

White paper

How Professional Services Add Value to RFID Projects

Review just a few successful radio frequency identification (RFID) implementations and something about the technology becomes very clear: the value RFID provides comes from improved processes and from how well the technology and processes are integrated with enterprise systems. That is why, despite all the focus on tag costs and product features, fundamental decisions about processes and system design have the greatest impact on the value and return on investment the RFID system provides. It's also why using experts to assist with system design and implementation is one of the safest and most effective RFID investments companies can make.

Researchers have noted the strong link between involvement of specialized RFID service providers and project success. Consider some of their findings and recommendations:

- "Don't 'self integrate' unless you happen to be a data integration specialist. Your information architecture will make or break the long-term ROI." – Russ Klein of Aberdeen Group, writing in the Nov. 10, 2006 edition of RFID Update.
- "There's been a lot of talk about the physics of RFID, for good reason. The hardware must work before firms derive business value. Fail-proof RFID deployments – still an elusive thing – require skills for diagnosing the RF environment of a site, installing readers, and testing tag performance." – Forrester Group's "Sourcing an RFID Project."
- "Given the current landscape of RFID in manufacturing, we contend that ironing out physical layer issues to ensure proper operation of the RFID system is an approach superior to reliance on software corrections to achieve the right reads.... Recommendations: 1) Recognize that RFID data management strategies, which are central to actualizing RFID's benefits, are reliant on sound physical layer strategies and infrastructure. 2) Industrial RFID implementations should begin with a comprehensive site survey and consequent development of a sound physical layer strategy that includes Operations personnel." – ARC Advisory Group's "Walk Before You Run with RFID"
- "RFID hardware installation – and the corresponding physics expertise – is the most essential service, since every pilot requires readers and tags even if architecture and apps requirements are rudimentary. Solid hardware configuration results in better reliability and performance, so deployment experience – and proxy measures like the number of reference clients – is critical for creating the vendor shortlist." – Forrester Group's "Sourcing an RFID Project."

You don't have to be an expert to see the value of RFID-enabled process changes – many case studies and articles about RFID users illustrate it clearly. However, expertise is required for planning the system infrastructure; determining the degree of communication and integration required for

host systems; supporting current processes—or designing new ones; developing supportable criteria for systems performance success; applying the most effective readers, antennas, tags and standards; and making sure it all works as intended.

This white paper shows how qualified service providers can add value to RFID projects, highlights some of the planning issues and considerations that call for experienced advice, and provides guidance to the types of services available and how to differentiate service providers.

Experience Matters

Demos and reference systems that show dozens of items being identified accurately, often at high speeds that other data collection processes or technologies can't match, make RFID look easy. Attaining this level of performance is not easy, and requires extensive planning, testing and configuration adjustment. There are no set, standard configurations for RFID systems, even if standardized technology is used. For example, the EPCglobal Gen 2/ISO 18000-6C standard provides flexibility and options for implementing security levels, memory, reader power output and other variables. As a result, there are hundreds of different tag and reader settings that are standard-compliant, which does not count the dozens of tag sizes, media, inlay and antenna options, which all perform differently, bringing the population of ISO 18000-6C/Gen 2-compliant products into the thousands.

Many of these variables need to be isolated and tested to find the products and configurations that will provide the best performance in each specific usage environment. The time, resources and expense required to implement an RFID system are highly dependent on this process. Professional service providers can be a valuable resource for shortening system development and testing time by quickly narrowing the range of variables.

RFID is fundamentally different from other data collection and wireless technologies, so experience with bar code or wireless LAN systems is not enough to ensure success with RFID. Companies wouldn't think of implementing an industrial wireless LAN without conducting a site survey. RFID implementations also require a kind of site survey, but signal tests and other measurements must be evaluated at several other levels.

Besides determining the best locations for readers and antenna, pre-installation planning and testing for RFID must also include determining the best location to place the tag on the object, how tagged items within a carton or pallet should be packaged and tagged, how read performance changes based on the nature of the object being identified (for example, an RFID tag permanently applied to a tote in a distribution center may perform differently depending on the specific products placed in the tote), and of course the best tag type and configuration. The movement of the tagged item also comes into play. Whether a tag is exposed or covered along with the speed and angle of its movement must be measured and accounted for.

System architecture is also an important variable when considering RFID implementation costs, and anticipated ROI. Enterprises can often get the coverage they need by simply adding readers to the environment, but this brute force approach is often unnecessarily expensive and rarely provides the best performance. Instead, the required reliability and coverage could probably be better obtained by using a variety of antennas and testing multiple placement options. Sometimes implementation costs can be reduced and scalability built into the system by including mobile RFID readers into the fundamental architecture, instead of resorting to the more traditional method of installing multiple, fixed-position readers (See Intermec's white paper "How Mobile RFID Systems Improve Operations and ROI" for more on this subject). Thorough knowledge of RFID products, processes and test scenarios is needed to identify and apply the most appropriate, most effective options for project success.

Back-end data integration also creates challenges and considerations that in-house IT personnel likely haven't faced before. Programs developed to create visibility could instead blind organizations with the sheer amount of raw data RFID systems can provide. For example, simply reading serial numbers on RFID tagged cases and pallets as they pass through a dock door can produce 3,000 bits of data per second. To be valuable, RFID data must be filtered and processed so information systems can provide useful information.

Should data filtering occur at the reader? Be handled with middleware? Or be processed at the enterprise software level? The questions demonstrate the importance of system planning, and the value of working with a service provider who understands how RFID, general IT and business factors interrelate. Making an informed decision requires a solid understanding of how RFID should support business processes and program goals.

Professional services providers are available to help organizations deal with the myriad possible variables presented by RFID business goals, data processing flows, asset and tag characteristics and read zone environments. Services available from outside vendors include:

- Feasibility Analysis
- Business analysis;
- Middleware and other software development;
- Process analysis,
- Site analysis,
- Site installation;
- Maintenance and Support.

The following graphic illustrates when and how professional RFID services providers can be used throughout the project cycle. The earlier that professional services are engaged, the more efficient the implementation will be.

Engaging RFID professional services ensures that the most appropriate courses of action are taken, and in the most appropriate sequence. Note the rather "late" position of "Hardware Purchase" in the project cycle (in Figure 1, above). Organizations who manage RFID projects without outside expertise tend to start this step sooner. As a result, hardware evaluation is often done before the process analysis is complete. This makes it difficult to correctly match products to the process, commonly resulting in the need for more testing and additional hardware evaluation. Organizations are not always willing or able to repeat or extend the hardware analysis portion of the project, and may end up installing equipment that is not optimized for the job. Using professional services and completing project steps in the recommended sequence makes it easier to match products to processes. The result is streamlined testing, shorter overall project completion time and optimal RFID performance.

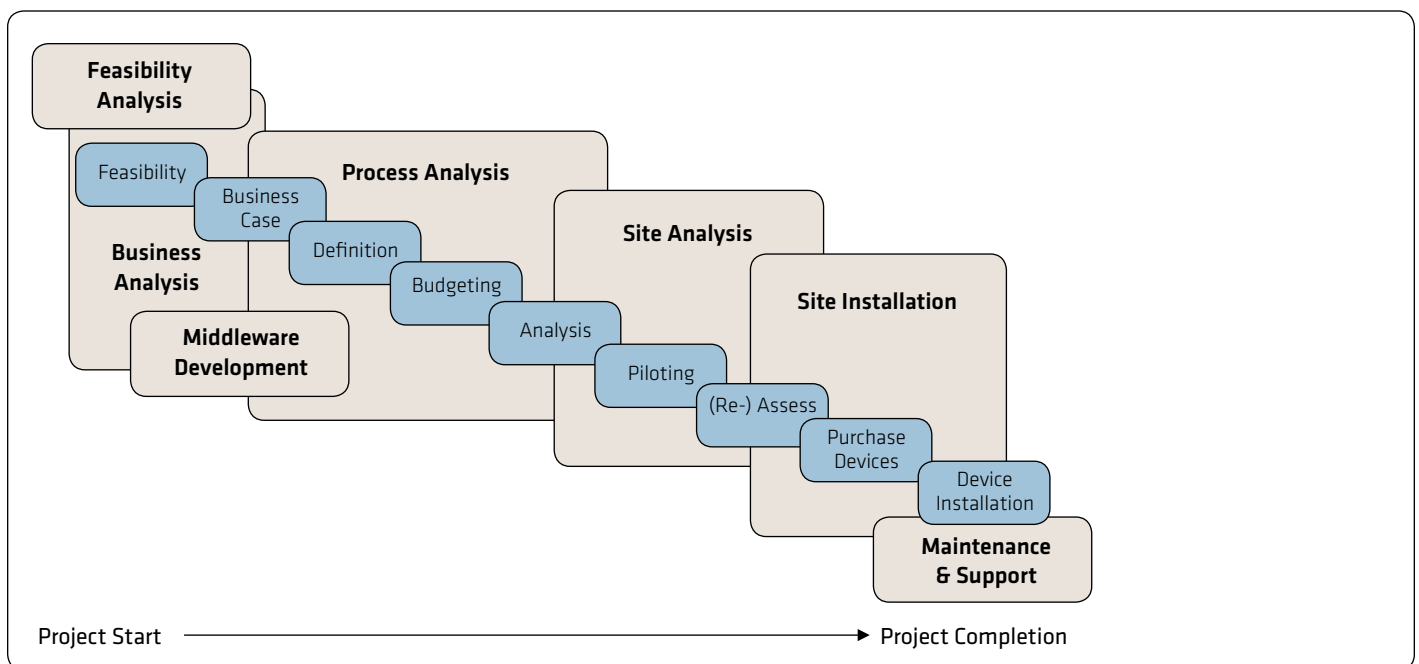


Figure 1: The Interrelation of RFID Services to an Implementation Project

How Professional Services Can Help

Owing to the complexities of RFID-supported process and infrastructure design, and the selection and configuration of appropriate hardware, even users with strong IT resources should avoid attempting to implement RFID systems without assistance. Engaging an RFID professional service provider allows the user's IT staff to concentrate on mission-critical activities while the implementation is in progress. Holding an outside vendor to contractual obligations helps prevent costly overruns and delays. Outside consultants can offer independent, objective validation of the RFID business case, and suggest cost-saving data-processing alternatives based on accumulated experience and practiced expertise.

RFID professional service vendors can perform the following activities at levels difficult to attain by user staff without undergoing extensive training.

- Technology feasibility analysis
- Business and ROI analyses
- Process analysis and definition
- Software development
- Establishment of attainable success criteria
- Specification of optimal RFID readers and tags, and their quantities and configurations
- Physical and spectral analyses of targeted read zones
- Precise calibration and tuning of devices
- Training and post-implementation support.
- Systems performance guarantees

The services themselves interrelate and slightly overlap. A feasibility analysis can provide a low-risk look at RFID before committing project-scale resources, and help develop realistic expectations for the business case. Business analysis

services help to construct a use case for applying RFID to current or proposed data-collection systems, for meeting specific external factors, such as compliance with customer requirements, or for realizing improved performance.

A process analysis will determine whether RFID technology can be effectively employed in support of the business case, and if so, will recommend types, quantities and configurations of readers and tags. If the business case cannot be effectively supported by RFID, then the business plans will have to be revised. During a process analysis, the vendor and the user will arrive at a consensus set of success criteria. These criteria will provide the measurements for determining whether or not the system's performance meets expectations.

A site analysis includes the testing of the recommended configurations in the actual read zone environment to confirm that the system will perform as anticipated. If the site analysis shows that the configurations cannot support the success criteria, then those criteria will have to be re-negotiated.

The site installation will put the specified devices in place and confirm, through testing, that the system will meet or exceed the success criteria. If the success criteria cannot be met, then adjustments will have to be made in the original recommendations, or even the business plan.

When the crucial steps of an RFID implementation project have been carefully integrated, the reliability of system performance can be guaranteed. A dynamic "feedback loop" approach, such as illustrated in Figure 2 below, is essential to any ability to provide such guarantees. RFID-

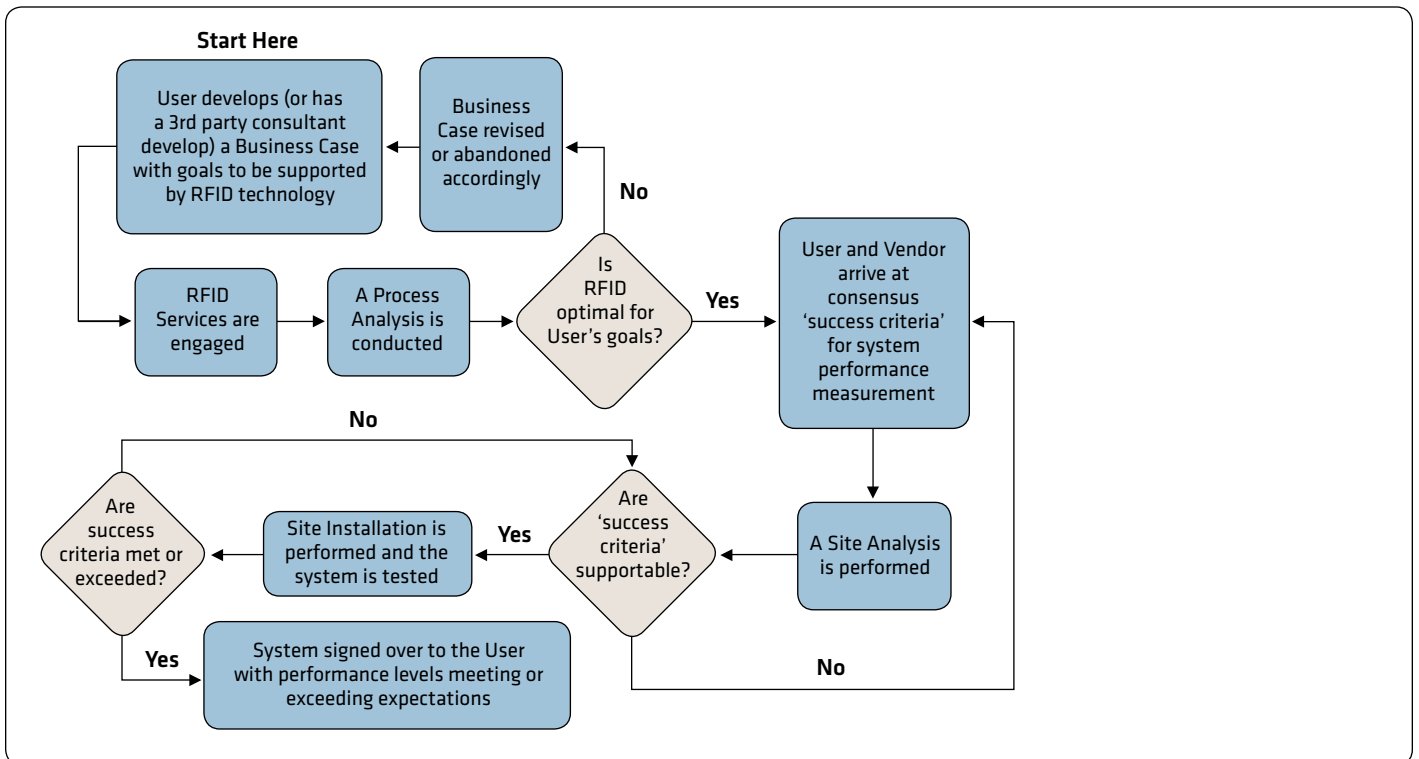


Figure 2: An Integrated Approach to RFID Project Implementation

services vendors with the requisite experience and expertise to take this approach will have no difficulty offering a performance guarantee with the systems they implement.

Experience can take many forms. When evaluating RFID-related service providers, users should look for specific experience, expertise, and references in the following areas:

- RFID business case development;
- Data-collection process and application knowledge;
- Experience in successful partnerships for RFID implementation;
- Experience applying RFID to a variety of vertical applications and industries;
- Site analysis and site engineering (i.e., “RFID physics”) experience and expertise, including radio frequency spectrum experience in complex environments;
- Post-implementation support infrastructure and experience;
- A successful history of providing technology services and recognition of that success;
- The ability to provide an integrated, inter-related RFID system “with no surprises”

Research into the RFID user community suggests some of these services are so specialized and valuable that organizations will continue to use outside providers, even after their staff has gained experience with RFID implementations. Companies are more likely to bring training, maintenance and support in-house as they become more experienced with RFID, but will continue to outsource integration and installation tasks, according to the RFID Professional Services market research report released by Venture Development Corp. in October, 2006.

The fact that even experienced RFID users show an increased willingness to invest in integration and installation services is a strong testament to the value these services provide. The value is easy to understand. Using professional services reduces the time required for system planning, testing and implementation. Saving time reduces implementation costs. Reducing the required investment is an ironclad way to improve the return on that investment. Well designed systems have a lower total cost of ownership (also supporting a faster ROI) than those that were not clearly thought out, and may require redundant equipment to provide needed reliability.

The comment at the beginning of this white paper from research firm Aberdeen Group reinforces this point: *“Don’t ‘self integrate’ unless you happen to be a data integration specialist. Your information architecture will make or break the long-term ROI.”*

Conclusion

Even with standards, RFID is nothing close to being a plug-and-play technology. No one knows that better than users who have already experienced RFID implementations. And as the research shows, users with some RFID experience are more likely to use professional services on future projects, demonstrating the value they place on the resources that expert service organizations can provide.

The long-term value, return on investment and total cost of ownership of an RFID system are all heavily dependent on the initial process design and implementation decisions. A solid business case, appropriate system architecture, and equipment that is optimized to satisfy both will provide the foundation of a successful project. Engaging a professional services provider early in the process increases the chances for success. The use of professionals also helps avoid roadblocks that can prolong implementation and undermine ROI.

About Intermec

Intermec Technologies has been part of the development and advancement of RFID and wireless technology and implementation for data collection since the advent of those technologies. Intermec consultants and technicians have been implementing RFID data collection systems since 1999 and wireless networks since 1986. Known for its work in some of the largest and most complex wireless environments, and with field offices in all major markets around the world, Intermec Technologies Professional Services staff provide the best in data technology deployment.

About Intermec RFIDeDeploySM Services

Intermec’s RFIDeDeploySM Services help customers by evaluating RFID technology and integrating it seamlessly into their business processes. RFIDeDeploy is a suite of consultative and site engineering services that combine together to accomplish a fully integrated RFID system implementation by virtue of an inter-service feedback process.

These services – Feasibility Analysis, Process Analysis, Site Analysis, and Site Installation – support the end user with a level of confidence in his RFID-related business decisions derived through proof of concept. The process is completed when the Site Installation tests out the performance level of the system against success criteria specified in the Process Analysis and confirmed during the Site Analysis. When RFIDeDeploySM services are engaged, performance of the RFID system is guaranteed to meet the criteria for success established in the Process Analysis for 18 months after hand off to the end user.

Intermec Inc. (NYSE:IN) develops, manufactures and integrates technologies that identify, track and manage supply chain assets. Core technologies include RFID, mobile computing and data collection systems, bar code printers and label media. The company’s products and services are used by customers in many industries worldwide to improve the productivity, quality and responsiveness of business operations. For more information about Intermec, visit www.intermec.com or call 800-347-2636. Contact Intermec Investor Relations Director Kevin McCarty at kevin.mccarty@intermec.com, 425-265-2472.

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