

WHAT IS RFID MIDDLEWARE AND WHERE IS IT NEEDED?

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This is the first installment of a three-part series examining middleware and other RFID integration options and the issues surrounding them. We use the term "middleware" broadly and loosely to refer to software or devices that connect RFID readers and the data they collect to enterprise information systems.

Middleware helps makes sense of RFID tag reads, but it is hard to get a reading on what RFID middleware is. Vendors and analysts differ as to what exactly "RFID middleware" is (e.g. Is it edgware? Software? A hardware layer?), what it does (Filter tag data? Execute applications? Monitor and manage devices?), and its future place. Questions aside, it's clear today that anything than can help organizations implement RFID equipment or get meaningful data out of a tag is a valuable resource.

Defined loosely, RFID middleware applies filtering, formatting or logic to tag data captured by a reader so the data can be processed by a software application. Even that broad definition has problems. For example, sometimes third-party software that performs the functions described above can be loaded directly into RFID readers, therefore there is nothing else between the reader and the application software. Other times, RFID "appliances" are used to filter and process data, which challenges the common connotation of middleware as a software product. Warehouse management systems (WMS) and other packaged software applications may have interfaces to accept RFID input; conversely, RFID-oriented middleware products increasingly perform application-like functions, such as directed putaway or shipment verification.

"Historically, some manufacturers have made dumb tags and dumb readers. So RFID middleware emerged to turn data into information," says Louis Bianchin, senior analyst and program manager at Venture Development Corp. (VDC), a long-time RFID industry research firm. "Now, some readers are really like PCs, and have full-fledged Linux boxes running applications."

Finding a place in the IT architecture

A major differentiator among RFID middleware products is where they reside in the IT architecture. Traditionally the choice has been between server software, or middleware bundled onto the reader to move intelligence to the edge of the network.

At one end of the architecture spectrum are "intelligent" readers with bundled middleware. Readers from several leading manufacturers including Alien Technology, Intermec Technologies and Symbol Technologies can be ordered preloaded with IBM's WebSphere RFID Device Infrastructure, which provides data processing, logic and connectivity features.

There's no argument that having data come out of a reader ready to integrate with software applications is a good thing. But there's plenty of debate as to whether that's the best approach -- debate similar to the wireless switch vs. intelligent access point and thin client/thick client arguments from the networking world.

"There is no one right architecture. We have more than 70 customers, and have taken a lot of approaches," says Marc Osofsky, vice president of marketing and product management for OATSystems. "One of our customers is a retailer, and they only need to store and forward RFID data at most stores. Some stores need more business logic. It's completely different at their distribution center. We've learned you have to have a flexible architecture."

"You really need intelligence at the edge of the network. Whether it should be in the reader is really an IT economics question," says Dave Macias of Omnitrol Networks. "There's a more economical point to put intelligence."

Appliances emerge

Omnitrol puts its middleware into an "Edge Server Appliance" that can simultaneously process input from multiple RFID readers and interface to enterprise applications through wired and wireless networks. Other vendors in the emerging appliance category include Blue Vector Systems and Reva Systems.

"Middleware has traditionally been centralized. Supply chains are not," says John Beans of Blue Vector. "Middleware needs to be modular, easy to deploy, and able to be put in many places, because supply chain activity takes place all over. "But there needs to be one version of the truth, so middleware has to be able to correlate input from all readers with business rules that exist at a higher level. The RFID system should let the ERP system know about an event, but it shouldn't manage the event. We shouldn't do ERP."

But should ERP do RFID? ERP and other higher-level software applications increasingly offer interfaces to accept RFID data. As enterprise software support for RFID becomes more common, it will potentially reduce the need for middleware. That will create an RFID chapter to another longstanding debate: ERP vs. best-of-breed. These issues will be covered more in the next installment of this series.

Development features

Not every company runs a formal, centralized ERP system, and there aren't many packaged RFID applications. This void is filled by another type of middleware, which performs traditional data processing and interface functions, as well as offering applications, objects, and development tools. These providers include GlobeRanger and OATSystems. Two other platform vendors, ConnecTerra and IDVelocity, were acquired in the past year by larger IT firms (BEA Systems and NCR, respectively).

"Software' is a better term than 'RFID middleware' because if it's developed correctly, it's applicable across a lot of technologies and devices, not just passive RFID," says GlobeRanger's Pete Poorman. GlobeRanger's iMotion Edgeware platform can process input from RFID, bar code, sensors and actuators. It is built on the Microsoft .NET framework and includes a software development kit to help users create their own applications.

OAT's offering's include a library of object-like applications that OAT calls "best practice RFID applications" for developers. Omnitrol enhances traditional middleware features by using service oriented architecture to provide access for developer building blocks for common RFID applications.

Beans of Blue Vector says the new generation of products has "blurred the line" about what RFID middleware is. New software standards from EPCglobal plus development efforts by the 800-pound gorillas in the IT industry may blur the lines as to where middleware is needed. The next installment will examine these developments, and the final article presents views on RFID middleware's future.

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