RFID Anywhere Overview

A whitepaper from iAnywhere Solutions, Inc., a subsidiary of Sybase, Inc.

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Introduction

RFID Anywhere is a platform for building RFID solutions that allows integrators to work with a single software vendor to easily produce robust RFID solutions by abstracting low-level hardware, standards and protocols while providing simulation tools and management capabilities in a service-oriented architecture. This allows integrators to focus on creating business logic and value. RFID Anywhere's capabilities set it apart by uniquely addressing the challenges of RFID today, while enabling the development of applications that will function with future technology.

This whitepaper provides an overview of the unique features of RFID Anywhere, and outlines the benefits of using this platform to develop rich RFID applications that integrate valuable information into enterprise systems.

RFID Anywhere Benefits

RFID Anywhere insulates developers and systems integrators from the low-level interfaces of the wide variety of hardware, standards and protocols in the RFID space. By abstracting these interfaces, developers can focus on creating business logic and adding value to the vast amounts of data produced by an RFID network.

A variety of standard interfaces allow simple integration of RFID data into a wide variety of existing enterprise systems.

The architecture of RFID Anywhere has been designed to provide support for current hardware, standards and protocols. When new hardware is introduced, or when new standards emerge, the architecture of RFID Anywhere enables them to be supported.

RFID Anywhere is embeddable technology that can implement the functionality of a smart reader. With the ability to process data at the edge of an RFID network, only valuable information processed from raw RFID data needs to be sent to enterprise systems.

Developers and systems integrators will benefit from included tools and easy to use interfaces, allowing for easy development and maintenance of powerful RFID solutions.

Unique Features of RFID Anywhere

RFID Anywhere offers the rich features and architecture flexibility that developers and systems integrators need to quickly build successful RFID solutions. System integrators understand the need for a middleware solution to be flexible, and to not lock them into specific hardware, standards or protocols, especially as the RFID industry continues to develop.

RFID Anywhere significantly raises the bar for RFID middleware platforms. iAnywhere Solutions has focused on delivering powerful and useful capabilities in

a number of areas. Key objectives of RFID Anywhere include:

- Abstract Low-level Hardware Interfaces
- Insulate Developers from Standards and Protocols
- Speed Development of Business Logic
- Provide Multiple Interfaces for Integration with Enterprise Systems
- Enable Distributed Deployment and Edge Processing
- Provide a Robust Simulator to Assist Development
- Offer an Advanced Architecture for Future Growth

The following section details RFID Anywhere's capabilities in each of these areas. Major features are identified with their significance and associated benefits explained. Drawbacks of alternative approaches will also be highlighted where appropriate.

Abstract Low-level Hardware Interfaces

A wide variety of RFID hardware is available today, with new offerings coming to market every day. Often, an organization will have a heterogenous mix of hardware as part of a complete RFID solution, or they may introduce new hardware throughout the life of the solution. For this reason, it is important that the development of RFID applications is not dependent on a specific type of hardware.

RFID Anywhere includes a growing library of hardware connectors that abstract the low-level implementation of each specific piece of hardware. The architecture allow systems integrators to develop applications that support a broad range of hardware without needing to code to each specific hardware interface. With RFID Anywhere, organizations can easily upgrade to new hardware without requiring changes to the application.

In addition, RFID Anywhere allows application developers to give meaningful names to groups of hardware components. By doing this, applications do not need to worry about specific RFID readers and antennas, for example. With RFID Anywhere, applications need only be concerned about a specific group or family of devices, such as *RFID readers at Receiving Door A* for example. Here, *RFID readers at Receiving Door A* refers to the group of readers that are reading RFID tags as they enter a specific receiving door. This meaningful name and group assignment makes it easy to picture a distributed RFID network, but also, new readers can be added to the location without changing the application. For applications that need to know detailed location data, RFID Anywhere also allows applications to identify which specific reader antenna to read data from.

RFID Anywhere also provides the built-in processing of vast amounts of data returned from the hardware. For example, a specific RFID Anywhere connector for an RFID reader can be configured to automatically smooth data as it is read by the reader, thus sending back useful information to the rest of the system without any development. This capability allows RFID Anywhere to provide a solution with

the functionality of a smart reader while allowing the organization to purchase less expensive dumb reader hardware.

The configuration and management of RFID hardware is done using RFID Anywhere's Web console. Administrators can perform common hardware maintenance tasks such as starting and stopping a particular piece of hardware. In addition, administrators can easily set hardware-specific options from this console. This provides a 'set and forget' model for hardware configuration.

It is important to note that RFID Anywhere does not take a 'lowest common denominator' approach to hardware management. Organizations often invest in powerful hardware with rich features or flexible configuration options. Each hardware connector is developed according to the hardware documentation to provide access to the features of that specific piece of equipment. Alternative solutions provide access to only the most common tasks, providing administrators and integrators with no interface or assistance for hardware tuning or advanced configuration.

RFID Anywhere also supports connection into additional collection and control devices. Barcode devices, as well as process control equipment including programmable logic controllers (PLCs) can be integrated into enterprise systems using RFID Anywhere.

Insulate Developers from Standards and Protocols

The RFID industry includes numerous standards and protocols. These standards and protocols define the format and transmission of data used by RFID tags and hardware. RFID Anywhere includes controllers that insulate a developer from the details of these standards and protocols. Developers and integrators do not need to concern themselves with low-level details of each standard or protocol that needs to be supported by an application. Instead, they can create their business logic knowing that data flowing from their RFID network will be in the format they are expecting.

RFID Anywhere supports ALE, but is not dependent on it. As standards evolve and emerge, the flexible architecture of RFID Anywhere allows for the future support of other standards and protocols.

RFID Anywhere currently provides support for EPC Reader Protocol 1.0, ALE 1.0, ISO-15693, ISO-18000-3, and ISO-11784. In addition to RFID readers, RFID Anywhere currently includes controllers for barcode readers and proximity sensors.

In addition to supporting existing protocols, RFID Anywhere can support custom data formats, allowing enterprises to develop their own data formats based on specific business needs and processes.

Speed Development of Business Logic

With RFID Anywhere's connectors managing and returning data from RFID hardware, developers and integrators can focus on turning that unprocessed data into useful information. Developers use included Microsoft Visual Studio .NET

extensions to create business modules. These business modules can process data and can define how that data is integrated into existing enterprise applications.

The extensions automatically generate C# shell code containing all necessary environmental references, allowing the developer to immediately focus on core business logic. The framework is tightly integrated with Visual Studio.NET to provide an easy to use and compact environment. This integration allows a developer to use a set of predefined templates and wizards to speed up the development process and to incorporate newly created components with some standard functionality. Repetitive tasks such as registering for notifications, or accessing specific hardware commands and features are automated through wizards.

Provide Multiple Interfaces for Integration with Enterprise Systems

Developing and rolling out an RFID application should not require fundamental changes to existing enterprise systems. Instead, the goal of many RFID applications is simply to provide more information to existing systems. With RFID, enterprises are looking to fuel existing systems with correct and real-time data collected automatically at specific points of activity.

Today, enterprise systems exist with a wide variety of back-end processes and existing interfaces for entering or retrieving information. Managing and developing these systems is often the responsibility of a team of developers or systems integrators. It is important than any new technology or data to be incorporated into an existing system should leverage the skillsets of these individuals and minimize the amount of changes to the enterprise system.

RFID Anywhere includes a variety of options for integrating RFID information into enterprise systems. Built-in connectors for messaging systems such as SMTP, MSMQ, JMS, as well as other connectors including SOAP, UDP, TCP and file creation provide a number of options to integrate RFID data into existing enterprise systems.

RFID Anywhere also supports CIM and SNMP, allowing management information to be fed to enterprise management consoles such as Tivoli and Open View.

Enable Distributed Deployment and Edge Processing

RFID Anywhere can be installed in one of two different modes. When installed in Component Manager mode, controllers and connectors are installed. This mode is necessary for distributed environments where data needs to be collected and filtered. By performing these tasks close to the point of activity, or near the edge of the RFID network, an organization can control the amount of data that needs to be transferred between the various components of an RFID solution, only sending the most valuable information to enterprise systems. With the ability to run on small, low-cost computers at the edge of a network, and with the ability to handle the data processing, such as filtering and smoothing, enterprises can have the functionality of an intelligent device without having to incur the cost of a device

with embedded intelligence.

When installed in Site Manager mode, connectors, controllers and business modules get installed on the computer running RFID Anywhere. The business modules running on the Site Manager can consolidate information from Component Manager sites. To simplify administration, the Web console on a Site Manager can remotely control all Component Manager installations, including the connectors running on those systems.

Provide a Robust Simulator to Assist Development

It is impractical, if not impossible, to use real RFID tags and hardware to build and test an enterprise-class RFID application. RFID Anywhere includes an RFID Network Simulator that allows application developers and integrators to perform load testing and special case testing of their RFID applications by simulating a complete RFID network. The RFID Network Simulator includes a graphical tool for creating test tags and defining when the tags should appear and disappear during a simulation. Once a simulation is defined, a connector is used to receive the information from the simulation, and then passed along to the other components of the application being tested.

By using the RFID Network Simulator, an application developer does not need to acquire any hardware when developing an application, and an integrator does not need to attempt to manually reproduce special cases or load testing scenarios with real hardware. Often, hardware has a limited life span based on the number of reads it performs, so the RFID Network Simulator can also be used to prolong the life of RFID hardware, especially during application development, testing and maintenance.

Offer an Advanced Architecture for Future Growth

RFID Anywhere was built from the ground up to include the architecture and extensibility to react to a growing market. Future hardware offerings can be supported by creating new connectors. New standards and protocols that emerge in the RFID space, or new families of hardware devices will be able to be supported by new controllers integrated into RFID Anywhere.

RFID Anywhere is not tied to one specific protocol or standard. Instead, the underlying architecture of RFID Anywhere focuses on collecting data from various RFID hardware. Any current or future standard can be supported by this underlying architecture.

By using RFID Anywhere as the middleware component when creating RFID applications, organizations allow applications to share existing hardware. For example, if an organization invests in the RFID hardware to monitor arriving palettes for an inventory application, the same hardware can be used to support another application in the future without requiring new hardware to be installed.

Summary

RFID Anywhere includes the rich features and broad hardware, standard and protocol support that developers and integrators require to produce enterprise-class RFID applications. The architecture and features of RFID Anywhere allow it to uniquely address the challenges of RFID today.

Developers are insulated from low-level interfaces and are allowed to focus on creating the business logic required by the application. An advanced, future-proof architecture ensures that RFID solutions developed today can take advantage of the hardware, standard and protocol changes that will continue to occur in this dynamic space.

Legal Notice

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