

History of Barcode

Heinrich Oehlmann



Key notes, occasionally



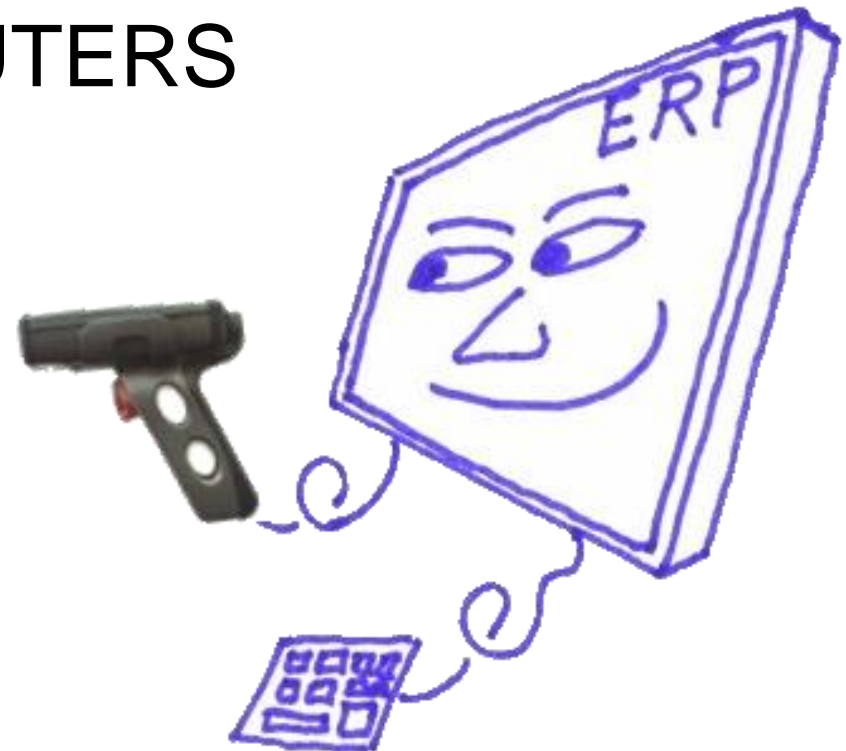
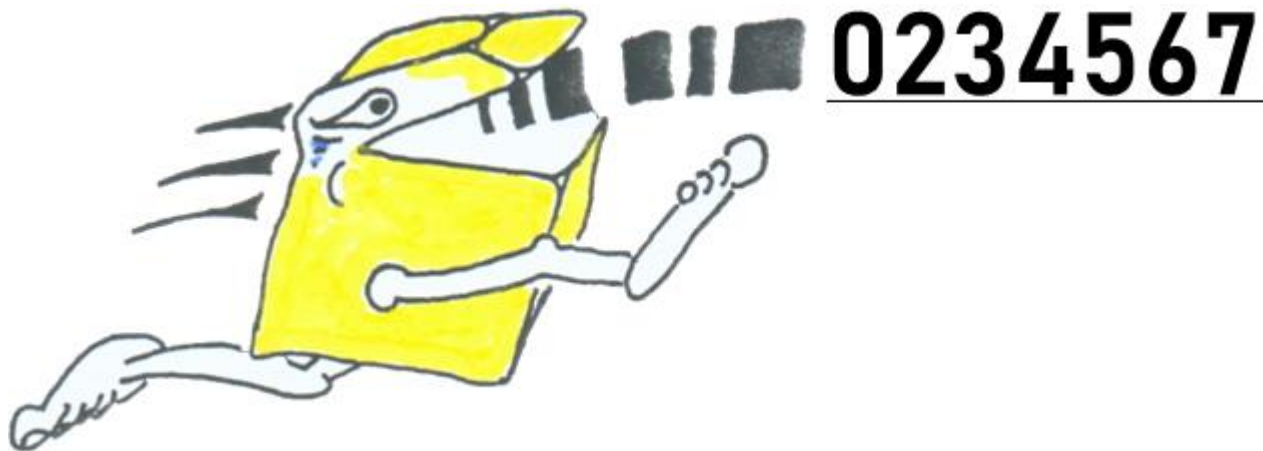
2023-10-17, Wiesbaden, Germany



History of Barcode

Barcode is a family of languages with many dialects:

→ FOR COMPUTERS



History of Barcode



Reasons for Barcode

Communication from items to computers:
QUICK - ERROR FREE - AUTOMATIC

- for Point of Sales: more speed, more money
- for healthcare: less manual entry, more security
- for industries: automation, more accuracy
- governments: secure data entry for transparency and traceability

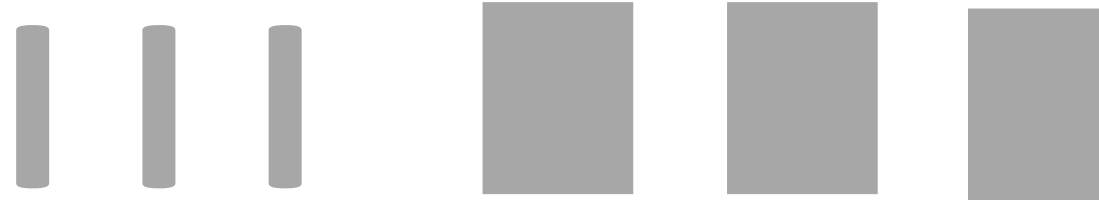
idea(s)



1838 →

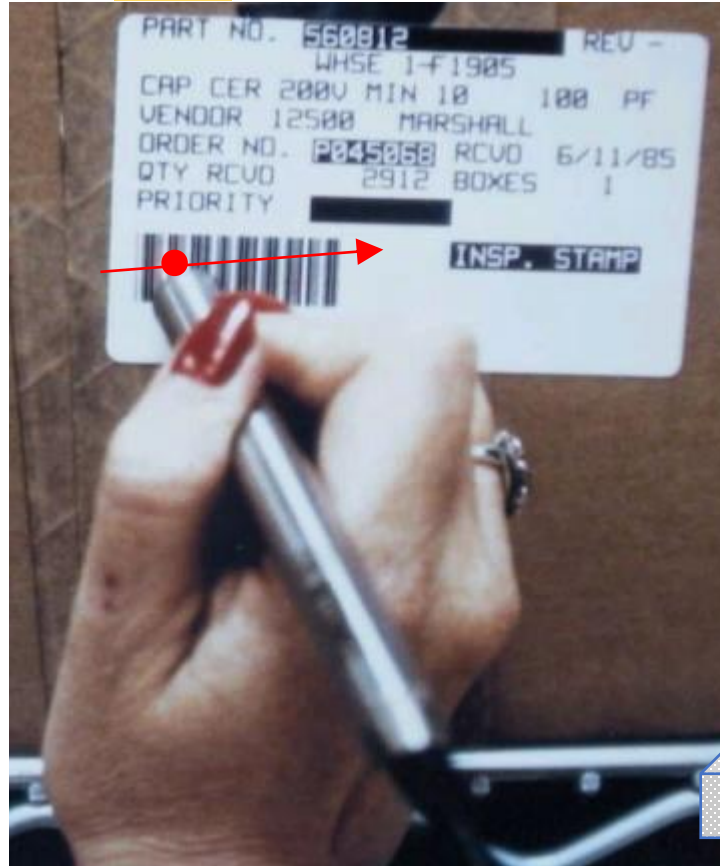


1960/70s →



BARCODE

1971



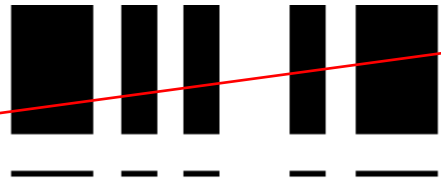
1985



1994 Imagers ----->



P045068



A

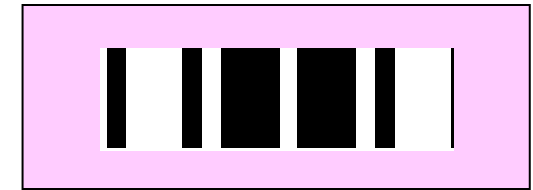
1973
1977

U.P.C.
→ EAN



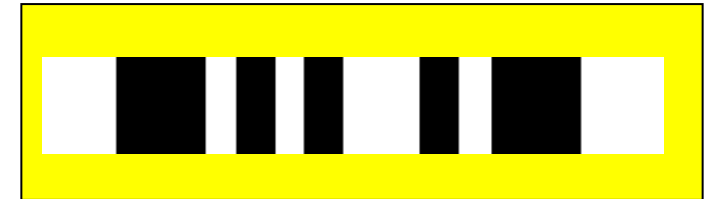
1972

Code 2/5i numeric
Characters 0 -9



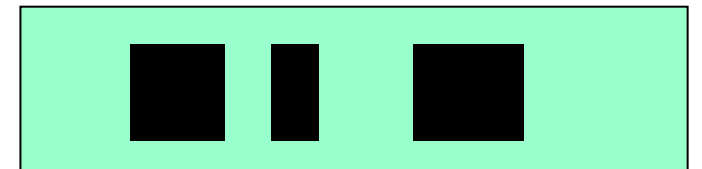
1974

Code 39 alphanumeric
(A-Z capitals)



1981

Code 128 alphanumeric
+ control characters

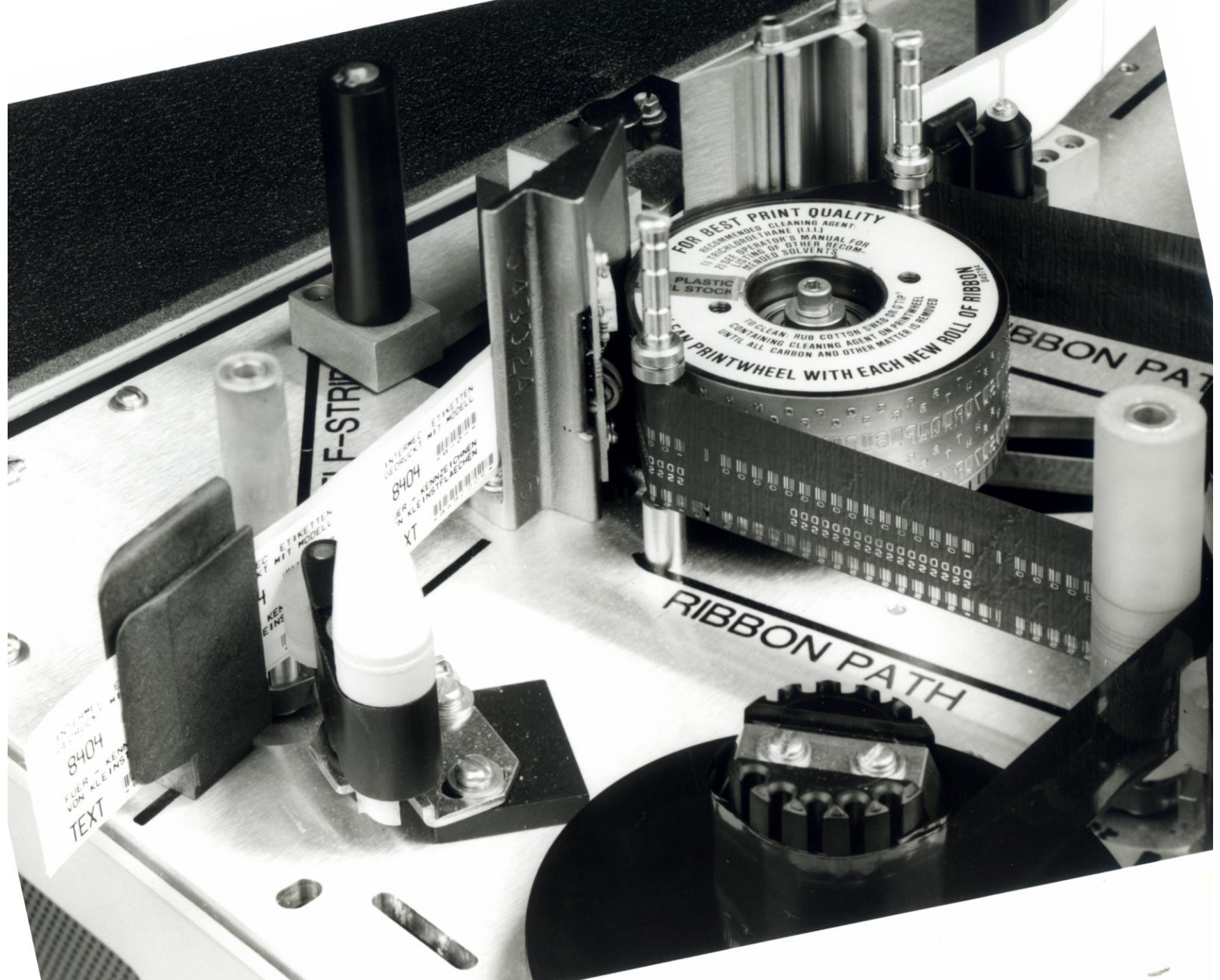


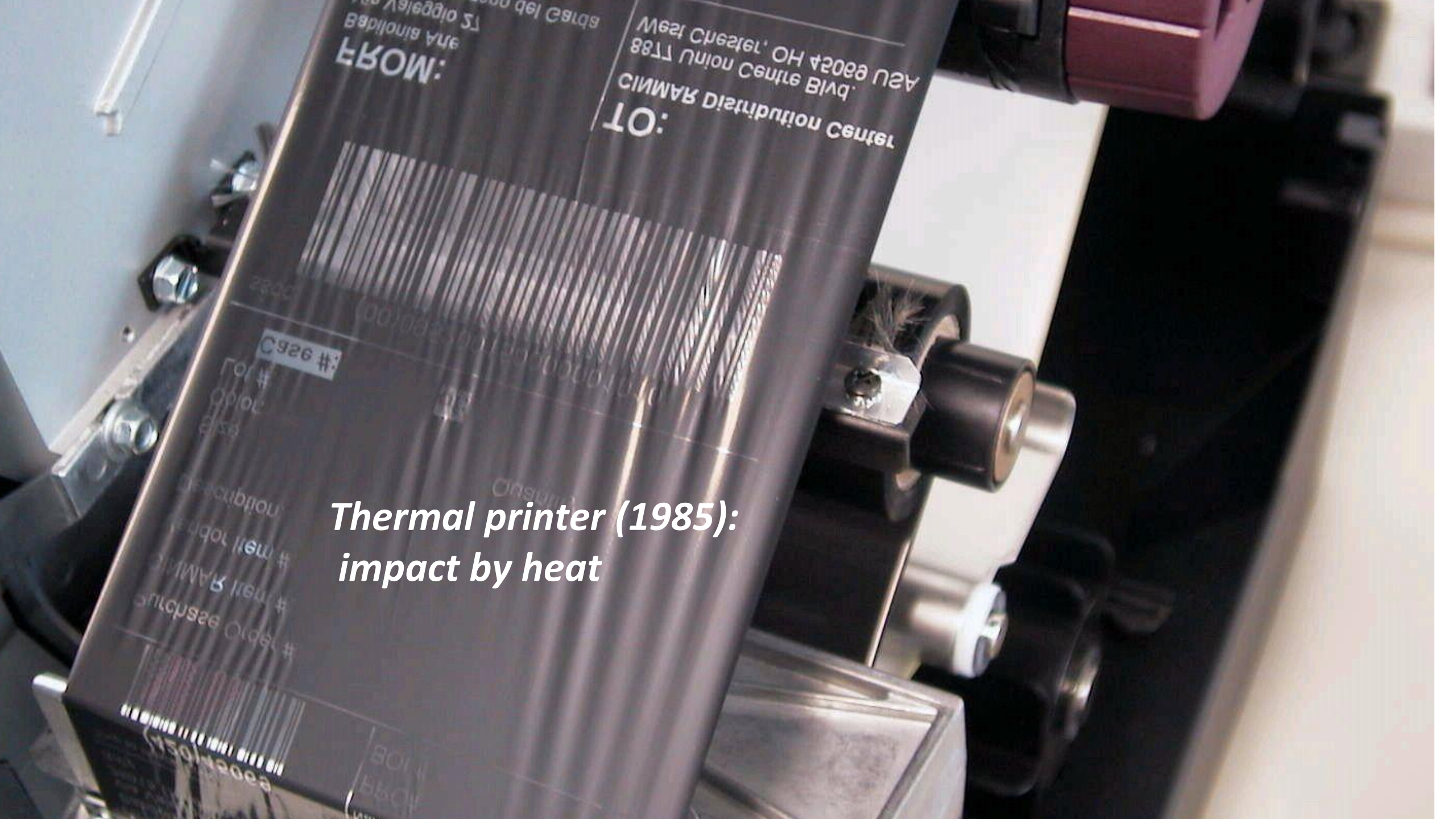
Rotating print wheel



Each character consists of a specific combination of bars. You read everything between start and stop or nothing at all.

***Impact printer
(hammer printer)
1985***





***Thermal printer (1985):
impact by heat***

**Light pen (Wand)
model 1983**



**Laser scanner
1985**

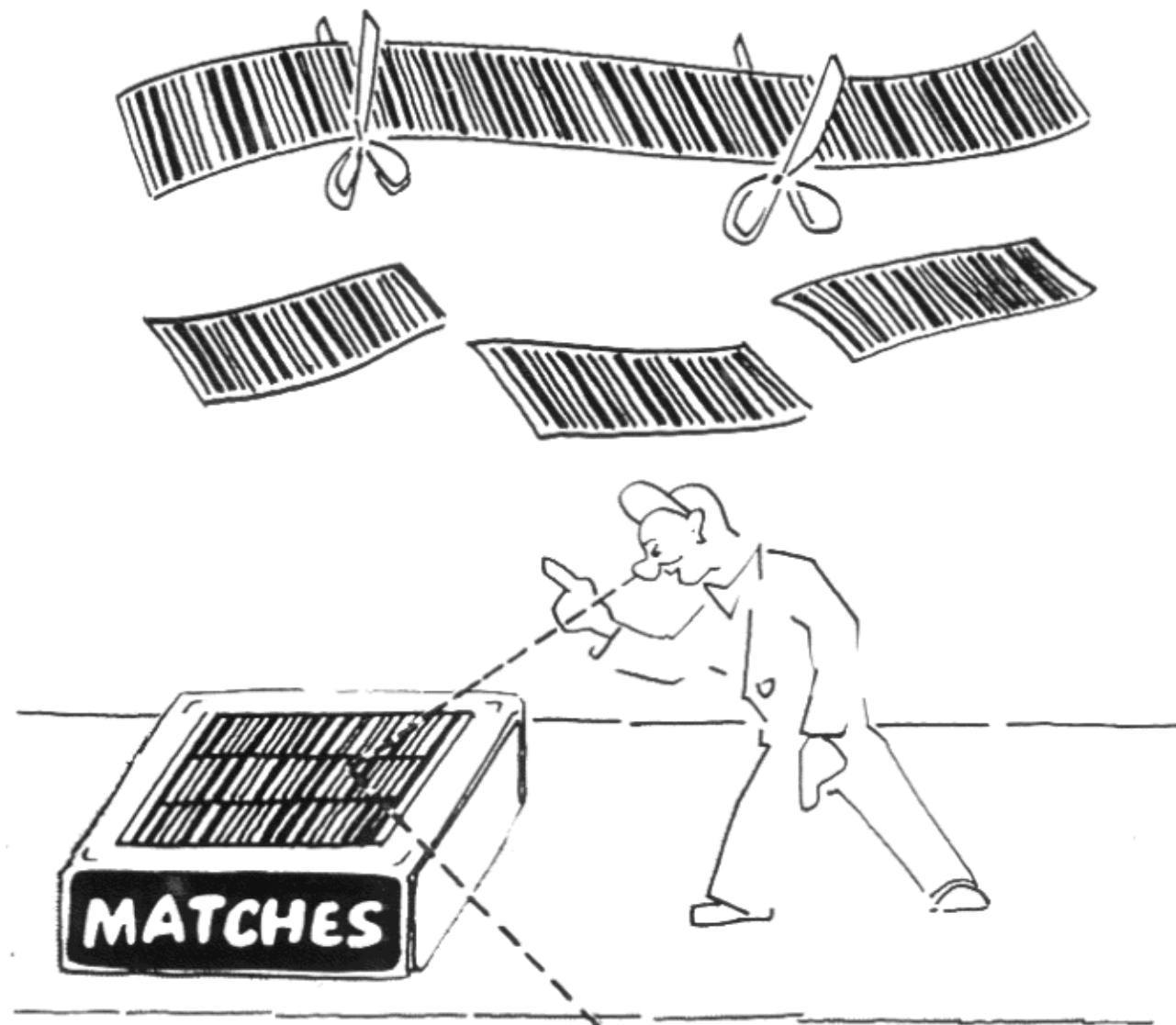


**Laser Mobile
1988**



1989 toward 2D

with 1D scanners



★ **CODABLOCK**
Developed by Harald Oehlmann

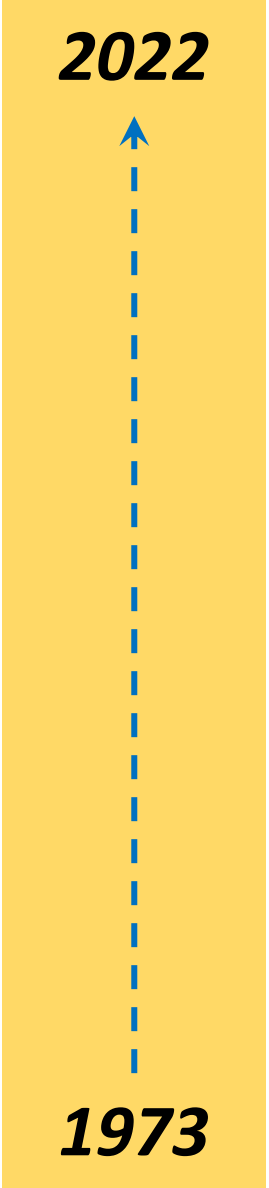
1989

CODABLOCK



**scan with standard
linear scanners**

Continuous development



JAB High Cap.		
Han Xing Code		
Data Matrix		an 2334
QR		an 4296
ATZTEC		an 3067
PDF 417		an 1850
CODABLOCK F		an 3500
CODE 128		an 50
CODE 39		an 30
U.P.C./EAN13		n 12/13



USD-1 AUTOMATIC IDENTIFICATION MANUFACTURERS
 UNIFORM SYMBOL DESCRIPTION—1
 INTERLEAVED TWO OF FIVE 5/1981

SC31 N 0335
 CD-Ballot, 01.09.98


AIM International ITS/97-001
 Date: 1997-03-01
 Secretariat: AIMI, Inc
 Document type: AIM International Technical Standard

Symbology Specification – QR Code

AIM AIM International, Inc.

AIM EUROPE
 UNIFORM SYMBOLOGY SPECIFICATION -
 CODABLOCK F

11/1994



AIM USA AIM^{USA} Technology Group
 5/24/94 BC021

**Uniform Symbology
 Specification
 PDF417**

5/13/94

AIM USA AIM^{USA} Technology Group
 5/24/94 BC022

**Uniform Symbology
 Specification
 Code One**



1234567890123456789012
 Figure 1: Code One Example

AIM EUROPE
CODE 128
 Uniform Symbology Specification
 Revised May 1996



Codes & Key Persons I

- **David Allais** 1972: 2/5, then i2/5, 39, 49, 93 symbologies and printing, reading, interfacing: INTERface MECanism (INTERMEC)
- **Dennis Priddy** 1989: Data Matrix promotion
- **Ted Williams** 1981: Code 128
- **Harald Oehlmann** 1989: CODABLOCK, 2020: DMRE
- **Andy Longacre** 1995: Atztek
- **IBM team** 1988: BC412 (for wafers)
- **Denso team:** 1995 QR Code, then Macro QR and Rectangular QR

Codes & Key Persons II

- **CHINA team** with Wang Yie 2020 (ISO....): Han Xing Code
- **Fraunhofer Inst.** Germany with Waldemar Berchtold: 3d JAB code

Other codes of the pioneer time:

- Plessey Code 1971
- CODABAR 1972
- Nixdorf code 1981,
- etc.

See: Barcode book
Bernhard Lenk

LINES of Communication
Craig Harmon



Craig Harmon



Bernhard Lenk

Heinrich Oehlmann



going global
=going standards

AIDC going global

1996: ISO + IEC = ISO/IEC TC 1/SC 31



2003 Paris, SC 31 Plenary, Chair: Alain Habermann



Achievements

Complete set of standards for Barcode symbologies and quality (WG1), RFID technologies (WG4), data structures (WG2) and applications (WG8).



2016 Sapporo, SC 31 Plenary, Chair: Dan Kimball

Achievements



- Technology standards: Barcode, 2D, RFID
- Quality & test specifications for codes and equipment
- Data structure standards e.g. for uniqueness (ISO/IEC 15459-n)
- Application standards for application of Barcode & RFID

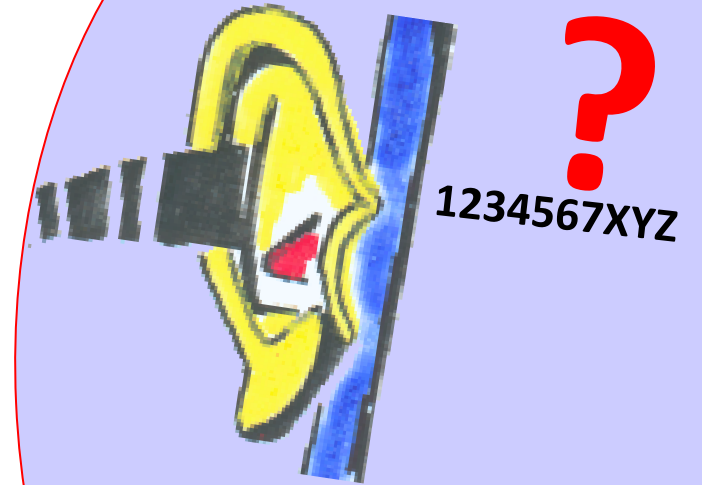
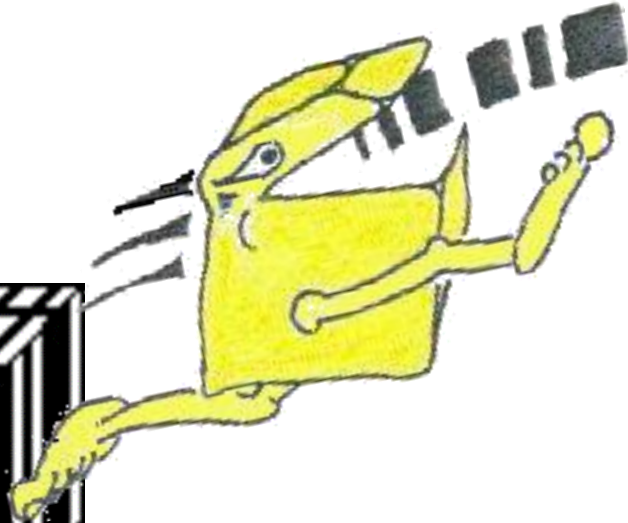
Focus on „GLOBAL UNIQUENESS“ why?



01234567XY

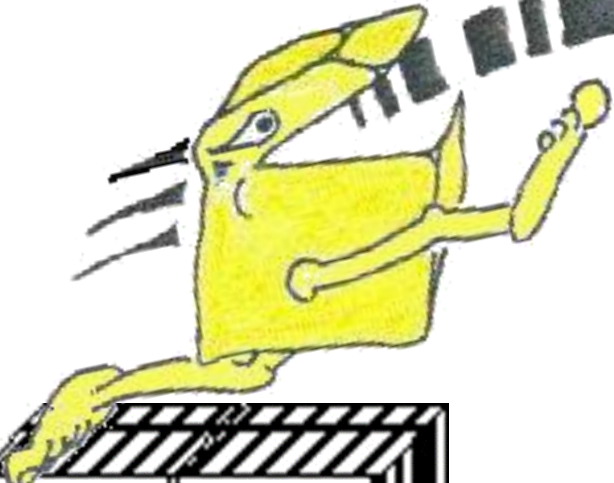
1234567XYZ

001234567X



I would need an
explanation:
what is: 1234567XYZ

Do you understand barcode language „ASC DI“



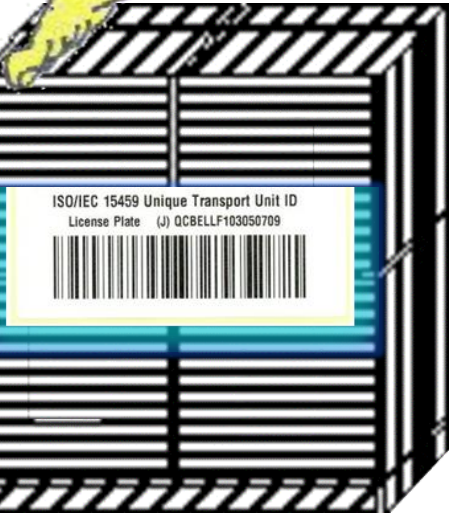
I'm a Transport unit from LILY, my No. is 1234567XYZ



ok

Yes, now I understand:

I see the flag „J“, it's truly a Transport unit



ISO/IEC 15459 Unique Transport Unit ID
License Plate (J) QCBELLF103050709



(J)QCLILY1234567XYZ

- Package No. <35an
- Registered Company ID „LILY“
- Registration Authority ID „QC“
- ASC Data Identifier for Transport Units „J“

Global AIDC language „ISO/IEC 15418“ (1997)

*ASC DIs & GS1 AIs apply uniqueness for the entire supply chain,
Any item gets an unique identifier according to global ISO standards
for globally unique item identification*



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Jxxxx Unique Transport Unit – **Agency/Company/Transport no.** (or AI “00”)

1Bxxx – Returnable Container ID (or AI “8002”)

Sxxx -- Serial number (or AI “21”)

1Hxxx -- Worker ID (or 25H - **Agency/Company/Serial number**)

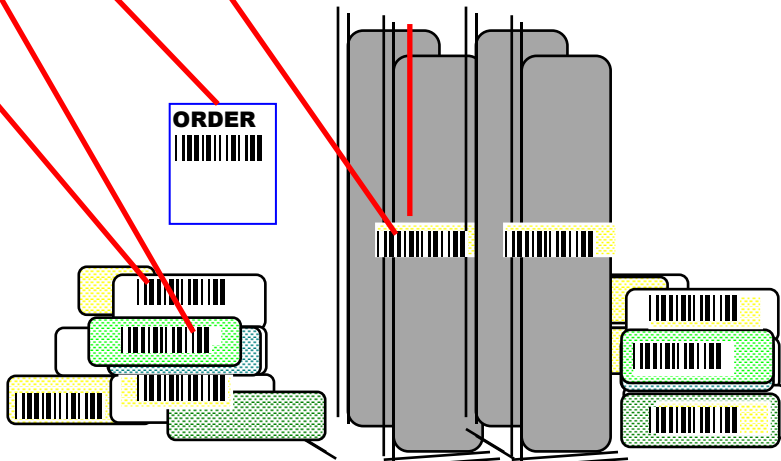
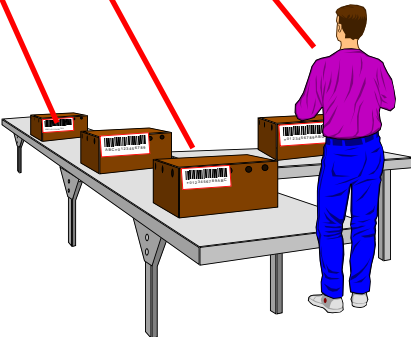
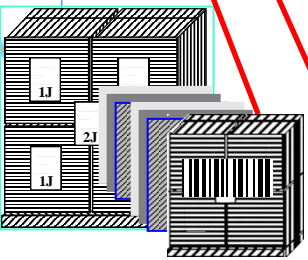
25Pxxx – Product ID (**Agency/Company/Product** + 1Txxx Charge/Lot)

01xxx – Product ID (**Agency/Company /Product** [GTIN])

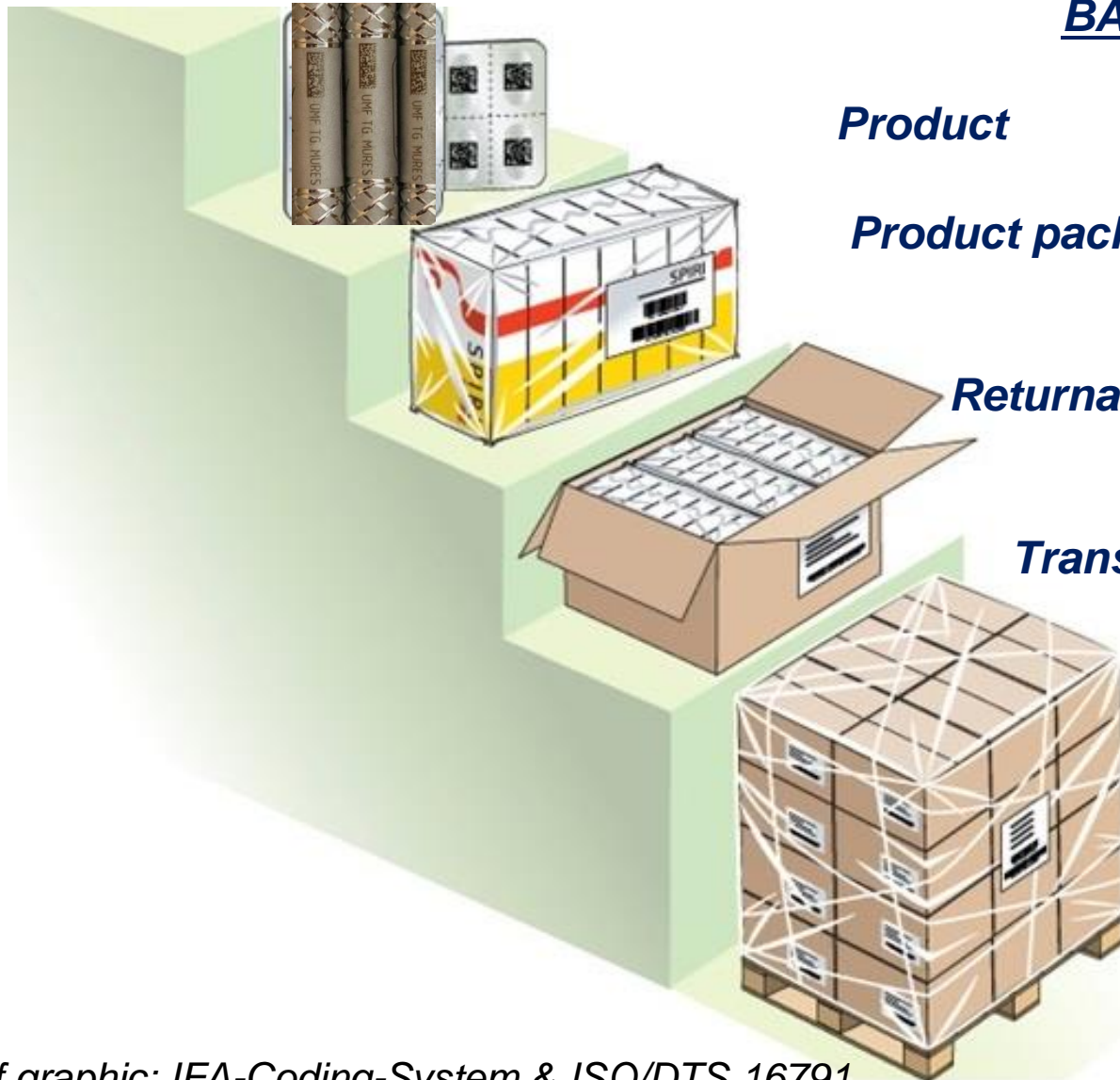
Kxxx -- Reference

Lxxx Location (or 25L...)

content



ISO application standards for uniqueness at any level:



BARCODE

RFID

Product

ISO 28219

ISO 17367

Product package

ISO 22742

ISO 17366

Returnables

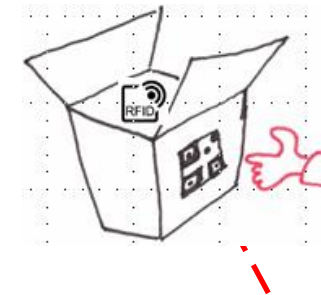
ISO/IEC 15459-5

ISO 17366

Transport Unit

ISO 15394

ISO 17365



**Problems to solve and solved
by standards, e.g. for codes with DIs:**

„Keyboard & WEB compatibilty“



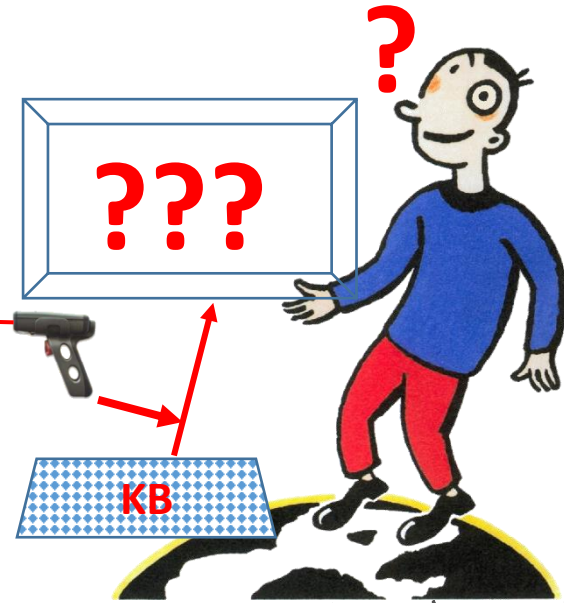
The problem of incompatibility
ISO/IEC 15434 control ch. do not
pass keyboards, nor WEB interfaces

ISO/IEC 15434



I carry ISO/IEC 15434

]>rs 06 gs S01876578 rs eot



It does not pass my keyboard

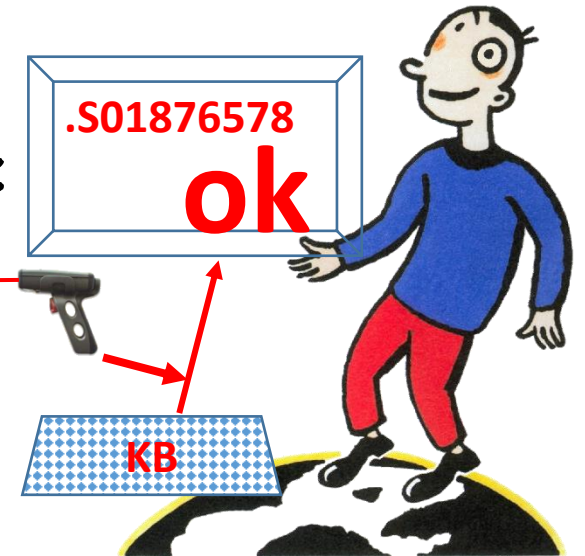
DIN 16598:2021
ISO/IEC: 202x

The solution
System Identifier for ASC DIs:



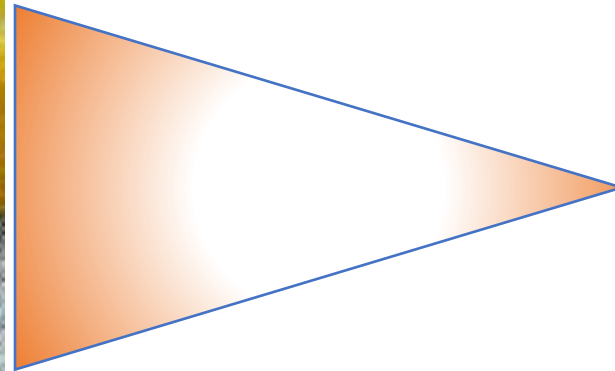
I carry DIN 16598, System ID is the DOT "."

. S01876578



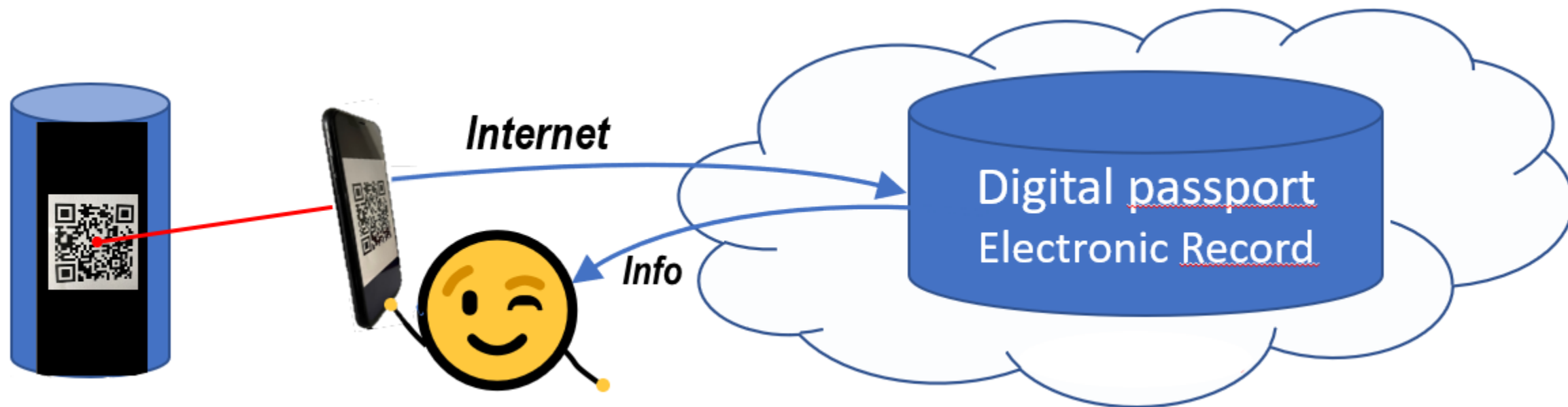
That's great!

Trend: Smartphone

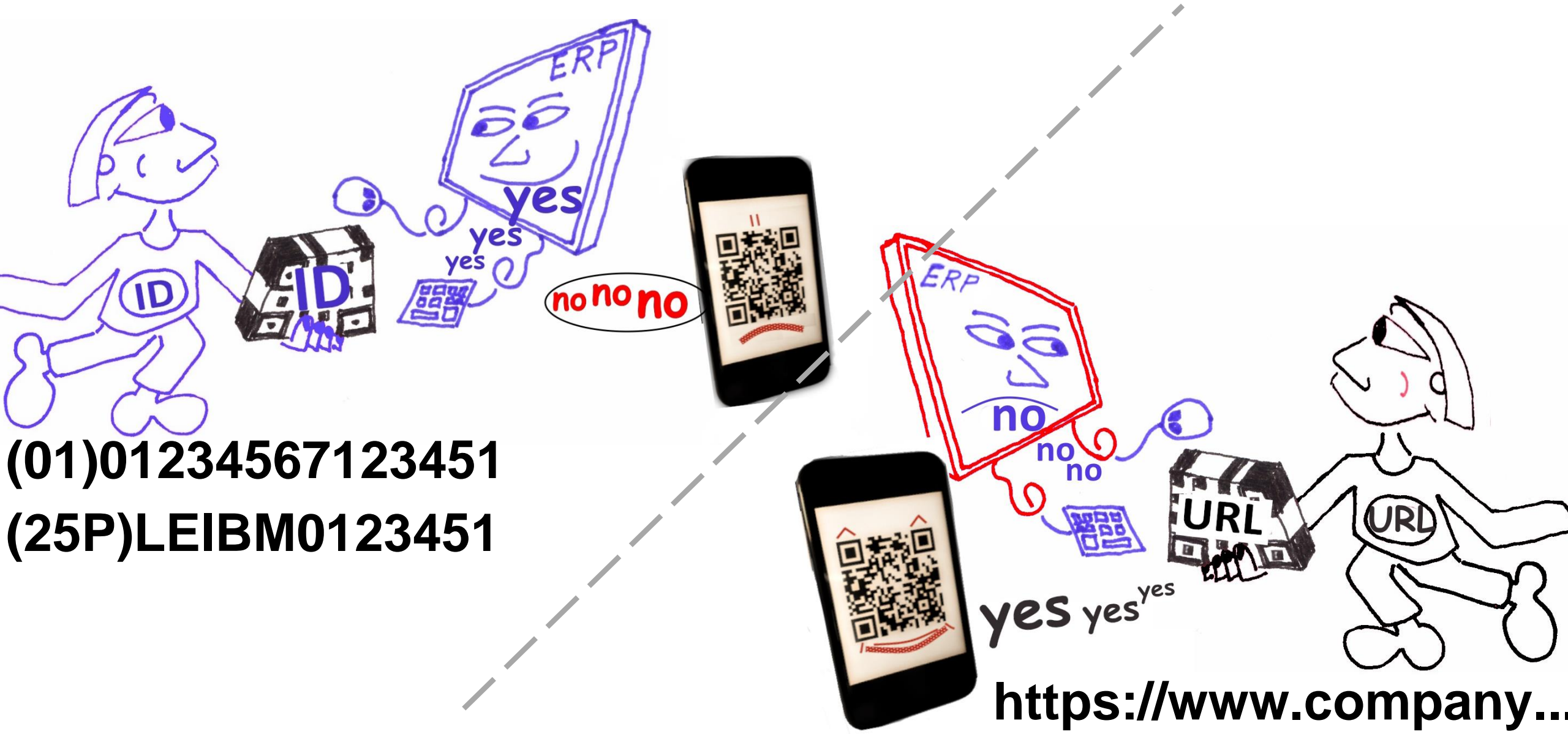


Application development

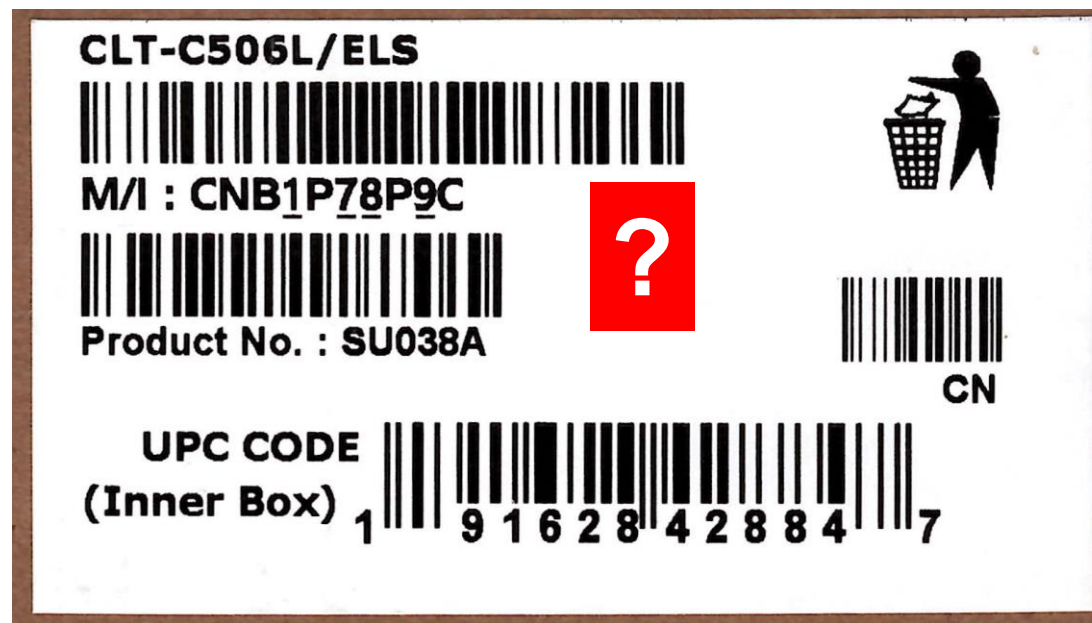
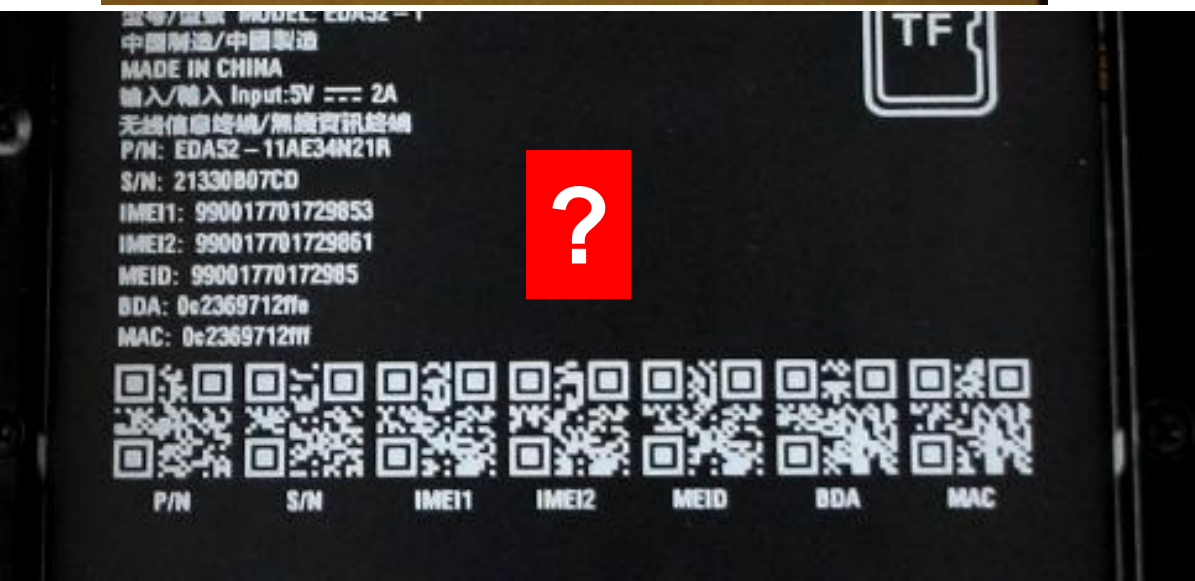
e.g.: Digital Product Passport (DPP):
PRODUCT ID + PRODUCT INFO



ID versus URL URL versus ID




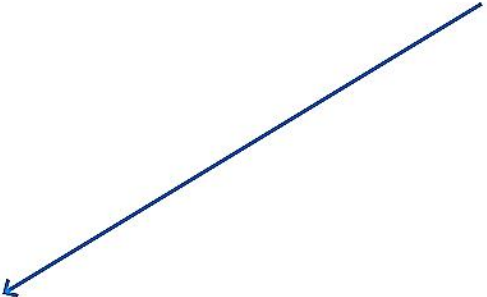



Is everything perfect already?



Is the future

*PRODUCT ID + WEB ACCESS !?!

Example	Analysis/Comments			Potential optimization																																														
 <p>REA JET</p> <p>REA JET ST FAS-GN 040</p> <p>Producto / Product: Tinta / Ink</p> <p>N° de artículo / Item No.: 060.900.212</p> <p>Consumo preferente / Best before: 04/2018</p> <p>Lote / Lot: 17101810440</p> <p>T3.1</p>	<table border="1"> <thead> <tr> <th></th> <th>ID</th> <th>Data</th> </tr> </thead> <tbody> <tr> <td>Structure type:</td> <td></td> <td>ADC</td> </tr> <tr> <td>ADC format type:</td> <td></td> <td></td> </tr> <tr> <td>Labeler:</td> <td>25P</td> <td>IEREA</td> </tr> <tr> <td>Article:</td> <td></td> <td>060900212</td> </tr> <tr> <td>Lot:</td> <td>1T</td> <td>17101810440</td> </tr> <tr> <td>Date:</td> <td>D</td> <td>180400</td> </tr> <tr> <td>Free Text Header Data:</td> <td>10Z</td> <td>FAS-GN_040</td> </tr> <tr> <td>Free Text Line Data:</td> <td>11Z</td> <td>REA_JET_ST</td> </tr> <tr> <td>URL:</td> <td>33L</td> <td>www.rea-jet.com</td> </tr> <tr> <td>Resume:</td> <td></td> <td></td> </tr> </tbody> </table>		ID	Data	Structure type:		ADC	ADC format type:			Labeler:	25P	IEREA	Article:		060900212	Lot:	1T	17101810440	Date:	D	180400	Free Text Header Data:	10Z	FAS-GN_040	Free Text Line Data:	11Z	REA_JET_ST	URL:	33L	www.rea-jet.com	Resume:			<table border="1"> <tbody> <tr> <td></td> <td>ADC format # 1 of type ASC: ANS MH10.8.2 DI</td> </tr> <tr> <td></td> <td>REA Elektronik GmbH Issuing Agency: EDIFICE</td> </tr> <tr> <td></td> <td>Interpreted data: 2018-04-30</td> </tr> <tr> <td></td> <td>Free text line data 1.</td> </tr> <tr> <td></td> <td> HTTP://www.rea-jet.com</td> </tr> <tr> <td></td> <td>▼ Result of last scan</td> </tr> <tr> <td></td> <td>ADC structure OK</td> </tr> </tbody> </table>		ADC format # 1 of type ASC: ANS MH10.8.2 DI		REA Elektronik GmbH Issuing Agency: EDIFICE		Interpreted data: 2018-04-30		Free text line data 1.		 HTTP://www.rea-jet.com		▼ Result of last scan		ADC structure OK	<p>Perfect label performing for global tracking & tracing as for product information via WEB!</p> 
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*Examples of different variations of Product Codes&URL and URL&Product Codes are available on request from the author or www.e-d-c.info:
< Investigation_of_DPP-ID-Codes_EDCi-whitePaper-r230823.pdf >

History is teaching us Development never stands still.





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