

**The project, involving academic and research institutions across Europe, has developed free open-source RFID middleware, and is currently working to create a range of tools to facilitate RFID deployment.**

By John Soldatos

Mar. 16, 2009—[AspireRFID](#) is an open-source RFID middleware project that was launched during the second half of 2008 by the [OW2 Consortium](#), an independent industry community dedicated to developing open-source code middleware, and a European research project known as [ASPIRE](#), co-funded by the European Commission in the scope of its [Seventh Framework Programme](#) (FP7).

ASPIRE is a collaborative effort involving 10 organizations from across Europe, including Aalborg University's Center for TeleInfrastruktur (Denmark), INRIA (France), Université Joseph Fourier (France), [Athens Information Technology](#) (Greece), Melexis Technologies (Switzerland), Open Source Innovation (United Kingdom), UEAPME (Belgium), ([SENSAP](#) an RFID consultancy and systems integrator located in Greece), Pole Traceability Valence (France) and the Instituto Telecomunicações (Portugal). ASPIRE aims to lower software and integration costs associated with RFID deployment. To that end, the organization has established the AspireRFID open-source project, which is developing a lightweight, programmable, standards-compliant, integrated and privacy-friendly RFID middleware platform, along with a range of tools intended to facilitate RFID deployment.



AspireRFID is motivated by the need to lower the total cost of ownership (TCO) for RFID deployments. This is particularly important for many small and midsize enterprises (SMEs), which typically lack sufficient equity capital to invest in radio frequency identification. Moreover, most SMEs do not have the resources and expertise necessary to research the optimal blending of RFID into their business processes. For many SMEs, RFID incurs a significant TCO, comprising hardware, software, integration, consulting and training costs. Hence, it becomes very difficult for these companies to leverage the technology to create innovative products and services. AspireRFID represents an effort to lower RFID costs based on royalty-free middleware, as well as tools enabling the setup of RFID-based solutions without the need for tedious low-level programming.

## **Standards, Specifications and Tools Implemented by AspireRFID**

Using code based on [Fosstrak](#) software—thanks to a Lesser General Public License (LGPL)—AspireRFID supports [EPCglobal](#)'s Electronic Product Code (EPC) architecture. In addition, AspireRFID has implemented modules for automatic generation of business events from low-level tag-readings (that is, the production of information comprising business semantics), as well as interfaces to enterprise resource planning (ERP), warehouse management systems (WMS) and other business applications.

AspireRFID also implements specifications from the [NFC Forum](#) and the [OSGi Alliance](#), along with several specifications of the Java Community Process (JCP). The project has already implemented a range of tools based on the popular [Eclipse](#) software-development platforms. These tools facilitate the design, development and deployment of RFID solutions, since they allow for managing a company's master data, logical readers and EPC configuration files (EC Specs and EC Reports, for example), as well as for the definition of processes and transactions.

## **An Early AspireRFID Success Story**

AspireRFID has a vision of becoming a low-cost alternative to commercial RFID suites, which would be used by enterprises (particularly SMEs) in realistic RFID deployments. One early success story involves the use of AspireRFID middleware for an RFID pilot project undertaken by Greek clothing manufacturer and retailer [Staff Jeans](#). The company maintains factories throughout the Balkan territory, with logistics warehouse in central Greece, and operates numerous retail stores in various European countries. Staff Jeans is utilizing radio frequency identification at its warehouse to track inventory at the pallet, carton and item levels, as well as to achieve automated handling of shipping and receiving procedures, and exploit real-time inventory data stemming from distant places.

Through this deployment, Staff Jeans realized the following benefits:

- Improved accuracy and reduced labor costs in such procedures as receiving and shipping. Moreover, both processes were significantly accelerated, given that RFID obviated the need for manual item-level processing.
- Real-time visibility into its own supply chain processes, with particular emphasis on inventory processes. The ability to inventory in real time empowers the company to better plan deliveries to retail stores. This is of the uttermost importance in the apparel industry, in which there is little room for returns.

According to Staff Jeans' management, the deployment of RFID has led to a positive return on investment (ROI). As a result of this positive ROI, the firm plans to conduct an extension of the pilot within 2009.

On the downside, this pilot deployment has also revealed that RFID is not a panacea for improving all business processes. As a characteristic example, Staff Jeans did not see any benefit in their pick-and-pack processes, in which RFID deployment seemed to offer no tangible improvement over its existing bar-code deployment. At the same time, as the company tags its own products (item-level tagging), its management argues that the firm's consumables budget (i.e., passive EPC tags) is quite high. This is because the company accounts for the total cost, rather than the relative cost (tag per item).

SENSAP established the Staff Jeans pilot, utilizing the AspireRFID middleware. Two additional pilots based on AspireRFID middleware are slated to take place in late 2009 and the beginning of 2010.

## **AspireRFID Roadmap**

The project has recently released software modules covering several middleware functions and tools, which have been used in the trial described above. AspireRFID has a longer-term roadmap, however, which extends beyond the three-year lifetime of the ASPIRE project (2008-2010). Hence, the project endeavors to attract interested contributors, as well as potential end users.

The AspireRFID roadmap also includes the following development activities:

- Improving the maturity of the middleware and tools.
- Integrating the workflow management of RFID-enabled processes, thereby enabling RFID consultants to visually design, test and deploy complex RFID processes.
- Creating tools for end-to-end management of the RFID infrastructure, which will assist companies in ensuring that their RFID systems operate as expected.
- Devising and implementing reusable solution templates that could be applied in many similar use cases, in areas such as logistics and process management.
- Implementing connector interfaces to popular enterprise systems—notably, ERP and WMS systems.

### **Additional Information**

Further information regarding the AspireRFID Open Source project is available online at the [AspireRFID Wiki](#). The project's source code can be accessed at the [AspireRFID Forge Web site](#).

*John Soldatos is an associate professor at Athens Information Technology. He and Didier Donsez, a professor at Université Joseph Fourier, are the initiators and technical leaders of the AspireRFID project.*