Business Effect via RFID

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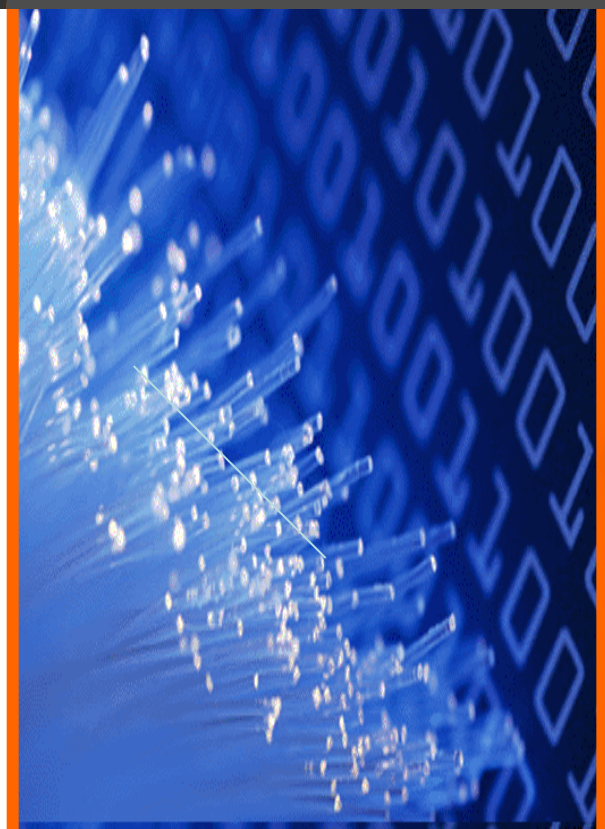
RFID ENABLED RAIL CART TRACKING



Integrated RFID Solutions

RFID

RFID stands for **Radio Frequency Identification**

It enables the unique identification of objects, which then can be recognized remotely and massively

RFID uses radio waves to identify or locate an item

A passive RFID System is composed of:

- **RFID Tag** (Stores & communicates item information)
- **RFID Reader** (Powers RFID tag, converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers)

In a more general sense, RFID is a technology, which provides **unprecedented visibility**.

RFID vs Barcode Comparison

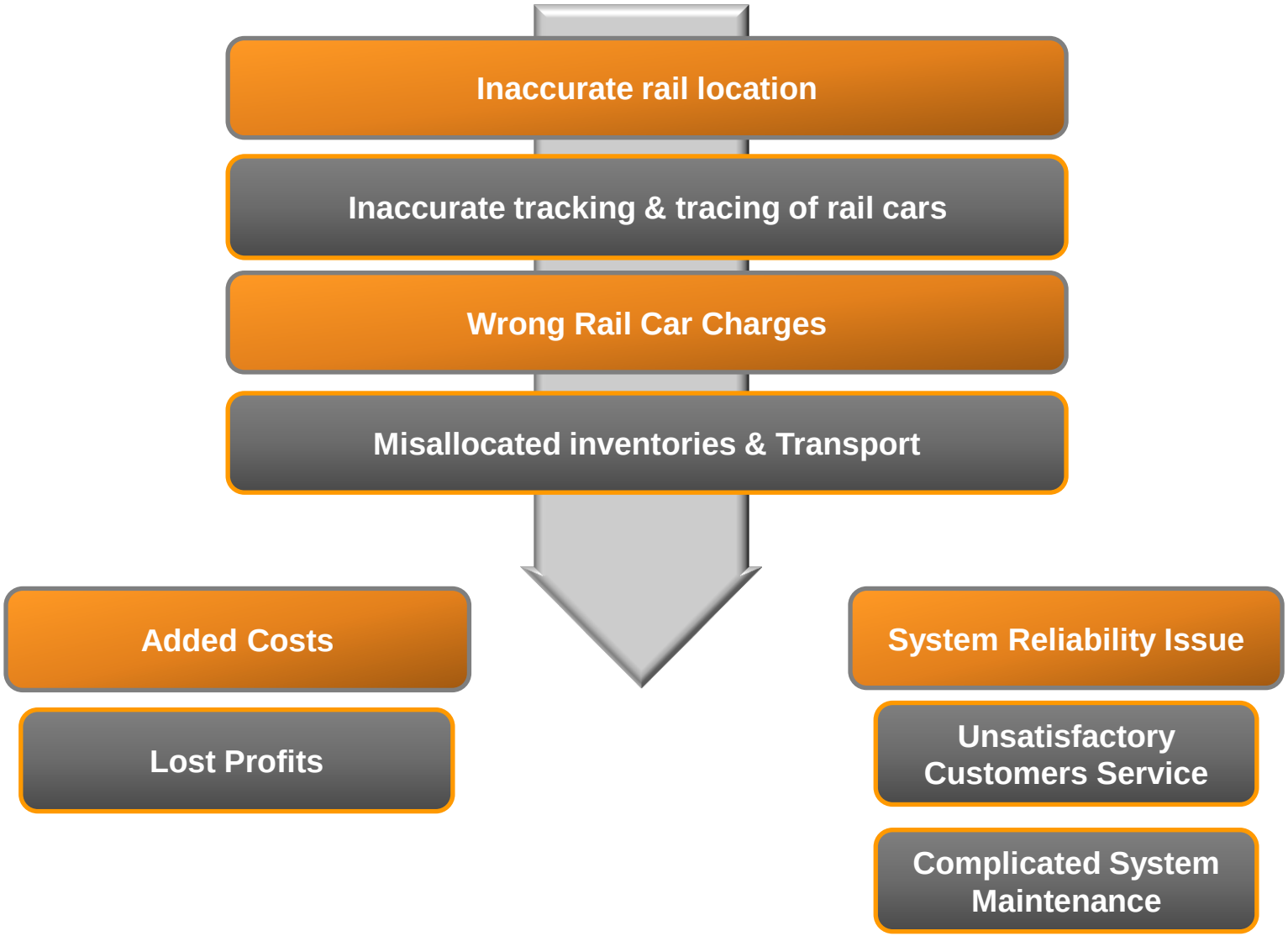
Capability	Barcode	RFID	RFID Benefit
Line of sight requirement	Yes	No	Orientation independent (box, pallet)
Items read at once	One	Multiple	Instantaneous inventory
Automation & Accuracy	Manual reading Human errors	Fully automated Highly accurate	Error-free data acquisition
Durability	Can be easily corrupted	Tolerance to harsh treatment	Accurate readings in any environment
Capacity	Small	Large	Can hold substantial amount of data
Data transfer		Read / Write	Continuous update through supply chain

The Rail Problem

Train operators would like to know where their vehicles are, their train formations and to update their maintenance records even when maintenance has been done by a third party.

- Train operators would like to be assured that the correct engine is carrying:
  - All of its allocated carts
  - Only the allocated carts
- As carts cross borders cargo owners would like to know how their goods are progressing.
- For maintenance purposes, infrastructure owners would like to get information about the rolling stock so as to enable maintenance and inform the owner and/or operator of the vehicle if there are problems. This might be the case if a vehicle is taken out of service or if there are delays.

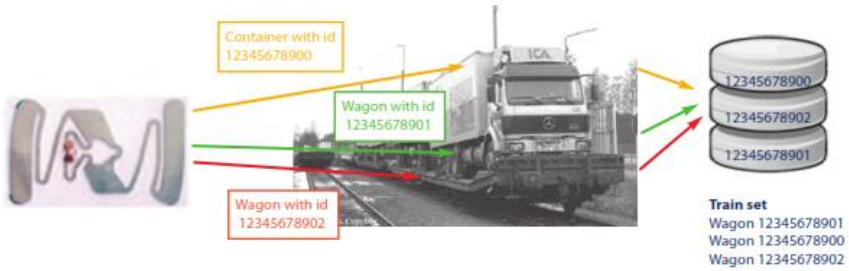
The Rail Problem



Business Effect Solution

Effective Management of the Rail Car Supply Chain

Modular standardized Business Effect equipment	**Modular Business Effect Software**
RFID Reading Stations	**Automated RFID Station Control**
Independent RFID Reading Stations (Solar Power & GPRS data transfer)	**Versatile Reporting**
Ruggedised & Best in Class Metal RFID Tags	**RFID system Data Exchange with enterprise systems**



Business Effect Solution

Engine Tracking via GPS

Rail Cart Identification via Ruggedized best in class RFID Tags

Outdoor RFID Reading Stations (Verifying that correct carts are carried by Engine)

Independent Outdoor RFID Reading Stations(Solar Power & GPRS data transfer)

Robust RFID SW

The Solution in a Glance

Rail Cart Identification

Passive UHF RFID Tags for Rail Applications delivering:

- Unprecedented Reading Range (up to 20m)
- High Speed RFID Reading
- High Durability
- Flexible Solution (Rail Cart Tracking, Maintenance &Inventory)
- Permanent & Vandal Proof Identification

Rail Cart Identification

Outdoor RFID Reading Stations for Rail Applications delivering:

- Long Reading Range
- High Speed RFID Reading
- Flexible Connectivity
- Reliable Reading
- Resilient in harsh Environments

Rail Cart Identification

Independent Outdoor RFID Reading Stations
for Rail Applications delivering:

- Full Standalone UHF Terminal
- Totally Wireless (Communication & Power Supply)
- Resilient in harsh Environments (Inwet or corrosive environments, severe temperature fluctuations|)

Benefits

Productivity gains

- Accurate and automated tracking and tracing of cars
- Efficient shunting operations
- Efficient wagon and locomotive utilisation
- Efficient use of labor
- Efficient identification of faults and errors.

Improved rolling stock management

- Accurate billing of third parties
- Inventory control.

Improved safety and service

- Timely and accurate error detection
- Fast repair and preventive maintenance.

RFID Solution Expansion

Automated Rail Cart Cargo Inventory Control

Route Recognition & Correction

Track maintenance & Control