd option (for LAM LBC) is recoded in FP2 (it's not there yet). Claude also wished to make sure MF and Aladin management is well informed about this pruning possibility. => *it is clear that FP1 is definitively broken for CY41. However, all features of interest now work with FP2, including Boyd option (CY40T1). Tomas does have a FP1-cleaning branch that he will send Ryad. The final pruning of FP1 will be done by MF, either for or soon after CY41. Claude will inform the Aladin management about the status. Action closed.*
4. Alan Geer would send an e-mail to MF, about the work towards a single call to COBSALL and the results of validation (contacts: Eric Wattrelot, Jean-François Mahfouf, Claude Fischer). => *Action open. Work is almost complete (Alan doing some final checks of bit-reproducibility before and after change)*
5. Wrap-up discussion about the work by Filip Vana for encapsulating the trajectory arrays. => *there had been several e-mail exchanges between Filip, François Bouyssel and Cécile Loo. Action closed.*
6. Finalize the expected scientific content of CY41 (RTTOV-11) => *RTTOV-11 is indeed expected for CY40R2, and therefore for CY41. Action closed.*
7. Hirlam normalization modset. Related actions:
 - 7.1. For the CPP/macro aspect, Ulf will ask Rimvydas to update the official common norm checker tool (contact at EC: Deborah, at MF: Ryad): *under preparation for CY40T1 (Rimvydas Jasinkas)*
 - 7.2. For FA/LFI, Ulf shall contact Philippe Marguinaud and check what is the status

of the C-code version of the LFI package, and they should decide together whether the LFI modset of code normalization still is relevant in terms of maintenance of the Fortran version of LFI. *Answer from Philippe Marguinaud: "LFI has been rewritten in C, but the Fortran version will stay there for a few cycles before being removed. However, the lfisuffix.h file has been removed, so you should not worry about that."*

7.3. Rimvydas mentioned a possible bug in one minimizer of "xla/algor" => action on Ulf to ask Rimvydas for more details, and send info to EC and MF. *Awaiting more concrete example.*

7.4. For RTTOV, it was decided to delay the implementation since RTTOV-11 would soon enter the official releases. The question of who should approach the RTTOV consortium was raised, and for this time, EC would check if they can take over the proposal (Deborah to check with Cristina Lupu). *Hirlam will take contact with Roger Saunders from the RTTOV-consortium.*

7.5. For the SURFEX code, Ulf will take contact with Stéphanie Faroux. *Suggested changes will be taken care of in SURFEX V8.*

7.6. For the Méso-NH codes, Ulf will take contact with the Méso-NH core team (Sébastien Riette and Christine Lac), with copy to Claude and Ryad, in order to agree on their implementation. We should then also discuss how the modset should be technically committed (directly to Méso-NH or via the CY40T1/GMAP code release). *Evaluation of the modset is ongoing.*

==> actions of item 7 closed as concerns the technical video-conferences.

2. Code refactoring aspects:

2.1. proposal to use the ASSOCIATE statement (Tomas, then all)

Tomas presented his slides from the OOPS training course held the week before. The discussion then focussed on the proposal for encapsulating the model global variables, a necessary step towards the Model object for OOPS/IFS and the multiple instantiations of MODEL objects. The proposal by Tomas is along the following lines:

- no logical reorganisation of the variables in the modules (in physics or dynamics).
- The global variables are encapsulated by declaring derived types per existing module.
- In order to avoid overloading the computational programming lines with instances of STRUC%SUBSTRUC%VARIABLE, it's proposed to use the Fortran 2003 ASSOCIATE statement for defining aliases with local scope: ASSOCIATE(VARIABLE => STRUC%SUBSTRUC%VARIABLE).

Tomas will write a Python script that should perform the encapsulation and the ASSOCIATION automatically (possibly January 2014). The input information for the script could be the list of modules to be re-factored. The script and the resulting codes could then be tested and evaluated by all partners (Feb/March). The technical discussion could be resumed at the next video-conference end of February.

The decision for implementation (and when and how) is left open at this stage. EC (Tomas) is keen to put this in for CY41 so that the OOPS model encapsulation work will not be delayed, and propose that this change to over 100 modules would be added as an 'automatic' step to the things that we do after the merge.

Claude nevertheless suggests to start addressing the impact of this proposal on the cycling strategy for 2014, as this implementation could be a matter for a specific technical common cycle. This impact should be addressed at the IFS/Arpège coordination meetings for CY41.

Actions:

- Tomas to write Python script for encapsulation and association of variables
- all: test script and check resulting code
- resume technical discussion at next video-conference
- if this implementation is accepted, agree on which modules (list) should be re-factored this way
- address the cycling and calendar aspects at the IFS/Arpège coordination meetings

2.2. cleaning of SUVAR & SUDYNA (Tomas and Karim)

Karim explained he will enter specific Setup reorganization (part for CY41, part after CY41). The reorganization will help moving other pieces of the Setup later, that probably are not properly sequenced at present. Tomas pointed out that while moving Setup around, one now had to be cautious not to unduly move Setup above the Geometry construct (all model part must be below, so that a Model object can be constructed from a State object).

Karim insisted that probably much more Setup cleaning should be considered for the future, while the efforts for CY41 were unanimously welcomed by all code experts ! Claude stressed that more Setup cleaning probably only can be considered once the major re-factoring for OOPS is completed, so after CY42 or CY43.

Actions decided:

- Karim will send a minimal list of Setup cleaning proposals for after CY41 to EC
- Tomas will write down recommendations for general Setup ordering, especially in order not to break specific Object-oriented rules (like a Geometry should be fully initialized without a Model dependency, so a Model can be defined from it)

2.3. an early kick-off discussion about the evolution of the VarBC code (Alan, Ulf, others)

Alan explained that he will encapsulate the VarBC control vector chunk for CY40R2. This work will allow removing several copy/paste pieces of code, and make the code simpler in the end.

Ulf stressed that Hirlam had seen weaknesses in some parts of the VarBC code, when optional settings only could be initialized in a binary logic (typically LECMWF=.T./F.).

The experts around the table agreed that an ambitious effort for more flexibility in the VarBC code probably is out of range of the existing workforces. Moreover, little for the time being is known about what type of coding solutions to implement. It was suggested that concrete examples should be tackled first.

Actions decided:

- Ulf to send e-mail to EC and MF about which issues Hirlam found
- MF informed the partners that they will study how to have more flexibility in the choice of

the VarBC predictors in Arome (with respect to Arpège). This may lead to proposals for implementing some flexibility. MF will inform EC and Hirlam when ready. Contacts in MF would be Louis-François and Vincent Guidard. At EC, Alan Geer.

3. Other code aspects for CY41:

3.1. short status about the so-called COMAD contribution (Karim, Sylvie ?)

Karim informed that he had exchanged scientific and technical information (and codes) with Didier Ricard (CNRM/GMME) and Sylvie Malardel (EC), about a new optional feature in the SL code. This is the so-called COMAD facility (make the SL interpolations dependent on the local flow deformation properties). This option could be of short-term interest to MF for Arome in very high resolution (we expect that COMAD will be beneficial for the representation of convective systems in Arome).

Karim, Didier and Sylvie have essentially agreed on the code structure to be implemented. Karim will introduce the COMAD code for both global and LAM geometries in CY40T1.

3.2. short note about a small modset by Louis-François Meunier (Tb from first guess and storage in the ODB)

Louis-François informed that he had contacted EC (Heather Lawrence and Niels Bormann) in order to agree on a bug correction for the handling of the brightness temperature control variable in the outer loops. EC also had spotted the problem recently.

The correction is agreed, and will actually enter in both sides into the code (CY40R2 and CY40T1). Care must be taken at the next common merge (CY41), in order to avoid a clash between these two (in principle identical ?) code changes. Louis-François is the contact at MF.

4. Exchange of information about porting and testing NWP applications on the new HPCs, at MF and at EC (Ryad ?, Deborah ?) :

EC informed that they had well progressed with the porting to CRAY. It is now expected that CY40R1 + porting fixes will enter pre-operational testing on CRAY before X-mas. CY40R1 is already operational on IBM.

MF informed that the NWP suites were now running in mirror suite on BULL since end of October. The system was now becoming increasingly reliable and significantly less failures of specific tasks were noticed. The plan still is to switch the operational production to BULL in December 2013. The NEC/SX9 machines shall be switched off in early February.

5. AOB

- Put back L801TL in CY41 (this was for Carla's FSOBS): will be done by EC

- FULLPOS-2 now OK to replace 927 for ECMWF: tests are showing promising results in terms of performance. Ongoing work by Tomas.
- FORTRAN2003 and discussions of impact on Aladin partners, from the Aladin General Assembly (Tunis, 14-15/11/13): Claude informed that he had stressed the acceleration of code modernization of the IFS, in link with OOPS and COPE, at the GA in Tunis. As a specific issue, the Czech delegation stressed that they would not be able to port IFS codes on their present HPC with CY41 (because of F2003 features). At the GA, it was decided that EC, CHMI and the Aladin management would discuss the issue and check for any possible solution, but the code modernization will be continued for the common codes.

6. Timing of next meetings

The next technical video-conference was suggested for the end of February.

Note: there is an IFS/Arpège coordination meeting planned on February 20, 2014.

List of Actions :

1. Deborah and Stéphane shall liaise during the phasing process of CY41 in order to perform the rename/move changes of Appendix E in the most optimal way. The Aladin “ald” routines will be changed in MF during the same phasing.
2. Geometry/Setup/OOPS-IFS forecast/STEPO_OOPS code changes, and work at MF on an OOPS-Arpège prototype forecast. MF will give feedback about the Arpège prototype porting to EC at the next video-conf.
3. Alan Geer would send an e-mail to MF, about the work towards a single call to COBSALL and the results of validation (contacts: Eric Wattrelot, Jean-François Mahfouf, Claude Fischer)
4. encapsulation of Model-related global variables (automatic script and ASSOCIATE statement):
 - 4.1. Tomas to write Python script for encapsulation and association of variables
 - 4.2. all: test script and check resulting code
 - 4.3. resume technical discussion at next video-conference
 - 4.4. if this implementation is accepted, agree on which modules (list) should be re-factored this way
 - 4.5. address the cycling and calendar aspects at the IFS/Arpège coordination meetings
5. cleaning in SUVAR and SUDYNA:
 - 5.1. Karim will send a minimal list of Setup cleaning proposals for after CY41 to EC
 - 5.2. Tomas will write down recommendations for general Setup ordering, especially in order not to break specific Object-oriented rules (like a Geometry should be fully initialized without a Model dependency, so a Model can be defined from it)
6. evolution of the VarBC code:
 - 6.1. Ulf to send e-mail to EC and MF about which issues Hirlam found
 - 6.2. MF informed the partners that they will study how to have more flexibility in the choice of the VarBC predictors in Arome (with respect to Arpège). This may lead to proposals for implementing some flexibility. MF will inform EC and Hirlam when ready. Contacts in MF would be Louis-François and Vincent Guidard. At EC, Alan Geer.

