GS1 Switzerland

The Management of RTIs (Returnable Transport Items) by GS1 Standards

Identification and Process Description

EPCglobal

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1. Introduction

There is great economic potential in the management of returnable transport item. For this reason, GS1 Switzerland brought commercial, industrial and service companies together to discuss their needs and experiences in the management of returnable transport items, and jointly to develop solutions using GS1 standards. It focuses on practical application, which should permit a concrete implementation in the marketplace.

If you can answer "yes" to six of the following questions, you should be deeply concerned with the more efficient solutions and process sequences proposed in this document.

1. Are you an owner or user of returnable transport items?
2. Do have problems with the availability of these returnable transport items?
3. Do you have several types of returnable transport items in use?
4. Are you not satisfied with the quality of the returnable transport items?
5. Do you spend much time dealing with complaints about the quality of the returnable transport item or the associated accounting?
6. Do you invest each year in new returnable transport items or do you have to pay for the loss?
7. Does the administration (procurement, receiving/issuing goods, quality control etc.) of your returnable transport items involve you in large amounts of work?
8. Do you lack transparency and knowledge of the exact situation regarding your pool of returnable transport items?
9. Do you want more transparency and control between dispatch and delivery of goods to the user?
10. Are you still using any decentralised solutions such as Excel for the administration and management of your returnable transport items?

The business case for the management of returnable transport items with the use of RFID has already been demonstrated in many cases and has been clearly proved and accepted by the market. This RFID application is sometimes regarded as one of the applications which have the largest potential savings for the user. Almost every company has returnable transport items in use and only a few actually know how many of these (sometimes expensive) returnable transport items are in circulation or even where they are located. In this document you will find some examples which will allow you to create your own internal calculations and to identify the possible potential.

Since the as-is processes for any undertaking vary, the core of this document consists of a description of the to be processes. The following processes are described in detail

- Initial procurement of returnable transport items (1-4)
- Acquiring returnable transport items for use (5-10)
- Ordering and delivery of goods by means of returnable transport items with direct exchange (11-22)
- Ordering and delivery of goods by means of returnable transport items without direct exchange (23-30)
- Return of returnable transport items (31-36)

The technical solution described in this document is based 100 % on GS1 standards. The EANCOM and GS1 EPCglobal standards represent the basis for the exchange of data and the tracking of returnable transport items. Ways of implementing these standards will also be shown, allowing you also to achieve a gradual implementation of the solution.

We would be delighted if you would use the technical and process-oriented solution described in this document for the management of your returnable transport items. Any implementation based on these standards represents an infrastructure that provides investment protection by possibly extending it to other interesting logistical applications.

This document has been approved by the Advisory Board "eBusiness" of GS1 Switzerland during the meeting of May 31st 2012.

2. Objective of the working group

Companies are of one mind in regard to the potential of EPC/RFID technology in the logistics environment. Many have therefore begun pilot projects and initiatives for the use of EPC/RFID. However, so far there are no implementations that can be applied directly over the entire logistic chain. As in most cases, where the technology affects cross-company matters, it is a problem of the non-existent infrastructure with EPC/RFID.

The key to success is called "management of returnable transport items". Herein lies great economic potential, which will help to build infrastructure for logistics applications. For this reason, GS1 Switzerland has begun to promote a working group with the aim of appropriate implementation and to demonstrate the benefits for all within the supply chain. The group aims to bring companies together to exchange information, knowledge and experience on the management of returnable transport items using GS1 standards. There the focus will be on practical applications and developing the best possible concrete implementations.

Only companies which are using returnable transport items and which want to manage them more efficiently, and at the same time enable the consistent identification in the open supply chain, will participate in the project. The GS1 standards form the necessary basis (GS1 EPCglobal, GS1 BarCodes, GS1 eCom etc.).

The scope is limited to returnable transport items in any form (such as for example containers (including boxes, crates), trolleys / dollies, barrels, suspensions, pallets etc., but excluding sea freight containers), which support and simplify the handling and transport of commercial and logistical units.

The specific aim of the project is as follows:

- The open exchange of information by end-user companies regarding the management of returnable transport items by means of GS1 standards
- Co-ordination of the GS1 standards and identifications to be used
- Documentation and availability for use of the project results
- Possible implementation of the first logistical applications (proof of concept) and demonstration of the potential concrete usage on the basis of implementation in Switzerland (2 to 3 concrete business cases)
- Establishment of proof of concept in Switzerland and Europe

The possible implementation and the realisation of proof of concept or pilot are to be carried out after the preparation of this document.

"Returnable transport items can be managed only if it is known when and where they are or where they are in transit. In this way their availability may be better planned and losses can be minimised. Basically, the management of returnable transport items means the management of assets (money). The unique identification of our returnable transport items enables costs and expenses to be reduced, especially when this is done with the use of internationally recognised standards in regard to both identification and communications throughout the supply chain. In addition, recognition by the organisations and end users involved takes place automatically. Through the use of one standard, the information is available to all in timely fashion and with a small investment for the entire supply chain. With the GS1 standard, a tool can be created for all commercial companies also not working together with Coop or Migros. A cost-benefit bill for the entire conversion including useful life and depreciation would be helpful, also to make the management of returnable transport items attractive to potential users (producers, trading companies, transport companies), a kind of marketing."

Jürgen Schmidle and Mischa Kessler, Bell Basel

"The objective of simplifying administrative processes has in my opinion been achieved with the present Guide and is sure to prove its practicality in a test to be implemented."

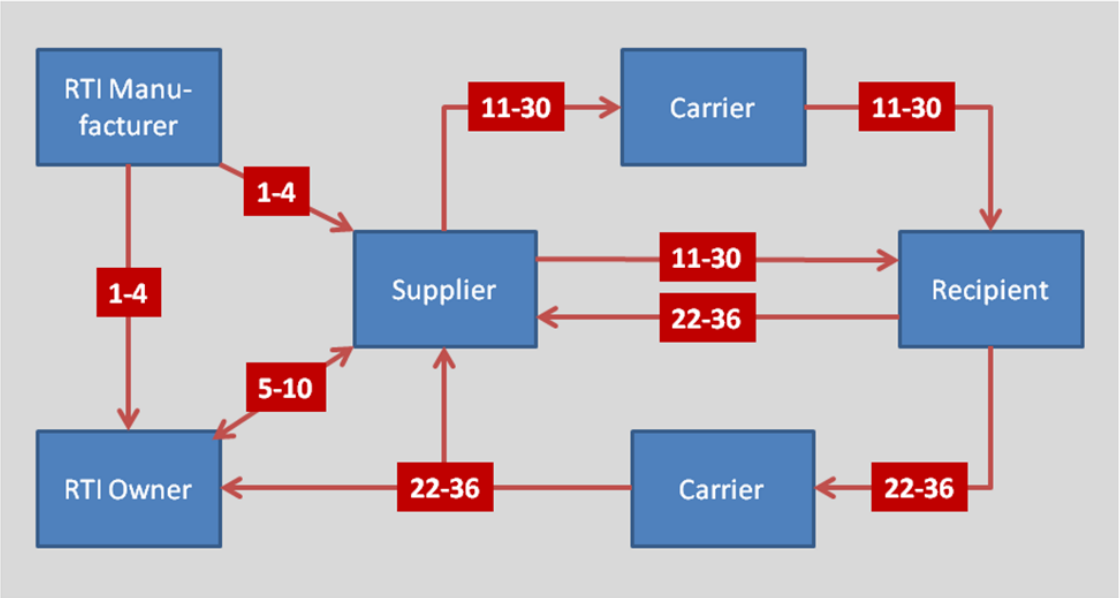
Günter Gerland, Container Centralen Hamburg, Managing Director

3. Description of the to-be processes

The supply chain of returnable transport items may be very complex with the participation of the many companies involved and specially negotiated processes. To simplify the process environment, we have focused on two companies within the supply chain. Each of the companies within the supply chain (raw material supplier, manufacturer, distribution, trading, branch office etc.) should be a supplier or recipient.

Description of companies within the supply chain:

Transport item manufacturer	A company which manufactures returnable transport items to order.
Transport item owner / pool operator	A company which is the owner of returnable transport items and provides other companies with these free of charge or for a fee (pool). Need not necessarily be the same company.
Supplier	A company which delivers goods to a recipient using returnable transport items.
Recipient	A company which receives goods from a supplier using returnable transport items.
Carrier	A company which effects delivery of the product and/or the returnable transport items to order.
Reusable transport item owner/user	A reusable transport item owner/user can be a supplier, carrier or receiver in the following process diagram.



Process diagram

An appropriate IT system environment for the process described is given on pp. 14 in Chapter 4.2 "IT System environment". In principle the GRAI messages are sent with each EANCOM message when using returnable transport items and/or goods. Due to a possible temporary storage or the return of returnable transport items by the carrier, it will be impossible to pass exactly same returnable transport items (with the same serialised GRAIs). With the physical flow of returnable transport items (EPCIS EPC), the serialised GRAIs will in principle always be captured.

3.1. Initial procurement of returnable transport items (1-4)

No	Description of process	Electronic data transmittion	Action
1	Order for new returnable transport items equipped with identification tags and serialised GRAIs if: ■ The owner does not change (company prefix from the customer) ➔ the order must be made by means of serialised GRAI as the serial number is managed by the owner (customer) ■ The owner may change (company prefix from the transport item manufacturer, e.g. EPAL) ➔ The order must be made by a GTIN, because the serial number is managed by the transport item manufacturer		Purchaser of the new returnable transport item (owner/user)
2	Equip returnable transport items with an identity tag including a visible number (serialised GRAI), barcode (serialised GRAI as GS1-128) and RFID (serialised GRAI as UHF EPC), attached in *a standardised manner* to the containers Transmit serialised GRAI including master data to ONS Ensure the quality characteristics of returnable transport items by use of an inspection company before delivery of the new containers	Master data to ONS	Transport item manufacturer
3	Scan or read serialised GRAI on dispatch and make available using EPCIS		Transport item manufacturer
4	Scan or read serialised GRAI on arrival and make available using EPCIS		Purchaser of the new returnable transport item (owner/user)

3.2. Acquiring returnable transport items for use (5-10)

No	Description of process	Electronic data transmittion	Action
5	Ordering of empty returnable transport items	ORDERS	Purchaser of the returnable transport items
6	Order confirmation	ORDRSP	Transport item owner
7	Delivery message Review, track and ensure quality characteristics of returnable transport items in the cycle according to set standards Scan or read serialised GRAI on dispatch and make available using EPCIS	DESADV Optional serialised GRAI in EANCOM	Transport item owner
8a	Delivery of empty returnable transport items by container owner or buyer using own logistics		Transport item owner or purchaser
8b	Delivery of empty returnable transport items by carrier Scan or read serialised GRAI on arrival and dispatch of the carrier and make available using EPCIS	IFTMIN / IFTMAN Optional serialised GRAI in EANCOM	Carrier
9	Arrival message Scan or read serialised GRAI on arrival and make available using EPCIS	RECADV Optional serialised GRAI in EANCOM	Purchaser
10	Invoice for goods prepared on delivery by the carrier	INVOIC	Carrier

3.3. Ordering and delivery of goods by means of returnable transport items with direct exchange (11-22)

Here, only direct exchange is considered, i.e. a returnable transport item is delivered and at the same time a similar returnable transport item is taken away. The simultaneous and physical 1:1 exchange process strictly does not exist, because all serial numbers are captured and need to be accounted for.

No	Description of process	Electronic data transmittion	Action
11	Ordering of goods	ORDERS	Recipient / buyer
12	Order confirmation	ORDRSP	Supplier
13	Delivery message Scan or read serialised GRAI of the returnable transport items on dispatch and communicate/make available in a standardised way Review, track and ensure quality characteristics of returnable transport items in the cycle according to set standards	DESADV Optional serialised GRAI in EANCOM	Supplier
14a	Delivery of goods in returnable transport items by the supplier or recipient using own logistics		Supplier or recipient
14b	Delivery of goods in returnable transport items by carrier Scan or read serialised GRAI on arrival and dispatch and make available using EPCIS	IFTMIN / IFTMAN Optional serialised GRAI in EANCOM	Carrier
15	Goods arrival message Scan or read serialised GRAI of the returnable transport items on arrival and make available using EPCIS	RECADV Optional serialised GRAI in EANCOM	Recipient
16	Order confirmation of returnable transport items	ORDRSP	Recipient
17	Delivery message Scan or read serialised GRAI on dispatch and make available using EPCIS Review, track and ensure quality characteristics of returnable transport items in the cycle according to set standards	DESADV	Recipient
18a	Return delivery of returnable transport items by the recipient or container owner's own logistics		Recipient
18b	Return delivery of returnable transport items by the carrier Scan or read serialised GRAI on dispatch and make available using EPCIS	IFTMIN / IFTMAN Optional serialised GRAI in EANCOM	Carrier
19	Arrival message Scan or read serialised GRAI on dispatch and make available using EPCIS	RECADV Optional serialised GRAI in EANCOM	Transport item owner/ supplier
20	Invoice for goods prepared on delivery by the carrier	INVOIC	Carrier
21	Goods invoice	INVOIC	Supplier
22	Optional: Standardised invoice for transport items use	INVOIC	Transport item owner

3.4. Ordering and delivery of goods by means of returnable transport items without direct exchange (23-30)

No	Description of process	Electronic data transmittion	Action
23	Ordering of goods	ORDERS	Recipient / customer
24	Order confirmation	ORDRSP	Supplier
25	Delivery message Scan or read serialised GRAI of the returnable transport items on dispatch and communicate/make available in a standardised way Review, track and ensure quality characteristics of returnable transport items in the cycle according to set standards	DESADV Optional serialised GRAI in EANCOM	Supplier
26a	Delivery of goods in returnable transport items by the supplier or recipient using own logistics		Supplier or recipient
26b	Delivery of goods in returnable transport items by the carrier Scan or read serialised GRAI on arrival and make available using EPCIS	IFTMIN / IFTMAN Optional serialised GRAI in EANCOM	Carrier
27	Arrival message Scan or read serialised GRAI on arrival and make available using EPCIS	RECADV Optional serialised GRAI in EANCOM	Recipient
28	Invoice for goods prepared on delivery by the carrier	INVOIC	Carrier
29	Goods invoice	INVOIC	Supplier
30	Optional: Standardised invoice for container use	INVOIC	Transport item owner

3.5. Return of returnable transport items (31-36)

No	Description of process	Electronic data transmittion	Action
31	Order for returning empty returnable transport items	ORDERS	Transport item owner/ Supplier
32	Order confirmation	ORDRSP	Recipient
33	Delivery message Scan or read serialised GRAI on dispatch and make available using EPCIS Review, track and ensure quality characteristics of returnable transport items in the cycle according to set standards	DESADV Optional serialised GRAI in EANCOM	Recipient
34a	Delivery of returnable transport items by the recipient or container owner using own logistics		Recipient
34b	Delivery of returnable transport items by carrier Scan or read serialised GRAI on arrival and dispatch and make available using EPCIS	IFTMIN / IFTMAN Optional. serialised GRAI in EANCOM	Carrier
35	Arrival message Scan or read serialised GRAI for returnable transport items on arrival and make available using EPCIS	RECADV Optional serialised GRAI in EANCOM	Transport item owner/ supplier
36	Optional: Invoice for goods prepared on delivery by the carrier	INVOIC	Carrier

This description of the returning process is not absolute.

4. Infrastructure and Communication

4.1. Data

Eligible participants can at any time retrieve the following data, standardised and encrypted:

- Container ID (serialised GRAI)
- Owner = derived from the GRAI
- Location (GLN) = current owner
- Date, time
- Process (EPCIS)

The following additional data will also be made available

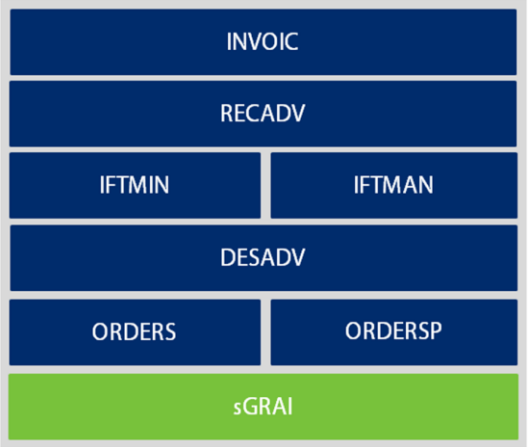
- Age of reusable container since first use
- Status (empty, loaded)
- State (usable, washed, interchangeable, not suitable, erected being repaired, set up, folded, etc.)
- Quality level (given in the master data in accordance with the owner's specification)

The system is to make available logical and qualitative indicators of the returnable transport items, to verify and to launch predetermined actions. In addition, the system adopts the administration (tally charts, balance) of the returnable transport items. For more information see Chapter 6 "Key performance indicators that the system allows for analysis of returnable transport items" on pp. 17.

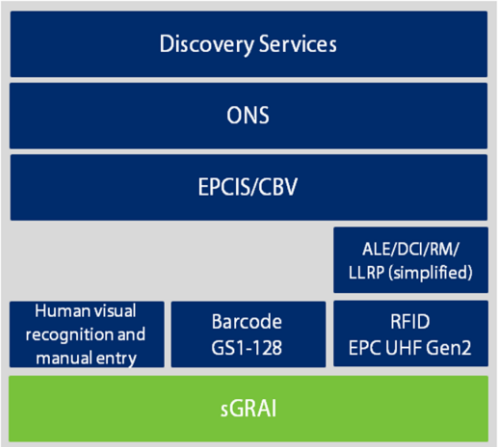
4.2. IT System environment

The solution described in this document is based 100 % on GS1 standards. The EANCOM and GS1 EPCglobal standards provide the basis for the exchange of data and the tracking of returnable transport items.

EANCOM messages for the exchange of commercial information:

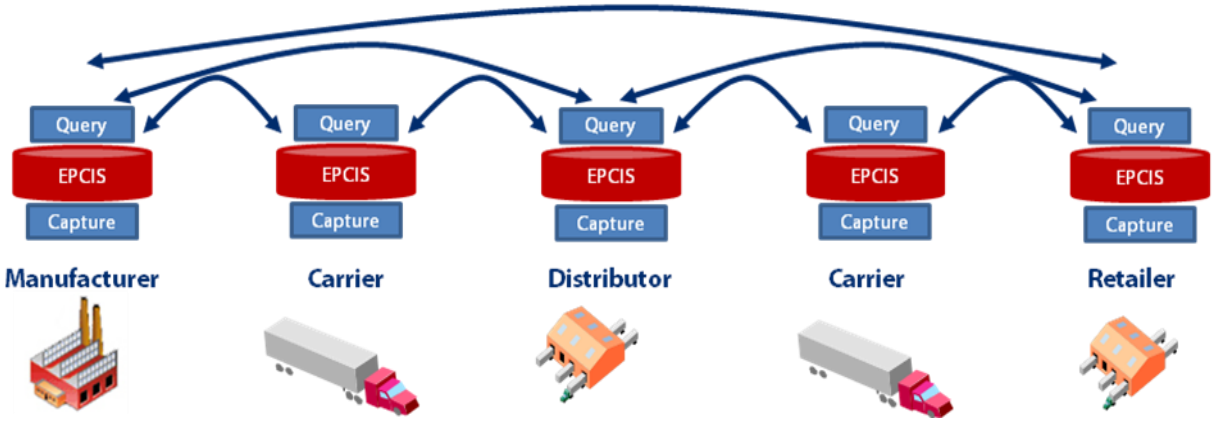


GS1 EPCglobal standards, which are used to track the returnable transport items:



The serialised GRAI serves as the main identification key for both levels. The above infrastructure is designed to help collect the data in a structured and especially standardised manner, and to provide or directly transmit it to other participants.

One of the key components here is the EPCIS standard, which is used both within the company and across companies. It requires serialised identification keys (such as a SGTIN, GRAI, SSCC in accordance with the EPCglobal tag data standard) and is independent of the disk (i.e. in addition to RFID as a data carrier for the EPCs, such as the GS1-128 or a GS1 data matrix can be used).



Companies may choose from four different EPCIS event types to be stored on each EPC entry point, depending on their needs. To this end, a process or requirements analysis should take place in advance. The following event types are specified

- Object event (at the forefront of these would be the pure observation of EPCs)
- Transaction event (the EPCs read are linked with a transaction ID. The latter may for example be the number of an invoice or a shipping notification.)
- Quantity event (with this type, only the amount of a particular EPC class is recorded, not the individual serial numbers of EPCs. This then makes sense if for example only the information is required as to how many objects of a certain type [such as an article] were captured, not every single instance.)
- Aggregation event (here the so-called child EPCs are associated with a parent EPC. This type of event is useful for example when choosing which box, boxes or pallet an article belongs to).

A current overview of GS1 EPCglobal standards can be found on the following web page: www.gs1.org/gsmp/kc/epcglobal

5. Labelling of returnable transport items

The labelling of returnable transport items is generally done by the owner or pool operator of the transport items. However, to ensure constant reading performance and the related process quality, the following criteria concerning reading distance and number of tags on all types of returnable transport items must be observed:

- There must be at least two RFID UHF Gen2 tags placed on a transport item
- These two RFID tags should if possible be placed opposite each other
- The GRAI of corresponding returnable transport item must be visible in the form of a GS1-128 barcode symbol and must be stored in the RFID tag

In the case of Euro pallets (1200 x 800 mm) the following additional points in the RTI document (Pallet Tagging Guideline Issue 2, approved September 2010) are to be observed

- Wooden pallets must have at least one RFID tag on the long side and one on the short side
- Plastic pallets must have at least one RFID tag on two opposite corners

The document referred to can be seen via the following link: http://www.gs1.org/docs/epcglobal/standards/implementation_guidelines/EPC-RTIPalletTagging-ImpGuide-i2.pdf.

6. Key performance indicators that the system allows for analysis of returnable transport items

The quality requirements of the transport items are generally defined by the transport item owner / pool operator. This can be determined by its quality criteria according to existing standards (IFS, ISO, DIN, etc.) if these are available. These requirements are mostly measurable on the basis of set standards and can be objectively evaluated.

At first glance, it seems easy to evaluate whether a returnable transport item is damaged or not - but there is, in some measure, much room for interpretation. For example - is a transport item with a hole in its side truly damaged, or would it perhaps be quite usable, depending on its contents? This becomes more complicated if the quality requirements are determined by visual examination. For example, according to who looks to it, a pallet may appear light or dark and therefore be regarded as usable or non-usable. This can be difficult to determine, which may lead to problems.

To avoid subjective observation as far as possible, the group has drafted a concept, which for better understanding may be compared with a vehicle service. In the case of a car, for example, apart from it appearing to be usable (if the engine can be started and the car can be driven) or non-usable, the mileage and time elapsed since the last service/repair are important. These two criteria determine, in large measure, the roadworthiness and quality of the car.

This approach may be implemented thanks to information available from the RFID and the system. This means that in order to assess the quality of a returnable transport item with regard to the possible quality requirements of the transport item owner / pool operator that may be available, the observer now also has the following information available:

- The number of exchange cycles for every transport item (comparable with the miles travelled by of a vehicle)
- The time elapsed since the last repair or Inspection/maintenance if required (officially determined by the transport item / pool operator)

The status of a transport item can for example appear as follows: “3/63” where the first figure represents the number of exchange cycles since the last repair and the second number the total number of all exchange cycles (equivalent to the mileage of a car). This has the advantage that for a process which requires a new or newer pallet, a suitable reusable pallet can more easily be identified. That is, if for example a user, for reasons of hygiene, would like to use a white or a new pallet, then this may be shown as new (1/1) or used only a few times and repaired (for example 2/5).

If the transport item needs to be repaired or is under repair, this is indicated by "0" as the first number (for example, 0/45) and thus the transport item is marked as not usable and out of service.

7. Business Case

The business case for the management of returnable transport items by means of RFID has already been demonstrated in many cases and is clearly proven and accepted in the market place. This RFID application is sometimes regarded as one of the applications which offer the largest potential savings to the user. Almost every company has returnable transport items in use and only very few actually know how many of these (often expensive) returnable transport items are in circulation or even where they are located. Nevertheless each year many companies invest a lot of money in the procurement of new returnable transport items, instead of concerning themselves with the improvement and optimisation of their management.

Following some results (average figures) coming from several realised implementations:

▪ Increase in speed of processing	up to 5-8 %
▪ Reduction in waste	up to 3 %
▪ Reduction in expenses in the search for transport items	up to 75 %
▪ Reduction in the number of transport items going astray	up to 95 %
▪ Reduction in production downtime due to missing transport items	up to 35 %
▪ Reduction in emergency stocks:up to 10 %	
▪ Improvement in handling at distribution centres (per pallet)	up to 8.5 %
▪ Reduction in loading and unloading times	up to 13 %
▪ Reduction in loading bay handling costs	up to 20 %
▪ Reduction of administrative costs on receipt of goods (in association with DESADV and SSCC)	up to 70 %

A simplified example from the automotive industry follows:[1]

▪ Average cycles per transport item per year	12 with RFID	10 without RFID
▪ Average labelling per cycle	0 with RFID	1-2 without RFID
▪ Time required for applying the label	0 with RFID	0.2 min. without RFID
▪ Frequency of checks	1/1 with RFID	1/50 without RFID
▪ Time it takes for a inbound control of 40 transport items	0 with RFID	5 Min without RFID
▪ Wastage per year	3% with RFID	5% without RFID
▪ Savings in inspection of incoming goods	€ 0.035 with RFID	
▪ Savings in labelling	€ 4.20 with RFID	
▪ Savings in wastage	€ 0.40 with RFID	

➔Total savings

▪ Per transport item (lifetime ~ 4 years)	€ 4.64
▪ Cost per container	€ 0.71
▪ Savings per container	€ 3.93
▪ ROI	8.5 months

1 Source: Auto-ID Lab St Gall / Zurich

A simplified example from the airline industry follows:[2]

▪ Reduction in waste:	up to 80 %	USD ~213,000
▪ Reduction in expenses in the search for transport items:	up to 50 %	USD ~204,000
▪ Reduction in stock:	up to 2 %	USD ~280,000
▪ Reduction of inventory:	up to 100 %	USD ~39,000

➔ Savings of USD ~736,000 per year

▪ Increased service efficiency	up to 5 %	USD ~39,000
▪ Increased service life:	up to 20 %	USD ~250,000
▪ Reduced risk of injury:	up to 80 %	USD ~330,000

➔Additional savings of USD ~619,000 per year

In our group the following advantages and benefits have been identified for various companies within the supply chain:

General

Reduction in costs

- □ Simplified handling
- □ Reduced and simplified maintenance
- □ Reduced cost of administration
- □ Reduction in the number of returnable transport items
- □ Optimisation of stacker rack circulation (quality)
- □ Optimal availability

- Improved availability of information (quality, availability, owner etc.) in real time
  - □ Information on the circulation of returnable transport items
  - □ Information on the optimisation and reduction of transport routes
  - □ Possible combination of the product with the transport item
- Tracking and tracing back of the returnable transport item
- Increased protection against forgery
- Identification of potential perpetrater
- Preventive maintenance - increased security - guaranteed quality standard
- Interfaces - uniform system
- Possibilities for outsourcing

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2 Source: IATA

Additional benefits for the supplier

- Preparation for dispatch is simplified, because the availability of returnable transport items is guaranteed thanks to their improved management.
- Increased visibility and control between dispatch and delivery of the goods to the recipient.
- Increased flexibility and simplified acceptance of returnable transport items (cross-docking).

Additional benefits for the recipient

- The recipient receives additional information, reducing quality control on receipt of goods.
- Increased flexibility and simplified acceptance of returnable transport items (cross-docking).

Additional benefits for the carrier:

- A clear and predictable competitive advantage may arise from implementation and proper management on the part of the carrier.
- Additional valuable information is available.
- Increased flexibility and simplified acceptance of returnable transport items (cross-docking).
- Reduction in problems occurring in loading and unloading due to increased quality of the returnable transport items. Delivery service standards can be met as a result.

Additional benefits for the transport item owner / pool user

- Increased visibility
- Improved availability
- Optimisation of resources
- Improved maintenance due to available information (cycle period etc.)
- Identify possible optimisation potential with the container manufacturer
- Protection against plagiarism
- Identification and reduction of "black market" activities

Additional benefits for the transport item manufacturer

- Genuine information on quality
- A clear and predictable competitive advantage can develop.
- Identify possible optimisation potential with the owner of the transport item
- Protection against plagiarism
- Identification and reduction of "black market" activities

8. Methods of implementation

A prerequisite for the efficient use of the proposed solution is the labelling of returnable transport items referred to in Chapter 5 "Labelling of " on pp. 16. The owner of the returnable transport items needs to implement this proposed standard, so that all users of the returnable transport items also achieve a clear benefit. Investment protection for the owner is ensured through the use of GS1 standards.

- Positioning
  - Check which to-be processes described can be applied in your own environment
  - Put together an internal project team from different departments (e.g., procurement, logistics, finance, etc.)
  - Calculate your business case based on your own figures (number of returnable transport items, process optimisation, etc.)
  - Determine which of the benefits and functions described in this document and features you wish to use (modular introduction possible)

- Action

  As all the technical components described in this document conform to GS1 standards, a modular implementation can be done on request according to needs.

Module / Function	Requirements	Liabilities / Consequences	Further information
Management of local data on returnable transport items	EPCIS		http://www.gs1.org/gsmp/kc/epcglobal/epcis
Data capture for the management of returnable transport items	Manual entry in EPCIS	Labour costs, requires the use of EPCIS	
Automated exchange of logistical data	EDI	EDI Infrastructure	http://www.gs1.org/ecom/xml/implementation
Automated data capture with human input (process not automated)	Automated entry in EPCIS using barcode	Labour costs, requires the use of EPCIS	Contact a barcode solution provider
Automated data capture without human input	Automated entry in EPCIS using RFID	Requires the use of EPCIS	Contact RFID solution provider. GS1 can provide you a list of solution providers

Only the software application (GUI visualisation) is not standardised, allowing the user freedom to analyse the data. Some possible standardised performance indicators are available on pp. 17 in Chapter 6, "Key performance indicators that the system allows for analysis of returnable transport items". It is in this area that Internal performance indicators can be defined, determined and evaluated by the users themselves, e.g. washing temperatures when cleaning returnable transport items, duration of use, individual pricing models, etc.

Module / Function	Requirements	Liabilities / Consequences	Further information
Management of returnable transport items	GUI visualisation (Application)	Requires the use of EPCIS	Contact RFID solution provider. GS1 can provide you a list of solution providers

9. Work to be done

The following work that needs to be done has been identified on the basis of this document:

- In accordance with the objectives of the group this document shall be implemented after completion and publication of a proof of concept or pilot for practical review.
- As a result of the working group, a work request within the GSMP (Global Standards Management Process) may be made, which will include the topic of the change of GRAI in changes of ownership
- Furthermore, it may be that there will be an addition in some EDI messages for handling the serialised GRAI. That work would be done by the T2T project from GS1 in Europe

10. Glossary

Concept	Explanation
Transport items (including boxes and crates)	A transport item is something that has a space in its interior which serves the purpose, in particular, of separating its contents from the environment.
Container	A container is usually a larger case for the storage and transport of goods. They exist in various sizes and are generally standardised.
Barrels	A barrel is a large, cylindrical container made of wood, metal or plastic; it may be convex in shape. It is normally used for holding liquids for a certain period of time, mostly in medium-sized quantities (a few litres up to a few hundred litres). A barrel either has a small opening, the bunghole, for the filling and emptying of liquid or one end is completely open and can be fitted with a lid. This second type of barrel is more suitable for the storage of solid or powdered substances.
Pallet	A pallet is a flat structure that is used for transporting many stackable goods. The pallet can be loaded by a conveying device (e.g. pallet truck or fork lift truck).
Pool	An exchange system of returnable transport items (with or without cost offsetting)
Trolleys / dollies	A dolly is an unaided wheeled carrier, conforming with the usual European standards for supply chains in the consumer goods industry ("Fast Moving Consumer Goods" sector) , e.g. ISO 3394 et seq.

Sources: www.wikipedia.org and GS1

11. List of abbreviations

Abbreviation	Explanation
DIN	Deutsche Industrienorm (German industrial standard)
DESADV	Despatch advise message
DS	Discovery Services
EPC	Electronic Product Code
EPCIS	Electronic Product Code Information Services
GLN	Global Location Number (unique serial number to identify a place)
GRAI	Global Returnable Asset Identifier [consists of the GS1base number, the device container type, and (optionally) a serial number]
serialised GRAI	Serialized Global Returnable Asset Identifier - for sake of clarity, the serialised GRAI abbreviation is used in this document (although not in the glossary of the GS1). Where a "Serialised Global Returnable Asset Identifier" is noted, a unique serial number will be required to identify the container used (the serial number must be transmitted according to this also).
IFTMIN	Electronic shipping order
IFTMAN	Arrival messages or acknowledgement of receipt
INVOIC	Invoice
ISO	International Organization for Standardisation
ORDERS	Orders
ORDRSP	Order Response
ONS	Object Name Service
RECADV	Receipt Advice
RFID	Radio Frequency Identification

More information on abbreviations can be found via the following link: http://gdd.gs1.org/gdd/public/searchableglossary.asp?categories=1

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Platform for Expertise: Build up Networks to Exchange Experiences

Passing on Expertise: Transfer Knowledge to Increase Expertise

Collaboration: Promote Cooperation to Increase Added Value

Standards: Use Standards to Improve Efficiency

Sustainability: Think Broadly to Protect Resources

The Management of RTIs (Returnable Transport Items) by GS1 Standards, Identification and Process Description
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