POSTDOC RESEARCHER: FP7 EDGI (European Desktop Grid Initiative)

Location:	LIP/ENS - Lyon (69) FRANCE
Research Team:	GRAAL/INRIA
Duration:	24 months
Gross salary / month:	2 681 Euros

Context

INRIA, the French national institute for research in computer science and control, is dedicated to fundamental and applied research in information and communication science and technology (ICST). INRIA has a workforce of 3,800 people working throughout its eight research centers established in seven regions of France. The GRAAL team at INRIA Lyon seeks a talented young researcher to develop innovative QoS solution as part of the European Desktop Grid Initiative (EDGI) project.

EDGI is an FP7 European project, following the successful FP7 EDGeS project, whose goal is build a Grid infrastructure composed of "Desktop Grids", such as BOINC or XtremWeb, where computing resources are provided by Internet volunteers, and "Service Grids", where computing resources are provided by institutional Grid such as EGEE, gLite, Unicore and "Clouds systems" such as OpenNebula and Eucalyptus, where resources are provided on-demand. The goal of the EDGI project is to provide an infrastructure where Service Grids are extended with public and institutional Desktop Grids and Clouds. Our partners include SZTAKI insitute (Hungary), CIEMAT (Spain), Univ. Coimbra (Portugal), Univ Cardiff (UK), Univ Westminster (UK), AlmereGrid (NL), IN2P3 (FR) and more.

Work Description

The postdoc researcher will have leading activities of the Work Package JRA2 : QoS support for Desktop Grids. We define QoS concretely as a probabilistic guarantee of job makespan or throughput. Providing QoS features even in Service Grids is hard and not solved yet satisfactorily. It is even more difficult in an environment where there are no guaranteed resources. In DG systems resources can leave the system at any time for a long time or forever even after taking several work-units with the promise of computing them. Two main approaches will be investigated within EDGI and deployed in the EDGI production infrastructure. The first approach will classify the DG clients according to their historical behavior and allocates applications with QoS needs to the more trustable and faster clients. However, even in this case it can happen that some of the work-units are not completed in time. For such critical work-units the DG system will be able to dynamically deploy fast and trustable clients from some Clouds that are available to support the EDGI DG systems. So the second approach will be based on the extension of DG systems with Cloud resources. The job consists in elaborating the technical solution to be able to take the right decision about assigning the necessary number of trusted clients and Cloud clients for the QoS applications. This will include: defining application QoS requirements, understanding existing QoS mechanisms based on replication in BOINC and XtremWeb, development of QoS Oracle to monitor and model application execution and anticipate QoS failure and development of the QoS Scheduler, which will extend DG systems with additional Cloud resources.

The job consists in the following components : designing QoS heuristics, implementation of the middleware, evaluation and benchmarking, deployment and maintenance, technical report and administrative duties, in collaboration with IN2P3, Univ Westminster, University of Coimbra and SZTAKI institute.

The postdoc will be supervised by Gilles Fedak and Derrick Kondo.

Required Knowledge and Background

Applicants are required to have at least 3 years of programming in Java and C/C++, and the ability to travel to European sites. Familiarity with Grid systems, security in distributed systems, volunteer computing systems is a plus, though not required. Good knowledge of the English language is required as well as the ability to write technical reports.

Application

Should you need further technical information about this position, please contact : Gilles Fedak (Gilles.Fedak@inria.fr)