2017-00174 - R&D Software Engineer upon simulation of a Resource Manager for Big Data infrastructures

Contract type: Public service fixed-term contract
Renewable contract: Oui
Level of qualifications required: Graduate degree or equivalent
Other valued qualifications: Bac + 5
Fonction: Temporary scientific engineer
Level of experience: Recently graduated

About Inria

Inria, the French National Institute for computer science and applied mathematics, promotes “scientific excellence for technology transfer and society”. Graduates from the world's top universities, Inria's 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

About the research centre or Inria department

About Inria

Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

About Ryax

Ryax Technologies is an early stage startup driven by the vision to provide the next generation resource and compute management system of hybrid Big Data infrastructures. Technology moves fast and now we are entering a new age of computing where the Internet of Things and the Industrial Internet deal with petabytes of data while applications from virtual reality to autonomous driving need extreme low latency responses. The efficient orchestration of compute workloads executed upon hybrid and complex infrastructures requires the latest innovations from different areas of computer science including stream and batch processing, distributed computing, large-scale system design, security and privacy, user interface design, machine learning, and more.

Ryax Technologies embraces this scientific knowledge to optimally manage distributed hybrid computing platforms for different use cases to enable big data applications. The core software named Ryax is an open-source resource manager based on the latest research and development from Inria.
on a decentralized management model, a P2P network overlay
and the support of a unified model for batch and stream
processing.

Context
Ryax Technologies is looking for a junior software engineer for an R&D project in
distributed computing. The software engineer will study the characteristics and needs
of the new open-source resource manager Ryax and will develop models and plugins
in order to provide the simulation of Ryax ecosystem upon Batsim and SimGrid which
are mature simulation tools for distributed systems.

Ryax enables a seamless execution of applications across the whole hybrid Big Data
infrastructure (Edge, Fog, Cloud). It is based on serverless technology and supports
programming models similar to Beam which enable a unified model for batch and
streaming data processing.

There are 2 basic characteristics of Ryax and its ecosystem that will need particular
attention:
- the high heterogeneity and complexity of platforms’ resources (compute,
  network, etc)
- along with the combination of batch and streaming workloads.

Hence, Batsim simulator will need to be adapted to allow the support of both batch
and streaming workloads.

The job will be located in Lyon or Grenoble, France, and will be part of Inria
research team Datamove and Ryax technologies startup.

Assignment
Assignments:
The software engineer would study Ryax and Batsim software and
will develop modules and plugins to enable the simulation of Ryax
upon Batsim.

Collaboration:
The recruited person will be in connection with both the team
responsible for Batsim software from INRIA Datamove group and
the team that develops Ryax from Ryax Technologies startup.

Responsibilities:
The person recruited is responsible for designing and developing
the code needed to perform simulations of Ryax upon Batsim,
reporting about project progression to both INRIA group and Ryax
Technologies representatives and will take initiatives for optimal
project progression.

Main activities
- Study Ryax, Batsim (https://github.com/oar-team/batsim) and Simgrid (http://simgrid.gforge.inria.fr/)
  software
- Propose software architecture for the simulation of Ryax
  upon Batsim/Simgrid
- Develop the code needed within Ryax and Batsim/Simgrid
  software
- Develop and execute performance evaluation experiments

Skills
Technical skills and level required:
- C/C++ Programming
- Linux Operating System
- Experience with Distributed Systems and Big Data will be a plus

Languages:
- Knowledge of English to study scientific publications and write documentation and reports

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration
Gross salary: 2,562 euros to 2,632 euros / month.