NASA SBIR 2008 Phase I Solicitation

S6.05 Software as a Service to Large Scale Modeling

Lead Center: GSFC

Participating Center(s): ARC

Currently there are notable obstacles in making NASA's Earth and space science research models useful to new investigators. Much of the software, upwards of hundreds of thousands of lines of code per model, has evolved gradually over the past three decades. At their inceptions the individual numerical models were intricate elements of independent research projects, intended to be mostly internal products rather than tools contributing to a larger, collaborative effort in Earth and space sciences. Hence today when investigators from outside the developers' organizations choose to begin a collaboration, or merely want to use the model for their own benefit, they are often required to adhere to the unfamiliar development environment of the host institution. This environment typically includes the regulation and management of the software repository, the data management system, and the high-end computing platforms. Problems that arise from this type of a work arrangement include:

- IT security policies that restrict certain individuals from obtaining access to Government facilities (especially with providing foreign national graduate students access to the institutional high-end computers that host a particular model);
- Knowledge of running a model residing "in the heads" of support programmers, often too busy to assist outsiders;
- Interface components residing in individuals' directories unknown to others who might take advantage of them;
- User administration practices (userids, passwords, filesystem/data management, other IT security rules) that are specific to one agency's computing center;
- A lack of front-end tools available to other model developers to set up and run collaborative experiments.

The Agency seeks a computational "service layer" to enhance NASA's scientific numerical modeling efforts. The goal is to improve the accessibility of the models to universities and other Government institutions for research and operations. Proposals are sought that develop methods for hosting NASA's Earth and space science models under a "Software As A Service (SaaS)" paradigm. Proposal are also sought which couple model components and ancillary programs under a service-oriented architecture. A feasibility study should be conducted during Phase 1 that will lead to a Phase 2 prototype that makes use of a NASA Earth or space science numerical model. Under such a scenario the back-end supercomputing environment should be segregated from the user's work environment while providing an interface to specific, secure services that will allow (1) execution of the model as a "black box" and (2) the ability to edit model elements, upload, recompile, and execute.

Proposals should show an understanding of one or more relevant science needs, and present a feasible plan to fully develop a technology and infuse it into a NASA program.Â