2018-00421 - [Campagne CORDI-S - CRI Paris] : Distributed coordination algorithms in dynamic networks

Type de contrat : CDD de la fonction publique
Niveau de diplôme exigé : Bac + 5 ou équivalent
Fonction : Doctorant
Niveau d'expérience souhaité : Jeune diplômé

Contexte et atouts du poste

The Delys group (previously Regal) <http://team.inria.fr/regal/> is a joint team of Inria and Sorbonne University whose research topics cover the whole spectrum of distributed systems and multicore systems. Our research topics span the whole spectrum between theoretical aspects of distributed systems, such as possibility and impossibility results, consensus or fault detectors, to the design and implementation of highly efficient algorithms and systems, such as an extreme-scale geo-replicated database minimising synchronisation. We publish in the best venues across the spectrum, such as PODC, DISC, SSS, OPODIS, JPDC, OSDI, EuroSys, Middleware, SRDS, DSN, IPDPS, EDCC, OSR, Systor, ASPLOS, POPL, etc.

Delys is located at LIP6, the Informatics research laboratory of Sorbonne University, in the Latin Quarter of Paris.

Mission confiée

Distributed algorithms are traditionally conceived for message-passing distributed environments which are static and whose membership is known. However, new environments such as ad-hoc mobile wireless network (MANET) or sensor wireless network (WSN), peer-to-peer networks, and opportunist grids or clouds provide access to services or information regardless of node location, mobility pattern, or global view of the system.

These new systems are dynamic, which means that the communication graph evolves over time, processes might join or leave the system, or crash and recover during the run. Additionally these systems are unknown, which means that processes do not initially know the membership of the system, and only discover it during the run. Therefore, distributed algorithms that run on top of these new systems cannot use prior distributed models for static known systems.

Principales activités

This thesis focuses on building block algorithms for distributed systems in dynamic topologies, studying fundamental problems such as consensus [1,2] and mutual exclusion [3]. For modeling the dynamics of the system and evolving communication between nodes, we will exploit the formalism of the Time-Varying Graphs (TVG) [4]. Delys has also been interested in failure detector (FD) [5] which is a fundamental abstraction for distributed algorithms. FDs have been widely used to solve agreement and locking problems in asynchronous systems prone to crash failures, but usually conceived for static environments and known network topologies. Hence, the objective in this thesis is also to propose efficient FDs algorithms for dynamic unknown networks which will be used to solve agreement and mutual exclusion problems.

Proposed algorithms will be evaluated both on simulation using OMNet++ tool and in real mobile sensor testbeds using FIT platform.

References


**Compétences**

The candidate should have knowledge in distributed systems and theoretical aspects of distributed algorithms as well as strong development skills since interest in experimental research is also requested.

**Avantages sociaux**

- Subsidised catering service
- Partially-reimbursed public transport

**Rémunération**

Gross Salary per month: 1 982 € the first 2 years and 2 085 € the last year

**Informations générales**

- **Thème/Domaine**: Systèmes distribués et intergiciels
  Système & réseaux (BAP E)
- **Ville**: Paris
- **Centre Inria**: CRI de Paris
- **Date de prise de fonction souhaitée**: 01-10-2018
- **Durée de contrat**: 3 ans
- **Date limite pour postuler**: 23-04-2018

**Contacts**

- **Equipe Inria**: DELYS
- **Recruteur**:
  Sens Pierre / pierre.sens@inria.fr

**Conditions pour postuler**

**Sécurité défense**:
Ce poste est susceptible d’être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L’autorisation d’accès à une zone est délivrée par le chef d’établissement, après avis ministériel favorable, tel que défini dans l’arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l’annulation du recrutement.

**Politique de recrutement**:
Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.

**Attention**: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.