

Buscom wires rides with IBM solidDB information management solution

Overview

■ Challenge

Find sophisticated and distributed relational data management software to embed in on-board fare collection systems for collecting fares, schedules, and vehicle usage data and synchronizing the data with central management applications

■ Solution

Embedding IBM solidDB™ in Buscom Palette System

■ Key Benefits

Buscom engineers were able to take transactional, distributed data management for granted, achieving significantly faster time to market with a superior product



The opportunity

With wireless connectivity becoming commonplace, and with the cost and footprint of computers steadily dropping, managers of public transport fleets are realizing that it is now possible to treat vehicles as part of the corporate network. Vehicles can be fitted with on-board computers that periodically establish connectivity to report back to the central site, and to download new information. In-vehicle applications can handle fare collection (and interface to the corporate billing system), as well as collecting schedule and vehicle usage information. Key to the successful design of such applications is a distributed data management

“Our public transportation customers’ future information systems will rely on real-time network architecture, and IBM solidDB provides an innovative, on-target solution for our demanding environment.”

– Kauko Suhonen, President and CEO, Buscom Oy

“Using solidDB gives our customers a reliable data management solution for tracking fare transactions in a mobile environment. It also makes it easier for customers to add innovative functionalities for passengers, including wireless access to route schedules, and payment card ‘reloading’ via mobile phones and internet terminals.”

–Kauko Suhonen

platform that can provide the mobile applications with both the data they need to continue functioning while offline from the network, and also the ability to move data reliably to and from the vehicle when it is connected.

Buscom Oy

Buscom Oy is one of the leading European providers of public transportation management systems. Founded in 1986, Buscom launched the world's first contactless smartcard-based fare collection system in 1991. By 2002, over 6,000 public transportation vehicles in more than 70 locations had been fitted with Buscom equipment. Buscom's competitive edge is based on profound knowledge of both public transport fare collection systems and contactless card technology.

Buscom offers a family of Traffic Information Management System products under the Buscom Palette name. The Buscom Palette product family offers a set of software, hardware and services products to satisfy different customer needs, including fare collection and management, operations management, and ergonomically designed terminals and in-vehicle devices.

Buscom's electronic fare collection system uses proximity card technology. A credit-card-sized contactless smart card is able to quickly exchange data with in-vehicle and static terminals without physical contact. In the future this will enable customers to load value into their card by using a mobile phone, Web browser or email, and then pay fares by passing the card near a fare collection terminal in the vehicle. The operator of the vehicle is provided with an information terminal that is used to monitor on-board activity, record schedule information and pass information such as traffic alerts to the driver.

Buscom chooses IBM solidDB

Buscom developers had to deal with the fact that the vehicle devices are not always connected to the network, and may become disconnected without warning, perhaps in the midst of a transaction. The in-vehicle devices must be able to run autonomously for some time, perhaps long periods, using only the data stored locally. But then they must be ready to resynchronize with a server whenever a connection is available. They must maintain absolute data consistency, despite dropped connections and garbled communications. And they have to do this with minimal human intervention.

Buscom chose to embed IBM solidDB in the Buscom Palette System. A key driver for the decision was solidDB's advanced replication capability that provides the data synchronization needed by the Buscom Palette System to collect and reconcile fare transactions. solidDB delivers sophisticated relational data management both to the on-board systems and the central management applications.

IBM solidDB guarantees transactional correctness for the data in the entire distributed network of vehicles, and provides a central information system that enables traffic operation centers to more accurately monitor passenger flow information so that they can plan efficient route schedules.

By embedding solidDB in their application, Buscom developers were able to take transactional, distributed data management for granted. Instead of spending development time on this critically important infrastructure feature, they could focus their attention on adding customer value in the application. The result: significantly faster time to market with a superior product.

A major concern for the designer of any distributed application is the cost of communications, so optimizing data transfer becomes a critical design factor. IBM solidDB guarantees efficient usage of bandwidth, because only updated information is passed between vehicles and the central system. To ensure additional cost efficiency for their customers, Buscom was one of the first to deploy new GPRS mobile communication technology in their applications.

Because the Buscom application is embedded in mobile devices, it must offer a high degree of robustness with minimal intervention. The huge footprint of classical relational database management systems, and their requirement for constant care by trained database administrators, made these products completely unsuited for Buscom's needs. IBM was able to provide Buscom with an extraordinarily robust data manager that required only 2 megabytes of RAM, and required no human attention.

IBM solidDB and Buscom

IBM solidDB runs on a wide variety of operating systems, including UNIX®, Linux®, Microsoft® Windows® and the real-time operating systems found in mobile devices. It tightly couples its embeddable relational data manager with a bi-directional data replication capability.

IBM solidDB is a fully transactional, relational data manager that uses the familiar SQL language, and standard ODBC and JDBC interfaces. Engineers who have previously used any kind of relational database face effectively have learning curve in using solidDB.

solidDB provides two-way data replication that supports a variety of application topologies: one master-to-many clients, many masters-to-one client, peer-to-peer and cascading hierarchical replication. It can be used to distribute data, to aggregate data, to provide fault-tolerant redundancy, and to load balance across multiple copies of the same data. Based on a flexible publish and subscribe model, solidDB makes it trivial to add another vehicle to the system. Once the

Key Components

Software

- IBM solidDB
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application starts, it automatically connects to the central solidDB database and downloads the information it needs to begin operations. From then on, it takes advantage of periodical network connectivity to resynchronize itself with the master database, uploading information it has collected, and downloading new information, including application upgrades. IBM solidDB is the first distributed data management platform designed for embedded and unattended operation.

IBM solidDB value

- *Highly reliable distributed data management platform for telematics applications and environments with tough industrial requirements*
- *Guaranteed data integrity and reliability*
- *Optimized data transfer minimizes communications costs*
- *Scalable architecture with carrier-grade service availability*
- *Wide range of platforms from RTOS environments to mobile terminals*
- *Simplifies development and integration through standards support*
- *Full binary compatibility between platforms reduces development time*
- *Reduced time to market*
- *Improved product functionality*

About Buscom

Buscom Oy has nearly 80 employees, with headquarters in Oulu, Finland and a subsidiary in Hungary. Buscom's mother company is Polar Electro Oy—the world's leading manufacturer of heart rate monitors, having a turnover over 100 million EUR. Situated in Technopolis, a technology park in Oulu, Finland, Buscom Oy is surrounded by an innovative

and effective environment in which it can act in its demanding branch of information technology. Buscom Oy has a vast technology network which ensures important contacts with other IT companies and to the university. This gives Buscom a brilliant potential for future development.

About IBM solidDB

On January 30, 2008, IBM completed the acquisition of Solid™ Information Technology, a privately-held company based in Cupertino, California that is the leading provider of fast, always-on and affordable database solutions known as solidDB.

There are more than 3 million deployments of Solid's database technology worldwide in telecommunications networks, enterprise applications, and embedded software and systems. Market leaders such as Alcatel, Cisco, EMC2, HP, Nokia and Siemens rely on IBM solidDB for their mission-critical applications.

IBM and Solid Information Technology together strengthen IBM's Information Management Data Server offerings by combining the speed of Solid's in-memory data server with the enterprise-wide scalability of IBM's existing on-disk data servers.

For more information

Please contact your IBM sales representative or IBM Business Partner.

Visit us at: www.ibm.com/software/data/soliddb

For more information about Buscom, visit: www.buscom.fi/en/index.htm

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