Online Inventory Management at REWE
Taking Inventory and Listing Items – Right at the Shelf

Bosch Software Innovations

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The very beginning

Early 2008, REWE decided to deploy a solution for online inventory for all of the 2,400 Penny discounters in order to take inventory during the day while the stores are open. What is unique about REWE's online inventory system is that current item movements – including all sales and incoming goods, and inventory corrections – are all precisely registered within 5 minutes.

Delivering such precise information makes this solution truly market differentiating for REWE. The solution was rolled out throughout the Penny chain in Q4 2009. The solution for this online inventory is based on REWE's technical enterprise resource planning infrastructure (constructed with Bosch Software Innovations) and inventory maintenance with exact item and time entries. All merchandise management processes in the stores are realized on mobile devices, including this online inventory.
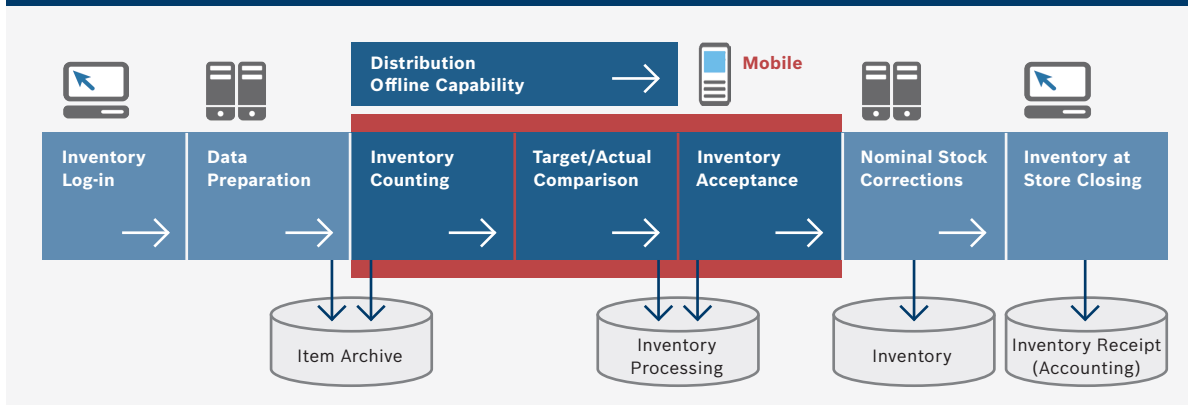
Extended Inventory Application

It became clear to REWE in the course of creating the concept for the mobile inventory application with Bosch that optimization with respect to items the store had not listed when inventory was taken would also be necessary. So Bosch was set about expanding the originally sought solution to include a seamless integration of item listings – which means, adding an item to the store's product lines. That in turn expands the downstream processes along the value chain including inventory management, automatic merchandise planning, and order activation. Managing the inventory and listing dialogues ensures that store

Figure 1: Streamlining of the ERP Core Processes

Inventory Log-in → Data Preparation → Distribution Offline Capability → Inventory Counting → Target/Actual Comparison → Inventory Acceptance → Mobile → Nominal Stock Corrections → Inventory at Store Closing

Item Archive · Inventory Processing · Inventory · Inventory Receipt (Accounting)

All Steps of Online Inventory and Downstream Processes along the whole process chain are based on current Data, at all Times, right at the Shelf.

employees can correctly take inventory of non-listed or incorrectly shelved items (which average more than 2 % of inventory) right at the shelf and count that inventory directly with mobile devices (see figure 1).

Mobile Applications

Rule-based Approach Tipped the Balance
A highly qualified COBOL developer was supposed to implement the analysis and preparation of store item data for the online inventory. After three months, the complexity of the processing logic had increased to such an extent that it was no longer comprehensible or controllable. A new approach was called for, one that would work in coordination with the experts in inventory, auditing, and merchandise master data. For REWE, that tipped the balance in their decision to implement the online inventory solution with the rule-based approach and Bosch' Visual Rules Business Rules tools. The experts from REWE and Bosch Software Innovations were then able to completely implement the business rules for merchandise data analysis and preparation in just 14 days.

The exchange of information and experience beyond the separate domains contributed significantly to the fact that, what started simply as a solution for correct inventory counts, became an integrated mobile solution that provides correct data to all central and store-driven business processes downstream from inventory.

REWE had previously worked together with Bosch Software Innovations to successfully deploy mobile applications for shelf placement management and incoming merchandise. In its proof of concept, Bosch also successfully showed that its mobile inventory application fully complied with core requirements regarding the highest user friendliness and performance.

Optimized Performance
Beyond data preparation oriented to the online inventory, the data is also processed on a rule basis for the stores'

anticipated inventories. The focus is on top performance in order to minimize waiting times when taking inventory (in order to comply with Service Level Agreements). 400,000 pieces of data are entered directly at the shelf every day in the approximately 2,400 Penny stores. Bosch met this challenge with approaches that save system resources, such as lazy loading, and with clear process steps in the dialogue flow.

The Inventory System

The Mobile Inventory Application (see figure 2) is integrated in REWE's enterprise resource planning (ERP) system. To ensure maximum performance in all parts of the entire system, the guiding principle is shifting as much processing logic as possible to the stores' servers. This approach guarantees response times of less than 1 second for the mobile applications.

The REWE ERP System (see figure 2) is responsible for all centrally managed processes; for inventory, this means primarily accounting, item management and data preparation. All data that is not store-specific (such as item data, etc.) is maintained in the central database.

The processing logic for the inventory and for nominal stock correction is executed in the Store Application Manager (see figure 2). Store and Item data is distributed to the mobile devices using WLAN and via the communication framework. This can also be done offline, which is required for highest performance where very large quantities of data are involved in real time. The complete data inventory of the stores and headquarters (a data volume of 6 Tbyte, including stock data, data of outgoing and incoming merchandise, and merchandise item data) are all available at any time to the users of the mobile application.

> "Introducing the mobile inventory applications to the Penny stores resulted in a significant fast-track of all inventory-related business processes."
> Thomas Friedl, Director RIS TIH Handels-System, REWE Group

The reliably implemented layering in the communication framework ensures that the mobile application can be expanded, independent of device or manufacturer.

Benefits of the Solution: Customer Metrics

▶ Penny realized a potential gain of more than 9,000 sales days with inventory being taken while the store is open and including up-to-the-minute sales figures.

▶ The inventory of non-listed items at Penny stores is clearly reduced. Also, expenditures for after-the-fact adjustments to inventory and downstream processes are reduced, down to almost zero, because inventory has been taken in full and validated through the online count.

▶ The stores' item inventory remains adjusted and there is no longer any waiting time at the cash register due to unknown items. Items that have not been listed when taking inventory can now be corrected and priced directly from within the online inventory application, and the cash point in the store will be given the correct price, in real time.

▶ Inventory costs have been greatly reduced with simultaneously improving the quality of the count. Inventories are now always completely taken by items of merchandise, as required by law.

▶ REWE´s maintenance costs are low in comparison with the retailer benchmark. E.g., today the responsible REWE employees can themselves expand the many hundreds of rules for data preparation and mobile device dialogue flow. All rules are comprehensible and documented.

▶ The stores and their employees have strongly accepted the mobile application and the 20,000 mobile devices in use. User satisfaction is a factor that REWE values greatly in its relationships with partner stores.

> "When introducing the mobile inventory application to additional channels of distribution in the REWE group, we need to implement further requirements of the business units. Being able to easily adapt the underlying business rule models, this expansion is accomplished very effectively. The major point is that the rules can be discussed on a business level thanks to their graphical representation."
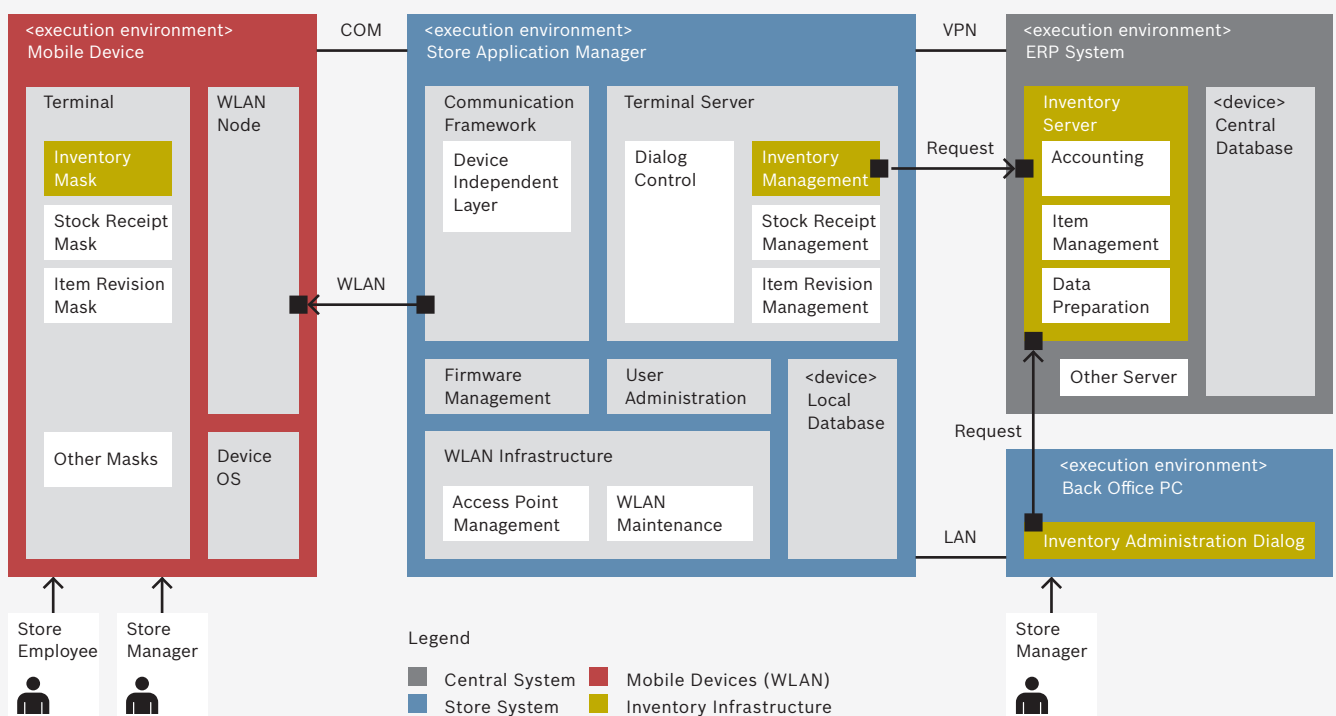>
> Thomas Friedl

Future Plans

This mobile inventory application was successfully rolled out in 2009 in more than 2,400 Penny discounters. Since the system was so well received in those stores, the solution is now being introduced in the more than 3,000 REWE supermarkets and the almost 100 Toom convenience stores (with an inventory of 45,000 items each). Simultaneous to the quantitative expansion to include more than half of all REWE stores, the solution is also being expanded by the business processes to include the full range of merchandise in addition to grocery items.

The system's open design was critical in enabling adaptations of the online inventory solution to include additional sales areas. The REWE ERP system is designed to enable different implementations of inventory management processes for the respective channels of distribution, all on a single platform.

Figure 2: Inventory Systems Overview - Technical Components

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