



# Implementation of the E-business industrial evaluation prototype v.4 for Serenity

## Opportunity for a 6 months internship (MSc) at SAP Research - SAP Labs France Cote d'Azur, FRANCE

Ref 4/4/2008 10:26:00 AM v1.00

The internship will be done in the context of the EU-sponsored Serenity project (<http://www.serenity-project.org>) and it will be performed fulltime at SAP Labs France – in the Security & Trust group of SAP Research.

SAP Research Center Sophia Antipolis contributes, together with others software companies, application solution developers and research institutions, to the EU Integrated Project SERENITY (“System Engineering for Security and Dependability”) whose main goal is to support system designers/developers (persons that in general might not have a deep security know-how) to make their systems — e.g., Ambient Intelligence (AmI) ecosystems applied in the area of healthcare, Enterprise Service-Oriented Applications for domains such as e-business, e-government, etc — secure by capturing security expertise and making it available for automated processing. One of the SERENITY key ingredients will be the enhanced notion of Security and Dependability (S&D) Patterns as precise specifications of validated S&D mechanisms that will serve as vehicles for the provision of S&D over a wide assortment of heterogeneous systems.

An entire activity, mainly carried on by the project industrial partners, will focus at developing a set of motivating reference scenarios to evaluate, tune, and assess all methods, techniques, and tools emerging from SERENITY. SAP Research at Sophia Antipolis will lead this crucial activity and will develop two over five reference scenarios: an e-Business scenario focusing on the loan origination process in the banking environment, and a Smart Items scenario focusing on health-care monitoring of patients after hospitalization. Not surprisingly these scenarios present a variety of S&D needs that range from the organizational and business level to the device and network one.

This internship will focus on the e-business scenario that deals with the growing requirements of the banking domain (e.g., necessity of preventing frauds, preserving the integrity of the customer data, insuring a secure channel any time the bank needs to communicate securely with another entity involved in the process like Credit Bureau, protecting the right to privacy of the customers, etc).

A first version of an industrial evaluation prototype for the SERENITY’s e-business scenario exists already. The scenario architecture relies on web services, a platform for interoperable, collaborative, and process-centered applications based on the Service-Oriented Architecture (SOA) paradigm. Services-Oriented technologies have been applied to build this prototype simulating the real industrial application. The prototype comprises few components with basic functionalities, and uses already implemented S&D patterns. The aim of this internship is to extend the current set of S&D patterns of the SERENITY library to offer a higher level of security and dependability, focus on web services and workflow security. Besides the technical aspect of the internship 50% of the work will be dedicated to research in the area of security modelling and verification. The goal of the research part is to investigate the different methodology best suited for formal verification of the implemented solutions.

Five sequential phases are foreseen:

1. Getting familiar with web services technology such as Tomcat, Axis2 and Active BPEL more importantly with the Web service security stack partially implemented by Rampart module (WS-Security and WS-Trust implementation).
2. Getting familiar with the e-business scenario and its security, privacy and dependability requirements.
3. Getting familiar with SAP environment (e.g., SAP NetWeaver) and with the current version of the prototype.
4. State of the art on security modelling and formal verifications
5. Implement a set of S&D patterns to enhance web services and workflow security, these implementations will be then added to the SERENITY library.<sup>1</sup>

Besides to work in an international environment and in the context of an EU project involving 15 partners from industry and academy, the student will get in touch with an industrial research surround offering concrete possibilities of migrating research outcomes into real industrial products.

Estimated effort is 6 months. The ratio between software development and research related activities is expected to be around 50% development and 50% research.

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<sup>1</sup> Notice that the prototype will go through design and code reviews. It should then be developed using software development best practices - design (e.g. UML), test case (e.g. JUnit), technical and user documentation.

## **Candidate Profile**

- University Level: Last year of MSc and behind
- Good skills in modelling, analysis and programming (Java, J2EE, ABAP is a plus)
- Fluency in English (working languages)
- Good oral and written communication skills
- Willingness and ability to work in an international environment are required

The position is to be filled by September 2008 or as soon after as possible.

## Internship Context

### SAP Research

Founded in 1972 as Systems Applications and Products in Data Processing, SAP is the recognized leader in providing collaborative business solutions for all types of industries and for every major market. Serving more than 36,200 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 38,400 people in more than 50 countries. Our professionals are dedicated to providing the highest level of customer service and support.

**SAP Research** –*Systematic Thought Leadership for Innovative Business*– is the research department of SAP, significantly contributing to SAP's product portfolio by identifying breakthrough innovation and conducting co-innovation with external partners and customers. SAP Research acts as SAP's IT trend scout, identifying emerging IT trends, researching and developing in strategically important SAP business areas, and leveraging entrepreneurial inventive talent.

SAP Research centers/campus-based engineering centers -- The goal of these technology research centers is to establish SAP as the thought leader in the area of innovative, breakthrough information technology. SAP research centers and campus-based engineering centers study IT trends and deploy new technologies in real-life environments to determine their potential business value for SAP. As a result, SAP Research is able to introduce new technology and concepts for future solutions that will be strategically important to SAP -- and its customers. SAP Research is headquartered in Walldorf, Germany. SAP Research has identified five 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**, the Research Center in South-France, is focusing its research activities on Security & Trust and application domains in the area of eGovernment and Environmental Risk Management. Being located in Europe's foremost Science Park, SAP Research Sophia Antipolis is in close relationship with local research organizations. SAP Labs France is a member of the Telecom Valley and Club Hi Tech associations and maintains close collaboration with academic institutions, including the University of Nice – Sophia Antipolis, Eurécom Institute and INRIA. 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.

17 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

- working hours: 9am to 5pm is the minimum. Other than that we are flexible.
- lunch: SAP Labs France has a local cafeteria; interns contribute 2,12 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 17<sup>th</sup>; May 1<sup>st</sup>, 8<sup>th</sup>, 25<sup>th</sup>; July 14<sup>th</sup>; Aug 15<sup>th</sup>; Nov 1<sup>st</sup>, 11<sup>th</sup>; Dec 25<sup>th</sup> 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] Implementation of the E-business industrial evaluation prototype v.4 for Serenity

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