<Title>
EC-Earth compilation and performance analysis: Beskow

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: Gunilla Svensson
Title/position: Professor
Affiliation: Department of Meteorology, Stockholms University
Phone:
E-mail: gunilla@misu.su.se

Name: Uwe Fladrich
Title/position: Developer
Affiliation: SMHI
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Project responsible for SNIC
Name: Chandan Basu
Title/position: Application expert
Affiliation: NSC, SNIC
Phone:
E-mail: cbasu@nsc.liu.se

< For other project members, please specify role and contact details. >

Project member
Name: Hamish Struthers
Title/position: Application expert
Affiliation: NSC, SNIC
Phone:
E-mail: struthers@nsc.liu.se

Project manager
Name: Torben Rasmussen
Title/position: Application expert

Affiliation: NSC, SNIC
Phone: 013281494
E-mail: torbenr@nsc.liu.se

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:

- Add Beskow to the list of EC-Earth support machines.
- Build an understanding of the performance characteristics of EC-Earth on the Cray XC30 architecture.

Long-term benefit:
This work will help to ensure Swedish researchers can get early access to EC-Earth on Beskow and perform simulations in an efficient way. In order to ensure that EC-Earth is run efficiently on SNIC resources we need performance information specific to SNIC resources. Global climate simulations are computationally intensive and so it is important to try to gain the best performance possible thus helping to optimize the use of Beskow resources.

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. It is envisaged that much of Sweden's EC-Earth CMIP6 production simulations will be run on Beskow.

CMIP6 is the sixth phase of the World Climate Research Programme CMIP (Climate Model Intercomparison Project) activities. Through CMIP, climate modelers and scientists from around the world have analyzed and compared state-of-the-art climate model simulations. CMIP model experiments have routinely been the basis for future climate change assessments made by the Intergovernmental Panel on Climate Change (IPCC).

5. Why is SNIC assistance needed?

Application experts have experience in configuring the necessary compilation settings and options for complex models such as EC-Earth. In addition, AEs have access to and experience with state-of-the-art analysis tools required for model performance evaluation. Performance evaluation of EC-Earth is already being done by SNIC AEs within the IS-ENES2 EU funded project.

< 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? >

The project aims are to: (a) successfully build EC-Earth on Beskow, focusing on finding the optimum set of compilers (both CRAY and Intel will be tested) and compiler settings and (b) to understand the performance of the EC-Earth code.

We will:

- Create an EC-Earth machine specific configuration for Beskow with appropriate compiler settings.
- Complete a scaling and performance analysis of EC-Earth on Beskow.
- Propose a set of recommendations (e.g. number of ranks per sub-model) for EC-Earth production runs on Beskow.

Deliverables:

Delivery no.	Description	Schedule
1	Create a machine (Beskow) dependent EC-Earth compilation profile using porting machine (Swan).	November 2014

	Report detailing performance profiling results and recommendations for runtime settings for EC-Earth production runs on Beskow.	December 2014

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 2014-H2.
NSC will spend up to 1 PM within this project. Person months will mostly be carried by the ‘National Användarstöd’ project.

Start date: Mid October 2014
End date: 2014-12-31

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	October 2014
MS1	Porting of EC-Earth to Beskow (Swan)	November 2014
MS2	Performance and scaling tests on Beskow complete.	December 2014*

* Dependent on access to the full Beskow machine.

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

- SMHI/EC-Earth developers will recommend to appropriate EC-Earth development branch to be used for this project.
- NSC/SNIC port EC-Earth to the Cray environment using Swan. Contact for this is Chandan and Hamish.
- NSC/SNIC will complete the performance analysis on Beskow including scaling tests. Contact for this is Chandan.

- Representatives from the Bolin Centre, SMHI and NSC/SNIC will attend a face-2-face meeting to discuss the project results and the completion of the project.

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 contact as necessary throughout the project.
- Project meetings organized if required during the project.
- Face-2-face meeting to present project results.

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:
Gunilla Svensson	Patrick Norman

Project responsible for SNIC

Date:
Chandan Basu