

# ISO/IEC JTC 1/SC 31

## Automatic identification & data collection

### Report on continued standardization of Bar Code & RFID

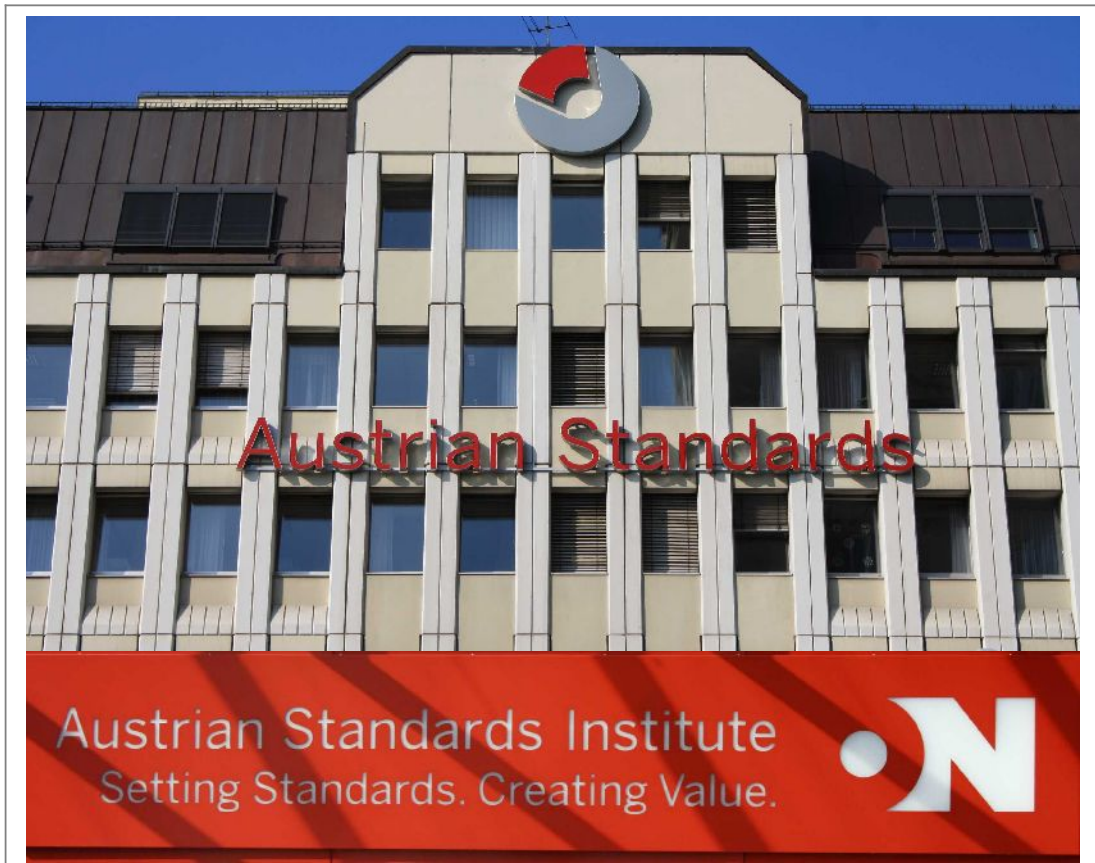


Fig.1) „Austrian Standards Institute“ hosting the JTC 1/SC 31 plenary meeting 2011

*Delegates of Nations and liaison of all parts of the world are contributing to standardization of AutoID techniques*

 Australia	 Austria	 Belgium	 China	 Canada	 Switzerland	 Germany	 Finland	 France			
 Japan	 Singapore	 S. Africa	 S. Korea	 Sweden	 NL	 Russia	 UK	 USA			
<i>and contributing organizations:</i>											
AIM	CEN TC225	DOD	EDC	ETSI	GS1	IATA	HIBC	ISO TC122	ISO SC17	ITU	UPU

*( and others such as IATA, IEEE , NATO)*

Editor  
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in co-operation with AIM, DIN, EDIFICE, Ehibcc and Liaisons  
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## AutoID standardization on highest level

### Introduction



*Fig. 2) Austria as host: Kerstin Zimmermann, Ministry of Transportation, Innovation & Technology welcomes the guests from all over the world.*

**Automatic Identification stands for error-free data collection** and consequently also for error-free data processing. The technical term is „AIDC“ (Automatic Identification & Data Capture“ or „AutoID“ as a generic term. There is a distinction between Optical Readable Media – ORM, where Bar code & OCR is belonging to and Radio Frequency Identification technology (RFID). Thus, the technologies are available globally, is standardization necessary. **AutoID with "ORM" and "RFID " are standardized techniques.** After the first sectorial and national standards of the early 80's followed the standardization at European level by creation of CEN TC 225 AutoID. However, with regard to globalization and global trade it has been found that global standardization is necessary as well for worldwide effectiveness. Therefore, in 1996, the Committee, "ISO / IEC JTC 1/SC 31 - Automatic Identification and Data Capture Techniques" was founded. The responsibility for

AIDC was assigned by the joint consortium of ISO and IEC for Information Technology, the Joint Technology Committee 1 (JTC 1) " The delegates of the national standardization bodies, composed of liaison organizations work together under that umbrella. Starting the JTC 1/SC 31 work existing CEN and also national standards have been transferred in the ISO standardization first, but followed by the new projects.

All stakeholders with interest in global standards for AutoID for Item & Supply Chain Management are invited to submit their requirements to the working groups, or better yet, even to collaborate directly creating globally effective specifications. The prerequisite is participation in one of the National Institute of the own country. The pragmatic rule for taking new standardization projects is that at least 5 other countries are in favor. This is to vote each. If voting was successful, the project will be assigned to a working group or a new WG will be established, if necessary. The final standards are available via the national bodies or from ISO. The standardization work for new projects involves the regular update of existing standards in a 5-year maintenance cycle. The working groups are compiled on specific subject areas (Table 1). Once a year, all sub-committee's meet in the "Plenary Meeting" to report on the results and take on new projects.

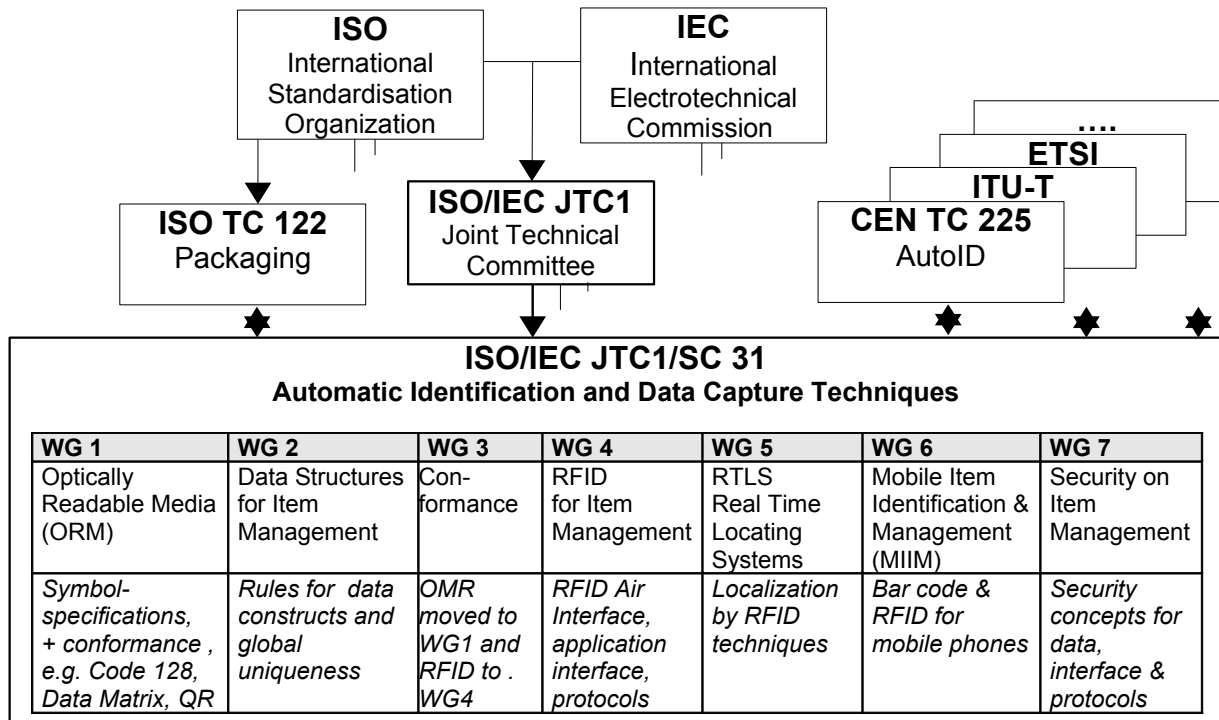
Following China 2010, the Austria Standards Institute invited 2011 to come to Vienna for holding the JTC 1/SC 31 plenary committee and sub-groups meetings there. On the part of the host Austria welcomed the guests, the representative of the Ministry of Transportation, Innovation and Technology, Mrs Kerstin Zimmermann (Fig. 2) and reported on extensive support for projects of "Intelligent Transportation Systems". The delegation of Japan could not do otherwise than to mention the recent tsunami and the associated problems and to thank the support and concern that Japan has received from all over.

The current slogan of the now 90-year institute Austrian Standards is: "Setting Standards. Creating Value". Under this banner the sessions have been held and in a most constructive and harmonious atmosphere.



*Fig. 3) AutoID experts in discussion*

Table 1) ISO/IEC JTC 1/SC 31 and its working groups on AutoID



### Topics of specific interest

From the variety of individual topics not every detail can be included in the report but those should be highlighted which are of specific interest for user areas of industry, healthcare and distribution:

- The national delegations report
- The ISO / IEC JTC 1/SC 31 committee meetings
- Key standard for uniqueness "ISO / IEC 15459 Unique Identification" completed and applied with the feature for unique "Returnable Packaging - RTP"
- Upgrade of RFID standards and integration of security techniques
- Update of RFID standards and integration of security mechanisms
- Open access to the standing document with listed "RFID Application Identifiers (AFI)"
- Access to the "Internet of Things (IoT)"
- Progress to the "Guidelines for using AIDC media (BC & RFID)"
- Standardization project Bar code & RFID for mobile phones
- Update Bar code & RFID application standards for "Returnable Packaging"
- Exchange of experiences in addition to the meetings

### The national delegations report

With Resolution 1998 in Rio de Janeiro, the national report was introduced in order to keep the committee informed about regional situation and trend to be considered for the work to be done. The national reports are submitted prior to the conference but commented during the meeting. Below are some excerpts from it to get an impression.

### Special report from Japan

The head of delegation of the Japanese Industrial Standards Committee (JISC) Akira Shibata presented an impressive report about the problems surrounding the earthquake and tsunami underlined by a live video.



Fig. 4 )Japan expresses thanks

Japan is one of the leading countries for the development and manufacturing of Auto-ID products. The Japan market is estimated at 220.7 billion yen, of which 14 million are barcode scanner worth of 44.3 billion yen. Now, he said, we have to deal with the problems and compensate for any shortages. He thanked, on behalf of Japan's Committee for the sympathy and support that Japan experiences. But he reported as well, that the tsunami did not effect the standards committee and its active work. Japan is extremely engaged with the standardization on AIDC. This is specifically visible in the public where QR code is seen in news papers and on fliers to be scanned by mobil phones linking to information sources like public transportation, cinemas shops, etc. By help of a mobile phone even tickets can be booked via QR code. For good reasons of deep expertise Toshihiro Yoshioka was confirmed at the plenary as chairman of the working group WG 2 - data structures.



Fig. 5) Nations report each other

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### Country specifics

With view to open trade, it is the ambition of the committee to synchronize the methods where, AutoID can be used as part of the IT concepts unrestricted and globally.

For this it is interesting to highlight some of the contributions coming from different countries.

- China: The People's Republic of China sent delegates from the two metropolitan areas Shandong and Beijing. The reported highlighted the development of the Chinese 2D-symbology, the "Han Xing Code ". The specification is being under preparation for normalization by by AIM China and AIM Global. China takes part actively with the JTC 1/SC 31 work and related voting joining the efforts for global harmonization.
- Korea: In Korea, the ministry is highly interested in setting standards for RFID applications in conjunction with mobile phones, providing the secretariat for the project "Mobile Item Identification and Management" assigned to WG 6.
- USA: The U.S. seems to be the most active group in the SC 31 supplying the Secretariat of JTC 1/SC 31 and the chairmen for the working groups WG1 and WG 5, 6 & 7. In addition, AIM-USA provides a registry for the "RFID Emblem" and for the "Application Family Identifiers (AFI) for RFID. In terms of traceability a project of particular interest might be the "UID" project of the US Department of Defense , which has global implications and impact on optimization of logistics even to NATO. The project "Unique Identification (UID)" has been set up to trace equipment, key parts and spare parts by help of a powerful central data storage. The base for "Item Unique Identification" is its serialization by help of DATA MATRIX. The successful project takes use of ISO standards for data carrier and data structure fully. Experts appreciate that "ASC Data Identifiers DI's" making suppliers original codification schemes globally unique. The UID's with DATA MATRIX enable realization of the challenging tasks tracking and tracing items for lifetime for control of inventory, maintenance cycles and locations where the items are available. Accordingly, a new market for direct part mark (Direct Part Marking - DPM) is obvious. US reported that RFID will move from standard applications to new area's with sensors and battery assistance opening much higher market potential by standardization. Moreover, the United States invites you to the 2012 plenary meeting in Pittsburgh.
- Germany: The delegation said that Germany is not an island but part of global developments. In addition to engagement with ISO, DIN is active with CEN TC 225 and with EU projects on RFID. From national view it is still fact that optical identification

techniques are dominant where trend to 2d-symbols like DATA MATRIX ISO/IEC 16022 are in the foreground. RFID applications for open supply chain management solutions migrate slow as in other countries but get increasing ground for special applications bar code cannot make. Certainly there are national peculiarities as in healthcare, such as application of Data Matrix on delivery notes and for products consisting of sets. The project "PaperEDI" promoted by the Healthcare Bar Code Council (EHIBCC) is enabling laboratories, hospitals and doctors to enter in the EDI world by help DATA MATRIX as data carrier. The service is already offered by suppliers and distributors in the commercial health sector, so that even dentists can scan delivery documents error free and quick by help of a DATA MATRIX. Using it, legal requirements for documentation received and used material can be fulfilled easily by optimizing same time handling of internal processes of inventory management processes, ordering, etc. This as an example that ISO standards can be used for benefit within any area but specifically by cross business applications. as from industry and distribution to health care.

- United Kingdom and France: UK and France also reported on additional activities resulting from activities in the European Union. Specific efforts are to make to participate with the "EU RFID Mandate M/436 - Information Technologies and applied to radio frequency identification (RFID) and Systems". "Privacy" for RFID is of high interest within the European Commission, specifically in connection with the developments for the "Internet of Things (IOT). The AutoID experts are ask for contribution to get the balance between fulfilling the public requirements on one hand but on other hand to promote the development on RFID.

### The ISO/IEC JTC 1/SC 31 committee meetings

A meeting on the international committee of IT experts, offers far more than the formal aspects work on standardization. Here is the opportunity to exchange experience in practices, trends and specific solutions. Especially interested, such as China search here the opportunity to get entry in international affairs. Even the participation of about 50 experts who meet at a common location, shows the great importance which is given to the ISO standards.

This year also took part, the representative of the parent Joint Committee 1 (ISO / IEC JTC 1), Ms. Karen Higginbottom (Chairman) and could provide valuable information on the procedures of ISO administration.

Table 2) The committee meetings

SC 31/WG 5	SC 31/WG 4-RFID	SC 31/WG 2	HoD	SC 31 Plenary
Chair Marsha Harmon  RFID Realtime Localization	Chair Henri Barthel RFID Air Interface, Application Interface Protocols, Conformance	Chair Toshihiro Yoshioka Data Structures for automatic identification and item management	Chair Ray Delnicki meeting „Head of National Delegations“ & Convenor's	Chair Chuck Biss Full Plenary Meeting Voting Members, National Bodies, Liaisons, Convenors

Table 2 shows the working sessions and the plenary summary on the last day. All other committee's meetings were set to separate appointments and meeting places, such as WG1 "ORM" in May in Stockholm, others to Korea and UK or were held as telephone conferences.

### The Mission of the DIN delegation

The order of the 3-member delegation was to represent the interests of the German community for interoperable standards and balanced solutions, e.g.:

- Maintaining the flexibility and capacity for unique ID numbers (license plates) for products, packaging, transport units, containers, etc.
- Focus on the ISO specifications for cross-industry functionality and to avoid licenses wherever possible.



Fig. 6) Josef Schürmann, DIN NIA 31 reports

- Update of the key standards for unique labeling and extensions for "ISO / IEC 15459 Unique Identification" in the "WG 2 Data Structures (for BC & RFID).
- Completion the "Application Guidelines" with shared data structures for bar code & RFID.
- Compliance with new requirements for control of emission and security but avoiding restrictions for practical applications in supply chain management.
- Lobbying for new solutions to close gaps, such as for "Set labels" and identifying product set's content in one hit (See annex).

The preparatory work for the delegation was the job of DIN-043-NA 01-31 AIDC and its members from industry, health and consumers area, supported by specific associations such as AIM-Germany, CEFIC, EDIFICE, EHBCC, EDC and liaison partners.

### Key standard for BC&RFID “ ISO/IEC 15459 Unique Identification”

The topic "unique identification" by ISO / IEC 15459 has the highest priority within WG2, because this standard is a prerequisite for unique marking at all, whether with barcode or RFID. ISO/IEC 1549 enables fulfilling the requirements for unique identification for tracking & tracing in open supply chain systems. It has been updated and consists of meanwhile 6 parts covering the levels from individuals items up to Returnable transport items. The specifications are provided with the identifiers for use in bar code and with object identifiers (OID's) for RFID.

Table 3) The parts of the key standard ISO/IEC 15459 for unambiguous identification

ISO/IEC 15459 Information technology - Autold and data capture techniques - Unique identification					
Part 1	Part 2	Part 3	Part 4	Part 5	Part 6
Individual Transport Units	Registration Procedures (Registration Authority is NEN)	Common Rules	Individual Products and Product packages	Individual Returnable Transport Items (RTI) & Returnable Packaging (RTP)	Groupings

Parts 1 – 6 completes ISO/IEC 15459 fully for application at every logistical level. By help of the standardized structure now any product, item or object can be marked uniquely, no matter where the marking or identification takes place in the world.

### Upgrade of RFID Standards, integration of techniques for security

For addressing the "RFID for Item Management WG 4 is responsible within JTC 1/SC 31. This WG enjoys very high popularity in the context of development international standards. WG 4 is covering the whole range of RFID technologies: RFID Air Interfaces, Application Interface Protocols, Conformance, but also legal aspects of patents. Any RFID standards for item management passes that team of experts. The specifications for RFID air interfaces of the frequencies <135KHz up to 2.4 GHz are published and available from national sources and ISO. Facing the availability of the RFID standards today, it has to be recognized that the group and affiliated national bodies did a good job. No it is with the users to take the benefit from it.

Table 3)  
New structure for RFID UHF standard

ISO/IEC	UHF
18000-6	general
18000-61	Type A
18000-62	Type B
18000-63	Type C
18000-64	Type D

**Upgrades** Upgrades and expansions are already in work with most RFID standards after the first edition. ISO/IEC 18000-6 became major extensions for sensors battery assistance. It became so large, that it has been restructured and split 5 parts (see table 3). In response to the "**Security & Privacy**" discussion in EU bodies and in the public, privacy techniques should be included in the next updates, specifically for the UHF RFID standard ISO / IEC 18000-63. The modules for it are in preparation already with working group „SC31/WG 7 Security on Item Management” under convenor-ship of Dan Kimball (USA). The project title is: "ISO/IEC 29167 Air Interface for file management and security services for RFID".

Optical signing for RFID tagged products and systems is another requirement addressed by the EC. The answer is the Standard ISO/IEC 29160 RFID Emblem. It is determined for optical

recognition "**Where RFID is in - RFID shall be seen**". The concept of the ISO RFID Emblem has got acceptance from CEN and EC committees in 2010 already. The graphics of the emblem are available via internet under: [www.aimglobal.org/standards/RFIDEmblem](http://www.aimglobal.org/standards/RFIDEmblem).



Fig. 7) ISO RFID-Emblem, source:AIM

### Public availability of the listed „RFID Application Family Identifiers (AFI)“

The Application Family Identifiers are, as the name implies, to identify specific applications and their data structures. The list of "AFI's" started with the introduction of RFID technology for smart cards. AFI's consist of registered bit sequences and identify the class of following data information in a RFID tag, e.g. „Product ID“, Packaging ID, Transport ID, etc. These are part of the specific RFID application standards of ISO TC 122 Packaging having produced the series of standards ISO 17364 to ISO 17367 for Freight Containers down to item identification. The list of AFI's was part of „ISO/IEC 15961 RFID Data Protocol“ but the committee felt that the list should be public available at the internet pages of JTC 1/SC 31 for direct access. The plenary agreed and advised the secretariat was instructed to implement this. AIM US declared prepared to act as a Registration Agency for AFI's for potential maintenance caused by applications for new AFI's. The latest AFI's have been assigned for the library community to identify books uniquely. The move to more public information shall assist system integrators better to implement ISO conforming RFID systems for reasons of compatibility of equipment and interoperability of tags in conjunction with necessary security features.

### Unused bit structures in RFID memory chips

In connection with the publication of the AFI list the bit structure of UHF RFID tag memories was discussed for reasons of opening it for new applications. The structure of the RFID chip memories is standardized. Segments are reserved for functional control, for the key data element, the "Unique Item Identifier - UUI" for the items to be tagged and a separate segment is determined as user area where the user can store its individual data information. Experts know that one BIT (BIT 17) identifies either a data according to the EPC structure (switch to "0") or an AFI (1) implementing specific application or item level. In discussion it was felt, that RFID tags would offer much more features if BIT 17 would be opened for other usage as just for EPC and AFI features. The discussion was stimulated by reports out of tendencies within groups of ITU-T for adding an additional "bit level" for similar purposes. Experts felt that opening the current bit structure would enable ITU-T to realize the ideas without changing the current standard specification. Interfering to current RFID specification would not be agreed by JTC 1/SC 31. Experts are asked to supply proposals for updating the definition for the current RFID memory specifications in order to fulfill new application requirements like those from ITU.

### Additional bands for RFID applications still open

JTC 1/SC 31 applied for usage of frequencies getting available after shut down of analog frequency bands of radio & television. Nevertheless there are other applicants in competition such as satellite radio. It requires much more detailed negotiations by experts like Josef Schürmann (DIN) and



Fig. 8) The China delegation

Josef Preishuber-Flügl (AN) to get it settled. It is about the use of 4 channels (916,3; 917,5; 919,7 and 920,9 MHz). The result is not foreseeable yet.



Fig. 9) Josef Preishuber-Flügl, Graz, Austria

### “Internet of Things - IoT”: RFID support for ITU-T X.500/LDAP“

The Working Group of the International Telecommunication Union - ITU-T/SG 17 developed a solution that takes into account a unique item identification (UII) of an RFID chip as a reference pointer for access to directories on the net. This is similar to the solution for access by an EPC code, but, as an open system for all participants that have received a unique Company Identification Number (CIN) Code from one of the 30 Issuing Agencies in accordance with ISO/IEC 15459-2. The actual ITU specification uses the SC-31 definitions for UII's, converting the ID to the X.500 structure, making it compatible. The Ad-Hock Committee will

coordinate with the ITU subcommittee to harmonize the definition. With the help of the ITU, the door for further access to the Internet of things will be opened (Fig. 10). The approach of the WG 6 project „MIIM“ is it, not to restrict access to the network to RFID only but to enable it via Bar code & RFID ID's as well captured by mobile phones. There is still a long way to get the "Internet of Things" done, facing different scopes of groups being interested in IoT.

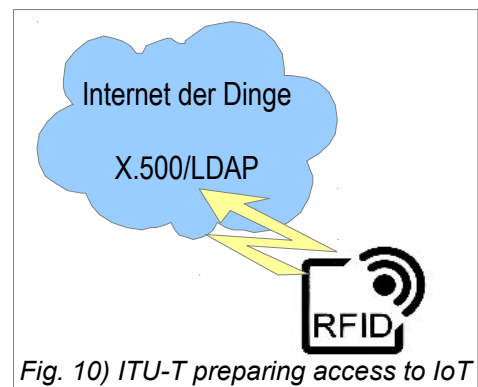


Fig. 10) ITU-T preparing access to IoT

### “Guidelines for using AIDC media (Bar code & RFID)”

The project "ISO / PDTR 29162 Guidelines for using data structures in AIDC media" has been assigned to WG 2. The focus is on interoperability and shall illustrate how data information is embedded within either Bar Code, 2D or RFID in a fully compatible manner. Implementations where new data sets had to be developed just for RFID applications have proven to be expensive and partly impractical. Moreover, there is no necessity for different data sets between Bar Code and RFID tags applied to same item since "ISO/IEC 15459 Unique Identification" specifies one ID only regardless of AIDC media. This applies to products such as transport units and returnable items, which have got one part each within ISO/IEC 15459. In essence, the standards prepare the most efficient choice for implementing RFID in existing systems – which is just to use the Bar Code infrastructure instead of generating new references to tagged items. Taking the existing references reduces the investments in front end installations where the ERP system may even ignore how the data is being captured from Bar Code or RFID. Experts from Japan, USA and DE put together principles and facts resulting in the guideline as a Technical Report. It describes how this method can be realized most easily for efficient systems. In addition to guidance for interoperability, it will include solutions on how data can be stored in an RFID chip most compactly to save space and to accelerate reading speed. These will meet the requirements from user groups, such as the "Joint Automotive Industries (Europe, Japan, US)" and many others where a bar code infrastructure is in place but RFID is integrated. Interaction of Bar Code & RFID implements a migration path from one technology to the other, but also supplies a back-up using hybrid solutions. Thus, the optical code is used on the ID card as the key to the information in the RFID chip.

## The mobile phone as data collection device

The project "MIIM", being attractive for applications in many areas, as well as for the public, was assigned to SC31/WG 6. The scope of the project reads: "Standardization of automatic identification and data collection techniques that are anticipated to be connected to wired or wireless networks, including sensor specifications, combining RFID with mobile telephony, and combining optically readable media with mobile telephony".

The term "Optically readable media" categorizes the reading of linear Bar Code as well as 2D symbols, like Data Matrix and QR Code. The convener of WG 6 is Craig Harmon (USA). He reported at the plenary on the rapid development of the current nine specifications, which are the modules for MIIM systems: ISO/IEC 29143 and ISO/IEC 29172 to 29179 (Fig. 12). The specifications cover the integration of Bar Code and RFID readers into Mobile phone devices, including specifications related to applications and service brokers. Since the solution will be specifically attractive for use in the public, it also contains security aspects within ISO/IEC 29176, Information technology — Automatic identification and data capture techniques — Mobile item identification and management — Consumer privacy-protection protocol for Mobile RFID services.

One of the drivers for the standard and supported by the national government is the standardization institute of Korea focusing on the use of RFID by the public. The input from Japan concentrates to interoperable use of ORM, based on their outstanding experience with QR code for public use, e.g. for reservation of cinema tickets by scanning advertisements via mobile phone.

Even in Germany, there is already QR code on advertising media. For example, QR Code is used on posters, bus stops, for linking the scanning of the QR Code to an internet connection to specific information ("routing"). In order to implement global solutions, of course, international standardization is a prerequisite so that this can be used everywhere.



Fig. 11) MIIM & QR in Japan  
Source: Akira Shibata, Japan

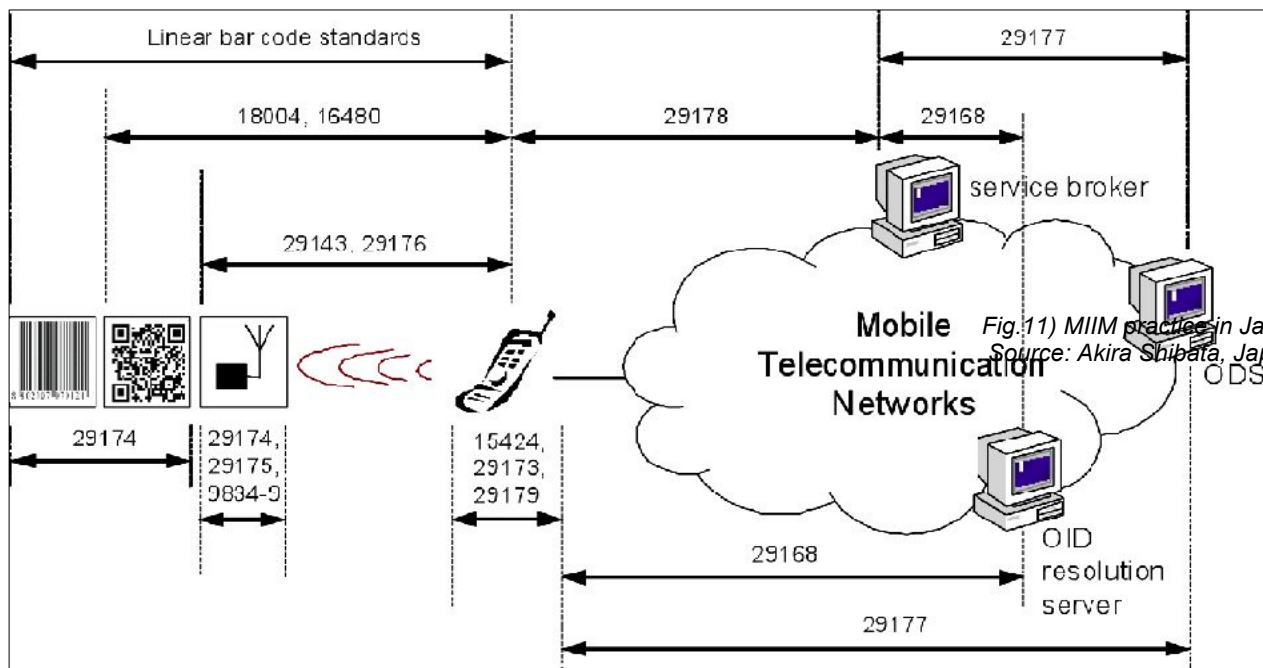


Fig. 12) Coverage of Standards for Mobile Item ID & Management (MIIM), source Craig Harmon, WG 6

## Bar code quality specifications for mobile phone use

The increasing usage of bar code scanning features of mobile phones causes increasing requirements quality and test specifications for it. In-build carrier's get the functionality of a bar code scanner and display's become media for symbols to be scanned. Airlines like Lufthansa offer it for check in, where the mobile phone display needs to perform for scanning at the

airport. Existing quality test specifications ISO/IEC 15415, 15416 don't cover this application exactly because the devices use a back lighted display performing totally different than a printed label. SC 31/WG 1 has been charged with the new project titled „Reading and display of ORM by mobile devices” (ORM stands for Optical Readable Media).

### Quality & test specification for Optical Character Recognition - OCR

This new project has been initiated in cooperation with the committee for smart card technologies JTC 1/SC 17. Convenor is Sprague Ackley, Intermec USA. The project is of special interest of the responsibilities for pas port printing, such as the federal Printing services for the German pass ports. The OCR text is used as a key to access the data in the embedded RFID chip of the new identity cards. If OCR is not readable, there is no access to the data information. Quality test specifications being used for bar code since along time have been missing for OCR and will be written right now where the experiences with bar code will be considered very well.

## Report on the update of global bar code & RFID application standards for Returnable Packaging

Whereas technical specifications are subject of SC 31, application standards for AutoID are dedicated to ISO TC 122, WG 10. The chairman, Craig Harmon, reported to the Plenum on the status for both the application standards for Bar Code and RFID and how the coverage is for the whole range of supply chain applications.

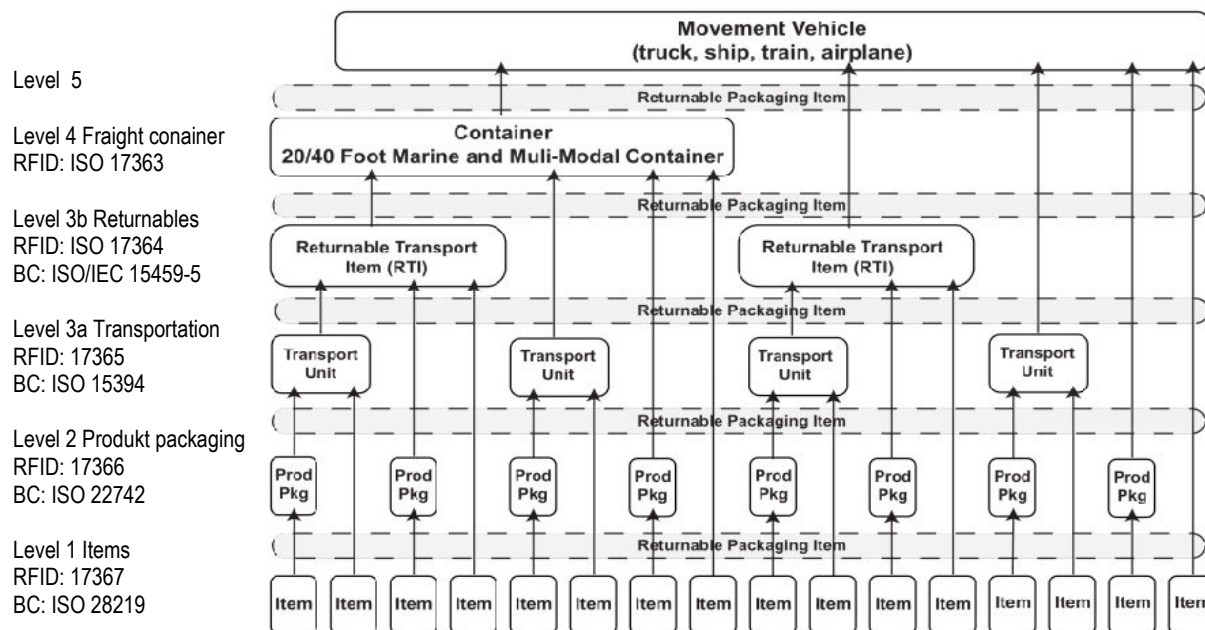


Fig 13) Chart Bar Code & RFID ISO-Standards covering the levels for supply chain applications

Figure 13 shows the layers from item to container, where each layer has one standard for Bar Code and equivalently one for RFID. During the update, an additional layer was introduced, the "Returnable Packaging ID (RPI)". In conjunction with this development, the need for a new Data Identifier crystallized for this specific layer. Immediately after the meetings, the application for that new DI was passed to the ASC DI Maintenance Committee. It took just a few day's to get the new DI registered, the ASC DI 55B for a "Globally Unique Returnable Packaging Item – RPI" (see info box). The application standards use the technical specification for data and carrier, and bundle it in accordance with the implementation. Both ISO 15394 "Bar Code for Transport Units" and ISO 17365 "RFID for Transport Units" use the same unique ID the as mandatory data element, the "License Plate" according to ISO/IEC 15459-1 of SC 31/WG 2. Technology which depends on the Data Identifier "J" is used for Bar Code in a 1:1 ratio, but for RFID, it is translated into Bit structure according to the RFID data protocol. A similar principle applies if the AI "00" is chosen for a License Plate. It is translated to an EPC

code in this case. In both cases, the ISO conforming decoders and interrogators are programmed to automatically interpret any combination correctly. The revisions of the RFID application standards, ISO 1736x, contain a harmonized Bit structure of 6 bit's over all layers and link to Bar Code and are interoperable with it. Furthermore, it contains the RFID Emblem ISO/IEC 29160 for visualization of invisible RFID tags for users. The state of standardization constitutes a comfortable situation across industries and countries. It answers the call for more standards but it minimizes it to "one standard only" per layer and technology. Together, these standards provide the necessary flexibility for meeting the requirements of open supply chain processes and offer the capacity for individual numbering schemes of variable length for unique identification where ever needed.

### Exchange of experiences in addition to the meetings and individual AutoID solutions

The meeting of experts of all over the world allows enough room for additional issues of individual interest and exchange of experiences. Four members of the ANS MH 10.8.2 Maintenance Committee" for ASC Data Identifiers (DI's) have been present, a chance for many participants to share information to specific issues of global uniqueness and trends. Examples are "PaperEDI" with DATA MATRIX on delivery sheets (see report Germany) and "set-label" for identifying all components of a set by one scan. Both were build of the modules of the ISO standards strictly (see Appendix "set-label"). Even, new upcoming requests have been touched by the experts, such as for specific identification solutions for automotive, health care and pharmaceutical areas. Definitely it was not only about "see - and be seen" but more like "listen - communicate & contribute". Committee participation is an ideal chance for direct influence to projects but also for taking home new insights.

### Coverage under this report

This report has been written to provide an overview of the current standardization work at ISO/IEC JTC 1/SC 31 to AIDC, where some selected detailed information has been added for those with specific technical interest. Certainly not every project of potential interest of specific user groups could be touched on, such as the project "Real Time Location Systems (RTLS)", the subject area of WG 5. Nevertheless, although there are new developments progressing, such as a standard for the so called "CHIRP" technology, a localization principle similar to Radar. Even this example shows the wide range of AIDC. Those who may not find the desired

#### **Registration new ASC Data Identifier (DI's) bei „Maintenance Commitee“**

*The Accredited Standards Committee "ASC" being charged with maintenance of the Data Identifiers ISO/IEC 15418, part ASC DI's, consists of members from ASIA, Europe & USA. One task is the inclusion of new DI's listed with the document ANS MH 10.8.2. Requests for new DI's can come from any user area but require justification for global usage.*

#### **Data Identifier „(55B) Global Unique Returnable Packaging Item (RPI)“**

*The demand for a new DI for RPI's was originated by ISO TC 122, WG 10 in conjunction with updating ISO 17364 RTI. The committee checked the demand and confirmed registration of DI „55B“ for RPI's.*

#### **Data Identifier „(25P) Global Unique Personal ID“**

*Another application for a new DI was accepted being received from European Health Industry Business Council (EHIBCC). The new DI "25P" has got the definition for unambiguous identification of Patients and Personal.*

*Both DI's are available for use with bar code and RFID.*

information or need specific details may contact either the author or [www.DIN.de](http://www.DIN.de).

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Bild 14) Das JTC 1/SC 31 Sekretariat

*Encl.: Appendixes 1 to 4*

**Annex 1 to:**  
**"Guidelines for using data structures in AIDC media"**

The project "Guidelines" shall provide information for understanding how the same data information can be carried by either Bar Code or RFID, that is printed or loaded into a chip. Basic information will include how data elements will be constructed for guaranteed uniqueness within open supply chain systems. Below are some excerpts of contributions to the guidelines.

**Target „Unambiguity" and registered Company ID and Issuing agencies for it**

Companies can only supply unique codes to partners if the structure has worldwide agreement. The highest level possible for obtaining this agreement is ISO. One group alone can never guarantee that numbering schemes will not overlap with others, but ISO can by its power over the global network. The specification for supplying unique codes is developed by WG 2 and named "ISO/IEC 15459 Unique Identification". It defines the rules for how unique codes shall be constructed. The base hierarchical distribution of responsibilities goes to multiple partners. Where the responsibility for the number itself (product code, serial number, Lot, etc. ) remains with the libeler. The labeller gets protection from the next higher level, the Issuing Agency, by assignment of a unique Company Identification Code (CIN) just assigned exclusively to him. The Issuing Agency gets its authority from the Netherlands Standards Institute (NEN) on behalf of CEN & ISO. A unique code always consists of the elements "What is it - Who is responsible - What are the data". The information "What is it" is provided by the proper Identifier defining a product or transport unit or returnable container or just a LOT or a Serial number. "Who is responsible" is defined by the combination of an Issuing Agency Code (IAC) with an assigned Company Identification Code (CIN). Finally the data follow. In conjunction with the prefix Identifier, IAC-CIN, that data is unique regardless what media will be used. A common term for a unique data element, which is serialized, is the "License Plate" or, in case of RFID it is called the "Unique Item Identifier" (UII) for same thing. To ease understanding of the hierarchy figure 16), I will illustrate the structure:

(A) ISO/IEC and CEN authorize (B) NEN, Delft (Netherlands) to register "Issuing Agency Codes (IAC's)" for (C) organizations qualifying for it. Such a registered Issuing Agency (IA) is entitled to register Company Identification Codes. (D) A company having got such a "CIN" are in the position to make any internal numbers (E) globally unique. Simply, the labeling company puts the CIN with IAC and pre-fixing identifier in front of their own references and the number gets distinguished from any other companies number in the world, even if it is the same reference value. The pre-fixing identifier, either an AI or DI. provides for identification of the category of the item as serial number or product, Transport Unit, etc.

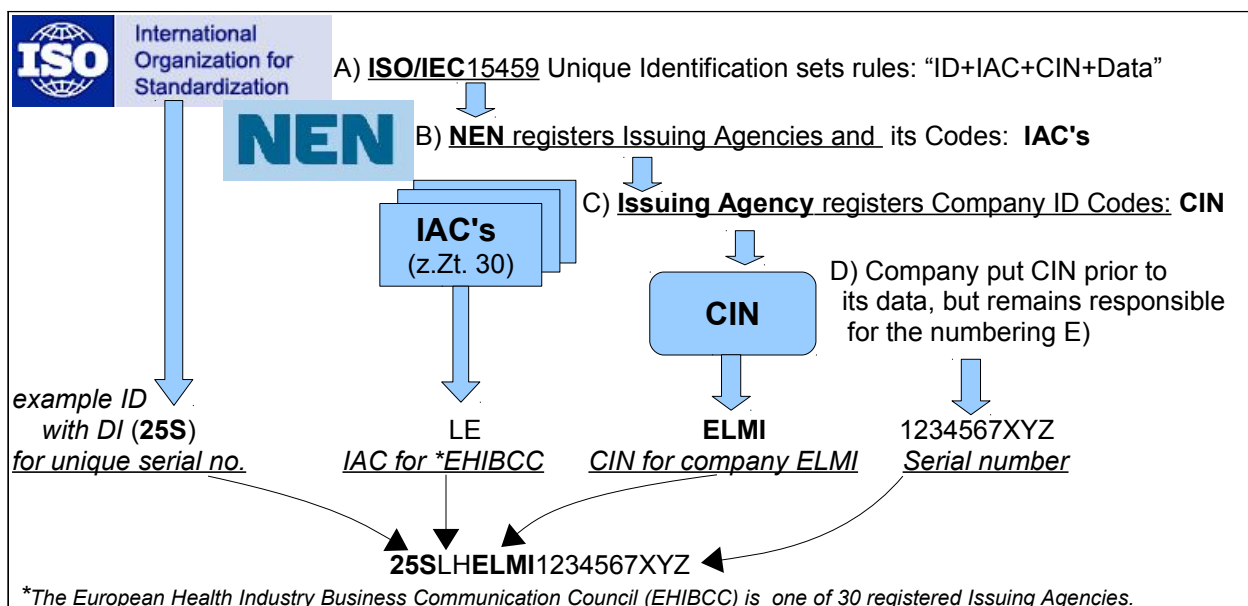


Fig. 15) Hierarchy of distinctiveness for unique Automatic Identification & Data Collection (AIDC) codes

For illustration purposes, fig. 16 shows a unique data element, with its proceeding data identifier (25S) for globally unique serial numbers. By means of this simple ISO/IEC 15459 method internal serial numbers will become globally unambiguous even for cross sectorial use. The following chapter will show the relation between Issuing Agency Codes, supported data structures and their capacities.

## Annex 2

### Company ID Codes and code capacity defined by Issuing Agency

Each Issuing Agency (IA) specifies their own formats for Company ID Codes and defines the data structure to be used for embedding a company's data. The Issuing Agency, GS1, requires the use of GS1 Application identifiers when used with trading partners using the GS1 system, the other 29 Issuing Agencies use ASC Data Identifiers. This is just a definition by the Issuing Agencies but does not affect the interoperability of the different coding schemes. Companies can choose any Issuing Agency. The choice by a company can be determined by whether their internal coding schemes fit and which do not to the structure of the Issuing Agency's code. To make such a decision, it is helpful to know the data capacity of data structures supported by Issuing Agencies prior to the choice. Table 5 shows a selection of IA's and supported CIN structure. It shows the data structure type and specifically for key data elements for products and transport units.

Table 5: Issuing Agencies, IAC's and support of data structures

Excerpt of the list of Issuing Agencies for Company ID's (CIN) ▼	IAC ▼	Length of a CIN ▼	typical CIN, e.g. ▼	'Support for structure & code capacity		
				Data structure ▼	Product code 2-20an ▼ (max. 50)	Transport code 2-20an ▼ (max. 35)
CEFIC Chemical Industries Ass.	QC	4an	CPRO	ASC	YES	YES
DUN Dun & Bradstreet	UN	9n	12345678 9	ASC	YES	YES
GS1 and EPC Global	0-9	3-7	1212345	GS1 (EPC)	3-5n	9n
EDIFICE European Electronic Industries Association	LE	3an	IBM	ASC	YES	YES
EHIBCC European Health Industries Assoc.	LH	4an	ELMI	ASC, HIBC	18	YES
ODETTE European Automotive Industry	OD	4an	A2B3	ASC	YES	YES
TELCORDIA ANSI ATIS-0300220 Telecom. Equipment	LB	4an	CSCO	ASC	YES	YES
UPU Universal Postal Union, etc.	J	6an	D00001	ASC	YES	YES

Note: The complete list of registered Issuing Agencies and its codes can be seen in "ISO/IEC 15459

Register for Issuing Agencies" accessible under link:

<http://www.nen.nl/web/file?uuid=373adc53-cd21-451e-a1bf-e944bc3891ca&owner=9bf8c5a0-29ed-4ca1-a502-a140b1b0fee8>

<sup>1</sup> to "YES" for 2-20 characters: This is the general recommendation but the maximum length is 50 for product codes and 35 for Transport ID codes. Exceptions are the shorter codes of the GS1 structure.

### Annex 3 Identifiers give the code its significance

Examples for 6 categories

A "unique code" must be named as such in order to be identified. This is achieved in machine-readable symbols by leading Application Identifiers (AI's) or Data Identifiers (DI's) conforming to ISO/IEC 15418. GS1 Application Identifiers are always relevant if a GS1 CIN is used, but ASC Data Identifiers with any of the other CIN's (see Table 5) or when using alphanumeric product

Table 6) ID categories and related DI's & AI's and capacity

ID for ?	DI / capacity ? ?		AI/capacity ? ?	
	Unique serial no.	25S	2-20(50)	8004
Unique product code	25P	2-20(50)	01	3-5n
Unique transport code	J	2-20(35)	00	9n
Unique RTI code	25B	2-20(35)	8003	14n+16
Unique Returnable Package Code (RPI)	55B	2-20(47)	-	-
Partner location code	25L	2-20(35)	414	13
Option 3d location code	11L	Lati- +Longi- +Altitude		

or transport codes. Table 6) shows AI's & DI's for 6 selected categories and data capacities involved. The complete set of "ASC Data Identifiers" available today is listed and described in detail in the document, ANS MH10.8.2. The ISO reference is ISO/IEC 15418. In addition to Application & Data Identifiers, it contains the System Identifiers (SI) for inter operable sub-structures, such as the Health Industry Bar Code (HIBC), where the distinct SI is the character "Plus (+)". In addition to showing DI/AI-applications in Table 6, Figure 16 illustrates sequences for unique data elements applied with sample data. For illustration purposes, the same data reference "0246359X12" is used for all of the categories below, in order to show how the identifiers distinguish themselves and also make them interoperable.

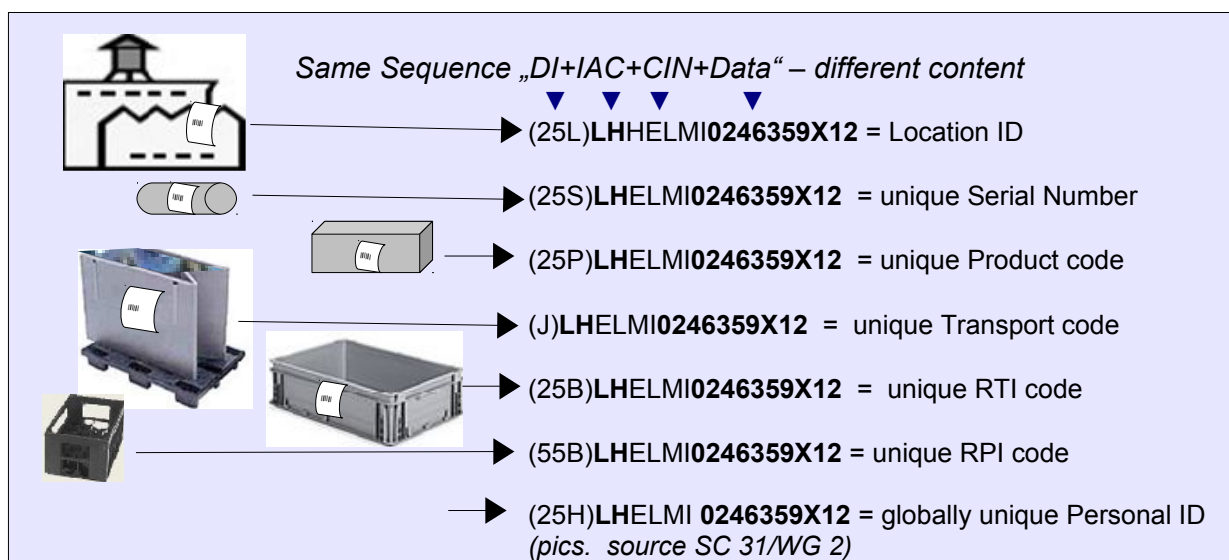


Fig. 16) Examples how Data Identifiers (DI's) apply the meaning of a data element

Addressing returnable processes table 8 is showing applicable identifiers of the AI/DI list as an excerpt just for identifying returnable items.

Table 7) AI's/DI's for multiple processes

Returnable-	Process	Owner	AI	DI	ISO/IEC 15459
-Container (RTI)	Return	1	8003	25B	part 5
-Container	Reuse	undetermined	8004	25S	part 4
-Package	Reuse	1		55B	*
Recycling	New provision		8004	25S	part 4

\*see ISO 17364 RFID for Returnable Transport Items - RTI

The newly defined ASC DI (55B) "Global Unique Returnable Packaging Item - RPI" was added in conjunction with updating the RFID application standard "ISO 17364 RTI".

## Annex 4 Example of consequent use of ISO/IEC standards, the new solution „Set-Label“

Products are generally provided with a single product code, even if a product package containing several sub-products or components as a "Set". So far products in the electronic industry up to now. The European association of the Electronic Industry - EDIFICE took the requirement for a solution to get the whole set content by one scan. The ADC committee of EDIFICE learned from the experience with the "PaperEDI" solution where the whole content of a shipping container were put in a code on a transport label, so why not to put the content of a "Set" in a product master code? The group found the solution by taking use of ISO/IEC standard modules and parts of the PaperEDI standard from the liaison partners EHIBCC and Eurodata Council and adjusted it to meet the actual requirements for scanning product set's. First step is to assign a high-level reference code to the bundle of products and components. Than the sub-products and components will be put in a hierarchical structure by help of the ASC Data Identifier "F" defined for creating hierarchical levels. As data carrier DATA MATRIX has been the choice for now but there is no reason to take QR Code or any other 2D symbol fulfilling the task of high capacity encoding. As overall syntax ISO/IEC 15434 has been chosen.

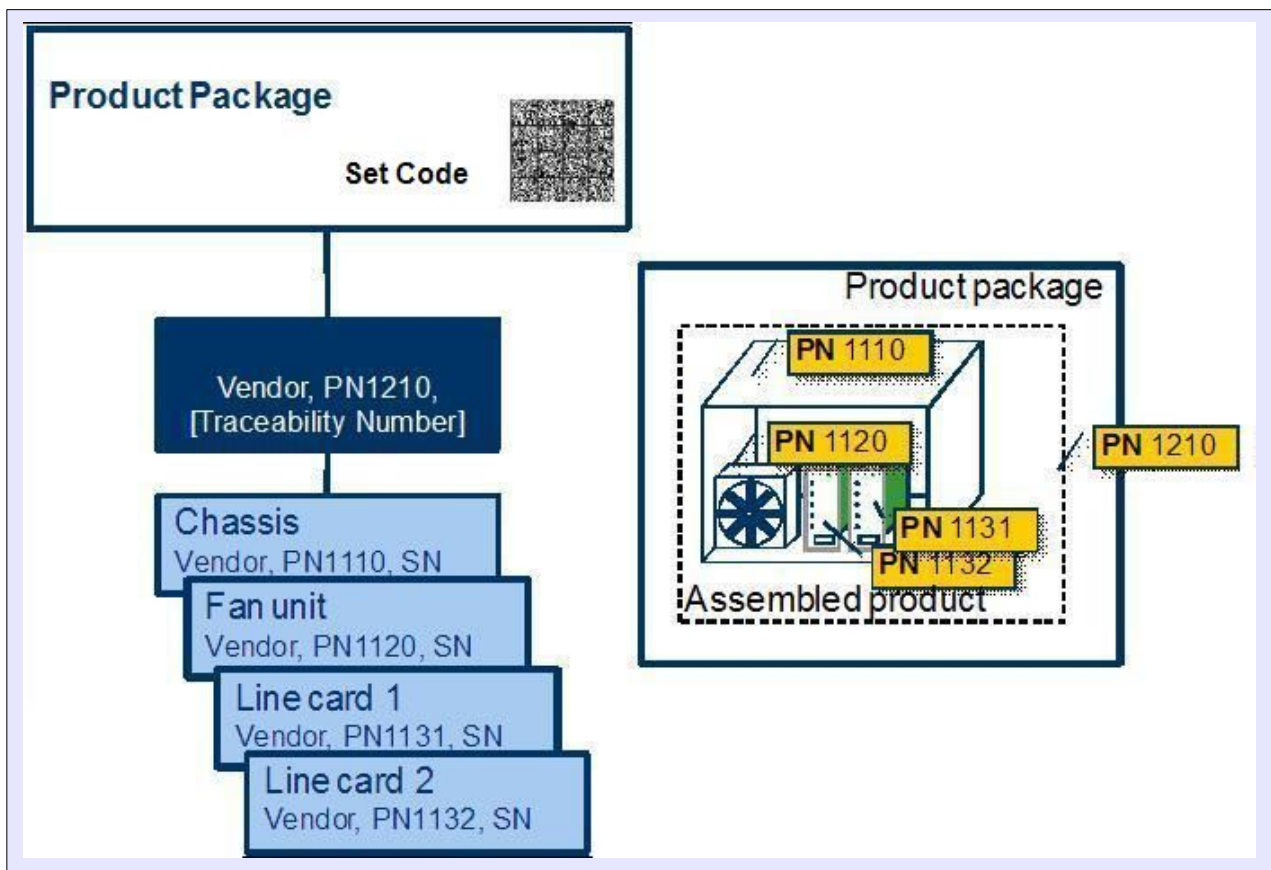


Fig. 17) Set-Label: DATAMATRIX carries product reference and embedded unique components (source: [www.EDIFICE.org](http://www.EDIFICE.org), Set-Label 2011, fig. 4)

Scanning the "Set Code" the data will be reconstructed after transmission and shown in the original context. This can be done by help of a mobile device or with an ERP system. Practical applications are marking electronic equipment, such as computers, where the in-built components get visible without opening boxes just by scanning the set label. Look Up to data bases just can be avoided. This is one example of consequent use of ISO/IEC standards for optimizing handling and processes and an example of co-operation between industry associations and its results.

## Annex 5 Selection of AutoID Standards

### Documents of ISO/IEC JTC 1/SC 31/WG 2 Data Structure“

ISO/IEC 15418 GS1 Application Identifiers and ASC Data Identifiers

ISO/IEC 15459 Unique Identification, Part 1 to 6

ISO/IEC 29162 Guidelines for using ADC Media (Bar code & RFID)

### Documents of SC 31/WG 4 RFID for Item Management

ISO/IEC 18000-1 REV 1 (including Battery Assistants, Sensor functions)

ISO/IEC 18000-2 AMD 1 (including Battery Assistants, Sensor functions)

ISO/IEC 18000-6, part 61 bis 64 REV1 (incl. Battery Assistants, Sensor functions)

ISO/IEC 18000-7 REV 1 (including Battery Assistants, Sensor functions)

ISO/IEC 15963 Tag ID: applied with the list of IC manufacturer ID's

ISO/IEC 29160 RFID Emblem

### Documents of SC 31/WG 4/SG 1 RFID Data Protocol

24791-Part 1 to 6 Software System Infrastructure (SSI)

ISO/IEC 24791-1: Architecture

ISO/IEC 24791-2: Data Management

ISO/IEC 24791-3: Device Management (incl. reader configuration commands)

ISO/IEC 24791-4: Abstracted Application interfaces (open)

ISO/IEC 24791-5: Device interface

ISO/IEC 24791-6: Security (based on pre-work of AIM Global)

ISO/IEC 24753: RFID & Sensors with reference to IEEE 1451.7

ISO/IEC 15961, 15962: RFID Data protocol – Update

ISO/IEC 15961-4: Sensor commands (NP)

### Documents of SC 31/WG 5 MIIM

ISO/IEC 29172-19179 Mobile item identification and management

ISO/IEC 29143 Air Interface Specification for Mobile Interrogators

### Documents of SC 31/WG 7 Security Item Management

ISO/IEC 29167 Air Interface for file management and security services for RFID

### Documents of the liaison for BC&RFID -application standards: ISO TC122/WG 10

ISO 22742 Linear bar code and two-dimensional symbols for product packaging

ISO 28219 Labeling and direct product marking with linear bar code and 2d- symbols

ISO 15394 Bar code and 2d- symbols for shipping, transport and receiving labels

ISO 17363 Supply chain applications of RFID – Freight containers

ISO 17364 Supply chain applications of RFID – Returnable transport items

ISO 17365 Supply chain applications of RFID – Transport units

ISO 17366 Supply chain applications of RFID – Product packaging, and

ISO 17367 Supply chain applications of RFID – Product tagging

### DIN standards

DIN 66401 Unique Identification Mark – UIM

DIN 66401 System Identifiers

### Additional application standards

*Global Transport Label V3, [www.odette.org](http://www.odette.org)*

*Global Guideline for Returnable Transport Item Identification*

*GS1 Global Specifications, [www.gs1.com](http://www.gs1.com)*

*HIBC Health Care Bar Code standard, [www.hibc.de](http://www.hibc.de)*

*PaperEDI standard, [www.eurodatacouncil.org](http://www.eurodatacouncil.org)*

*Set Label standard, [www.edifice.org](http://www.edifice.org) (release announced for Juni2011)*

Note 1: ISO-, CEN- and DIN-Standards are available from [www.DIN.de](http://www.DIN.de)  
or from any other national Normalization Institute like ANSI, AFNOR, BSI, etc.

Note 2: For further information, contact the author <[heinrich.oehlmann@eurodatacouncil.org](mailto:heinrich.oehlmann@eurodatacouncil.org)>  
or DIN NA 043-01-31 or any national standards institute