Offre n°2025-08755

Scalable and Resilient Distributed Storage

Le descriptif de l'offre ci-dessous est en Anglais

Type de contrat : CDD

Niveau de diplôme exigé : Bac + 5 ou équivalent

Fonction : Ingénieur scientifique contractuel

A propos du centre ou de la direction fonctionnelle

The Inria center at the University of Rennes is one of eight Inria centers and has more than thirty research teams. The Inria center is a major and recognized player in the field of digital sciences. It is at the heart of a rich ecosystem of R&D and innovation, including highly innovative SMEs, large industrial groups, competitiveness clusters, research and higher education institutions, centers of excellence, and technological research institutes.

Contexte et atouts du poste

Context

This Research Engineer position is part of a collaboration between HIVE and the WIDE and COAST

teams at Inria. The successful candidate will be part of the WIDE team based at Inria Rennes.

About WIDE

The WIDE team at the Inria center at Rennes University investigates the key fundamental theoretical

and practical questions posed by modern distributed computer systems. This involves exploring the

inherent tension between scalability and coordination guarantees and developing novel techniques

and paradigms that are adapted to the rapid and profound changes impacting today's distributed

systems, both in terms of the application domains they support and the operational constraints they

must meet.

About COAST

The COAST team at Inria Center at Lorraine University aims at providing support to build trustworthy

collaborative applications based on the knowledge from replication algorithms, from the composition

of services and from services quality that can be deduced and monitored. The complexity of the

context in which applications are executed makes it impossible to provide provable deterministic

guarantees. COAST tackles this problem by leveraging a contractual and monitored approach to give

users confidence in the services they use.

About Hive

Hive is shaping the future of cloud computing by leveraging unused computing capacity to provide a

decentralized, environmentally friendly, and user-empowered alternative to traditional cloud services.

By utilizing distributed peer-to-peer networks, end-to-end encryption, and blockchain technologies,

Hive aims to establish a more sovereign and efficient cloud ecosystem.

Mission confiée

Position Overview

We are seeking a Research Engineer to work on the development of a scalable and resilient

distributed storage system suitable for a decentralized, trustless environment. The role will involve

designing, implementing, and optimizing Distributed Hash Tables (DHTs) for large-scale,

permissionless networks, addressing challenges related to scalability, reactivity, and resilience in

adversarial conditions.

Principales activités

Research & Development: Analyze and improve existing DHT mechanisms, such as

Kademlia, to ensure scalability and efficiency in handling large numbers of nodes and data

blocks.

Implementation & Optimization: Develop adaptive refreshment and routing strategies

informed by real-world data from IPFS workloads.

Security & Fault Tolerance: Enhance the system's resistance to Byzantine and Sybil attacks

using innovative cryptographic and distributed consensus techniques.

Proof-of-Storage Mechanisms: Explore alternative consensus mechanisms (e.g.,

Proof-of-Storage) to ensure security without the energy consumption or economic

centralization of PoW or PoS.

Collaboration & Integration: Work closely with academic partners, integrating research

insights into practical, deployable solutions for Hive’s decentralized cloud platform.

Testing & Validation: Conduct simulations, benchmarks, and real-world testing to validate the

proposed solutions.

Compétences

Preferred Qualifications

Experience working with large-scale decentralized applications.

Familiarity with adversarial models and security threats in distributed environments.

Contributions to open-source projects in distributed storage or blo

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

Rémunération

monthly gross salary from 2695 euros according to diploma and experience

Informations générales

- **Thème/Domaine :** Systèmes distribués et intergiciels
  Système & réseaux (BAP E)
- **Ville :** Rennes
- **Centre Inria :** Centre Inria de l'Université de Rennes
- **Date de prise de fonction souhaitée :** 2025-05-01
- **Durée de contrat :** 12 mois
- **Date limite pour postuler :** 2025-04-30

Contacts

- **Équipe Inria :** WIDE

- **Recruteur :**
  Frey Davide / davide.frey@inria.fr

A propos d'Inria

Inria est l’institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l’interface d’autres disciplines. L’institut fait appel à de nombreux talents dans plus d’une quarantaine de métiers différents. 900 personnels d’appui à la recherche et à l’innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

Required Qualifications

Master’s degree or PhD in Computer Science, Distributed Systems, Cryptography, or a related field.

Strong experience in distributed systems, DHTs (e.g., Kademlia), and peer-to-peer

networking.

Proficiency in programming languages such as Go, Rust, or Python.

Experience with blockchain technologies, Byzantine Fault Tolerance (BFT), or distributed

consensus mechanisms is a plus.

Strong problem-solving skills and ability to work in a collaborative research-driven

environment.

Prior experience in implementing or researching distributed storage solutions (e.g., IPFS) is

highly desirable.

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.

Consignes pour postuler

Please submit online : your resume, cover letter and letters of recommendation eventually

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.