A propos du centre ou de la direction fonctionnelle

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, EquipeX) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety and reliability; modelling, simulation and optimisation (with priority given to energy).

The 450 researchers and engineers from Inria and its partners who work in the research centre’s 28 teams, the 60 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Contexte et atouts du poste

Research on mobile systems involves the analysis of spatiotemporal data. Unfortunately, gathering data is hard: recruiting volunteers demands considerable technical, logistic, and administrative efforts, and the subjects are generally an inhomogeneous sample of the population. All these drawbacks are inherent to active, intrusive data collection methods.[1]

Against these issues, passive measurement strategies are a good contender, limiting the selection bias and expanding the potential target pool by orders of magnitude. They all draw upon the same principle: rebuilding information from the signals connected devices naturally emit. In this context, we could infer the devices’ mobility by leveraging their WiFi, cellular, or Bluetooth signals.

WiFi, being the short-range and most prevalent mode of communication, is thus an optimal choice. To protect the user and avoid displaying a unique identifier, the WiFi standard forces devices to regularly change their public MAC address: the MAC address randomization process. Therefore, all the works on trajectory reconstruction and other related domains that rely on device identification must be revisited with an adequate MAC association scheme. WiFi MAC randomization has been studied [2], and it has been shown by numerous works [3][4][5] that the current randomization recommendations do not preserve privacy. But none of the existing generic solutions [3][5] on MAC address association can get high accuracy and is validated for real-world scenarios.

Mission confiée

This internship aims to verify the correctness of current MAC association algorithms in literature and build upon that to come up with a new generic and accurate MAC association solution. In particular, this internship will involve WiFi protocol analysis to find privacy-intrusions, efficient algorithm design, trace-collection, and network simulation. This internship will be the first to evaluate-and-design a generic, accurate solution to defeat WiFi MAC address randomization.

Principales activités

Scope of the internship:

During the internship, the student will get acquainted with the research and implementation of various privacy-provisions and device-fingerprinting in WiFi. Three significant steps involved in this internship are:

1. The study and the implementation of most generic WiFi MAC address associations currently available in the literature.
2. Evaluate the solution with real-world traces consisting of public WiFi packets and ground truth.
3. Design a new solution that is more accurate in large-scale outdoor WiFi usage scenarios.

If time permits, the intern is more than welcome to benchmark and open-source the new solution.

References:


Informations générales

- Thème/Domaine : Réseaux et télécommunications
- Ville : Palaiseau
- Centre Inria : CRI Saclay - Île-de-France
- Date de prise de fonction souhaitée : 2021-03-01
- Durée de contrat : 6 mois
- Date limite pour postuler : 2021-02-28

Contacts

- Equipe Inria : TRIBE
- Recruteur : Achir.Nadjib@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 200 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3500 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 180 start-up. L’institut s’efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l’économie.

Consignes 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.
Compétences

Required Technical skills:
- Good knowledge of wireless networks and protocols
- Knowledge and interest in network privacy
- Strong programming skills (C++, Bash, Python)
- Experience in the network simulators (like NS-3) is a plus.
- Good communication and documentation skills in English

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

Internship gratification