



Pilot Semantic Grid Service for Environmental Modelling



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Introduction

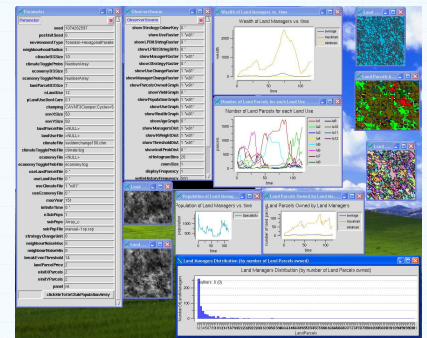
The FEARLUS-G project aims to explore the application of emerging Grid technologies within the social sciences, through deployment of an existing **land-use modelling tool** into the Grid context. The project has already successfully deployed FEARLUS as a Grid service using the **Open Grid Services Architecture** (Globus Toolkit 3) which integrates Grid and Web service technologies. The project is now exploring the costs and benefits of using proposed **Semantic Grid** standards.

Key Aims of the Project

- To serve a well-established environmental modelling framework to the scientific community, allowing very large-scale experiments to be run, analysed, and repeated.
- To explore, through a case study, costs and benefits of emerging Grid standards, methodology and tools in environmental modelling.
- To promote collaboration among environmental modellers by facilitating access to alternative models and comparison of results.
- To support training of environmental scientists, by providing a shared co-laboratory environment for experimentation.
- To foster interdisciplinary research between computing and environmental scientists.

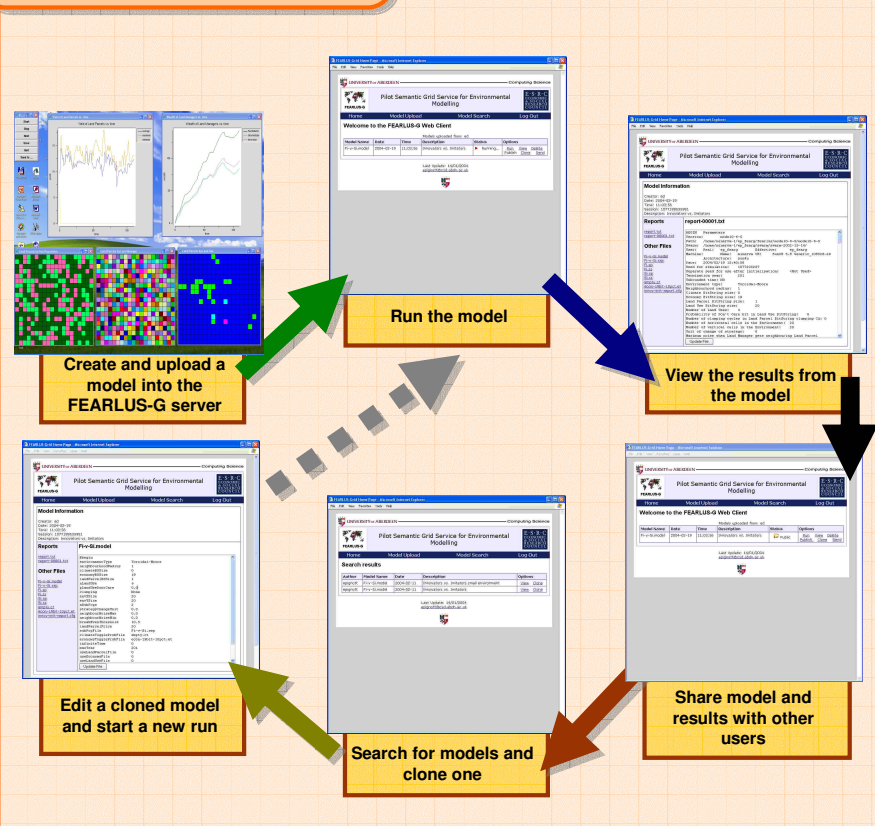
FEARLUS

FEARLUS Model 0-6-4 is an agent-based model of land-use change developed at the Macaulay Institute in Aberdeen. The system contains objects that represent human decision-makers in the real-world (land managers), and takes into account attributes such as yield from land parcels. Parameters to the modelling environment allow a variety of land-use strategies and their outcomes to be explored.



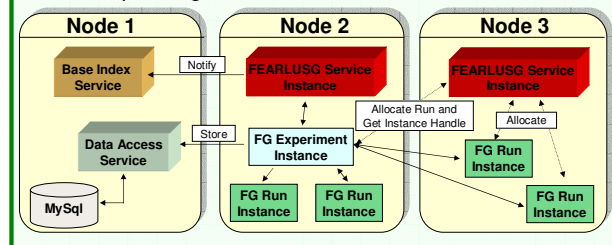
The agent-based simulation component in FEARLUS is implemented using the **Swarm** system developed at the Santa Fe Institute (www.swarm.org). Swarm provides an environment that can handle large experiments using agent-based simulation models. A typical FEARLUS experiment involves studying the dynamics of imitative and nominative approaches to land use selection change under different circumstances.

FEARLUS-G Web Client



FEARLUS-G Service Overview

FEARLUS-G uses the **Base Index Service** to identify available services through their **Service Descriptor**. Experiments and Runs can be allocated to different nodes depending on the resources available.



FEARLUS-G Model

Semantic Grid standards and methodology focus on supporting high-level e-science activities rather than low-level computational operations; these promise to allow scientists to work with "information and knowledge" rather than "raw data". In line with this vision, FEARLUS-G makes use of **Semantic Web technologies** (RDF, OWL, WSDL) to define shared representations which facilitate communication of experiment specifications, models, parameters and results.

An Example of a FEARLUS-G Model

```

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  <mod:subPopulationFileURI rdf:resource = "http://www.csd.abdn.ac.uk/~js/tmp/FI.sp"/>
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  </mod:Fearlus065>
  </rdf:RDF>
    
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People

Pete Edwards (Principal Investigator)
pedwards@csd.abdn.ac.uk

Alun Preece (Co-Investigator)
apreece@csd.abdn.ac.uk

Edoardo Pignotti (Research Assistant)
epignott@csd.abdn.ac.uk

Nick Gotts, Gary Polhill (Macaulay Institute)

Contact Information

<http://www.csd.abdn.ac.uk/research/fearg>

Department of Computing Science
King's College
University of Aberdeen, Aberdeen
AB24 3UE UK

Voice: +44 (0)1224 273114
Fax: +44 (0)1224 273422