Reflections on 2020 work plan

Bref reminder of NEMO development yearly cycle

Sept - Nov : elaboration of next year's work plan draft

Starting from the NEMO Development Strategy document, using inputs from System Team experts and from Working group leaders,

December :

◉ Merge party: developments if the past year are consolidated during « Merge Party », which builds the future version of NEMO including those new developments, and starts the validation

◉ Developers Committee discusses next year's work plan draft, and gets feedbacks from the Consortium's institutions through their respective « Consortium Experts » (2 max. per institution)

January: Steering Committee endorses the final work plan of starting year

January - Nov : the actions of the work plan are carried out by developers, all of them meeting every 3 weeks to coordinate

Work plan is on line with all information on ongoing work:
https://forge.ipsl.jussieu.fr/nemo/wiki/2020WP

2020 : a crazy year…

- A very heavy work plan: a number of actions, postponed or unfinished in 2019, scheduled for this year (wind-stress/current coupling, mass flux convection…)

- New actions, new ideas coming in the play (AGRIF vertical refinement, SI3 improvements…)

- Development actions scheduled in H2020 IMMERSE projects: important and intrusive ones (new numerical schemes RK3, DO-loops macros, wave coupling, haloes, tiles…)

- IMMERSE expects all these developments to be completed by end 2020, in order to build the 4.2 release, expected by the « non NEMO development work packages » of the project

- And COVID, of course : parents of young children not able to work for months

2020 : yes, we can!

As will be shown by the NEMO officers, an amazing amount of development work has

been successful carried out this year,

see **https://forge.ipsl.jussieu.fr/nemo/browser/NEMO/branches/2020:**

there will be a release by end 2020, with most of the expected developments

Successes and issues will be described in a minute by each NEMO officer.

I think this 2020 work of NEMO developers deserves congratulations and recognition.

The 3 levels of access rights and duties in NEMO - the NEMO developers team

User of NEMO « on the shelf »:

• Everything is available, no registration: free licence software = free download, documentation, reference manual, reference configurations test cases and tools

User of NEMO developing its specifics (configuration, addition developments…):

• register on TRAC to be allowed to access forums, open tickets

Developer/Contributor: needs to be able to write in a development branch

• Needs a login on NEMO forge to have read/write access to NEMO repository -> caution!

• Login is open by one of the NEMO officers, his/her « sponsor » in the system: checks the new comer has complete information on NEMO development workflow, and that he/she will be careful enough with NEMO repository! Reports on his/her work here too.

NEMO development Team:

• Core group is the NEMO System Team (experts from the five Consortium's institutions)

• Other developers join the NEMO System Team on some specific actions (ex: L. Brodeau (Ocean Next), M.Castrillo (BSC), O.Tinto (BSC), F. Lemarié (INRIA), E. Maisonnave (CERFACS), J. Sterlin (UCL), P-V. Huot(UCL), P-Y. Barriat (UCL))

• This sponsoring will be visible in the coming presentations: for each NEMO officer, not only the work of his institution's experts, but also the work of their « sponsored » experts

Floor to the NEMO officers!

Organisation of merges this year 2020

Reminder of the usual strategy

- **January - Nov** : the actions of the work plan are carried out by developers, all of them meeting every 3 weeks to coordinate

- **Nov:**

  - List of development branches ready to candidate for merge **(must have successfully passed the Review phase)**

  - **The PI of a branch is responsible to update it to a given revision of the trunk, and run successfully all the validation tests (needed for this branch to be accepted for Merge Party)**

- **December** :

  - Merge party: developments if the past year are consolidated during « Merge Party », which builds the future version of NEMO including those new developments, and starts the validation of it

  Merge Party is a 3 days workshop with all developers gathering to produce the new NEMO version with all the new developments included

2020 Merging strategy

◉ **January - Nov** : the actions of the work plan are carries out by developers, all of them meeting every 3 weeks to coordinate

◉ **July:** Considering the number of developments scheduled this year, and their complexity and intrications, **an intermediate merge has been done, including some major and intrusive branches.** The trunk after July is now very different from the trunk in January (starting point of 2020 developments).

Consequence for the PIs, the work to be done in November:

The PI of a branch is responsible to update it to a given revision of the trunk, and run successfully all the validation tests (needed for this branch to be accepted for Merge Party)

WILL BE BIG AND DIFFICULT

The NO GO answer has been experienced in the past.

A very uncomfortable situation we must try to avoid

=> Need to be very serious, even more than usual on effective readiness of dev. branches:

• PI completing the wiki page of its action for each and every step :Preview, Status (development , documentation, validation) and Review

• Previewer and Reviewer to be attentive and fast in their answers

◉ **December** :

Merge party: will merge all the developments finalized between July and November., and starts the validation of it

The release next December: we need to clarify…

- Will be created in December
- Its content will strongly depends on how seriously the Previewers, Developers and Reviewers will do their work up to December

Their seriousness depends obviously on the time they will have to take care of this big amount of work: this message is for the Consortium experts, to take back to their institution…

We (NEMO Consortium and IMMERSE) want and need this release.

We should all be aware it will be possible only with major efforts from each and all

4.2? 4.2_RC (Release Candidate)? other? we need to see what will be in it, and what may not: an incomplete release is not a sustainable option

Next step once 4.2 is build in December:

- Validation during first semester 2021. A major subject!
- Asset: the ongoing efforts on test cases and trusting tools : increasing and automatizing the sequence of tests and the readability of their results
- Warning: need to schedule in 2021 work plan (first semester, commitments from each institution needed) the longer « scientific » tests on Reference Configurations and on the IMMERSE configurations now under development

Thank you!

Purpose of the Consortium

The purpose of this Agreement is to set up appropriate arrangements for the successful and sustainable development of the NEMO System as a well-organised, state-of-the-art ocean model code system suitable for both research and operational work."

- **1 FTE minimum (20% min. per person), on the long term in NEMO System team /Consortium member**
- **motivation to work together on NEMO developments, even with non convergent needs**

Project Manager
Claire Lévy (CNRS LOCEAN-IPSL)

Scientific Coordinator (France)
Julien Le Sommer (CNRS IGE)

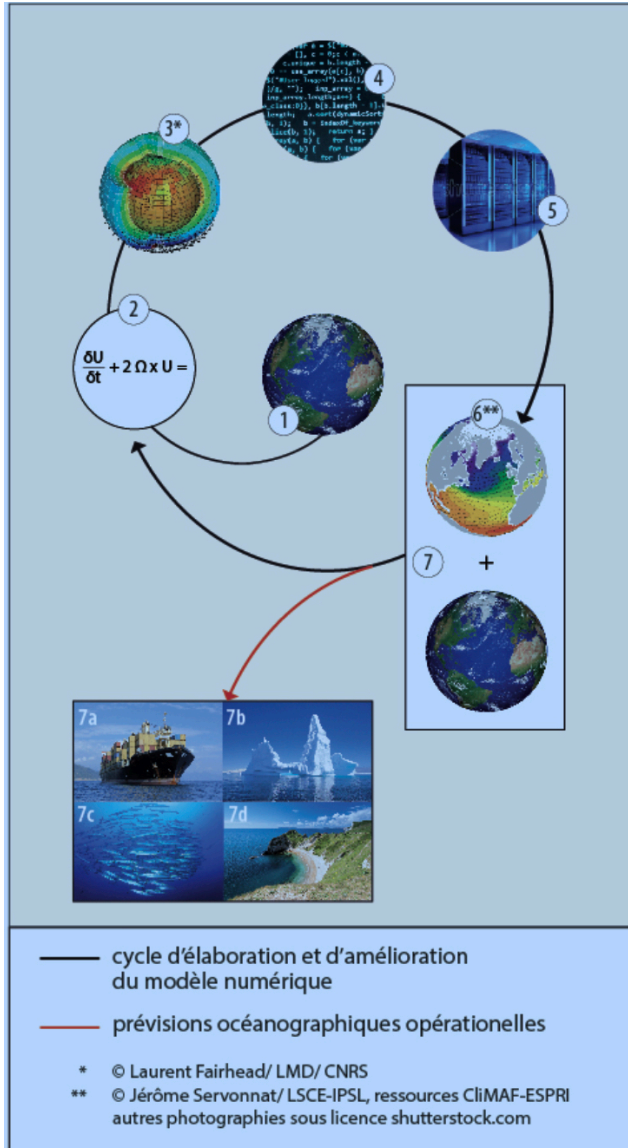| CMCC	cnrs	MERCATOR OCEAN INTERNATIONAL	Met Office	National Oceanography Centre
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All not full time of course!: total 10 FTE in the core team of developers

Developing NEMO: a lot of expertises needed

cycle d'élaboration et d'amélioration
du modèle numérique

prévisions océanographiques opérationelles

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conservation equations and their boundary conditions

physics, continuous equations

… then discretization with choices of numerical schemes

applied maths

physical and biogeochemical approximations

+ parametrisation of subgrid processes, source and sinks for biogeochemistry
+ choice of vertical and horizontal resolutions
+ choice geographical area, of latéral boundary conditions, of input and forcing data…,

+ computing, performance and HPC..

NEMO Consortium intends to gather all these expertises and allow them to work altogether

Development of numerical models for ocean, other components of Earth System and climate:

Engineering the Software for Understanding Climate Change. S. Easterbrook. Computing in Science & Engineering 11, 64 (2009):
(NEMO Consortium signed in 2008!)

« Specifically, they rely on self-organization of the teams, use informal communication channels extensively, and **have developers who are also users and domain experts**. They also have highly customized software verification and **validation techniques that are tightly integrated into their scientific research**. These observations suggest that **domain-independent software development process models are unlikely to be useful for this type of scientific software development**. »