



## Overview

**Country or region:** Singapore

**Industry:** Transportation and Logistics

### Customer Profile

Toll Global Logistics is one of Asia's leading logistics service providers. Its strength and credibility rests on the ability to provide total integrated logistics solutions, backed by innovative technologies and world-class processes.

### Business Situation

Toll Global Logistics wanted to take warehousing technology to the next level of visibility and productivity.

### Solution

Toll Global Logistics invested in S3Edge's Spotlight technology, the first packaged Real-Time Visibility & Control System (RTVS) built ground up on the Microsoft BizTalk RFID platform, to develop REAP. The REAP solution tracks and controls material movement in warehouses resulting in better, faster, error free and near real-time warehouse operations for end-users.

### Benefits

- Improves throughput of business processes by increasing labor efficiency
- Enhances accuracy, reduces errors in warehouse operations
- Provides visibility and control of asset movements

## Asia's Leading Logistics Service Provider Automates Warehouse Operations

“RFID, via Toll's REAP platform, is a key technology that we believe will take our supply chain into the future today. This innovation is going to be a game-changer for Toll. It will differentiate the way we do our business. In addition, it will enable us to stay ahead of competition and become more integrated to our customers.”

Wayne Hunt, President & CEO, Toll Global Logistics

Offering global logistics solutions that encompass air, land, rail and sea services, Toll Global Logistics excels in providing quality solutions that bring greater operating efficiency and savings to supply chains. To meet their needs of taking warehouse operations to the next level and providing a premium service to their customers, the company invested in S3Edge's Spotlight technology which is built ground up on the Microsoft BizTalk RFID platform to develop REAP (RFID Enterprise Application Platform). The REAP solution has automated operations leading to better visibility into movement of assets within the warehouse. It also helps reduce or eliminate errors due to paper-based or manual processes and improve labor productivity for Toll. Overall, the solution takes warehousing technology to the next level of visibility and productivity.



“The new system provides an additional failsafe layer for us and our customers by ensuring that pallets do not get shipped to the wrong destination as a result of manual errors. This results in reduction of expenditure associated with missed shipments, damages and reworks by up to 80 percent. In addition, we should expect to see a reduction around 6 minutes of handling time per pallet cycle, which in turn will translate into significant savings for a warehouse that handles hundreds of thousands of pallets per annum.”

James Chan, General Manager of Innovation, Technology and Operations Development, Toll Global Logistics

## Situation

Toll Global Logistics, a business unit of Toll Holdings Ltd., Australia's largest logistics and transport provider, having more than 120 years of experience in providing integrated logistics services, is now a world class, cross-border total logistics solutions provider in the Asia Pacific region. Its operations span Australia, New Zealand, Singapore, China, Japan, Taiwan, Korea, Hong Kong, Cambodia, Malaysia, Thailand, Vietnam, Indonesia, Philippines, India, Sri Lanka and the United Arab Emirates.

Toll Global Logistics provides customers with sophisticated end-to-end solutions for the entire supply chain, from the procurement of raw materials to the distribution of finished goods, global freight management and reverse logistics. As a leading logistics participant within the Asian region, Toll delivers for many of the world's best-known brands. In partnership with niche logistics players, the company also provides specialized logistics services including defense logistics, collateral management, metals logistics, dangerous goods management, wine logistics and aviation fuel logistics.

Toll wanted to take their customer satisfaction to the next level. The company wanted a completely automated system to do away with manual updates and thus avoid the risk of inaccuracies in its operations.

## Solution

Toll engaged Microsoft Partner S3Edge Inc. to develop a real-time software solution for warehouse management. S3Edge was selected because of its deep expertise and proven track record of creating enterprise software solutions on the Microsoft platform and executing on the potential of scalable, packaged Real-Time Visibility and Control Systems for various organizations.

Some of the important requirements listed by Toll were:

- Scalability: The system must be a scalable enterprise-wide platform with failsafe reliability, and the ability to handle vast quantities of transactions.
- Flexibility: The system must be easily and cost effectively configured for different process flows.

S3Edge's Spotlight technology, the first packaged, RFID-based Real-Time Visibility & Control System (RTVS), built ground up on the Microsoft BizTalk RFID platform, was the answer to Toll's requirements.

Microsoft BizTalk RFID is an innovative device management and event processing platform at the edge of the enterprise. It has provided S3Edge and Toll a scalable, extensible platform for developing rich RFID-based solutions. It also provided a way to install hardware in a plug-and-play fashion, resulting in a complete and 'future-proof' RFID solution that utilized best of breed hardware technology.

The resulting solution that was delivered - REAP (RFID Enterprise Application Platform) - is specifically designed for the cost efficient implementation of RFID in warehousing logistics. It is a holistic suite of predesigned software, fixed and mobile RFID devices, tags, network, and integration components designed to cut costs, and improve labor productivity within a warehouse by tracking asset and material movements in an automated manner. This translates to a dramatically reduced total cost of ownership and time to market for Toll's customers.

“S3Edge's Spotlight software provides us a packaged, device independent solution that can be customized easily using standard tools while leveraging mobile applications seamlessly, for real-time visibility and



Automated Goods Receive / Ship  
(Pallet based execution system)

control,” says Kelvin Tan, Technology Development Manager, Toll Global Logistics.

The Spotlight server provides Toll with a solution platform that abstracts primitives such as Assets, Zones, Alerts, and Devices declaratively to track and control asset movements in real-time across the enterprise, while the mobile

applications handle task assignment and management across the network of Motorola Hand-held (MC 9090) and vehicle mount (RD 5000) RFID devices. The base capabilities of the Spotlight platform were customized using standard tools to implement the domain specific workflows that REAP required, such as seamless linkage to controlling WMS, full and partial operations, as well as controlling applications on mobile devices (forklifts and hand-helds) for enhancing tasks such as Putaway, Pick, and Zone transfer.

Chris Rodrigues, Warehouse Specialist, Toll Global Logistics, states, “The system is very simple to use. I just have to follow the instructions on screen and perform the task; the system takes care of the rest. I used to spend a lot of time with paperwork, but now I am able to process orders faster since everything is automatic.”

Key features of the solution are:

- Pallet based execution: RFID tags are embedded in pallets and are reused throughout the life of the pallet. Inventory items are not tagged. Rather, they are associated to the pallet’s RFID tag through barcode scans. This results in

significant cost efficiency over disposable item-level tagging.

- Pallet state control: REAP’s key differentiating factors from a rudimentary RFID system are the use of pallet state control and complex rules governing legal and illegal operations. For example, when goods are put away into locations, they are in the “putaway” state and unless a pick order is received from WMS, an alarm is triggered if it is inadvertently pushed out of a shipment gate. This eliminates operational errors and other suspicious activity.
- Mobility: The REAP system emphasizes the use of applications on mobile devices in order to perform on-ground tasks such as receive, ship, pick, pack and putaway of pallets. It incorporates a seamless integration interface with the WMS, which means system-driven pick order instructions are distributed directly from the WMS to the operator’s mobile device through Spotlight without any need for human interaction. Mobile devices include handheld RFID computers, which can process warehouse floor based activities, and RFID forklifts, which can automatically process putaway of RFID pallets into RFID-tagged racking and floor locations.
- Task assignment capabilities: When the REAP system receives an instruction from WMS, it has the ability to independently and intelligently distribute these instructions as tasks to all available mobile devices. The device delivers step-by-step instructions on its screen and guides the operator until the task is complete. This removes the need to process orders and perform associated paperwork, allowing warehouse workers more time to perform warehouse activities with greater accuracy and efficiency.
- External system interactions: REAP is primarily designed to be coupled to a WMS (or any other enterprise inventory management system), but can be used as

Task Assignment to a Warehouse Operator



a stand-alone system as well. In the coupled mode, the WMS takes control of all warehouse operations such as stock levels and locations, inbound management and order management. It takes instructions from the WMS and handles the physical workflow execution, updating the WMS when the task is complete.

According to Wayne Hunt, President & CEO, Toll Global Logistics, “RFID, via Toll’s REAP platform, is a key technology that we believe will take our supply chain into the future today. This innovation is going to be a game-changer for Toll. It will differentiate the way we do our business. In addition, it will enable us to stay ahead of competition and become more integrated to our customers.”

The strength of the overall solution lies in the Microsoft-S3Edge-Toll partnership; resulting in world class software platform, world-class software solution implementation and world-class logistics domain knowledge.

“REAP is an example of a world-class service for Toll and their customers who will benefit from the advantages that RFID technology provides in terms of substantial reduction in the number of operational errors, and the costs required to recover from such mistakes,” says Anush Kumar, CTO, S3Edge Inc. “We are proud to have partnered with Toll to deliver REAP on Spotlight technology, and firmly believe that this approach provides Toll, and their customers a scalable base to continue transforming their internal processes and operations in the long run as well.”

## Benefits

Toll’s REAP is an industry first RFID based turnkey solution to track and control asset and material movement in warehouses resulting in better, faster, and near real-time warehouse operations for end-users.

“With the new solution, we can form strategic partnerships with our customers to achieve intelligent and adaptive supply chains,” says Andrew Lim, Director of Innovation, Technology and Operations Development, Toll Global Logistics.

## Improves Throughput

The solution enables existing warehouse processes to be performed with higher efficiency. An inbound gate can process thousands of items per minute, and a forklift driver can concentrate on simply putting pallets into rack locations and letting the system automatically update putaways. “There is no need to scan inventory or location barcodes, or to record activities onto pieces of paper for manual data entry later,” says Kelvin Tan. “RFID operations result in the ability to perform more operations in a shorter time, and with a leaner workforce.”

## Enhances Accuracy, Reduces Errors

The elimination of manual barcode scanning and data entry processes removes any possibility of human errors. Errors are captured by the RFID system upfront – before they are allowed to propagate down the process chain, sidestepping customer frustration and costly return logistics. For example, an alert is instantly raised if a pallet has been wrongly picked or is pushed past the wrong shipment gate. Had the error not been captured at this stage, the pallet would have been shipped to the wrong destination, resulting in a dissatisfied customer and costly return logistics. Lesser errors and exceptions during material handling, in turn result in high customer satisfaction downstream.

“The new system provides an additional failsafe layer for us and our customers by ensuring that pallets do not get shipped to the wrong destination as a result of manual errors,” says James Chan, General Manager of Innovation, Technology and Operations

Development, Toll Global Logistics. "This results in reduction of expenditure associated with missed shipments, damages and reworks by up to 80 percent. In addition, we should expect to see a reduction of around 6 minutes of handling time per pallet cycle, which in turn will translate into significant savings for a warehouse that handles hundreds of thousands of pallets per annum."

#### **Provides Visibility and Control**

The solution offers true real-time visibility because electronic records are updated as physical tasks are being performed. For example, pallets are received exactly when they pass the dock door and enter the warehouse. In a traditional warehouse, the items may be sitting for hours in the staging area before an operator goes over to scan their barcodes to receive them, or before the receipt is manually keyed into the WMS system. RFID offers management a clear and accurate snapshot of what is going on in the warehouse without physically being there.

According to Eunis Hew, Operations Manager, Toll Global Logistics, "Since installing REAP, we have seen a huge reduction in time for processing each pallet. But the most significant improvement is the level of visibility that the RFID system provides. With an extremely accurate snapshot of inventory level, we can make more intelligent decisions in managing our clients' goods. This translates to happy customers, which makes my job so much easier."

## For More Information

For more information about Microsoft products and services, call the Microsoft Sales Information Center at (800) 426-9400. In Canada, call the Microsoft Canada Information Centre at (877) 568-2495. Customers who are deaf or hard-of-hearing can reach Microsoft text telephone (TTY/TDD) services at (800) 892-5234 in the United States or (905) 568-9641 in Canada. Outside the 50 United States and Canada, please contact your local Microsoft subsidiary. To access information using the World Wide Web, go to: [www.microsoft.com](http://www.microsoft.com)

For more information about Toll Global Logistics products and services, call (65) 6462 2288 or visit the Web site at: [www.toll.com.sg](http://www.toll.com.sg)

For more information about S3Edge Inc. products and services, call +1-310-943-7992 or visit the Web site at: [www.s3edge.com](http://www.s3edge.com)

## About S3Edge Inc.

S3Edge, Inc. is a software product company that provides packaged, RFID-based Real Time Visibility and Control systems for automation and error proofing of supply chain operations. Spotlight, S3Edge's software product enables enterprises to quickly and easily configure and view assets, zones, alerts, reports and manage an extensive network of RFID devices. Spotlight has been deployed in a wide range of systems including Asset & Personnel Tracking, Factory Floor Automation, Warehouse Operations, MRO and Tool tracking. It is built from the ground up on the Microsoft BizTalk RFID (Server and Mobile) platforms and uses the Windows Mobile/CE, Microsoft SQL Server, and Windows Server platforms. An integral part of the provided by S3Edge are the device providers for various hardware vendors (fixed, mobile, fork-lift and active RFID readers) that are utilized as part of the overall solution.

## Microsoft Server Product Portfolio

For more information about the Microsoft server product portfolio, go to: [www.microsoft.com/servers/default.aspx](http://www.microsoft.com/servers/default.aspx)

### Software

- Microsoft BizTalk Server 2009
- Microsoft BizTalk RFID (Server and Mobile)
- Microsoft SQL Server 2009
- Microsoft SQL Server 2009 Reporting Services
- Spotlight Server and Mobile

### Hardware

- Motorola MC9090-G RFID
- Motorola RD5000
- Motorola VC5090
- Intermec IF30

### Partner

- S3Edge Inc.

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