

Business Effect RFID Software Suite (BERSS)

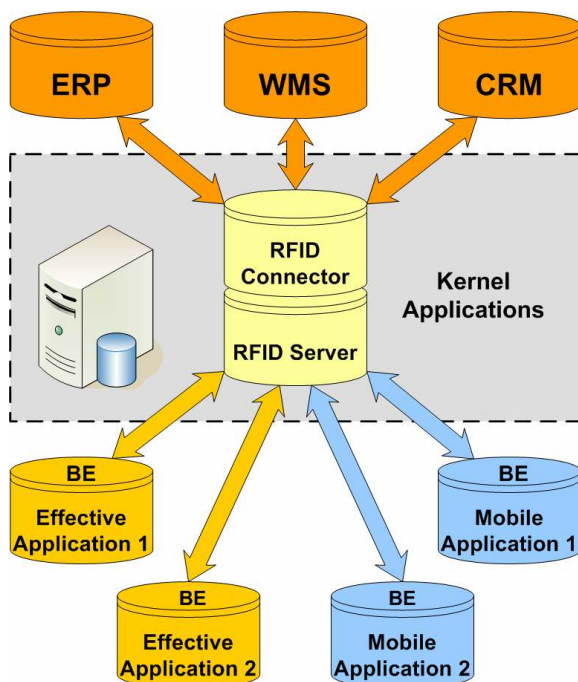
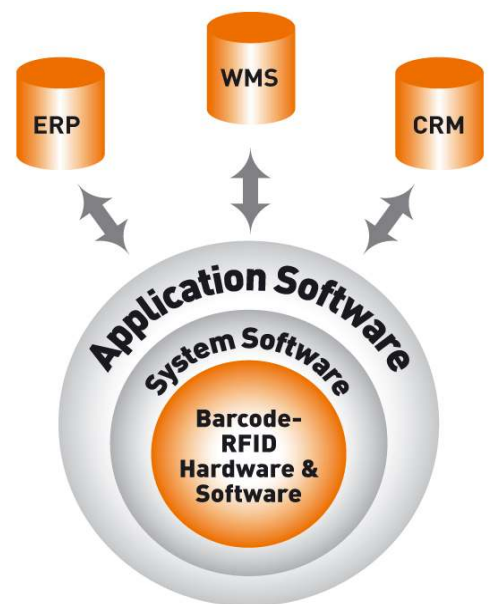
A Comprehensive Range of RFID Powered Tools & Applications

A fully integrated, modular suite of SW tools & applications that cover a wide range of common business needs and bridge the gap between RFID data collection equipment and existing enterprise systems (ERP, WMS, etc), ensuring their robust and effective interoperability

Introduction

As RFID technology matures and spreads, the need of off-the-shelf, shrink-wrapped, hardware independent, event-driven, real-time software applications, which operate either standalone or connected and exchanging data with other enterprise systems has become more than ever crucial, in order to reduce the complexity, risk, time and cost of deploying RFID enabled systems to effectively reduce operating costs.

Business Effect SA, as an RFID system integrator, designs and produces several standardized or custom hardware constructions (e.g. RFID portals, etc) to cover horizontal and vertical customer needs in the best possible way. Additionally, in order to facilitate the deployment of new RFID systems, the company has developed and distributes a comprehensive range of standardized, fully parametric, modular software applications that can interoperate with all its RFID hardware products. This is achieved through a layer of **proprietary system software (middleware)** that provides a higher level of abstraction and shields the application programmer from the specific technical characteristics, the complexity and peculiarities of each different underlying hardware product or special construction and allows the development of truly device-independent, portable software applications based on the **Microsoft® SQL Server database and .NET development platform.**



System Architecture

The modularity of BERSS is achieved through the (compulsory) **RFID Server** kernel application, which contains the (common to all other BERSS applications) central database consisting of all RFID specific tables (e.g. RFID tag mappings), as well as all tables required by those applications to operate (asset / stock item, customer and other master files, document and other transaction files, etc). These may be (synchronized) subsets of other application tables, in the case that data has to be interchanged with third party systems. In this way, modifications to existing enterprise systems are not required since these remain **RFID independent**, rendering the early adoption of RFID technology feasible and cost-effective.

The **RFID Connector** module acts as a two-way staging agent between BERSS and third party systems. According to the type of the specific (packaged or bespoke) system, the appropriate connector software is installed or developed, in order to ensure the desired interoperability features and functionalities.

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Fundamental Design Principles

BERSS was designed according to specific fundamental abstractions, principles and assumptions that ensure its generic character and make it suitable for a wide range of horizontal and vertical business environments and processes.

The generic **RFID Element** supported by the system is defined as anything (object or attribute) that an organization may want to recognize, track, manage and control by exploiting modern automatic identification technologies such as Barcodes or RFID.

The main categories and some common examples of possible RFID Elements are shown in the figure on the right. In typical supply chain applications, a (header - detail) RFID recorded transaction involves one or more objects and some or no attributes. In other type of applications (e.g. access control) attribute type elements may be the main elements of interest.

BERSS supports the fully parametric definition from the part of the user of static and dynamic multilevel elements that may be RFID and/or Barcode tagged at (possibly multiple) predefined levels of the hierarchy, such as:

- Boxes containing RFID tagged items (e.g. apparel, footwear, books, etc)
- Pallets comprised of a fixed amount of boxes that contain a fixed amount of similar items
- Pallets build to order (eg. through a picking process) that contain a variable number of various types of boxes.

Business Effect RFID Elements		
OBJECTS	Assets	<ul style="list-style-type: none"> ✓ Machinery ✓ Furniture ✓ Equipment ✓ Returnable Assets
	Stock Items	<ul style="list-style-type: none"> ✓ Raw Materials ✓ Finished Goods ✓ Packaging Materials ✓ Consumables
ATTRIBUTES	Locations	<ul style="list-style-type: none"> ✓ Storage Locations ✓ Rooms - Warehouses ✓ Floors - Levels ✓ Wings - Buildings
	Resources	<ul style="list-style-type: none"> ✓ Fork Lift Trucks ✓ Trucks - Buses ✓ Tools - Storage Means ✓ Human Resources
	Third Parties	<ul style="list-style-type: none"> ✓ Customers ✓ Suppliers ✓ Collaborators ✓ Visitors

Business Effect RFID SW Suite Application Levels & Types

1. Tools	Middleware for Business Effect HW Devices & Products
2. Kernel	BERSS Foundation & Communication Applications
3. Utilities	Building Block Applications for Usual RFID Based Tasks
4. Effective	Complete Solution Applications with Embedded Utilities
5. Mobile	Complete Applications for Mobile RFID / Barcode Terminals

Codification Standards

To ensure the uniqueness of (**non EPC**, closed loop BERSS application) RFID tags not already programmed by the manufacturer or printed & programmed by e.g. the client's ERP system (i.e. those either printed & programmed by BERSS or pre-programmed by Business Effect on behalf of the client), very strict, proprietary codification standards have been defined and apply. In addition, these standards enhance significantly the flexibility and the speed of execution of these applications since:

- They dictate the inclusion (if possible) in the RFID tag code of the existing unique item code (e.g. the EAN13), so that the already recognizable by the client's enterprise system item code is simply a substring of its RFID code (no need for mapping tables)
- They allow the utilization of regular expressions (RFID code masks) for the fast validation of RFID tags, a filtering feature that is often offered by popular RFID readers at the firmware level.



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