



Access Control to Wireless Sensor Data: design of a research solution

Opportunity for a 6 months internship (MSc)

SAP RESEARCH - SAP LABS FRANCE

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Ref 7/8/2008 10:38:00 AM v1.20

The internship will be performed at SAP Labs France in the Security & Trust area of SAP Research in the context of the EU-sponsored WASP project (<http://www.wasp-project.org/>).

WASP (Wirelessly Accessible Sensor Populations) aims at focusing on the newly emerging Wireless Sensor Network (WSN) technology, covering the whole range of layers, from basic hardware, sensors, processor, communication, through the packaging of the nodes, the organization of the nodes, towards the information distribution and a selection of applications. The emphasis in the project lies in the self-organization and the services, which connect the application to the sensor network.

Three business areas, selected for their societal relevance and technical differences, validate the results of the project: healthcare, automotive, agriculture.

One of the main tasks of SAP in the WASP project is a vertical approach to the enforcement of WSN security through the design of the adequate services, protocols, mechanisms, and programming paradigms. Interesting challenges spring from this work field, such as – for instance – ensuring the privacy of highly sensitive data on low powered nodes, or implementing efficient access control to sensory data, given the diversity of WSN data users.

The goal of the internship is to contribute to the creation of a novel security protocol for access control to wireless sensor data. The expected outcome is a publication to an international conference or journal. The internship work will require to:

- Understand the state of the art of generic and WSN systems, in particular, hierarchical access control
- Present a critical reading of such state of the art, finding strengths and feeblednesses of the analyzed schemes
- Understand the main idea behind the new scheme, already designed internally
- Enrich this main idea and create a full solution out of it
- Writing of the solution in a research paper, ready to be submitted to a conference/journal

Stretch goals include:

- Finding weaknesses/suggesting improvements of the scheme
- Participating to the team work with ideas and actively contribute to the definition of new protocols

References:

[1] – Alessandro Sorniotti, Refik Molva, Laurent Gomez: "Efficient access control for wireless sensor data", PIMRC 2008, IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, 15-18 September, 2008, Cannes, France.

[2] – Selim G. Akl, Peter D. Taylor: "Cryptographic Solution to a Problem of Access Control in a Hierarchy", ACM Trans. Comput. Syst. 1(3): 239-248 (1983)

[3] – Mikhail J. Atallah, Marina Blanton, Keith B. Frikken: Incorporating Temporal Capabilities in Existing Key Management Schemes. ESORICS 2007: 515-530

Technologies involved:

WSN, cryptography, security protocols, access control

Candidate Profile

- University Level: Last year of MSc or behind
- "Security" oriented mindset: analytic, critical, eager to look at problem from different perspective
- Knowledge of security in IT systems
- Fluency in English (working language)
- Good oral and written communication skills
- Knowledge of cryptography and security schemes/protocols would be a strong plus

The position is to be filled by January 2009

Internship Context

SAP & SAP Research

Serving more than 41,200 customers worldwide, **SAP is the world's largest business software company and the world's third-largest independent software provider overall**. We have a rich history of innovation and growth that has made us a true industry leader. Today, SAP employs more than 41,900 people in more than 50 countries. Our professionals are dedicated to providing the highest level of customer service and support.

SAP has leveraged our extensive experience to deliver a comprehensive range of solutions to empower every aspect of business operations. By using SAP solutions, organizations of all sizes – including small businesses and midsize companies – can reduce costs, improve performance, and gain the agility to respond to changing business needs.

SAP has also developed the SAP NetWeaver platform, which allows our customers to achieve more value from their IT investments.

SAP Research –*Systematic Thought Leadership for Innovative Business*– As the global technology research unit of SAP, SAP Research significantly contributes to SAP's product portfolio and extends SAP's leading position by identifying and shaping emerging IT trends through applied research and corporate venturing.

In contrast to SAP's product groups, which work on new functions and releases, SAP researchers explore opportunities that haven't yet been developed into products. We track technology trends, evaluate the potential impact on SAP solutions and customers, and generate breakthrough technologies. The business model of SAP Research is based on co-innovation through collaborative research. Working with leading universities, partners, customers, and SAP product groups, SAP Research oversees the development of promising ideas and prototypes into market-ready software for maximum customer value.

SAP Research is headquartered in Walldorf, Germany. SAP Research has identified six long-term and global research programs, among them the **Security & Trust Research** Program, which is lead by SAP Research at SAP Labs France.

SAP Research Sophia Antipolis, SAP Research Center Sophia Antipolis is located in the setting of one of the most important scientific parks worldwide. A high concentration of IT and telecommunication industries within walking distance, proximity to partners and customers, as well as the educational establishments in the region provide SRC Sophia Antipolis with an ideal working environment. Based at SAP Labs France, the focus of SRC Sophia Antipolis is mainly in the research field of security and trust. However, of great interest is the work on e-government and public safety applications. Local collaborations with external partners and educational organizations in the region, such as Inria, Eurécom Institute, and the University of Nice Sophia Antipolis, provide a strong benefit to these research activities. SAP Research also participates to the French poles de competitivites *Risques* (Risk) and *Solutions Communicantes Securisees* (Secure Communicating Solutions). Beyond that, SAP Research Sophia Antipolis is collaborating with industrial partners and customers which provide a strong benefit to the research activities.

20 researchers are working at SAP Labs France (among ~200 employees) and are mainly involved on European Research Projects in the area of Security & Trust with applications to eGovernment, Mobility and Public Security.

Standard Internship Package

- **salary:** depending on the length of the internship and your diploma
- **working hours:** 9am to 5pm is the minimum. Other than that we are flexible.
- **lunch:** SAP Labs France has a local cafeteria; interns contribute 2,1 Euros/lunch, like other SAP employees.
- **vacation:** at the discretion of your manager (usually 1 worked/day per month).
- **holidays:** based on French holidays (April 17th; May 1st, 8th, 25th; July 14th; Aug 15th; Nov 1st, 11th; Dec 25th are French holidays).
- **travel:** no personal travel (your trip to and from Nice) will be paid by SAP.
- **accommodation:** we can propose to you an accommodation for the duration of your internship. If you accept SAP will take care of the rent but 250 Euros will be deducted from your monthly salary. Otherwise you are on your own.

If you have any question, do not hesitate to contact us.

Contacts and Procedure

Please send your CV and any relevant documents to the following persons stating the title of the Internship in the Subject **[Internship Application] Access Control WSN**

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