The work proposed in this post-doctoral position is to study, within the opens the way to a study of relationships between Scheduling and management problems and skills, while establishing the possibility to It is important to keep the separation of concerns between different box, and enriching the controller with the new available information. The integration and coordination of multiple management mechanisms coordinating them explicitely : this involves opening the RJMS as a grey RJMS and the controller, to go beyond implicit interferences, by The challenge of this projet is to deepen the interaction between the RJMS and the controller, to go beyond implicit interferences, by coordinating them explicitely : this involves opening the RJMS as a grey, and enriching the controller with the new available information. The integration and coordination of multiple management mechanisms is an important topic in Software Engineering for Autonomic Computing. It is important to keep the separation of concerns between different management problems and skills, while establishing the possibility to cooperate in order to reach improved performance. In our context, it opens the way to a study of relationships between Scheduling and Control for HPC systems. The work proposed in this post-doctoral position is to study, within the
framework of CiGri [1], how to integrate information from the RJMS (e.g., scheduler) into the feedback loop. The RJMS is a key software component in charge of allocating resources to users' jobs. It involves the scheduling component OAR, detaining information about premium users tasks. This information can be useful for the controller to act more predictively according to planned variations of resources to be harvested.

**Principales activités**

More precisely, a first approach is to consider the jobs allocation plan computed by OAR (usually depicted as a Gantt diagram), where information about tasks and their resource usage in time is available. The coordination will be supported by an interface to be developed, in order to communicate to the controller the predicted variations in load (upwards: premium jobs taking additional resources, as well as downwards: jobs releasing resources). The controller will be designed in order to use this predictive information, to regulate the submission of best-effort jobs so as to e.g., minimize useless computation induced by the submission of best-effort jobs which would be prematurely killed by an upwards variation.

This simple reactive approach could be enriched to leverage the knowledge of past jobs. For example, one could weight the controller's reaction based on some life expectancy metric. This opens up the door to stochastic approaches.

The work is performed in a multidisciplinary cooperation with researchers from both control engineering and computer science fields. On the Control Theory aspects we are cooperating with Gipsa-lab in Grenoble and the Spirals team at Cristal/Inria in Lille. The objective of this post-doctoral position is to contribute more on the side of HPC, interfacing with OAR, and experimental validation. The latter will follow a reproducible approach, building upon tools developed in the Datamove team.

Steps will feature:
- study of existing techniques related to autonomic computing;
- appropriation of the CiGri and OAR environments, and the recent developments;
- interaction with colleagues designing the control feedback loop exploiting information from the cluster RJMS: \\"integration of this controller with the RJMS: interfacing components, extracting useful information ; \"experimental evaluation (performance analysis) of the proposed strategy.

**References**


**Compétences**

The candidate is expected to hold a PhD (or be finishing its preparation) in Computer Science, in the domain of High-Performance Computing, with an interest for experimental validation, and for multidisciplinary work.

**Avantages**

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
Social, cultural and sports events and activities
Access to vocational training
Social security coverage

Rémunération
Gross salary: 2,746 euros per month before income taxes.