

3/27/17

<Title>

EC-Earth/COSP code analysis

Project plan

< The purpose of the project plan is to identify, define and delimit the project's commitment. >

< WHO IS INVOLVED IN THE PROJECT >

1. Project organization

Requester

Name: Uwe Fladrich
Title/position: Developer
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Project responsible for SNIC

Name: Chandan Basu
Title/position: Application expert
Affiliation: NSC, SNIC
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< For other project members, please specify role and contact details. >

Project member

Name: Wei Zhang
Title/position: Application expert
Affiliation: NSC, SNIC
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Name: Hamish Struthers
Title/position: Application expert
Affiliation: NSC, SNIC
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Project manager

Name: Torben Rasmussen
Title/position: Application expert
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2. SNIC project name

< Name of an associated SNIC resource allocation project, if applicable (e.g. SNIC 2014/X-YYY). >

< MOTIVATION FOR GETTING THIS PROJECT SUPPORT >

3. Expected enabling benefit

< Generally provided by the requester. Formulate the expected enabling benefit. That is, the benefit the project will contribute to associated research activities on short and/or long term. How will this further enable research activities for the requester and others? >

Short-term benefit:

- Better understanding of the bottlenecks and performance optimization potentials of the EC-Earth/COSP model.
- Set of recommendations regarding focus points for code optimization changes.

Long-term benefit:

A speedup of this code will enable researchers to perform more and/or longer simulations within a range of scientific projects.

4. Impact of the research that the project is associated with

< Generally provided by the requester. Why is this enabling important? For example, describe how important the software/data is for your current and future research activity and for other national and international research activities. >

EC-Earth is a fully coupled global climate model being developed and used by a consortium of European partners. EC-Earth is an important global modeling tool used in a range of Swedish climate research projects and will be the primary model used to generate simulation output for Sweden's contribution to the international CMIP6 project.

COSP is a flexible software tool that enables the simulation of several satellite-borne active and passive sensor observations from model variables and is integral to the Cloud Feedback Model Intercomparison Project (CFMIP).

Global climate simulations that include COSP are very computationally intensive and so it is important to ensure the model is well optimized. This will ensure valuable computational resources are not wasted, and enable more and/or enable longer simulations to be run and completion times to be reduced - freeing time for scientific analysis of the output.

5. Why is SNIC assistance needed?

The proposed project is a technical analysis of the EC-Earth/COSP model and therefore outside the scope of atmospheric modeling scientific research. SNIC application experts have experience with the analysis of complex models such as EC-Earth/COSP and therefore such work is more efficiently performed by SNIC AEs.

< WHAT ARE WE HANDS-ON GOING TO DO IN THE PROJECT? AND HOW? >

6. Project objective

< Describe briefly the background and formulate the project objective, i.e. what is it intended that the project should do to achieve the expected enabling benefit? How are you going to deliver the requested enabling? >

We will:

- Analyze the EC-Earth/COSP to identify code sections and routines to be further evaluated for performance optimization. We will do this by running suitable test cases through analysis tools such as VTune and Allinea MAP.
- Propose a set of recommendations for code changes/optimization based on the code analysis.

Deliverables:

Delivery no.	Description	Schedule
1	Presentation of code profiling analysis.	March 2017

7. Work plan and resource estimate

< Specify the required staff resources in PM and the time frame for the project. >

The project will be conducted during March 2017. NSC will spend up to 0.5 PM within this project. Person months will be carried by the 'National Användarstöd' project.

Start date: 2017-03-01

End date: 2017-03-31

Defined milestones (MS) and decision points (DP):

< Describe important review points in the form of milestones and decision points. >

Milestone/Decision point	Description	Date
DP1	Project plan approved	March 2017
MS2	Analysis/profiling completed	March 2017
MS3	Presentation detailing profiling results and recommendations.	March 2017

Responsibilities:

< Describe the responsibilities of the various project members and stakeholders. Who is responsible for what? And who decides what? >

- SMHI will provide access to the relevant EC-Earth/COSP code and documentation.
- When necessary, SMHI will provide assistance for SNIC to understand the code.
- SMHI will provide test cases for the code profiling/analysis.
- NSC/SNIC will perform the code analysis/profiling and prepare a report of proposed code changes.
- All project members will discuss what code changes may be relevant for implementation. NSC/SNIC will organize a face-2-face meeting to go through the project results and discuss any followup.

Communication and dialogue:

< Describe how the project members will keep each other updated throughout the project. Describe how results, decisions, project changes, etc. will be discussed and communicated. >

- E-mail, phone or skype contact to set up access to the code and provide test cases for the code profiling.
- E-mail, phone, skype contact as necessary throughout the project.
- Face-2-face meeting at SMHI to present project results, discuss future implementation of recommendations and close the project.

Confidentiality requirements:

N/A

8. Approval

< The signatures of all parties confirm the validity of the project plan. The SNIC office can overrule this approval or require adjustments to the project plan, such as the amount of PMs that can be spent in the project. >

I agree to the objective, scope, and responsibilities described in this project plan:

Requester**For SNIC**

Date: _____

Date: _____

Uwe Fladrich_____
Matts Karlsson**Project responsible for SNIC**

Date: _____

Chandan Basu