



Eclipse Plugin for WSN Development

Opportunity for a 6 months internship

SAP RESEARCH - SAP LABS FRANCE
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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 narrowing this mismatch between application level and the node and network level by covering the whole range 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.

One of the main tasks of SAP in the WASP project is secure integration of WSNs into enterprise systems via design of the adequate services, protocols, mechanisms, and programming paradigms. Sensor networks appear to be the next hype technology of the 21st century [1, 2]. Empowered with short wireless communication capabilities, Wireless Sensor Networks (WSN) leverage traditional sensor networks by enabling randomly and densely deployment of smart and small devices in physical areas (e.g. battle field, body). We understand WSN as any self-organised wireless network involving low-cost and low-power sensor devices which are capable for sensing, processing, routing and disseminating data toward special sensor nodes so-called sink.

The goal of the internship is to develop an Eclipse plugin to ease the development, debugging, and deployment of application of applications on CrossBow [3] sensor nodes. Based on our experience on node application development, we want to propose to the application developer a unique development environment for nodes applications. To that effect, the internship will include the following tasks:

1. Analysis of existing existing tools (e.g. Motes Work) for development, debugging and deployment of corssbow sensor nodes applications.
2. Design and development of a Eclipse plugin for development, debugging and deployment of crossbow applications.
3. Tutorial for development, debugging and deployment of crossbow applications based on that plugin.

Since SAP is key player in the development of enterprise software, the intern will have the rare opportunity to influence certain aspects of future standards of WSN integration, he/she will also gain experiences with web service and SOA infrastructure.

The candidate is furthermore expected to participate actively in the team work with ideas and to contribute accordingly to the project, at each phase of his internship.

References:

[1], "21 ideas for the 21st century.", *Business Week*, pp 78-167, 1999.

[2], "10 emerging technologies that will change the world.", *Technology Revue*, vol 106, 2003.

[3], CrossBow, <http://www.xbow.com>

This internship is mainly software development oriented.

Technologies involved:

Mainly WSN, Web Services, J2EE, Java, Eclipse, SAP Netweaver Developer Studio, UML

Candidate Profile

- University Level: Last year of MSc or less if the student has a good profile.
- Good skills in modelling and analysis
- Good knowledge of Java
- Fluency in English (working language)
- Good oral and written communication skills
- Knowledge of Wireless sensor networks, Web Services and Security would be a strong plus

The position is to be filled between September and December, 2008.

Internship Context

SAP & SAP Research

As the world's leading provider of business software, **SAP** delivers products and services that help accelerate business innovation for our customers. We believe that doing so will unleash growth and create significant new value – for our customers, SAP, and ultimately, entire industries and the economy at large. Today, more than 46,100 customers in more than 120 countries run SAP applications – from distinct solutions addressing the needs of small businesses and midsize companies to suite offerings for global organizations.

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 competitivités *Risques* (Risk) and *Solutions Communicantes Securisées* (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.

30 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
- **lunch:** SAP Labs France has a local cafeteria; interns contribute 2,13 Euros/lunch, like other SAP employees.
- **vacation:** at the discretion of your manager (usually 1 worked/day per month).
- **holidays:** based on french holidays
 - 2008: January 1st, March 23rd;24th, May 1st,8th;July 14th;Aug 15th;Nov 1st,11th;Dec 25th,31st 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 275 Euros will be deducted from your monthly salary. Otherwise you are on your own.

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] WSNs for Public Security**

Supervisor

Laurent Gomez
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Administrative point of contact

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