Secure Integration of Internet of Things

Opportunity for a 6-month internship

Security Research @ SAP Labs France
Sophia-Antipolis – France

SAP's security vision is built on 5 ideals to secure business: Defendable Application, Zero-Knowledge, Zero-Vulnerability, Security by Default, and Transparency.
SAP's security research group lays the foundation for realising the vision: The 30+ researchers of the Security Research unit focus on security engineering (e.g., the automation of the secure software development lifecycle), secure business execution (e.g., business process security and security in cloud based business applications) and secure operations (e.g., secure maintenance and support of complex and heterogeneous cloud IT landscapes).

Security Research proposes a 6-month internship in its Sophia-Antipolis offices (Mougins, France).

INTERNSHIP TOPIC

This internship is based in the SAP Labs France Research Lab, in Sophia-Antipolis. The work will be performed in the context of the Research Program "Security & Trust", and deals with secure integration of Internet of Things with SAP HANA applications. The Internet of Things (IoT) is expected to grow to 50 billion connected devices and $14.4 trillion in value at stake until 2020. SAP is exploiting this trend and centers its IoT development on the SAP HANA Cloud Platform IoT Service.

The Internet of Things (IoT) is seen as one of the most ground breaking and game-changing evolutions of operational and information technology in modern times. More and more enterprises are nowadays aiming to connect both new and legacy physical assets to their system landscapes in order to capture the data from these assets, generate insights and derive value out of the latter. This requires to retrofit existing physical assets in order to leverage them as part of the (connected) physical (IoT) infrastructure.

A major part of this growing number of "things" (devices) is expected to be low-powered, i.e., devices which are restricted to consume only very little energy to operate (and therefore to communicate). This has numerous consequences in practice; for instance, one cannot expect these devices to hold an active link but rather to communicate on-demand only. To this effect, these devices will have to communicate not only with a reduced packet size, but to embrace both a higher latency and a lower throughput at run-time. This takes us to the concept of Low-Power Connectivity, materialized as Low-Powered Wide-Area Networks (LPWANs) or Low-Power Networks (LPNs). LPNs offer an economically viable option to physically deploy new sensors along with the necessary communications infrastructure in order to generate, transport and ingest data coming from any type of asset. This means that part of the great potential of the LPNs rely on the cost effectiveness of retrofitting old assets with new (low-power) sensors and (low-power) connectivity, making this type of approach the first choice when targeting legacy assets and landscapes.

However, even if the connectivity is achieved, security is often an equally important requirement- in particular end-to-end data protection from the devices (i.e. the first end) all the way to the backend applications (i.e. the second end). The involvement of multiple actors in an IoT scenario (e.g. device, network, platform, application, professional services providers, etc) together with LPN constraints makes the fulfillment of an end-to-end data protection (i.e. confidentiality and integrity) a challenging endeavor. Nevertheless, the integration of IoT with business applications raises several security challenges: confidentiality and integrity of IoT information, secure device and software management.

The goal of this internship is thus to assess different industry scenarios, identify associated security requirements. In a second phase, the candidate will have to implement a Proof of Concept demonstrating a security solution on a selected scenario.

We expect that 80% of time will be dedicated to development and 20% to research activities.

CANDIDATE PROFILE

- University Level: Last year of MSc in Computer Science or beyond
- XSJS (SAP HANA language), C, Java
- Experience on Internet of Things and embedded systems
- Fluency in English (working language)
- Abilities in organizing meeting and contacting people
- Good oral and written communication skills
- Capacity to write documents in English, ability to synthesize

INTERNSHIP CONTEXT

SAP

Over the past 45 years, SAP has grown to become the world's leading provider of business software solutions. With 12 million users, 96,400 installations, and more than 1,500 partners, SAP is the world's largest inter-enterprise software company and the world's third-largest independent software supplier, overall. SAP solutions help enterprises of all sizes around the world to improve customer relationships, enhance partner collaboration and create efficiencies across their supply chains and business operations. SAP group includes subsidiaries in over 180 countries and employs more than 84 000 people.

Security Research at SAP Labs France, Sophia Antipolis

Based at SAP Labs France Mougins, Security Research Sophia-Antipolis addresses the upcoming security needs, focusing on increased automation of the security life cycle and on providing innovative solutions for the security challenges in networked businesses, including cloud, services and mobile.

STANDARD INTERNSHIP PACKAGE

- *Salary*: depending on the length of the internship and your diploma.
- *Lunch*: SAP Labs France has a local cafeteria; interns contribute 2,40 €uro/lunch, like other SAP employees.
- *Holidays*: French Bank Holidays
  - January 1st; April 2nd, May 1st, May 8th, May 10th, May 21st, July 14th; August 15th , Nov 1st and 11th; December 25th
- *Travel*: no trip will be paid by SAP.
- *Accommodation*: SAP can propose an accommodation for the duration of your internship. The accommodation is subsidized by SAP: the intern pays half of the rental cost: 342€ for a 1-room apartment or 442€ for a 2-room apartment (Choice depending on the availability).

CONTACTS AND PROCEDURE

Please send **in English** your CV, a cover letter and any relevant documents to the following persons stating the title of the Internship in the subject: [Internship Application] **Secure Integration of Internet of Things**.

Supervisor
Laurent Gomez
laurent.gomez@sap.com
Tel. +33-(0)4-92286346

Administrative point of contact
Sylvine Eusebi
sylvine.eusebi@sap.com
Tel. +33-(0)4-92286477