Reusable Transport Items within GS1 EANCOM®

GS1 Implementation Guide

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Document Summary

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1	November 2013	Richard Chresta	First Draft Transmission from the European Guideline into the GS1 Global Template. Sections 8.2 + 8.3: GIN-Segments, Codelist 7405: Code "RTN" replaced by Code "DA" Sections 8.3 + 8.4: Code "RTS" replaced by Code "DB" Section 8.4: Code "XZ5" replaced by Code "SUE"

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1. Introduction and Acknowledgments

1.1. Purpose of this Document

The purpose of this document is to give (globally valid) recommendations on the eCom messages, which can be used for Reusable Transport Item (RTI) management. It shows the different eCom messages.

The eCom T2T Group created this report within the framework of T2T PROJECT. The overall goal of the T2T project was to clarify and create a reference case for GS1 in Europe and other related GS1 standards and GS1 keys in order to help users understand how they can improve RTI using GS1 global standards. The GS1 system offers a suite of tools that can be combined to improve RTI management. The result is best practice recommendations on how to use the GS1 standards to identify and manage RTI such as pallets.

The objective is to define recommendations for the message(s) within the framework of the relationship between logistic services client (retailer or supplier), carrier and logistic services provider.

This guideline focuses on EANCOM® messages as the most commonly used GS1 eCom standard. Under no circumstances should this application guide be considered as a standalone document or a replacement for the GS1 General Specifications / GS1 eCom messages (EANCOM® or GS1 XML®). To implement the GS1 System effectively these recommendations must always be used in conjunction with the mentioned guidelines.

2. Executive Summary

GS1 recommends global standard solutions, which make the different functions of capture and automatic information processing operations easier.

The aim of this document is to promote a common approach to the identification of, and eCom message standards used for RTI management.

The enclosed recommendations are made to help companies to choose, in various contexts, the right identification with the right flow of information.

The aim of this guideline is to clarify, within the context of RTI management, the usage of GS1 Keys and the usage of eCom messages.

The guide makes the distinction between RTI private, rented and open pool. Processes and actors are not always the same.

The guideline focuses on EANCOM® messages for RTI management between all the partners in the supply chain.

Among these partners, the logistic service provider and carrier are included as actors notably involved in the RTI exchange processes.

For each message, there are definitions and examples with the EANCOM® 2002 format in order to have identical implementations for one business need.

The main chapters are:

> chapter 5 for the usage of Identification

> chapter 7 for the description of the processes

> chapter 8 for the description and examples of each message.

3.   Background

The RTI supply chain is very complex. A large number of parties are involved in the supply chain each with different roles and incentives to manage RTIs. Globalization of international trade increases the number of participants in the supply chain. At the same time, the pressure to improve the management and visibility of RTIs is increasing from different directions such as legal requirements. There is therefore a need to manage RTIs across the supply chain. However, with the complexities and number of parties involved, RTI management solutions must ensure that all parties can be involved.

RTIs are either owned by user companies (e.g. EPAL pallets) or by professional pool providers (e.g. crates or pallets). User companies use the RTIs to exchange goods between trading partners, pool providers own their RTIs and manage the movement of their pool between the trading partners.

3.1.   Current situation

Currently the management of RTIs is very disjointed. There is no common commitment among participants in the supply chain to guarantee (achieve) better RTI control. Only some parties in the supply chain undertake actions to improve the follow-up of RTIs,and the non-commitment by the other parties makes it difficult or even impossible to control the RTIs in the whole supply chain. If parties in the supply chain are to maximise the benefits that come from having better visibility and control of RTIs, then all parties must be involved.

The management and follow-up of RTIs are:
- subject to controversy and tensions in the supply chain.
- seen as both a substantial financial item but also as a complex issue
- handled as secondary in supply chain management.

Key issues with current management of RTI:
- current practices do not allow much transparency in the management of RTI.
- without real visibility there is neither accuracy nor accountability.
- Logistic Service Providers are often forced to maintain the proprietary solutions of customers, which creates further complexity and unnecessary costs.

The current management of RTIs leads to:
- a substantial loss of RTIs
- oversized stocks because of lack of visibility
- limited efficiency of actions undertaken by some companies
- conflict with business partners, as it is difficult to prove where RTIs are.

3.2.   A common approach to RTI management

For most companies, the implementation of an RTI management system not only leads to business benefits but also results in substantial financial savings. Using GS1 standards in RTI Systems enables the:

- standardisation of RTI solutions therefore reducing entrance barriers
- linking of products to RTIs which increases traceability
- increase in partnership potential
- RTI solutions to be integrated.

- standardisation of RTI management thus simplifying the supply chain design (e.g. administration, logistic processes, shop design)
- standardisation resting in cost reductions (e.g. sorting)
- the traceability of RTIs builds on a unique and common solution for all stakeholders in the supply chain.

The implementation of RTI management systems by all parties in the supply chain results in financial savings, better stock management, improvements in business relationships and safety due to better traceability of RTIs and products,

3.3. Financial and business benefits

- Reduction of asset stock due to better control of asset use
- Cost transparency
- Control and elimination of fluctuations in demand
- Reduced total supply chain costs as dwell time and asset loss is reduced
- Loss of RTI reduced, leading to lower cost for refilling the pool
- Lower system costs

3.4. Stock management

- Know location of external stocks
- Reduction in out-of-stock --- assets not being available when and where needed
- Knowledge of asset location and quantity at different locations

3.5. Business relationships

- Decrease in dispute caused by lack of information on current location of assets
- Have a higher service level
- Ability to provide an integrated solution for RTI

3.6. Traceability

- Facilitate the tracking and tracing of individual RTIs
- Have a higher transparency of the supply chain facilitating the analysis of critical points within the supply chain
- Traceability of products carried in RTI hence guaranteeing product safety and complying with legal requirements

4. Scope

It is very important to specify that this guideline is compliant with the recommendations from the GS1 General Specifications. This European guideline gives recommendations on identification and eCom messages across Europe and it focuses on the RTI management in a B2B context.

The scope includes:

- RTI management with eCom messages.
- clarification of the use of the Serial Shipping Container Code (SSCC), GRAI.
- following EANCOM® messages: ORDERS, DESADV, INVOIC.

This document covers the most relevant business processes of the flow of goods (delivered, stored and managed with RTI).RTI Trade processes covers:

- Procurement (the ordering process)
- Financial settlement (the invoicing process)

RTI and goods Logistic processes covers:
- Warehousing (the shipment, the stock management)
- Transport (the consignment process)

Out of scope:
- The data carrier
- The B2C context

5. Identification of RTIs

A **Reusable Transport Item** (**RTI**) is an asset used for moving or transporting other materials. It may be worth stating that every RTI starts its lifecycle as a trade item (merchandise). It will be sold by a manufacturer of RTIs to either a **L**ogistics **S**ervice **P**rovider (LSP), an **R**TI **P**ool **O**perator having RTI management as his core business, or a company needing the RTIs for internal, or private use (e.g. any company internally moving products). As soon as an RTI has been acquired by such a party, it gets a logistic function and therefore can only be considered as an asset. The information flows linked to acquiring new RTIs and to using them as assets, remain completely separated from each other. From here on, this Guideline will focus exclusively on RTI **management**, i.e. from the moment the RTI is taken into service as an asset.

When an RTI is a logistic instrument, it is limited to a **B2B** context. Therefore, this document does not take into account typical consumer 'empty goods' (bottles, kegs, and other liquid or gas 'containers'[1]) and their related deposits, which are part of the consumer price but will be refunded if the consumer returns these 'empty goods'.

RTIs can be classified according to various criteria like measurements, weight, purpose, material, etc. In this Implementation Guideline the RTIs are classified according to the **modus operandi**, since this it affects the physical and information flow and hence the management of the RTIs. Three completely separated RTI types can be distinguished: **Private RTIs**, **"Rented" pool RTIs**, and **"Open" pool RTIs**[2].

5.1. RTI types

Depending on how RTIs are used in the field, two main types can be distinguished: Private RTIs and Public RTIs.

5.1.1. Private RTIs

Private RTIs are permanently owned and used by one party only, which is solely responsible for their management.

The Private RTI is normally used in a **"closed-loop" model**: it always returns to its starting point. The owner (e.g. a retailer) can decide to use his RTIs with certain partners (e.g. suppliers): in that case he decides about the conditions and the rates he applies.

5.1.2. Public RTIs

"Public" RTIs (or **"Pool" RTIs**) are part of a shared system, called a "pool", which is run by one single company, for which running that pool is its core business.

The basic characteristic of a pool is that the RTIs move freely within it, without any obligation for them to return to their starting point at their next movement.

In the field a pool can be organised in two distinct ways: "rented" pool RTIs and "open" pool RTIs.

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[1] All of which are considered to be **B2C**.
It should be noted that some types of RTIs, e.g. a keg, can occur in both a B2B and a B2C context, though the actual RTIs will be different. E.g. the beer kegs a pub receives from the brewer will be of much bigger volume than the beer keg a consumer buys at a retailer.
[2] See Chapter **7** for the corresponding process descriptions.

5.1.2.1. "Rented" Pool RTIs

"Rented" Pool RTIs are permanently owned by one party, which manages the pool.

Rented Pool RTIs are used in a **one-owner pool model**. The RTIs are provided and owned by the pool manager (e.g. *CHEP*, *LPR*, *Steco*, ...), which is responsible for all the pool operations and services, such as collection, quality checking, and maintenance.

5.1.2.2. "Open" Pool RTIs

The ownership of "Open" Pool RTIs changes with each movement to another party.
As a consequence the RTIs carry no elements (private brand, name, address, ...) that would allow the identification of the owner.

"Open" Pool RTIs are used in a **changing-owner pool model**. When such an RTI is shipped, its ownership changes to the receiving partner, who has to return a similar RTI of the same quality (1:1 exchange concept). A specific **logo** on the RTI identifies it as being part of the pool.

EPAL is a well known example (for pallets) of such an "open" pool. However, strictly speaking, it is not a pool operator as it doesn't physically run the pool but only coordinates its administration.

It should be noted that this "open" pool approach can only work if it is governed by a "Central Body", which is in charge of the allocation of GRAIs. (*see Sections 5.2.1. and 5.2.5.*) Otherwise, the uniqueness of this GS1 Identification Key cannot be guaranteed.

5.2. RTI identification with GS1 Identification Keys

Once it is established that an item will be used as an asset, its identification and further management is only possible with a Global Returnable Asset Identifier **(**GRAI).

When an RTI is loaded with goods, the combination of both will be identified with an **SSCC**.

The use of, and distinction between all RTIs related to each of the GS1 Identification Keys is summarized in the remaining sections of this chapter. For further information and technical details the reader should refer to the *GS1 General Specifications*.

5.2.1. GRAI for unique identification of RTIs

According to the *GS1 General Specifications* a **Returnable Asset** is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a pallet, a crate, etc. The GS1 Identification Key for a Returnable Asset, the **Global Returnable Asset Identifier** (**GRAI**), enables tracking as well as recording of all relevant data.

The GRAI has a double nature. It can be used to identify either a particular kind of asset or an individual asset within a given asset type. In both cases the GRAI is composed of the **GS1 Company Prefix** of the company assigning the asset identifier (RTI) and of the **Asset Type**. The latter is assigned to uniquely identify, together with the GS1 Company Prefix, a particular kind of asset. The GRAI remains the same for all identical types of Returnable Assets. An optional Serial Number may be used to distinguish Individual Assets within a given asset type. The fixed part always has a 13-digit structure; the optional part may vary from 1 to 16 digits.

The above can be summarised as follows:

Global Returnable Asset Identifier (GRAI)			
GS1 Company Prefix → ← Asset Type		Check Digit	Serial Number (Optional)
N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}		N_{13}	X_1 variable X_{16}

← "Non-serialised" →

"Serialised" →

where N_1 can only be 0 for certain GS1 Company Prefixes attributed by *GS1 USA*.

To avoid confusion between both occurrences of the GRAI, it may be advisable to refer to them as "**non-serialised GRAIs**" (= asset type) and "**serialised GRAIs**" (= individual asset). For clarity's sake these occurrences will be referred to as **nGRAIs** and **sGRAIs** respectively in the rest of the document.

Private, "Rented" pool and "Open" pool RTIs can be identified with nGRAIs or sGRAIs, depending on the owner's aims. (*see Section 5.2.5. for discussion of the ownership*).

!! Warning !!
Though the above seems to correspond with the use of GTIN-13s and SSCCs, the user should keep in mind that neither GTIN-13 or SSCC are to be confused with GRAIs. (*see Section 5.2.3.*)

5.2.2.   SSCC for unique identification of logistic units

Logistic units are items devised and composed for transport and distribution purposes (like pallets, boxes, containers, trolleys, cages, etc). The **Serial Shipping Container Code** (or **SSCC**) is the GS1 Identification Key which allows the unique identification of such a logistic unit.

Its structure is as follows:

Serial Shipping Container Code (SSCC)			
Extension Digit	GS1 Company Prefix → ← Serial Reference		Check Digit
N_1	N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12} N_{13} N_{14} N_{15} N_{16} N_{17}		N_{18}

where N_1 = 0..9 --- hence the SSCC can begin with a (significant) leading zero.

The most common way to mark a logistic unit with an SSCC is by using the **GS1 Logistic Label**. In fact, according to the *GS1 General Specifications,* the SSCC is the only compulsory information on the GS1 Logistic Label.

Scanning the SSCC barcode on each logistic unit allows the physical movement of units through the supply chain to be matched with the electronic business messages that refer to them. This is the so-called "tracking and tracing" process, which opens up the opportunity to

implement a wide range of applications such as cross docking, shipment routing, and automated receiving.

The SSCC will be created by the company, which composes the logistic unit. It will do so using its own GS1 Company Prefix. If the logistic unit is not marked with an SSCC at goods reception, the subsequent (logistic) party in the supply chain will have to allocate the SSCC in order to guarantee tracking and tracing.

5.2.3. GTIN for identification of Trade Items

As previously pointed out, this Guideline only focuses on RTIs as assets. However, there is one notable exception to this principle: when RTIs are "**encompassed**" by a GTIN, and as a consequence are ordered **implicitly**.

What does this mean?
A basic concept of the GS1 numbering standards is to define or standardise as much as possible all occurrences of a product, i.e. from the smallest one (aka "base unit") to the tallest one. If a certain volume of a product is always delivered in/on the same RTI (a crate, a pallet,...), it is highly recommended to define this occurrence as a GTIN and to label it as an ordering unit in the central data pool, as (logically) only ordering units can be ordered by the client (after the Master Data has been synchronised or aligned --- *see Chapter 6*). As a consequence, the carrying/containing RTI becomes a composing part of the GTIN: it is "encompassed" by the GTIN. As a result of the previous data synchronisation the **n**GRAI will be known by the customer, even without it being explicitly exchanged via a DESADV message (*see Section 8.2.2.1.*), which is why it is considered to be ordered implicitly.

"**Standard pallets**"[3] are a good example of this situation. The term is generally used to describe a pallet, which is always loaded in the same way and with the same amount of a product. As a consequence, its manufacturer can define it as a fixed volume of this product, attribute a GTIN to it and make it an ordering unit. The carrying pallet, which is identified as a GRAI, will be part of the definition of the GTIN. The use of Standard pallets is not very widespread yet, but is rapidly growing in the field.

5.2.4. RTIs and the role of GTIN, GRAI and SSCC

GTIN, GRAI, and SSCC serve different purposes within the supply chain, hence they can co-exist during an RTI's life cycle. However, their roles as GS1 Identification Keys are very distinct and should never be confused:

- **GTIN**: identification of trade items.
  (only used for the trading of RTIs, i.e. by buyers of RTIs in the ordering cycle)

- **GRAI**: identification of Reusable Transport Items.
  (only used to identify an asset, either as a generic asset type ("non-serialised GRAI"), or as an individual asset ("serialised GRAI"))

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[3] "Standard pallet": the term stands for a fixed volume of a product, and, as such, is not to be mixed up with the carrying pallet itself, which is of course also standardised!

- **SSCC**: identification of <u>logistic units</u>.
  (only used to identify a single logistic unit, in order to track it throughout the logistic flow)

Nevertheless, some uncertainties about the correct use of these GS1 Identification Keys persist, as is explained hereafter.

GTIN vs. GRAI

As the GTIN is part of the trading of RTIs, and the GRAI of the (logistic) managing of RTIs, both cannot possibly be confused. The question is rather to know if the GTIN by which an RTI is ordered from a manufacturer, can next be kept and be a (non-serialised) GRAI with the same 13 digits. The answer is negative, because the manufacturer of the RTI assigns the GTIN and the RTI owner attributes the GRAI; both will do so using their own GS1 Company Prefix.

Note that as a consequence of the above, a non-serialised GRAI (nGRAI) can never be identical to a GTIN-13, unless a manufacturer also acted as a pool operator.

SSCC vs. GRAI

Although the SSCC and the <u>serialised</u> GRAI (sGRAI) seem to serve the same purpose, they are very different! Indeed, the sGRAI only identifies the RTI, whereas an SSCC uniquely identifies the combination of carrier (= RTI) and content as one whole.

The <u>lifetime</u> of both is also completely different.
- an **SSCC** will only exist while its corresponding logistic unit exists;
- a (serialised) **GRAI** will exist as long as the physical asset exists.

5.2.5. Allocating GRAIs and SSCCs

1) **GRAIs**:
GRAIs are allocated to RTIs from the numbering capacity of their <u>owner</u>. In principle, these RTIs keep this GRAI as long as they exist.

There is one notable exception to this allocation rule:
the ownership of *"open" pool RTIs* changes <u>with every movement</u>.
As the GRAI cannot be changed accordingly every time, a "Central Body" taking charge of the allocation of GRAIs to such RTIs will be needed.
(e.g. *EPAL, ... --- see Section 5.1.2.2.*)

Often, either type of GRAI will be marked on the RTI by the RTI manufacturer on behalf of his client, the future RTI owner. (*see Section 5.3.*)

2) **SSCCs**:

The **party which composes the logistic unit** assigns the SSCC.

Change of asset ownership:
(This applies both when the managing party is taken over by another party, and when it, partially or completely, sells its RTI stock)

1) **GRAIs**:

Ideally, the GRAI should at once be replaced by another GRAI. However, it is permissible for the GRAI to remain on the asset if the old owner takes responsibility for its uniqueness, i.e. if he makes sure that numbering clashes are avoided. This is feasible because a GRAI, as any other GS1 Identification Key, is merely an access key to information stocked in a data base, so it is a matter of correctly recording and tracking the corresponding information. Besides, it should be noted that many GRAIs are (indelibly) engraved on or burned into the RTI. They cannot be modified without seriously damaging the RTI.

2) **SSCCs**:
Not applicable!!!
Once it has been attributed, an SSCC by definition never changes. No added value can be obtained by replacing it by another SSCC.

5.2.6. GLN for unique identification of location

Each physical location within a company can uniquely be identified in the supply chain by a GS1 Identification Key: the **G**lobal **L**ocation **N**umber (**GLN**).

As is the case for goods (with the synchronisation of the trading partners' master data), this identification of locations is a prerequisite for efficient electronic commerce (*see Chapter 6*). EDI for one uses GLNs to identify all trading partners and locations involved. Similarly, the mailbox or network address of a company is traditionally identified with a GLN to facilitate eCom exchanges.

The structure of the GLN is as follows:

Global **L**ocation **N**umber (**GLN**)		
GS1 Company Prefix $\longrightarrow$	Location Reference $\longleftarrow$	Check Digit
N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}		N_{13}

where N_1 can only be 0 for certain GS1 Company Prefixes attributed by *GS1 USA*.

Within the GS1 System the GLN and the GTIN are two distinct Identification Keys. There is no conflict when a GTIN and a GLN have the same digits, as the context will always prevent any misinterpretation. Yet, in the light of internal storage, users should be aware that the same 13 digits can represent more than one GS1 Identification Key.

Note:
Although in some countries a national GLN database is administered by the GS1 Member Organisation, it remains the responsibility of the issuing company to keep its business partners informed of all the relevant GLNs related to the trading relationship. Special care is needed if ownership of the company changes (*see the general GLN Allocation Rules on www.gs1.org*).

5.3. Marking of RTIs

Notwithstanding its type, an RTI is **marked** with a logo, a brand or some other labelling. For private RTIs this will be the responsibility of the owner. RTIs which are completely unmarked, can't be used in an RTI pool.

In general there are three different ways of marking an RTI with a GRAI:

1. Human Readable:
Both nGRAI and sGRAI are possible.
This is often used as a back-up system for the barcode or the EPC tag (see below.) As a rule, human readable information must always be combined with one of these GS1 symbologies.

2. Barcode:
The encoding of nGRAI and sGRAI in the GS1-128 barcode is possible, provided AI 8003 is used. The use of sGRAI is recommended as it is the only approach, which makes possible tracking and tracing of RTIs.

3. EPC Tag:
Only the sGRAI can be used.

It should be noted that the marking of RTIs is a complex issue of its own. Often, burning or engraving the information into the RTI is the only possibility, as such identifying it for its entire lifecycle.

6.   Data alignment: a prerequisite

The sharing of the data base information between trade partners (requesting party and logistic service providers) on both products and locations is a condition sine qua non for the control of the operations in this complex environment of modern distribution and logistics (preparation; constitution of the pallets, of the boxes).

The process as a whole, which provides correct and up-to-date data, is conventionally called "(master) data synchronization". It results in an ideal state of shared information called "data alignment".

GDSN is GS1's Global Data Synchronization Network, built around the GS1 Global Registry®, GDSN-certified data pools, the GS1 Data Quality Framework, and GS1 Global Product Classification (link), which when combined provide a powerful environment for secure and continuous synchronization of accurate data. Synchronizing accurate, properly classified data results in:

- smoother and quicker business processes

- improved accuracy of orders

- fewer forms to fill out

- fewer duplicate systems and processes

- a proven way to drive unnecessary costs out of the supply chain

- GDSN linked to RTI data will make it possible to share information on RTI such as size, weight or other variables to all supply chain partners in an efficient way.

7. Business processes

The following business process descriptions focus only on the RTI management process. The trading process of an RTI (buying and selling of RTIs) is a normal trade process, as for any other traded goods.

To simplify the drawings, the logistic service providers between the partners have not been included in the drawings. When the logistics service provider is included in the process, there are some more EDI messages to be considered, as stated below.

7.1. Business Process for Private RTI

Private RTIs are used either in a company internal process (internal distribution), or are used between specified trading partners. The owner of the RTI does not change during this process and the RTI does always come back to the same company to be loaded or filled again.

It is important for the RTI owning company to know how many RTIs they possess and where they are. To be able to manage their own pool of RTIs, the flow of RTIs has to be known.

Examples of Private RTI: beer kegs, crates, boxes, etc.

7.1.1. Physical flow description

Case 1 - e.g. between supplier and retailer
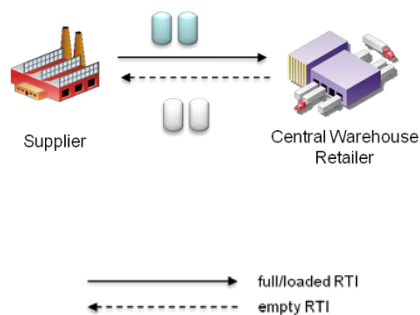
RTIs are flowing in a closed loop between a retailer and a supplier and the RTIs are only used in this specific trading relationship.

Case 2 - e.g. between DC and stores of a retailer
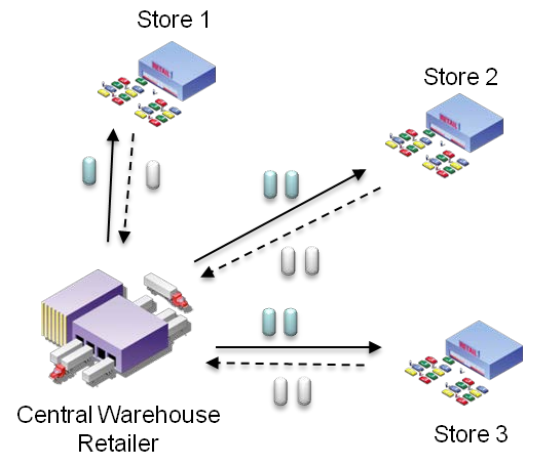
RTIs are flowing in a closed loop between a retailer's warehouse and the retailer's stores and the RTI does not exit the *sphere of influence* of the retailer.

The physical flow description is not limited to the two examples above, nor is it limited to a specific industry. Other examples could be a medical device producer directly delivering its products to a hospital – in his own (private) boxes (RTIs).

7.1.2. Information flow description

The information of how the RTIs are circling within the trading relationship can be provided in two ways: either the information is included in the normal business transaction messages or the information is provided in separate messages. (In the second case the central warehouse (or store) despatches e.g. a truck full of empty RTIs to be returned to the original sender.)

Case 1 - e.g. between supplier and retailer   **Case 2 - e.g. between DC and stores of a retailer**

7.2. Business Process for Rented RTIs

Rented RTIs are provided and managed by a Pool Operator. The Pool Operator is the owner of the RTIs and rents them to the users (both manufacturers and distributers). The Rented RTIs are transferred in a closed loop from the Pool Operator to a consignor or a consignee and back to the Pool Operator. The Pool Operator not only rents the RTIs, but also provides other services such as cleaning and repairing of the RTIs.

It is important to the Pool Operator to track and trace the flow of the rented RTIs to be able to optimise the pool management.

Example of Rented RTI: pallets (e.g. Chep, LPR, ...), plastic boxes for vegetables (in retail)

7.2.1. Physical flow description
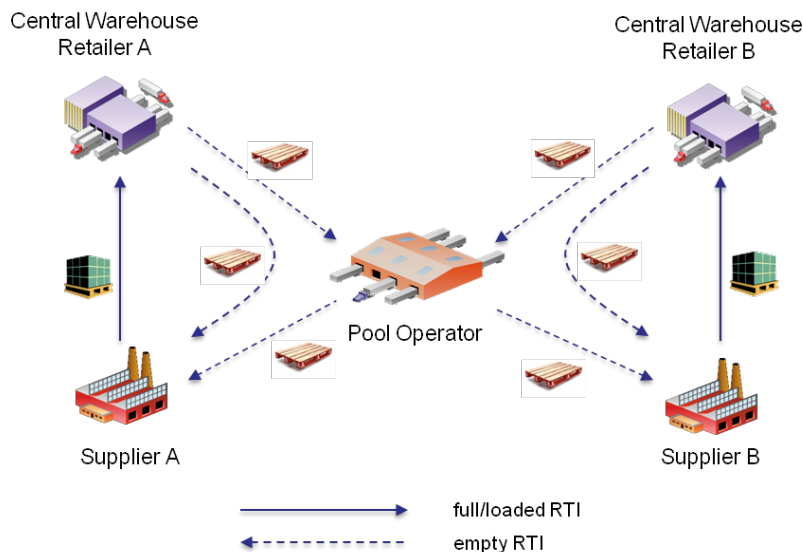
The Pool Operator provides his RTIs to the supplier, who will then use them to deliver his goods to his business partner. The empty RTIs are then brought back to the supplier (e.g. by the Pool Operator or any other logistic service provider) or the empty RTIs are taken back by the Pool Operator for cleaning or repairing. The Pool Operator is managing the flow of his RTIs and therefore, RTIs can circle between several supply chains.

7.2.2. Information flow description

Between the two business partners, there is the normal information flow, probably including information on RTI.

Pool Operator - supplier	Suppier - retailer	Retailer - Pool Operator
DESADV	ORDERS	ORDERS
INVOIC	DESADV	DESADV
...	INVOIC	INVOIC
	...	...

The messages between the Pool Operator and the business partners are different from the messages between the two business partners. In the communication with the pool operator, an RTI is handled as a product where, in the communication between the business partners, the RTI is handled as a means to transport the goods.

7.3. Business Process for Open RTIs

Open RTIs are a special but widely used group of the pool RTI: for example EPAL pallets. The idea of the EPAL concept: pallets are exchanged on a 1 to 1 basis --- whenever receiving 1 pallet, one has to return 1 pallet of the same quality. A speciality: with every transfer the ownership of the pallet is transferred to the receiving partner. Therefore pallets move all over the world in ways that cannot be traced and it is improbable that a pallet will return to its first owner.

For the business partners it is not so important to know the flow of the pallets, but to know, how many pallets have been delivered to and received from the business partners. To enable a fair use of the 1 to 1 exchange of pallets, the quality control of received (and shipped) pallets is important.

Physical flow description

A supplier uses EPAL pallets to deliver his goods to his two business partners. In an ideal case, he will get back immediately the same amount of pallets of the same quality as he has shipped to his client. It is obvious that in this open supply chain, pallets can be transferred to many business partners.
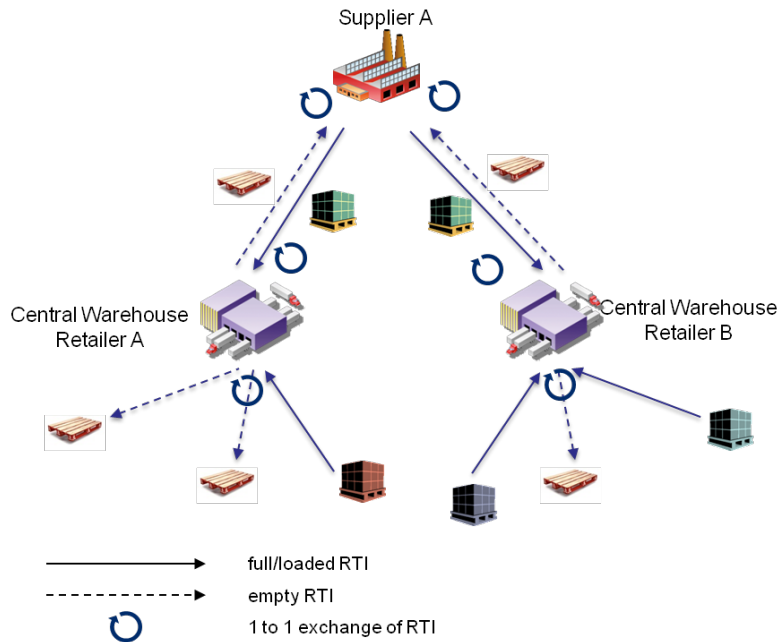
7.3.1. Information flow description

The information flow concerning open RTI is between two business partners. The number of the transferred pallets has to be included in the normal EDI messages:

- (ORDERS)
- DESADV
- INVOIC
- ...

7.3.2. Information flow description, including a logistic service provider

A logistic service provider is the transportation partner between the two business partners. If the logistic service provider is included into the EDI communication, the following EDI messages have to be considered:

- IFTMIN
- IFCSUM
- IFTSTA
- INSDES
- HANMOV
- INVRPT
- OSTRPT
- ...

7.3.3. Logistics Interoperability Model (the LIM document)

We recommend following the rules described in the Reference to LIM (Logistics Interoperability Model) Document version:

http://www.gs1.org/transportlogistics/forum/work_groups/lim/

Notably we advise you to see the LIM overview in chapter 1.2 and then the section III for the detailed scenario. The LIM describes common business processes and data interchanges to support interoperability with Logistic Service Providers, notably in the RTI context. It is available on the GS1 Global Office web site within the sector: Transport and Logistics.

7.4. Change of ownership vs. handling of an RTI

To understand the different processes concerning the movement of RTIs, it is important to group them into the three above defined groups: private, open and rented RTI. When discussing RTIs always make sure what kind of RTI it is and therefore what processes you have in mind.

Nevertheless, for the application of the RTI processes into EDI messages, it is not the change of ownership that is most important[4], but the way an RTI is handled: an RTI could be seen as an asset (a means for transporting goods) or as a trade item (when the focus lies on the empty RTI itself).

Remark on RTIs and master data:
Usually RTIs are ordered implicitly with the goods which means RTI information is included in the master data of the ordered product (or the type of RTI has been agreed on in e.g. an Interchange Agreement [5]).

There may be a few exceptions, where the RTI information is ordered explicitly. But these exceptions have to be agreed upon in e.g. an Interchange Agreement as well.

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[4]   except for the INVOIC.

[5]   Interchange Agreement (IA): written agreement with the status of a (legally binding) contract in which both eCom partners make explicit a number of agreements which they regard as essential for a correct and efficient use of eCom. It will describe the procedure to follow when electronic communication fails, how to deal with an order that cannot be met, etc.

The following table provides an overview on how an RTI is seen as an asset and where it is seen as a trade item.

Message	Private RTI	Rented RTI		Open RTI
		Trading partner	Pool Operator	
ORDERS	RTIs should be part of the master data: it is defined what RTI will be used to transport the ordered Product (no GRAI in the orders)	RTIs should be part of the master data: it is defined what RTI will be used to transport the ordered Product (no GRAI in the orders)	The supplier orders (empty or new) RTIs from the pool operator. These RTIs are seen as Trade Items.	RTI should be part of the master data: it is defined what RTI will be used to transport the ordered Product (no GRAI in the orders)
DESADV	GRAIs should be mentioned in the despatch advice: enables the two trading partners to count the send/received RTIs (RTI is seen as an asset)	There might be a need to have some RTI information within the despatch advice: in case the retailer has to have RTI inventory reports with the pool operator. RTIs would be seen as assets.) Otherwise no need for RTI information in these despatch advices.	The pool operator despatches his RTIs to the supplier. These RTIs are seen as trade items.	GRAIs should be mentioned in the despatch advice: enables the two trading partners to count the send/received RTIs (RTI is seen as an asset)
INVOIC	The RTI belongs to one of the two partners, the ownership does not change and there is no fee invoiced. No GRAI in the invoice.	The two trading partners do not invoice the RTI to each other. No RTI information in the invoice.	These RTIs are rented to the supplier and therefore a fee is invoiced. These RTIs are seen as trade items being rented to a client.	Usually, these RTI are exchanged on a 1-to-1 basis. In this case no RTI information in the invoice. If this is not the case, a handling fee or a price will be invoiced. (in this case RTIs are seen as trade items.)

8. Flow of information and eCom messages

This chapter describes the different flows of information between partners and gives recommendations on the basic eCom messages to be used. The guideline focuses on EANCOM® messages as the most commonly used GS1 eCom standard.

The management of RTIs, packing and reusable packaging consists in supplying, tracing and the compliance of reusable items that temporarily contain and carry merchandise through the supply chain, then **restituting** ? or invoicing them. This implies a perfect control of information that proves which operations were followed.

The solutions offered in this chapter are based on EANCOM® 2002. The principal messages, which must be used for RTI management and the way they should be mapped in EANCOM® 2002, are described in this chapter.

8.1. Handling of RTIs in eCom Messages

As pointed out before, this Guideline exclusively focuses on the handling of RTIs as assets. RTIs can move around in three distinct ways:

- **unloaded** (aka "empty"):
  the RTI is moved without merchandise on/in it.

- **loaded**, but as a fixed part of a GTIN (*see Section 5.2.3.*):
  the RTI is moved as the carrying part of the logistic unit, which is also a GTIN[6] (via which the goods have been ordered). The type of the RTI is predefined in the description of the "encompassing" GTIN in the product data base.

- **loaded**:
  the RTI is moved as the carrying part of the logistic unit with which the goods are delivered. The type of the RTI is chosen according to, and can vary depending on previous agreements between supplier and buyer.

> The difference in processes between "empty" RTIs and "loaded" RTIs is reflected in the way they are identified in the subsequent EANCOM® messages.
>
> ■ If "empty" RTIs are the object of the message, they will be identified as **n**GRAIs in the PIA segment for the asset types, whereas possible individual IDs (**s**GRAIs) will be communicated in the subsequent GIN segments.[7]
>
> ■ If goods (hence "loaded" RTIs) are the object of the message, they will appear as GTINs in the LIN segment. The corresponding RTIs (asset types) are identified in subsequent GIN segments, regardless of their general (nGRAI) or individual (sGRAI) nature.

Obviously, a combination of both situations is also possible.

In each of the following EANCOM® messages the distinction between "empty" RTIs and "loaded" RTIs is taken into account, as it has an influence on the way the message will be structured.

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[6] In this case the logistic unit (aka delivery unit) is also the ordering unit.

[7] As a reminder: the requesting party can never ask for **s**GRAIs, only for **n**GRAIs. However, its partner can communicate sGRAIs if they are available (and depending on previous agreements between the partners).

8.2. Purchase order

The ordering process takes place between two commercial partners. In principle, only occurrences of products and packaging units, which are defined (presented) as ordering units by the supplier, can be ordered by his customer.

8.2.1. "Empty" RTIs

"Empty" RTIs can move between partners, which have a private relationship, or within the context of an RTI pool. In both instances it can be necessary for a party to request "empty" RTIs, either from his private partner of from the pool coordinator.

If for example a retailer has too many empty bottles at his point of sale, he will request empty crates from his beverage supplier to return these bottles to him. Parties can also request empty crates from the pool operator to replenish their RTI stock.

Obviously, only types of RTI (= **n**GRAI) can be requested, never individual RTIs (= **s**GRAI).[8]

It is important not to mix up these movements of "empty" RTIs with the return of goods, for which specific EANCOM® messages exist (e.g. RETINS or RETANN).

The following example shows how two types of "empty" RTIs are requested by the sender of the message, in case 48 units of type <nGRAI-1> and 20 of type <nGRAI-2>.[9]

S.#	ORDERS	Meaning of every segment
	...	
#47	LIN+1'	
#48	PIA+5+<*nGRAI-1*>: **SUE**'	Asset (type) is identified by nGRAI <*nGRAI-1*>
#51	QTY+21:*48*'	Ordered quantity = *48* [RTIs]
#47	LIN+2'	
#48	PIA+5+<*nGRAI-2*>: **SUE**'	Asset (type) is identified by the <*nGRAI-2*>
#51	QTY+21:*20*'	Ordered quantity = *20* [RTIs]
	...	

---

[8] In some countries national solutions have been implemented in which the RTI is identified by a GTIN. Please contact your local GS1 organisation for further details.

[9] Conventions for EANCOM Examples: New code values for RTI are marked in **bold orange**; content (= information to be filled out by user) is marked in *italic blue*.

8.2.2. "Loaded" RTIs

Normally the customer does not order separately the RTIs on/in which the products will be delivered, as for larger product volumes they will already know this information as the result of previous master data alignment. This information is important as it allows the customer to correctly manipulate the logistic units, as well as to foresee the space needed for storage.

However, depending on the Interchange Agreement (IA) between the trading partners it may be possible for the customer to specify in the ORDERS message not only the goods he wants to receive, but also the type of the RTI on which the goods will be loaded.

Depending on the way of ordering this Guideline differentiates between RTIs implicitly and RTIs explicitly ordered.

Smaller volumes of merchandise (GTINs), which do not encompass reusable assets, will normally be grouped together on/in an RTI for transportation purposes. Here also the type of RTI can beforehand be agreed upon between partners, or can be made explicit in the order. However, that does not impact the use of the DESADV message, which will follow the order.

8.2.2.1. Implicitly ordered RTIs

In this situation the RTI serves as the transport/packaging support for a trade item, and as such is an integral part of the ordered GTIN, so no further communication about it is necessary. Owing to the previous data synchronisation the client already knows which type of RTI (nGRAI) the ordered goods will be shipped on/in.

In the following message excerpt 20 units of <GTIN-1> are ordered. For this example it is necessary to know that <GTIN-1> is an ordering unit and that the RTI type it will be shipped on, <nGRAI-2>, is part of the definition of <GTIN-1>. Hence, no information about the nGRAI needs to be exchanged, as this is part of the master data of the trade item's GTIN and is known already by the issuer of the order.

S.#	ORDERS	Meaning of every segment
	...	
#47	LIN+1++<*GTIN-1*>:SRV'	First line item is identified by the GTIN <*GTIN-1*>
#51	QTY+21:*20*'	Ordered quantity of current line item is *20* units.
	...	

As the example demonstrates, the RTI information does not appear.

8.2.2.2. Explicitly ordered

A customer (e.g. retailer) may occasionally need a different, one-off requirement from his supplier (e.g. manufacturer), regardless of the ordering unit. Whether that is allowed in a specific commercial relationship, and if so, how much such a special request will be charged, will have been specified previously in the Interchange Agreement (IA) between these parties.

If the RTI should be ordered explicitly, the GRAI is displayed in the PCI and GIN segments of the PAC group at detail level. In such an ordering process only types of RTIs, i.e. non-serialised GRAIs (nGRAIs), can be used.

In the following message excerpt 150 units of <GTIN-2> are ordered. The customer specifies that he wants them delivered in/on 10 RTIs of type <nGRAI-2>.

S.#	ORDERS	Meaning of every segment
	...	
#47	LIN+1++<*GTIN-2*>:SRV'	First line item is identified by GTIN <*GTIN-2*>
#51	QTY+21:*150*'	Ordered quantity of current line item is *150* units
#63	PAC+10'	Current line item must be packed on 10 packaging units [RTIs]
#65	PCI+<41G>'	Packaging units [10 RTIs] [to be] marked with a GRAI
#68	GIN+**DA**+<*nGRAI-2*>'	Current packaging unit [10 RTIs] [will be] identified by non-serialised GRAI <*nGRAI-2*>
	...	

!!! **Warning** !!!

How the goods are allocated to the individual RTIs in such a scenario (i.e. in which order, up to which degree, etc) must have been agreed in the Interchange Agreement (IA).

Alternatively, repetitions of the LIN segment with the same GTIN could be used. In that approach the customer describes what they wants RTI by RTI. (However, it is obvious that such custom-composed RTIs make things much more complex, hence should be avoided if at all possible.)

8.3.   Despatch Advice (DESADV)

The despatch advice is sent from the consignor (supplier or third party) to another party, not necessarily the buyer, and contains logistic information. This information builds logically on the preceding ORDERS message. Apart from the ORDERS message's reference number there is no direct link other than the GTINs ordered, and possibly the requested RTI types.

It is assumed that all logistic units (= despatch units) are individually identified with an SSCC. (*see Sections 5.2.2., 5.2.4 and 5.2.5.*)

In the delivery process it is important to know if the RTIs move with or without goods, because this calls for a different approach in the DESADV. But it makes no difference whether the RTIs have previously, in the ORDERS message, been made explicit or not: as they can also travel to third parties (e.g. Logistic Service Providers), it is recommended always to detail the RTIs involved, regardless of the scenario.

8.3.1.   "Empty" RTIs

This situation occurs when unloaded ("empty") RTIs are moved to another destination. That can be another company (e.g. pool member), but also another place within the company's "sphere of influence", like a warehouse. When and how this happens, is part of the Interchange Agreement.

If the unloaded RTIs are only a part of the complete shipment, their corresponding information should be communicated in the "non-structured" part of the DESADV message, i.e. between

CPS+1' and CPS+2+1', which is the point where the communication of the "structured" information starts.

8.3.1.1. NON-SERIALISED GRAI (= nGRAI)

In the following message excerpt 50 RTIs (empty pallets) of type <nGRAI-1> and 20 RTIs (empty crates) of type <nGRAI-2> have to be moved to another place. Here is how this should be expressed in the DESADV[10]:

S.#	DESADV	Meaning of every segment
	...	
#22	CPS+1'	1st consignment level (= whole shipment)
#31	LIN+1'	
#32	PIA+5+<*nGRAI-1*>: **SUE**'	Asset (type) is identified by nGRAI <*nGRAI-1*>
#35	QTY+12:*50*'	Despatch quantity = *50* [RTIs]
#31	LIN+2'	
#32	PIA+5+<*nGRAI-2*>: **SUE**'	Asset (type) is identified by the <*nGRAI-2*>
#35	QTY+12:*20*'	Despatch quantity = *20* [RTIs]
#22	CPS+2+1'	2nd consignment level (parent = complete shipment)
	...	

It should be noted that there is no way of expressing if/how these RTIs have been grouped (e.g. piled, upright) in the transporting vehicle.

8.3.1.2. SERIALISED GRAI (= sGRAI)

In the following message excerpt 50 individual RTIs (empty pallets) marked with <sGRAI-1> to <sGRAI-50> are moved to another place. Here is how this should be expressed in the DESADV. The segments marked in grey are identical with the corresponding segments for the nGRAI solution!

S.#	DESADV	Meaning of every segment
	...	
#22	CPS+1'	1st consignment level (= whole shipment)
#31	LIN+1'	
#32	PIA+5+<*nGRAI-1*>: **SUE**'	Asset (type) is identified by nGRAI <*nGRAI-1*>
#35	QTY+12:*50*'	Despatch quantity = *50* [RTIs]
#47	PCI+41G'	Units [50 RTIs] are marked with a GRAI
#51	GIN+**DB**+<*sGRAI-1*>+<*sGRAI-2*> +<*sGRAI-3*>+<*sGRAI-4*>+<*sGRAI-5*>'	Packaging [RTIs] identified by sGRAIs <*sGRAI-1*> to <*sGRAI-5*>
#51	GIN+**DB**+<*sGRAI-6*>+<*sGRAI-7*> +<*sGRAI-8*>+<*sGRAI-9*>+<*sGRAI-10*>'	Packaging [RTIs] identified by sGRAIs <*sGRAI-6*> to <*sGRAI-10*>
	...	
#51	GIN+**DB**+<*sGRAI-46*>+<*sGRAI-47*> +<*sGRAI-48*>+<*sGRAI-49*>+<*sGRAI-50*>'	Packaging [RTIs] identified by sGRAIs <*sGRAI-46*> to <*sGRAI-50*>

---

[10]   In some countries national solutions have been implemented in which the RTI is identified by a GTIN. Please contact your local GS1 organisation for further details.

S.#	DESADV	Meaning of every segment
#22	CPS+2+1'	2nd consignment level (parent = complete shipment)
	...	

It should be noted that there is no way of expressing if/how these RTIs have been grouped (e.g. piled, upright) in the transporting vehicle.

8.3.2. "Loaded" RTIs

It is up to the user if he will provide only the type of the RTI (= **n**GRAI) or information about the individual pallet. However it is recommended to provide the information about the **s**GRAI, if available, since this approach allows the tracking and tracing of each individual pallet.

In the following example a shipment consisting of 20 individual pallets of type <**n**GRAI-3>, all loaded with <GTIN-1>, is described. Whether this type of RTI had been detailed in the preceding order (i.e. explicit order), or if it is a component of a GTIN (i.e. implicit order), is of no importance, because it does not lead to a different approach. The only real difference between both situations resides in the GIN segment, where another qualifier must be used.

In both scenarios the RTIs will be detailed with a GRAI. According to GS1 recommendations the logistic units have also been marked with an SSCC (<SSCC-1> to <SSCC-20>).

8.3.2.1. NON-SERIALISED GRAI (= nGRAI)

In this example we consider 20 pallets of type <nGRAI-3>; their SSCCs range from <SSCC-1> to <SSCC-20>.

S.#	DESADV	Meaning of every segment
	...	
#22	CPS+1'	1st (highest) consignment level (= whole shipment)
#23	PAC+20'	Current consignment level [shipment] consists of 20 [logistic] units
#22	CPS+2+1'	2nd consignment level (parent = whole shipment): description of 1st logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with SSCC
#30	GIN+BJ+<*SSCC-1*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-1*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI
#30	GIN+**DA**+<*nGRAI-3*>'	Current packaging unit [pallet] identified by nGRAI <*nGRAI-3*>
#31	LIN+1++<*GTIN-1*>:SRV'	First line item, on current logistic unit [pallet], identified by GTIN <*GTIN-1*>
	…	
#22	CPS+3+1'	2nd consignment level (parent = whole shipment): description of 2nd logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with SSCC
#30	GIN+BJ+<*SSCC-2*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-2*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI

S.#	DESADV	Meaning of every segment
#30	GIN+**DA**+<*nGRAI-3*>'	Current packaging unit [pallet] identified by nGRAI <*nGRAI-3*>
#31	LIN+2++<*GTIN-1*>:SRV'	Second line item, on current logistic unit [pallet], identified by GTIN <*GTIN-1*>
	…	
#22	CPS+21+1'	2nd consignment level (parent = whole shipment): description of 20th logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with SSCC
#30	GIN+BJ+<*SSCC-20*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-20*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI
#30	GIN+**DA**+<*nGRAI-3*>'	Current packaging unit [pallet] identified by nGRAI <*nGRAI-3*>
#31	LIN+20++<*GTIN-1*>:SRV'	20th line item, on current logistic unit [pallet], identified by GTIN <*GTIN-1*>
	…	

8.3.2.2. SERIALISED GRAI (= sGRAI)

We take the same example as for the previous section, the only difference being the use of **s**GRAIs instead of **n**GRAIs, ranging from <sGRAI-1> to <sGRAI-20>. The SSCCs of the logistic units again range from <SSCC-1> to <SSCC-20>. The segments marked in grey are identical with the corresponding segments for the **n**GRAI example!

S.#	DESADV	Meaning of every segment
	...	
#22	CPS+1'	1st (highest) consignment level (= whole shipment)
#23	PAC+20'	Current consignment level [shipment] consists of 20 [logistic] units
#22	CPS+2+1'	2nd consignment level (parent = whole shipment): description of 1st logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with an SSCC
#30	GIN+BJ+<*SSCC-1*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-1*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI
#30	GIN+**DB**+<*sGRAI-1*>'	Current packaging unit [pallet] identified by sGRAI <*sGRAI-1*>
#31	LIN+1++<*GTIN-1*>:SRV'	First line item, on current logistic unit [pallet], identified by GTIN <*GTIN-1*>
	…	
#22	CPS+3+1'	2nd consignment level (parent = whole shipment): description of 2nd logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with an SSCC
#30	GIN+BJ+<*SSCC-2*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-2*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI

S.#	DESADV	Meaning of every segment
#30	GIN+DB+<*sGRAI-2*>'	Current packaging unit [pallet] identified by sGRAI <*sGRAI-2*>
#31	LIN+2++<*GTIN-1*>:SRV'	Second line item, on current logistic unit [pallet], identified byGTIN <*GTIN-1*>
	…	
#22	CPS+21+1'	2nd consignment level (parent = whole shipment): description of 20th logistic unit
#23	PAC+1'	Current consignment level consists of 1 unit [pallet]
#27	PCI+33E'	Packaging unit [pallet] marked with an SSCC
#30	GIN+BJ+<*SSCC-20*>'	Current packaging unit [pallet] identified by SSCC <*SSCC-20*>
#27	PCI+41G'	Packaging unit [pallet] is marked with a GRAI
#30	GIN+DB+<*sGRAI-20*>'	Current packaging unit [pallet] identified by sGRAI <*sGRAI-20*>
#31	LIN+20++<*GTIN-1*>:SRV'	20th line item, on current logistic unit [pallet], identified by GTIN <*GTIN-1*>
	…	

8.4.   Invoice (INVOIC)

There are several possible reasons why one may want to invoice an RTI[11]. In the context of RTIs as logistic assets they can all be led back to the application of the guarantee function (i.e. the managing of deposits).

Together with the invoicing of his merchandise the RTI owner (or responsible: most probably the supplier or a sub-contractor like an LSP) charges a value for the carrying RTI. This is to make sure that his risks are covered.

In the case of a pool the 'membership' and the annual user's fee will be dealt with in a separate invoice, hence these are not the concern of this Guideline.

In situations where users (bilaterally) make up an RTI balance at the end of a given period and invoice or credit the possible imbalance, such a balance will normally be the subject of a separate invoice (or credit note). For the RTI balance itself only the INVRPT message is needed.

In the invoice the deposit functionality also applies for lost or damaged pallets.

8.4.1.   How to identify an RTI in an invoice

In an invoice the RTI is always identified with a non-serialised GRAI in the PIA segment. If a serialised GRAI needs to be invoiced, it will be detailed in the following PCI-GIN segments[12]. This is the same approach as for the DESADV message.

It is important to realise that whenever RTIs are identified in an invoice, they will have to be paid for, even if they are only subject to a deposit.

---

11   As a reminder: the purchasing of newly manufactured RTIs is not covered by this Guideline.

[12] In some countries national solutions have been implemented in which the RTI is identified by a GTIN. Please contact your national GS1 organisation for further details.

8.4.2. Processing of GRAIs in the INVOIC

As a consequence of the above, only the deposits need further detailing. Whether the RTIs are "empty" or "loaded", makes no difference, as they always have to be identified via a separate occurrence of the LIN - Segment Group.

!!! Warning !!!
1. Since the scenario for the "encompassed GRAI" (See sections 5.2.3. and 8.2.2.1.) assumes that this "encompassed GRAI" is an integral part of the "encompassing GTIN", this "encompassed GRAI" or RTI will not appear separately as such on the invoice. It is payed for via the "encompassing GTIN", which will be the only related reference mentioned on the invoice.

Users should pay extra attention to this situation, as the dismanteling of the GTIN (logistic unit) will also "create" a new RTI which must be incorporated into the company's assets.

2. In some European countries RTIs are subject to VAT. I.e. the law considers them to be sold <u>together</u> with the merchandise they carry. Please contact your national GS1 organisation for more information. The slightly different approach for both situations will be shown in the rest of Section 8.4. However, in order not to make the examples unnecessary complex, and also because the further processing of the VAT may be different from country to country, no further attention will be payed to it.

8.4.2.1. NON-SERIALISED GRAI (= nGRAI)

In the following INVOIC example it is assumed that a number of goods have already been invoiced in the <N-1> previous LIN segments. Next, all related RTIs are identified and invoiced: 5 of type <nGRAI-1> with a deposit of €20 each, and 7 of type <nGRAI-2> with a deposit of €10 each.

S.#	INVOICE	Meaning of every segment
	...	
#37	LIN+<N>'	
#38	PIA+5+<*nGRAI-1*>:**SUE**'	Asset (type) is identified by nGRAI <*nGRAI-1*>
#41	QTY+47:*5*'	Invoiced quantity = *5* [<*nGRAI-1*>]
#47	MOA+203:*100*'	**with VAT** on RTI : Line item amount = *100*
	MOA+227:*100*'	**no VAT** on RTI : Deposit = *100*
#52	PRI+AAA:*20*'	Net price = *20*
#37	LIN+<N+1>'	
#38	PIA+5+<*nGRAI-2*>:**SUE**'	Asset (type) is identified by the <*nGRAI-2*>
#41	QTY+47:*7*'	Invoiced quantity = *7* [<*nGRAI-2*>]
#47	MOA+203:*70*'	Line item amount = *70*
	MOA+227:*70*''	Deposit = *70*
#52	PRI+AAA: *10*'	Net price = *10*
	...	

The RTIs are identified in the PIA with a non serialized GRAI. The deposit value of the RTI is specified in the PRI Segment, and the total number of RTIs in the QTY segment.

The exact settlement system is left to the discretion of each national GS1 organisation. This way users are assured that country-specific tax and legal requirements are met. Please contact your national GS1 organisation for more details.

8.4.2.2. SERIALISED GRAI (= sGRAI)

In addition to the preceding INVOIC example, here is how to handle **s**GRAIs in the INVOIC. Segments which are identical for both types of GRAI, are marked in grey.

In this example it is assumed that a number of goods have already been invoiced in the <N-1> previous LIN segments. Next, all related RTIs are identified and invoiced: 5 RTIs of type <nGRAI-1> are identified with **s**GRAIs <sGRAI-1> to <sGRAI-5> and have a deposit of €20 each. Additionally, 7 RTIs of type <nGRAI-2>, with a deposit of €10 each, are identified with **s**GRAIs <sGRAI-10> to <sGRAI-16>.

S.#	INVOICE	Meaning of every segment
	...	
#37	LIN+<N>'	
#38	PIA+5+<nGRAI-1>:**SUE**'	Asset (type) is identified by nGRAI <nGRAI-1>
#41	QTY+47:5'	Invoiced quantity = 5 [<nGRAI-1>]
#47	MOA+203:100'	**with VAT** on RTI : Line item amount = 100
	MOA+227:100'	**no VAT** on RTI : Deposit = 100
#52	PRI+AAA:20'	Net price = 20
#56	PAC+5'	Current line item consist of 5 packaging units [RTIs]
#58	PCI+<41G>'	Packaging units are marked with a GRAI
#59	GIN+**DB**+<sGRAI-1>+<sGRAI-2>+<sGRAI-3>+<sGRAI-4>+<sGRAI-5>'	RTIs identified by sGRAIs <sGRAI-1> to <sGRAI-5>
#37	LIN+<N+1>'	
#38	PIA+5+<nGRAI-2>:**SUE**'	Asset (type) is identified by the <nGRAI-2>
#41	QTY+47:7'	Invoiced quantity = 7 [<nGRAI-2>]
#47	MOA+203:70'	**with VAT** on RTI : Line item amount = 70
	MOA+227:70'	**no VAT** on RTI : Deposit = 70
#52	PRI+AAA:10'	Net price = 10
#56	PAC+7'	Current line item consist of 7 packaging units [RTIs]
#58	PCI+<41G>'	Packaging units are marked with a GRAI

S.#	INVOICE	Meaning of every segment
#59	GIN+**DB**+<*sGRAI-10*>+<*sGRAI-11*>+<*sGRAI-12*>+<*sGRAI-13*>+<*sGRAI-14*>'	RTIs identified by sGRAIs <*sGRAI-10*> to <*sGRAI-14*>
#59	GIN+**DB**+<*sGRAI-15*>+<*sGRAI-16*>'	RTIs identified by sGRAIs <*sGRAI-15*> to <*sGRAI-16*>
	...	

The PAC segment (#56) is necessary to get to the PCI-GIN group. Its information must be identical to the preceding QTY segment (#41).

9.   Appendix 1 – Source Reference recapitulation

Number	Reference name	Source	Version
Ref1	Business Requirements Document (BRD)	GS1 Nederland	1.0 - 19/10/2005
Ref2	Logistics Interoperability Model (LIM)	GS1	1.0 June 2007
Ref3	Reusable Transport Items (RTI) – Organisational Recommendations	ECR Europe / CCG	2003
Ref4	GENERAL SPECIFICATIONS	GS1	
Ref5	UN/CEFACT	UN/CEFACT	2008
Ref6	CD ROM EANCOM® 2002	GS1	2002
Ref7	GS1 in Europe Despatch Advice Guideline	GS1 in Europe	May 2008

10.   Appendix 2 – Glossary of terms

	DEFINITION	SOURCE
AI	Abbreviation for Application Identifier	
10.1.1.1.1.1. AIDC	Abbreviation for Automatic Identification and Data Capture. A technology used to automatically capture data. AIDC technologies include barcode symbols, smart cards, biometrics and RFID.	*(Ref4)* GENERAL SPECIFICATIONS V8
Carrier	Party undertaking the transportation of goods from one point to another. The party that provides freight transportation services or a physical or electronic mechanism that carries data.	*(Ref2)* LIM *(Ref4)* GENERAL SPECIFICATIONS V8
Carrier/forwarder	The carrier is the party undertaking the transport of goods from one point to another. The freight forwarder is the party arranging the carriage of goods including connected services and/or associated formalities on behalf of a shipper or consignee.	*(Ref2)* LIM *(Ref5)* UN/CEFACT
Company Number	A component of the GS1 Company Prefix. GS1 Local Member Organisations assign GS1 Company Prefixes to entities that administer the allocation of GS1 System identification numbers. These entities may be, for example, commercial companies, not for profit organisations, governmental agencies, and business units within organisations. Criteria to qualify for the Assignment of a GS1 Company Prefix are set by the GS1 Local Member Organisations.	*(Ref4)* GENERAL SPECIFICATIONS V8
Consignee	The party by whom the goods, cargo or containers are meant to be received. The actual physical receipt can take place by another party.	*(Ref2)* LIM
Consignor	The party by whom the goods, cargo or containers are sent. The physical dispatch can be done by another party. Synonym: Shipper.	*(Ref2)* LIM
Despatch advice	A message specifying details for goods despatched or ready for despatch under agreed conditions.	*(Ref6)* EANCOM® 2002
Global Location Number GLN	The GS1 Identification Key used to identify physical locations or legal entities. The key is comprised of a GS1 Company Prefix, Location Reference and Check Digit.	*(Ref4)* GENERAL SPECIFICATIONS V8

Global Trade Item Number GTIN®	The GS1 Identification Key used to identify trade items. The key is comprised of a GS1 Company Prefix followed by an Item Reference Number and a check digit. Identification of a trade item, which is defined as any item (product or service) upon, which there is a need to retrieve pre-defined information and that may be priced or ordered or invoiced at any point in any supply chain. A Global Trade Item Number® may use the GTIN-8, GTIN-12, GTIN-13, or GTIN-14 Data Structure.	*(Ref4)* GENERAL SPECIFICATIONS V8
GLN	Abbreviation for the Global Location Number.	
GS1 Check Digit Calculation	A GS1 System algorithm for the calculation of a Check Digit to verify accuracy of data. (e.g.: Mod 10, Price check digit).	*(Ref4)* GENERAL SPECIFICATIONS V8
GS1 Company Prefix	Part of the GS1 System identification number consisting of a GS1 Prefix and a Company Number, both of which are allocated by GS1 Member Organisations.	*(Ref4)* GENERAL SPECIFICATIONS V8
GS1 General Specifications	Defines the GS1 System data and application standards related to the marking and automatic identification of trade items, locations, logistic units, assets, and more using bar code, RFID, and GS1 Identification Keys.	*(Ref4)* GENERAL SPECIFICATIONS V8
GTIN®	Abbreviation for the Global Trade Item Number®.	
Inventory report (INVRPT)	A message specifying information related to held inventories and planned or targeted inventories. The Inventory Report message is intended to be used in either direction between trading partners.	
Invoice (INVOIC)	A message claiming payment for goods or services supplied under conditions agreed between the seller and the buyer.	*(Ref6)* EANCOM® 2002
Instruction to despatch (INSDES)	A message from a party to another party who has control over ordered goods, providing instructions to despatch or collect a consignment according to conditions specified in the message	*(Ref6)* EANCOM® 2002
Logistic service provider	Party providing logistic services such as warehousing, re-packing products, distribution and assembly. Synonym: Third-party logistics provider (3PL)	*(Ref2)* LIM

Logistic unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with SSCC.	*(Ref4)* GENERAL SPECIFICATIONS V8
RETANN (Announcement for Returns)	The Announcement for Returns message is used by a party to announce to another party details of goods for return due to specified reasons (e.g. returns for repair, returns because of damage, etc.).	
RETINS (Instructions for Returns)	The Instructions for Returns message is the means by which a party informs another party whether and how goods shall be returned. The sender of an instruction for returns message will normally have previously been informed by the recipient of the intention to return goods by means of the Announcement for Returns message.	
RTI Reusable Transport Item	A reusable entity owned by a company that is used for transport and storage of good. RTI are all means to assemble goods for transportation, storage, handling and product protection in the supply chain which can be returned or exchanged for further usage, including for example pallets as well as all forms of reusable crates, trays, boxes, roll pallets, barrels, trolleys, pallet collars and lids with and without cash deposits. The term RTI is usually allocated to secondary and tertiary packaging. But in certain circumstances also primary packaging may be considered as a form of RTI. Freight containers, trailers and other similar modules are not covered by the terminology.	*(Ref1)* BRD GS1 Nederland
SSCC	Term used for the Serial Shipping Container Code. This GS1 Identification Key used to identify logistics units. The key is using an 18-digit data structure comprising Extension digit, GS1 Company Prefix, Serial Reference, and Check Digit.	*(Ref4)* GENERAL SPECIFICATIONS V8
Trade item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.	*(Ref4)* GENERAL SPECIFICATIONS V8
Warehouse	A building specially designed for receipt, storage, material handling, reconditioning and shipping of products.	*(Ref2)* LIM