

Options for Growing Your RFID Network

When it comes to implementing an RFID solution, there are several decisions you should make now to ensure your RFID network will scale as your requirements grow.

Nov. 27, 2006—Many initial RFID deployments are limited in scope. Little more than proof-of-concepts, they typically do not get into the highly valuable, yet complex, solutions that are possible using RFID technology. As RFID technologies mature, however, an organization may find that as it becomes more comfortable with and knowledgeable about the technology, it may want to grow its RFID network to provide additional value. Such a company may consider several options: expanding its current application; expanding the size and breadth of its current network to support new applications; or adding new, distinct applications to its existing network. These options are not mutually exclusive, and there is frequently value in implementing two or three options simultaneously. It is helpful to consider these options during the evaluation, development and deployment of the initial applications to help future-proof the solution.

Expanding Current Application

The most common and compelling way to grow an RFID solution is to extend the scope of the current application. After completing a successful RFID pilot program, take the network created for the pilot and increase its functionality. This may be something as trivial as defining additional Application Level Event (ALE) reports, or something more complex such as creating new integration points for enterprise systems, supporting new tag types or increasing the complexity of business logic.

In order to make this transition as seamless as possible, you will need to put some thought into the base RFID infrastructure being used for your project. Many companies' initial RFID deployments start as homegrown solutions where all the hardware integration, data aggregation and filtering and business logic or report generation are developed from the ground up. While this may look like a feasible approach for a pilot, it can quickly turn into a significant resource commitment as the RFID solution expands—particularly when multiple classes and brands of devices are being used.

Instead of developing your solution for such things as the hardware integration, data aggregation and filtering and business logic, consider using RFID middleware. A product such as Sybase's RFID Anywhere provides prebuilt connectors into the leading hardware devices; a complete data collection, filtering and reporting engine; a flexible environment for creating custom business logic; and an enterprise-scale management console. Building your applications on top of this type of product will greatly simplify development, while also providing a seamless transition when improving performance or adding new features and functionality to your applications.

Once the base platform is in place, enhancing your applications becomes much more straightforward. Below are some common ways in which RFID applications can be expanded:

Adding antennas to readers—RFID readers allow for multiple antennas to gather the data. This commonly ranges from two to eight antennas, four being the most common. This approach is frequently used to increase the read zone, but some middleware platforms allow for each antenna to be treated as a unique data-collection point.

Modifying tag types being monitored—Current second-generation readers can monitor EPC, ISO and other tag formats. Be sure to select a platform that allows for adding newly ratified tag specifications. Having this option in both your hardware and software environment provides the ability to choose the appropriate tag for each application.

Adopting a service-oriented architecture (SOA) to expose raw RFID data—A common interface over an SOA layer provides flexibility in how applications interface with the RFID network. Having one point of integration into your RFID network allows data to be delivered in multiple report formats. Be careful of filtering data on the RFID reader itself, though, as there may be a benefit to allowing seemingly useless data available for ongoing reporting and analysis.

Adding new reports—Once a solution is deployed, new insight can often be gathered by the data already being generated. Adding additional reports on the data, perhaps at an increased frequency or enhanced format, is often of benefit. ALE is one common form of reporting, but be aware that ALE is designed for EPC data formats. If you require reports on other tag formats (including ISO), or possibly from other device types (such as bar-code scanners), make sure you select a platform that provides this level of multi-protocol reporting.

All of these options will ultimately depend on the RFID technology you utilize for your implementation. Consider purchasing RFID middleware that provides flexibility in supported hardware devices, development options, communication protocols and reporting options. All of these lead to more options for expanding and integrating RFID into your enterprise.

Expanding Network Size and Breadth

RFID network growth can simply occur by purchasing, configuring and maintaining dedicated hardware for each new application. New hardware could include RFID readers or intelligent sensors to enable additional process automation. This strategy is most common for new applications requiring different levels of intelligence than existing applications. For example, an initial app might monitor dock doors with one set of readers, while the new application could use sensors and printers to automate a production line.

In addition to deployments requiring new types of hardware, the growth strategy of expanding the network with new hardware is acceptable for applications covering distinct zones or physical locations, where bringing in dedicated hardware is a necessity. RFID interference concerns arise when monitoring zones overlap, but the expansion of an existing network also introduces opportunities to increase its utilization.

Additional concerns with a strategy of adding new hardware for each new application include investment and maintenance costs, management requirements and the missed opportunity of leveraging existing hardware or infrastructure investments. Thus, this highlights the benefits of an architecture that offers new applications the ability to leverage an existing RFID network.

When employing this strategy, it is important to build on a framework that provides advanced management capabilities to simplify tasks for managing such a broad network, including firmware upgrades, configuration and monitoring.

Adding New, Distinct Applications to Existing Network

The third option for growing your RFID network is to utilize your current physical network to deliver data to new applications. This scenario is not applicable to all deployments, as many RFID applications do require a dedicated network. However, when this is an option, it is certainly worth pursuing.

Since ROI justifications are typically based on the initial application, adding new apps to an existing network can help realize a greater return on initial hardware and infrastructure investments. It can also avoid concerns

of interference or complexity that could occur if overlapping hardware were introduced. Using the same hardware results in improved maintainability while avoiding hardware redundancy.

This type of network expansion is not often discussed, due to a common misconception that there needs to be a one-to-one relationship between the physical RFID network and the applications consuming the data from the network. This may be true for RFID solutions built with a tightly coupled relationship between the application and the hardware, but if a flexible middleware platform is deployed, no such limitation exists. This type of platform can enable multiple applications to share the same set of hardware if it can provide such things as a service-oriented architecture exposing raw RFID data from readers to any number of applications; flexible development options and pre-built messaging connectors to simplify development and integration; powerful multiprotocol support (reading, processing, reporting) allowing customers to choose the most appropriate tags and hardware; and an architecture that supports a wide variety of application types, from periodic reports to real-time processing and alerting.

Many hospitals, for example, are implementing RFID technology to track assets as they move throughout a facility. For lower-valued goods, this often takes the form of an extensive passive RFID network created to monitor the movement of equipment as it travels past RFID readers located at choke points defining the distinct zones. Once this network is in place, it becomes feasible to expand the implementation to monitor staff and patients, as well. Even though these applications have very unique requirements, both can use the same network to obtain the asset location data.

Another example can be found in a warehouse, where RFID technology is often implemented for inventory and supply-chain management applications. The first application could use RFID readers at dock doors and forklifts to track incoming and outgoing shipments. Once this network is in place, it can be leveraged to monitor equipment and tools, and even to help track employees' arrival and departure times.

Many organizations are presently in the early phases of RFID deployment. As we continue to witness successful RFID projects in a variety of industries and use cases—including automated toll payments, access-control systems, supply-chain optimization, fraud and counterfeit prevention and asset-location tracking—we can expect to see RFID deployments grow in innovative new ways.

Whether the goal is to have multiple applications on a single network, or to grow an application incrementally, understanding the various options available for extending an RFID network allows companies to plan their growth strategies at the start of their projects. In order to take full advantage of these options, developers need to select a flexible and extensible RFID infrastructure that meets current requirements and also provides future growth without significant additional expenses.

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