



HUG Primer EPC

Berlin, 30 January 2007

Craig Alan Repec

The global language of business

www.gs1.org

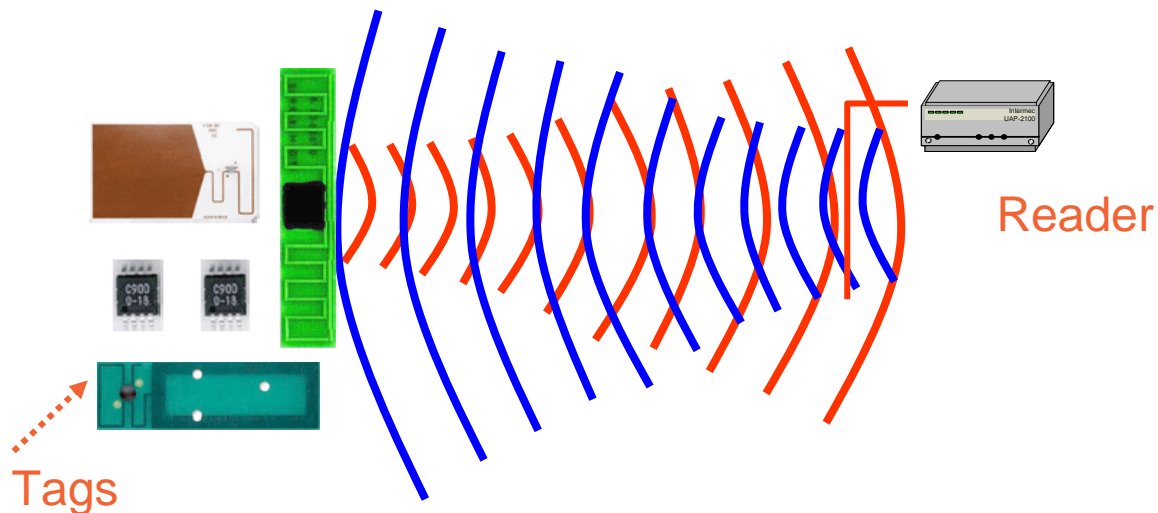


What we'll cover in this session...

1. **Fundamentals of RFID**
2. EPCglobal Standards
3. EPCglobal Network – “Internet of Things”
4. EPCglobal Organization

Radio Frequency Identification (RFID)

- Non-contact data transmission by means of radio waves
- Read ranges of up to several meters
- High storage capacity
- Re-writable data
- No line-of-site contact necessary
- Simultaneous identification of multiple items



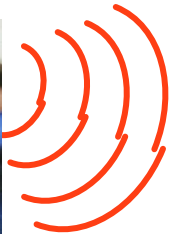
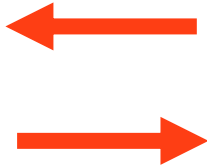


Components of an RFID System

Computer Application

Reader

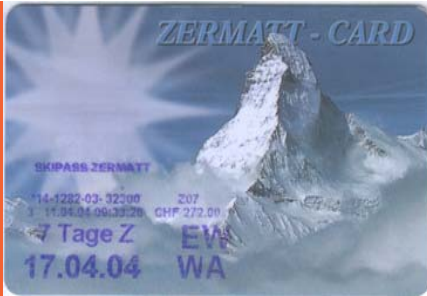
Transponder



**Local
Interface**

**Air
Interface**

RFID – It's Everyday Life ...



ski pass



marathon



admission tickets



library



car key

... but up to now, only in **closed systems**

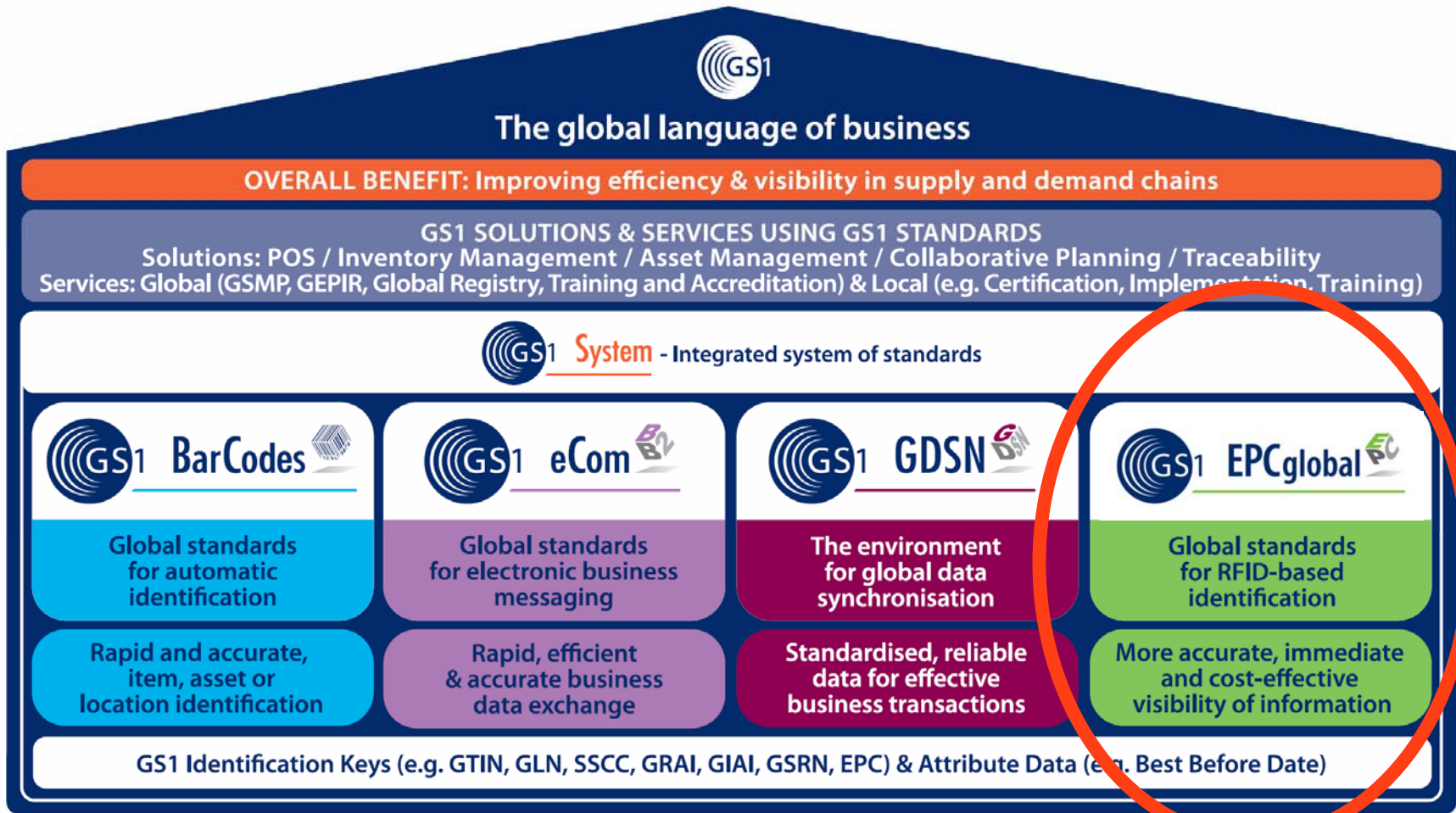


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EPC: A pillar of the GS1 System

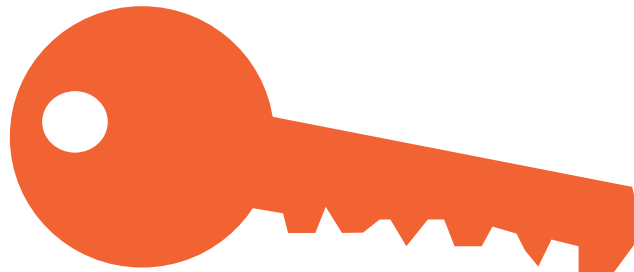




Electronic Product Code (EPC)

- **Identification of individual objects**
- **On the basis of RFID (transponder as data carrier)**
- **Globally unique and collision-free**
- **Access key to additional information stored in databases**

EPC





EPC: one of the Identification Keys on which the GS1 System is built



The global language of business

OVERALL BENEFIT: Improving efficiency & visibility in supply and demand chains

GS1 SOLUTIONS & SERVICES USING GS1 STANDARDS

Solutions: POS / Inventory Management / Asset Management / Collaborative Planning / Traceability
Services: Global (GSMP, GEPIR, Global Registry, Training and Accreditation) & Local (e.g. Certification, Implementation, Training)

System - Integrated system of standards



Global standards for automatic identification

Rapid and accurate, item, asset or location identification



Global standards for electronic business messaging

Rapid, efficient & accurate business data exchange



The environment for global data synchronisation

Standardised, reliable data for effective business transactions



Global standards for RFID-based identification

More accurate, immediate and cost-effective visibility of information

GS1 Identification Keys (e.g. GTIN, GLN, SSCC, GRAI, GIAI, GSRN, EPC) & Attribute Data (e.g. Best Before Date)

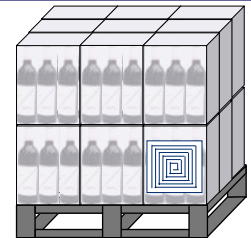


EPC at item, case and pallet level

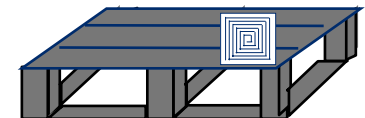
SGTIN (serialized GTIN)



Serial Shipping Container Code (SSCC)

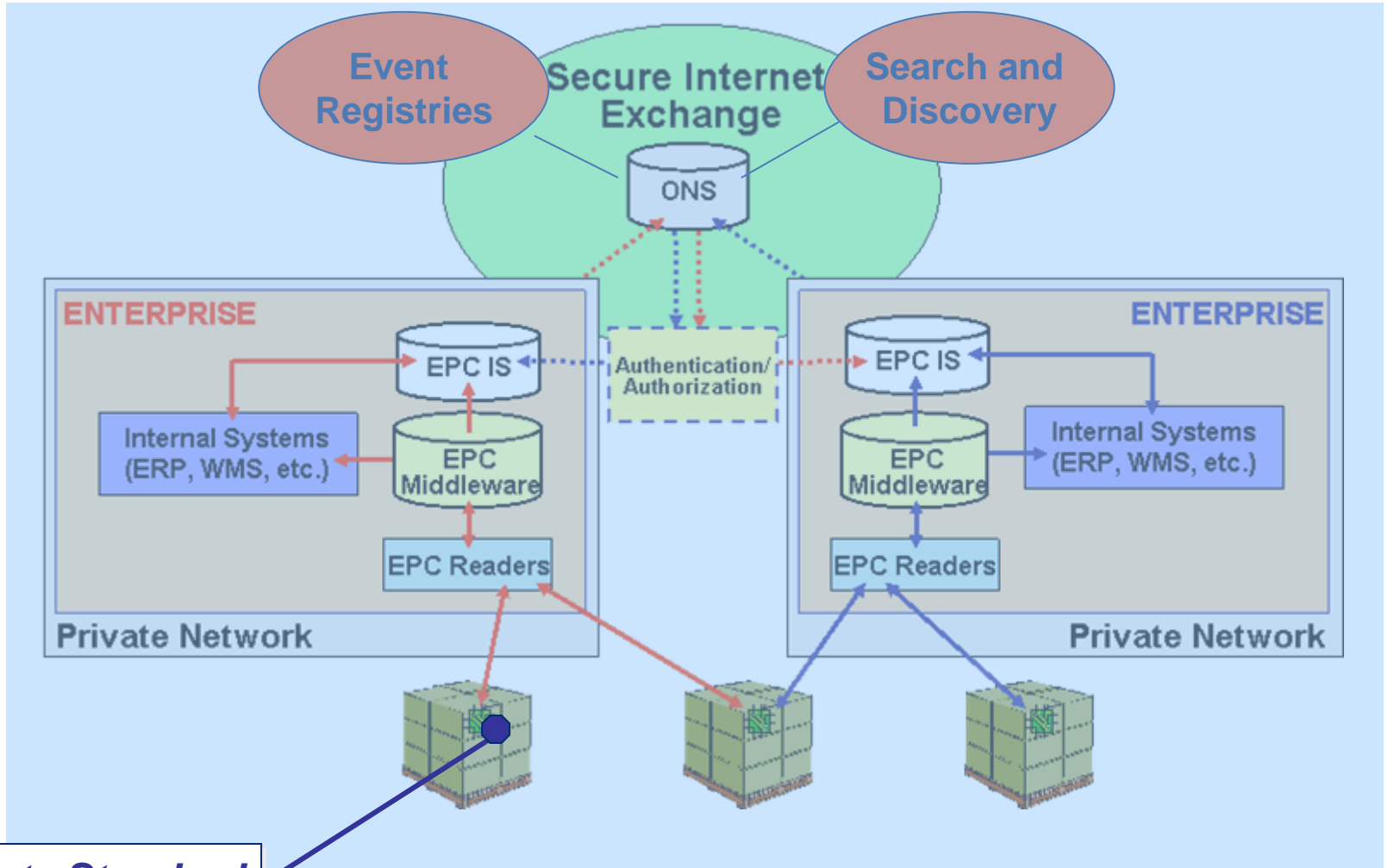


Global Returnable Asset Identifier (GRAI)
Global Individual Asset Identifier (GIAI)





EPCglobal Standards Overview



Tag Data Standard



Compatibility GTIN – EPC SGTIN

GTIN	Indicator	Company Prefix	Article	Check Digit	Serial Number
	0	4012345	00734	3	2

EAN 128 Barcode



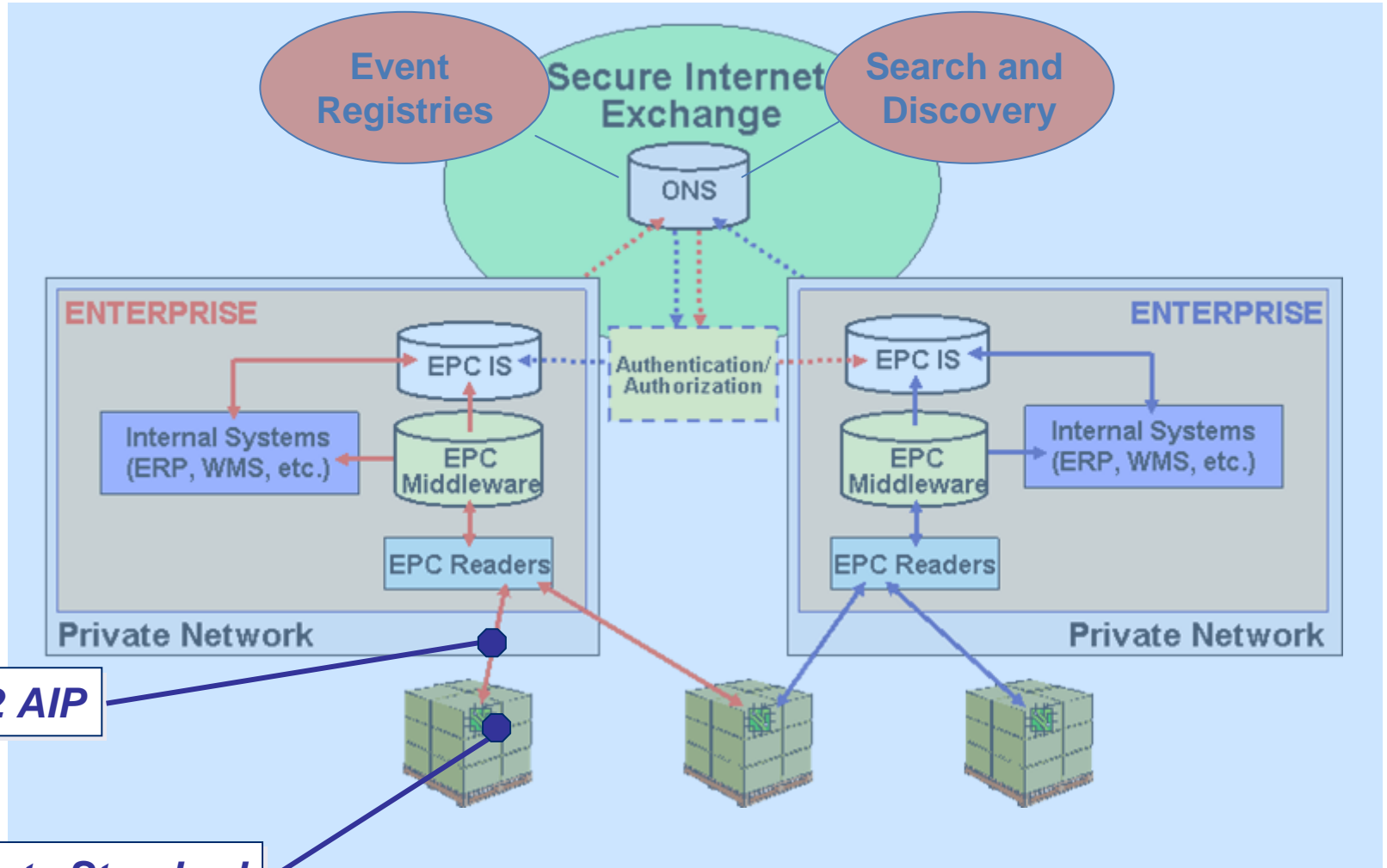
(01) 0 4012345 00734 X3 (21) 2

EPC 96 Bit

Header	Filter	Partition	EPC Manager	Object Class	Serial Number
8 Bit	3 Bit	3 Bit	24 Bit	20 Bit	38 Bit
0011 0000 binary	001 binary	5 decimal	4012345 decimal	000734 decimal	2 decimal



EPCglobal Standards Overview



GEN 2 AIP

Tag Data Standard



EPCglobal Air Interface Protocol

Specifies...

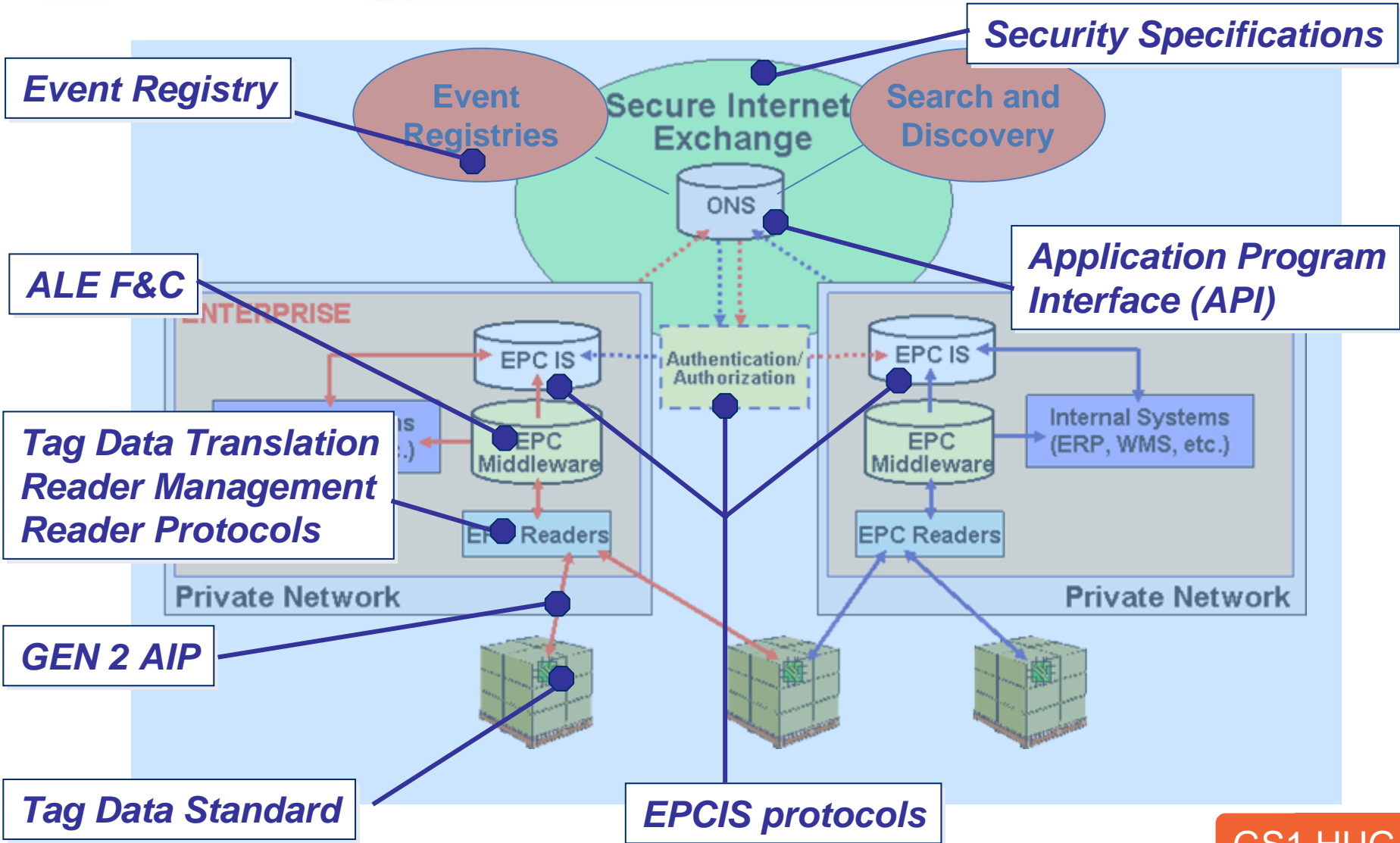
- **physical transfer** of data between transponder and reader
- **Commands** which the reader can execute in its communication with transponders
- **Anti-collision procedures** for simultaneous reads

Features include...

- EPC Air Interface ⇔ ISO 18000-6 Part C
- Frequency: UHF
- High read & write speeds (50-200 tags/second)
- KILL Function



EPCglobal Standards Overview





EPCglobal Standards Overview

Tag Data Standard	How to encode EPC tags information based on various numbering system standards?
G2 Air Interface Protocol	How does a reader communicate with tags?
Reader Protocol	How does middleware communicate with a reader?
Reader Management	How to manage a multiple EPC reader environment?
Tag Data Translation	How a reader converts tag data standards to an Internet compatible format?
Filter and Collection ALE	How to count the number of EPC's from multiple readers based on specific criteria?
ONS Application Layer Interface	Where to find more information about an EPC?
EPC IS Protocols	How to store and retrieve information about an EPC?
Security Specification	How to keep EPC information secure?
Network Architecture	How to find where is an EPC and where it has been?



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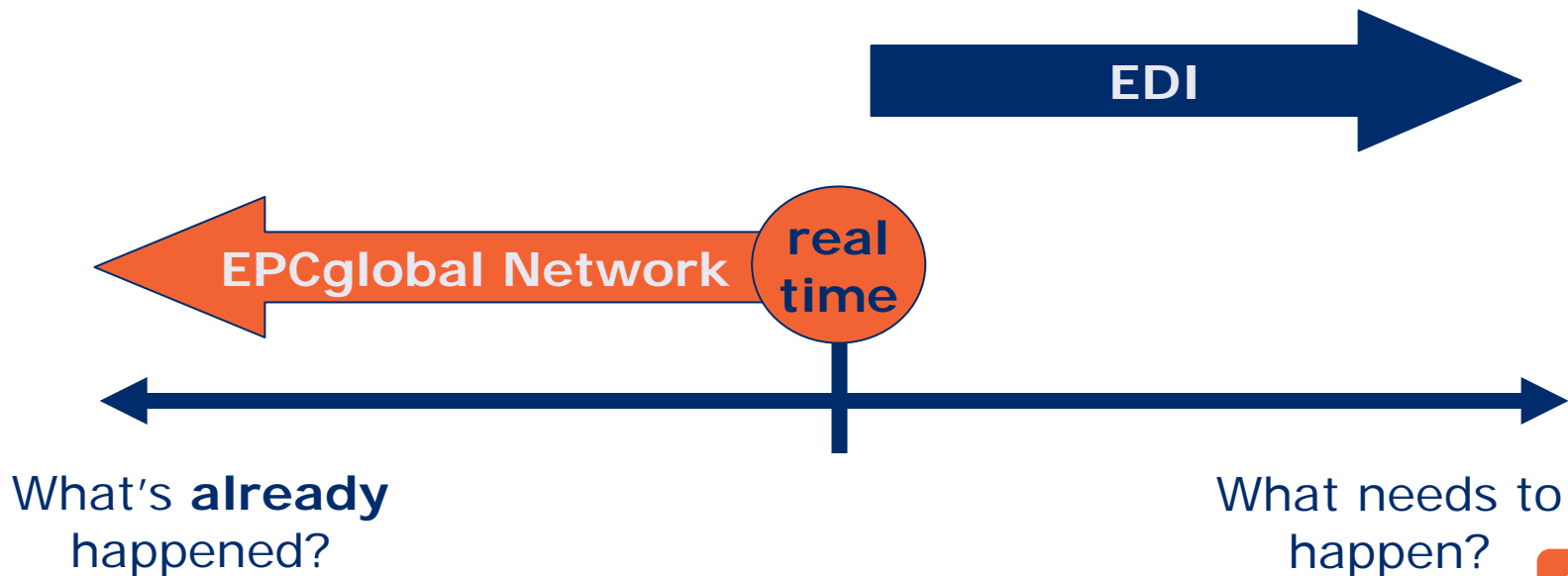
Traditional EDI vs. EPCglobal Network

EDI (EANCOM or X12): **process-centric**

- Request for action or a series of actions to generate an event or service

EPCglobal Network: **event-driven**

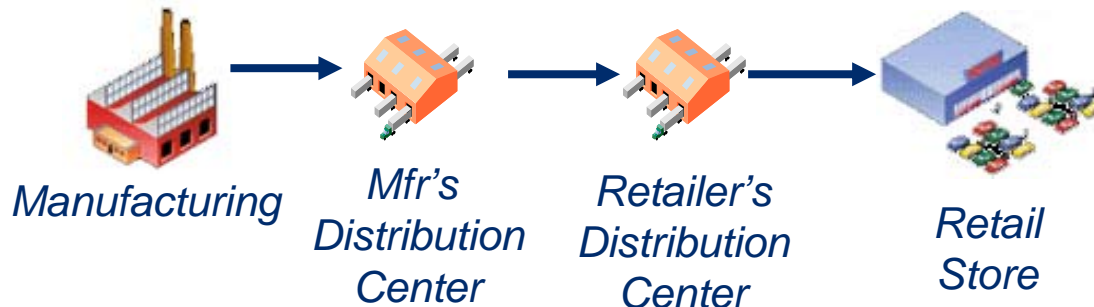
- Automatic logging of movement and events in real time, as they occur





EPC Information Services (EPCIS) EPCIS Events

- **Which** EPC numbers have been read?
- **When** have the EPC numbers been read?
- **Where** have the EPC numbers been read?
- **Why** have the EPC numbers been read?

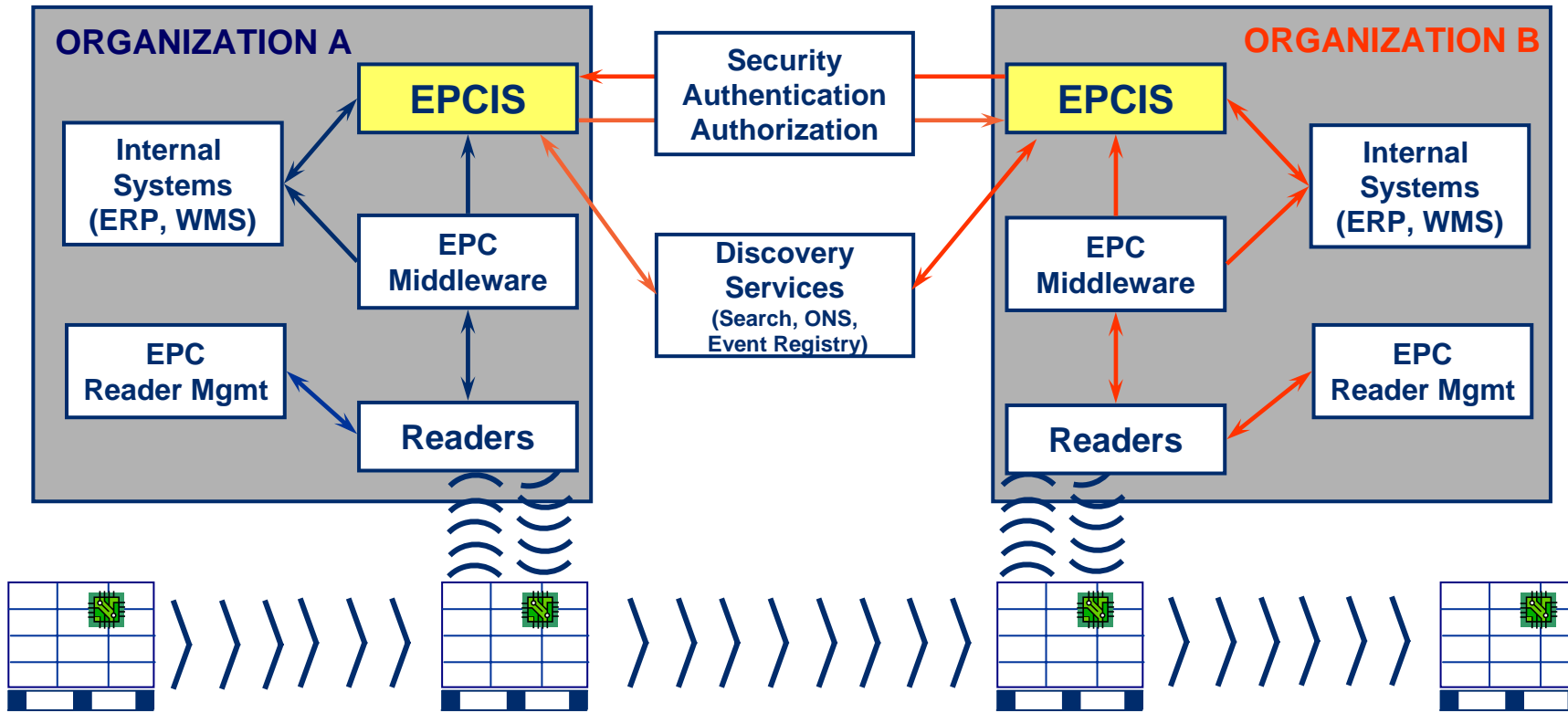


EPCIS events are the basis for improving business processes



The EPCglobal Network

Supply Chain Visibility *Event Related Information*



Tagged Units Moving Through the Supply Chain



Supply Chain Visibility

The power of event-related information...

- Improved consumer availability
- Demand driven supply chain
- Reduced inventory
- Increased productivity
- Reduced claims and resolution costs
- Reduced shrinkage
- Improved promotional effectiveness
- Reduced counterfeit
- Improved ability to track and trace



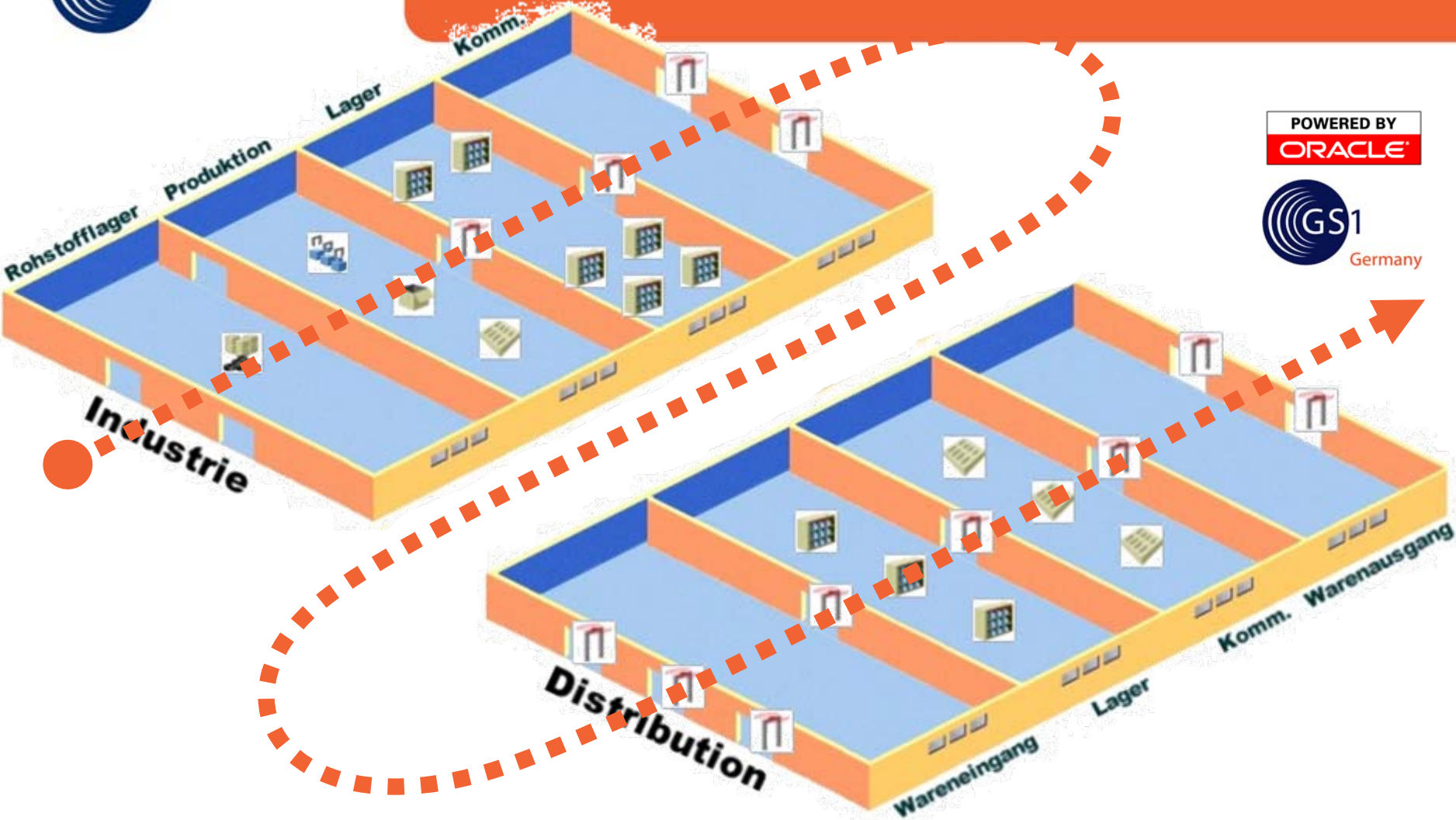
Supply Chain Visibility

- If you can't see it, you can't measure it
- If you can't measure it, you can't control it
- If you can't control it, it's probably costing you too much money
- And you probably don't even know how much



Flow of goods in the EPC Showcase

POWERED BY
ORACLE



<http://www.gs1-germany.de/internet/content/e39/e52/e2685/e2688>

GS1 HUG



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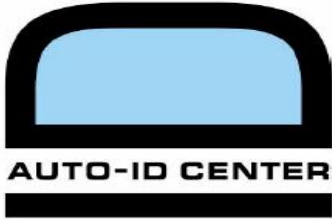


EPCglobal Organization

- Founded in 2003 by von GS1 und GS1 US
- Specifications based on the work of the Auto-ID Center at MIT
- User-driven and user-sponsored
- GS1 Member Organizations (MOs) are the exclusive representatives of EPCglobal at national level

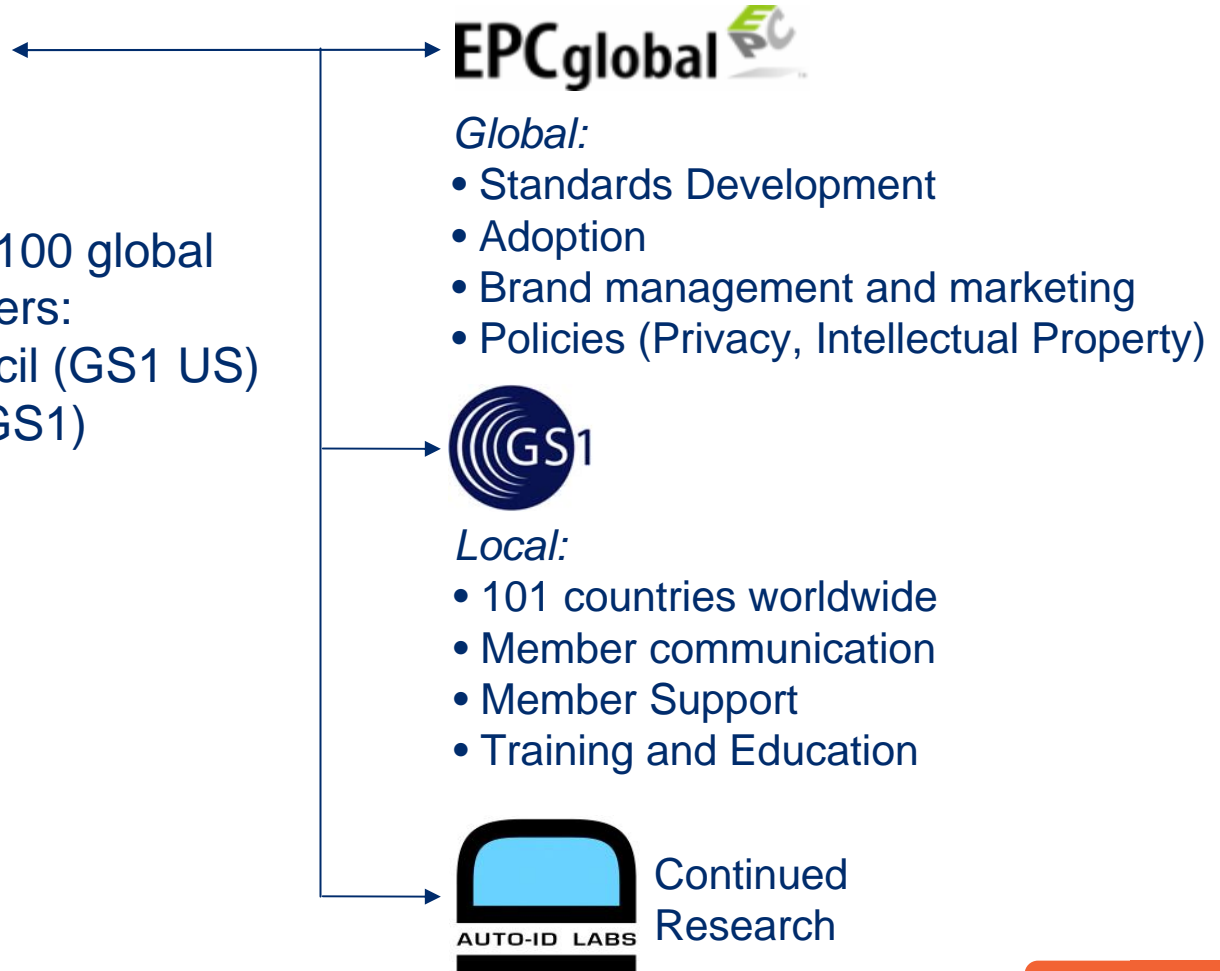


From Auto-ID Centre to EPCglobal



Partnership between 100 global firms, including founders:

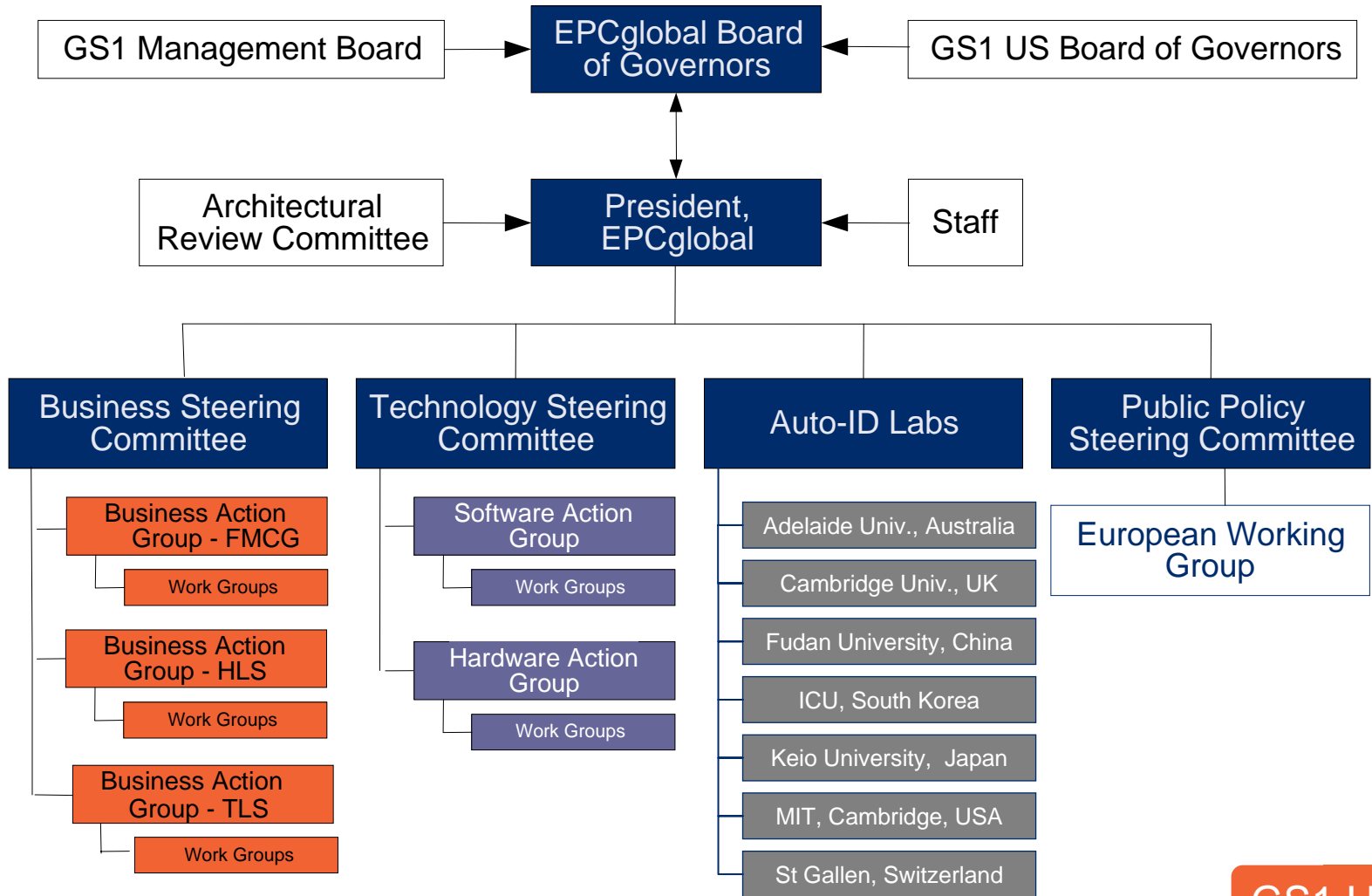
- Uniform Code Council (GS1 US)
- EAN International (GS1)
- Procter and Gamble
- Gillette



Research Implementation



EPCglobal Inc Organisation Chart



Virtual organization ~ 2000 individuals



GS1 Member Organizations (MOs) – Representatives of EPCglobal at national level





European EPC Competence Center (EECC)

- Accredited as EPCglobal Test Center in September 2005
- Focus on European regulations and processes
- Goal: support the rollout of RFID and EPC in Europe



METRO Group
The Spirit of Commerce



RFID Testing

RFID Education Program



EECC's Service Portfolio

RFID Testing

Applied Tag Performance (ATP)

- Transponder Placement
- Read Range (860 - 960 MHz)
- Orientation Sensitivity (360°)

“Real Life” Dynamic Testing

- In live production environment

Custom RFID Testing

- Individually tailored

RFID Education Program

- Technical principles and functions
- EPCglobal & ISO Standards
- RFID regulations
- EPCIS, EANCOM® interim solution
- Applying transponders
- System and application design
- User reports from EPC pilots

Instructors from standardization (GS1), users (industry/retail/logistics) and technology manufacturers and providers

Further info: epc@eecc.info





EECC's RFID Education Program: 2007 Sessions

**Fundamentals of
RFID & EPC**

*Grundlagen
RFID und EPC*

Tuesday
Dienstag

6. März

24th April

**Criteria for a
Successful Rollout**

*Einflussfaktoren
der erfolgreichen
RFID-Einführung*

Wednesday
Mittwoch

7. März

25th April

**UHF
Expert Training**

*Expertentraining
UHF*

Thursday
Donnerstag

8. März

26th April



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