

Beyond Middleware:

Save Time and Money by Scaling Your RFID Deployment

For years, industry has promised us that RFID technology would make our businesses more efficient by automatically tracking items throughout the supply chain. Until recently, the prohibitive cost of tags, shifting standards, and unreliable hardware has made RFID technology a pipe dream. Now that tags can be purchased for less than fifteen cents and the hardware is more reliable, we have been presented with new challenges keeping us from harnessing the true power of RFID.

- RFID hardware vendors do not use a standardized communications protocol.
- The costs of high performance readers are prohibitively high for wide deployment.
- High data rates drain network and system resources.
- Linking real-time RFID data with back-end systems is still a tedious exercise.

System designers need a mix of hardware and software technologies that will help them meet these challenges directly, while building their solutions at the lowest cost in a timely manner.

Even though the industry has united behind the Gen2 standard as an accepted RFID tag protocol; currently, there is no standard protocol for communicating with the best-of-breed RFID switches and readers.

For many system architects, using a middleware solution makes sense. An RFID middleware solution will abstract the various communications protocols amongst the various RFID vendors and provide a device-independent set of software interfaces that can be used to communicate with your hardware. Middleware helps integrators select RFID equipment for their deployment without being locked into a specific hardware vendor. A good middleware solution will provide plug-n-play capability amongst the various RFID vendors.

Current Middleware Solves One Piece of the Puzzle

There are many middleware systems that abstract RFID reader communication, but; in order to make an RFID deployment successful, a robust link must be made between real-time RFID data and current business processes.

Most middleware systems are software interfaces that can be used to control and configure RFID readers. These systems provide adequate hardware control but just deliver raw data back to the controlling systems.

Today's enterprises are used to barcode technology and the low volume, predictive nature it presents. RFID deployments create a significant volume of tag events and increase the scope of automatic identification beyond anything that barcode technologies can produce.

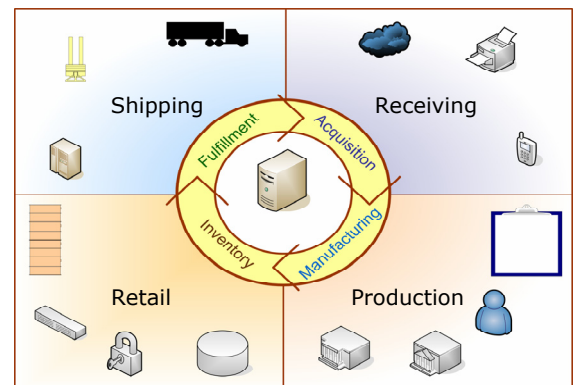
These demands require an architectural platform in which your current and new applications can be built upon.

An Enterprise Needs More than Reader Control

A successful RFID deployment consists of numerous input sources at different locations in the supply chain. As your needs and reporting requirements adapt, data may need to be dispatched to various business processes. Many companies use real-time data for various business functions:

- Cost-In-Progress during manufacturing.
- Reduction of insurance liability when products leave.
- Origin labeling.
- Automatic materials reordering.
- The list continues...

Based upon business requirements, an enterprise may require read points at dock doors as goods come in, antenna pads for manual verification at check-in points, or a read point when items go through quality control. Some industries need to meet custody tracking regulations by recording an item as it moves through out its manufacturing process.

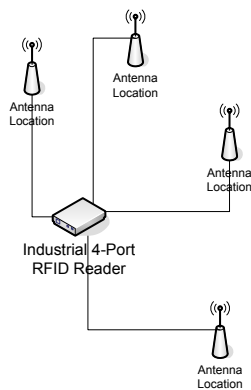


Arphidium Helps Build an RFID Ecosystem

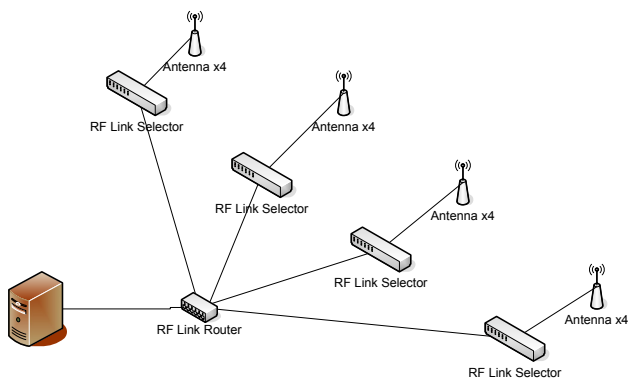
In order to support these requirements, readers and antennas have to be positioned to acquire the tags reliably as items move through out the supply chain. Most high performance readers can read up to four different antenna locations, based upon the size of the supply floor and recording requirements, the cost of having to deploy readers to provide excellent coverage may prove to be prohibitively high.

RF Internetworking technologies can scale the capabilities of today's industrial readers from their built-in maximums.

RF Link Internetworking devices can provide up to 64 unique antenna locations from a single reader. The concept of RF Internetworking is similar to the IP networking that we use everyday. RF Link Routers and Selector devices channel and route RFID tag signals similar to the routers and switches that we use to route Internet packets.



Standard RFID Reader with 4 Antenna Ports



Antenna Network Managed by Arphidium

Deployments using RF Link Internetworking can be installed at nearly a third of the cost of full scale rollouts consisting of RFID readers with 4 port antennas.

Information Overload

In today's world we all crave more information. RFID may give us what we ask for:

- The US Department of Defense states that 75 percent of RFID events are useless.
- An HP Test site generated over 1 Terabyte of RFID data in a single day.
- RFID events have brought some Wal-Mart installations to a halt.

As items pass through the supply-chain, events are captured at every read point cycle. Many systems are designed to capture data any time a tag is read in the antenna field. Solution builders want to record the most critical events in the supply chain and immediately act on exceptional cases. For an enterprise the exceptional cases arise during predefined moments, e.g. an item is out-of-stock.

RFID software systems need to be able to recognize the conditions of exceptional cases and alert users or perform specialized processing when an exceptional event is triggered.

Platforms Provide Power and Flexibility

Platform systems give implementers the creative control of defining exceptional cases and enabling and disabling them in real-time. Opposed to middleware technologies that use rules engines, a platform solution may be able to run complete subprograms and additional processing before, during, and after exceptional cases occur.

A fundamental difference between middleware and platforms is the flexibility of the location in which your rules are executing. Platform systems give you the flexibility of determining if your processing rules should run in the same location as the control systems or at a remote location on another machine. Additionally, this aids developers in the planning of filtering systems that are required to minimize the amount of RFID traffic on your data networks.

In tandem with RF Internetworking, a determination can be made to filter RFID data at the edge of the RF network where the data is first interrogated, or at the data collection level before it gets processed.

With the numerous options for databases and messaging systems, RFID solutions must be able to communicate with a heterogeneous mix of backend software and systems. Few IT environments run a single operating system or database platform for all business processes.

Most middleware systems provide interfaces that return RFID data from multiple sources. What actions should be taken with that data once it's acquired? Where should it go? In our information driven culture, RFID tag and event data should be delivered to sources that can use that information for making the enterprise more efficient. In addition to receiving data, an RFID solution should be able to deliver the appropriate data to a data source based upon rules defined by the enterprise.

More than Middleware

System Integrators are always under a schedule and budget crunch. This industry has always had a focus on solving customer problems and delivering the features that they demand. While being able to deliver increased efficiency, RFID solutions can present a unique set of challenges that have not been seen in supply chain deployments built using previous technologies.

These challenges require more than simple reader configuration and control. Solution providers need a system that is cost effective in itself while helping reduce implementation and deployment costs.

A solution must be:

- Device-Independent
- Software-Agnostic
- Secure
- Standards-Based
- Hardware Scalable
- Software Scalable

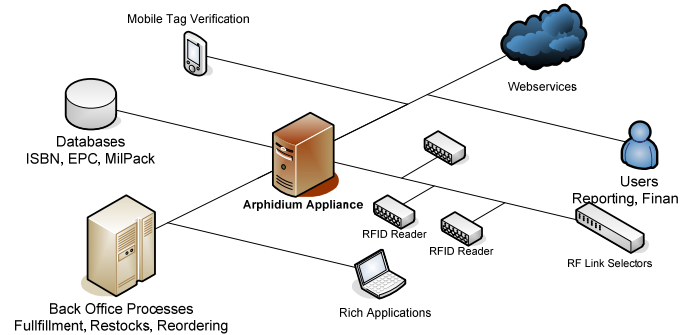
Arphidium is an Internetwork RFID Application Platform. The Arphidium Platform was designed from the ground-up to be a platform that sits in the software stack.

The solution is more than a middleware solution in that it provides the toolkits and accessories for

building complete applications. It can communicate with the best-of-breed in database and messaging systems, back-office processors, and RFID hardware; helping reduce development costs by a significant amount.

Out-of-the-box support for RF Link Internetworking hardware helps system builders create and maintain large arrays of antenna networks lowering the costs of your hardware deployment.

Today's businesses are built around interoperability and standards. The Arphidium Platform was created to support today's high level programming languages and the flexibility of the Internet for device-independent communication.



Arphidium Provides Rich Application Possibilities

Conclusion

Though RFID deployments may present unique challenges for System Integrators, these challenges can be solved with solid planning and choosing the right hardware and software for the solution. Application platform solutions that provide more than simple reader control will help integrators further the success of their RFID deployments.

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An Arphidium Corporation White Paper
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