



# EPCglobal Overview

Delivering value through global standards

June 17, 2008

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Director, GS1 Healthcare US





# GS1 Healthcare Overview

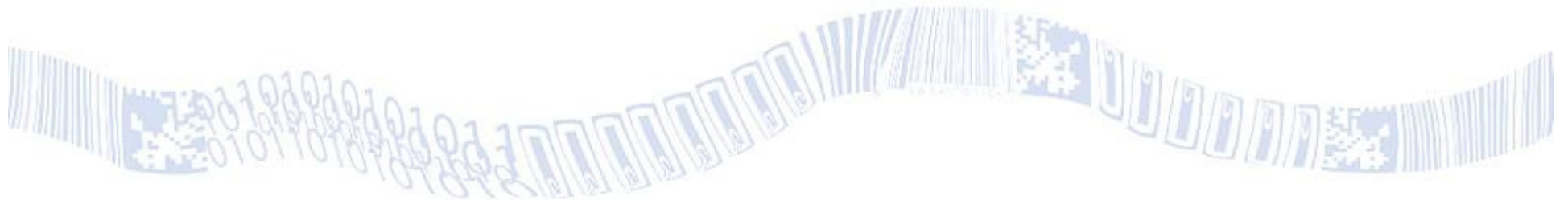
RFID Basics

About EPCglobal

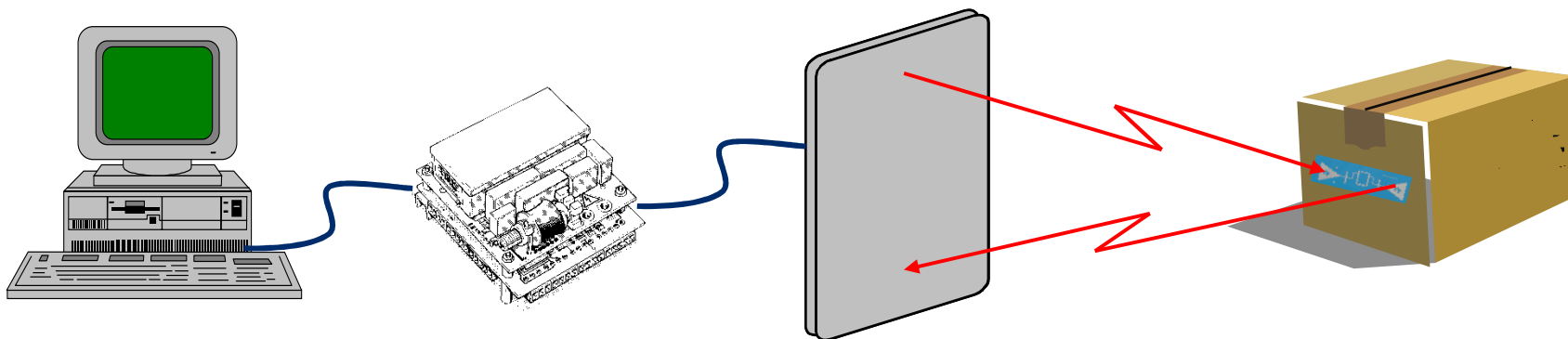
Current Standards

Tangible Results/Case Studies

Summary



# GS1 Healthcare Basic RFID System



**Host**

**Reader  
Module**

**Antenna**

**Tag**



# **Healthcare Key RFID Frequencies**

Four main 'globally established' frequencies on which RFID operates

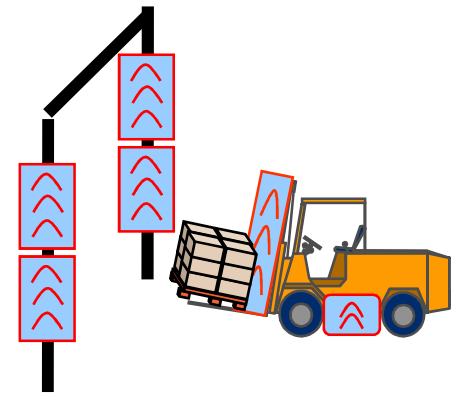
- 125 - 132 kHz (Low Frequency (LF))
- 13.56 MHz (High Frequency (HF))
- 850 - 950 MHz (Ultra High Frequency (UHF))
- 2.4 GHz (Microwave).





# GS1 Healthcare Benefits of RFID

- Non-line of sight
- Range
- Bulk read - Speed
- OHIO
  - Zero Human Involvement Operations
- Durability
- Read/Write
- Visibility into the movement of physical objects in the supply chain at new levels

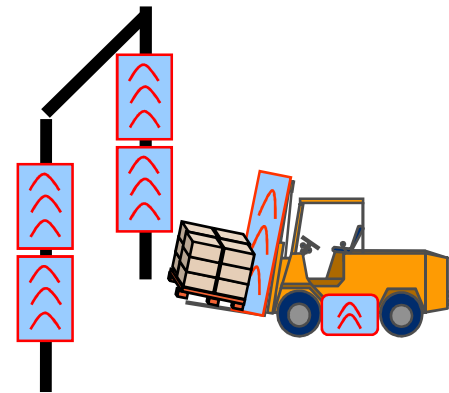


## Automation

Integration of physical and computer worlds

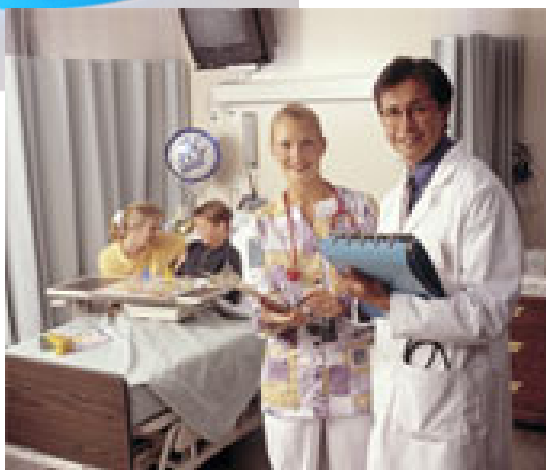
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# Benefits of RFID

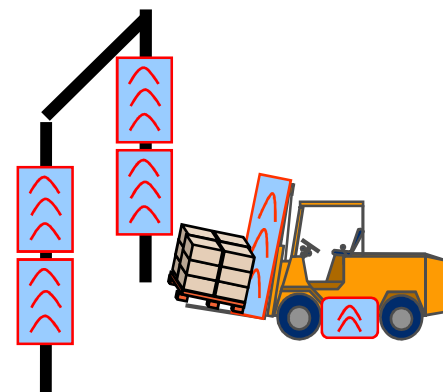
Non-line of sight, Range, Bulk read - Speed





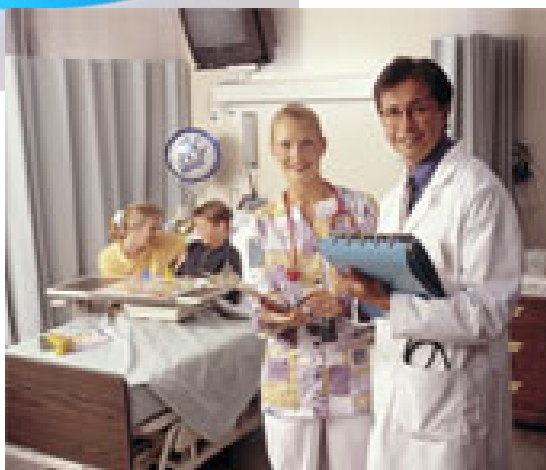
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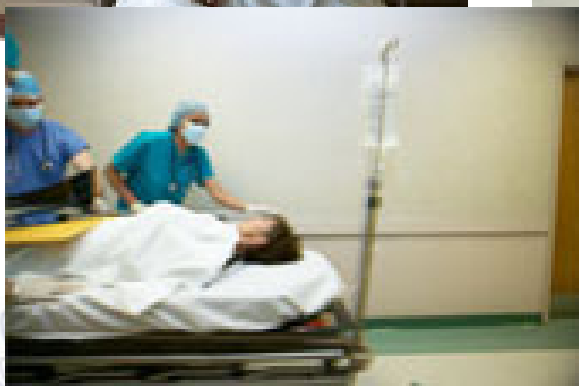
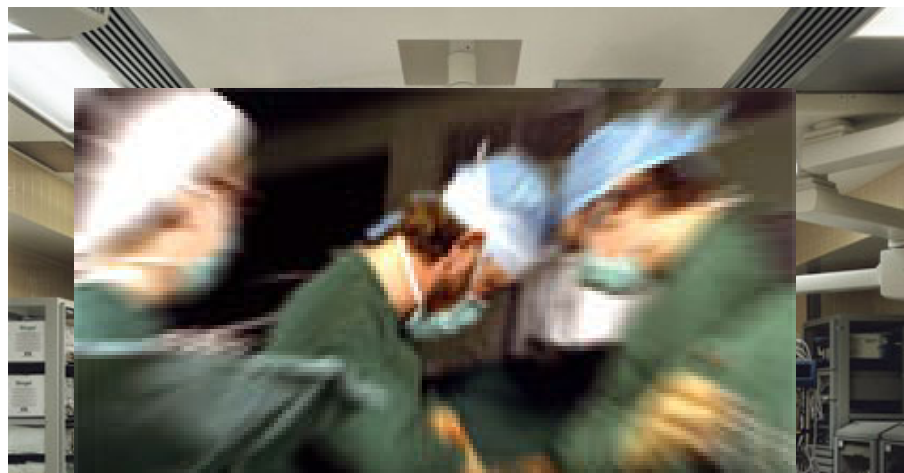
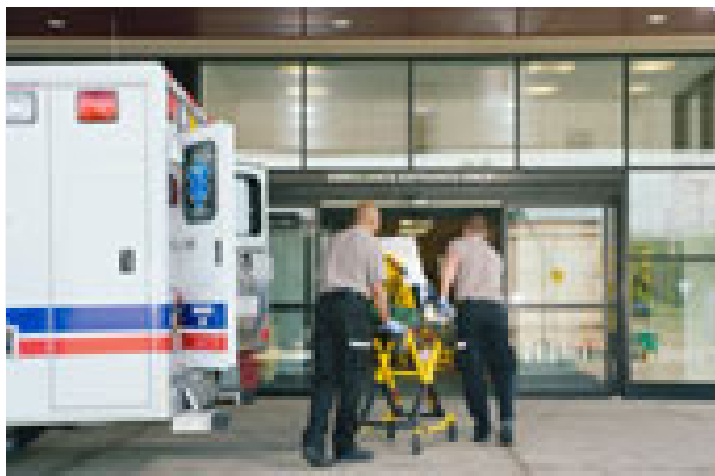
# Benefits of RFID

## Zero Human Involvement Operations



# Benefits of RFID

## Zero Human Involvement Operations





## Data management: What's new with RFID

### New types of information

- EPC/RFID event related, sensor data

### More detailed location information

- Locations within companies

### More items tracked

- Not just pallets

### More frequent information collection

- Many times per day

### Information shared with multiple partners

- Logistics, distributors, suppliers

### New access methods

- On demand by exception



## Unique ID for objects - serialised

- Electronic Product Code (EPC)

## Automated reading and tracking of physical events

- RFID (bar codes in some circumstances)

## Physical activity automatically updates computer systems

- Accurate, detailed, real time

## Computer systems accurately reflect the real world

- Improved control
- Lower costs, better quality, improved service





# Standards reduce costs and risks

Manufacturers have the **same basic processes** for all customers and vice versa

Products from different solution providers can work together

Encourages **solution commoditisation** which drives competition, product improvement and lower costs

Reduces risk and simplifies investment decisions

**Rapid adoption of new systems and processes**





# Healthcare RFID Questions

- What data to put on the tag
- How to put the data on the tag
- How the tag talks to the reader
- What data to capture about RFID read events
- How RFID event data is aggregated, filtered and linked to business processes and internal IT systems
- How data exchange is managed with business partners

EPCglobal standards answer these questions  
so you don't have to worry about them



# Healthcare RFID Questions

- What data to put on the tag - GS1 Data
- How to put the data on the tag - EPC
- How the tag talks to the reader - Gen 2
- What data to capture about RFID read events – EPCIS, Data Exchange
- How RFID event data is aggregated, filtered and linked to business processes and internal IT systems – Reader Protocol, ALE, EPCIS
- How data exchange is managed with business partners – EPCIS Guidelines

EPCglobal standards answer these questions so you don't have to worry about them



# **Healthcare EPC and GS1 Identifiers**

Electronic Product Code (EPC) is a construct that allows all the GS1 Identifiers (GTIN, SSCC, GLN, GRAI, GIAI) to be encoded into an RFID tag

A pointer to information about the item

Contains:

- Header
- EPC manager number
- Object class
- Serial number
- Different identification systems can be used with EPC
  - DoD CAGE
- Additional Information on Gen 2 Tag
  - User memory, Manufacturer info, password security

**SGTIN**

016.37000.123456.100000000			
Header	EPC Manager	Object Class	Serial Number

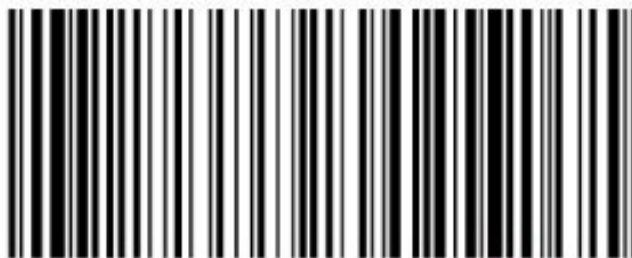




# Healthcare Compatibility GTIN – EPC SGTIN

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

EAN 128 Barcode

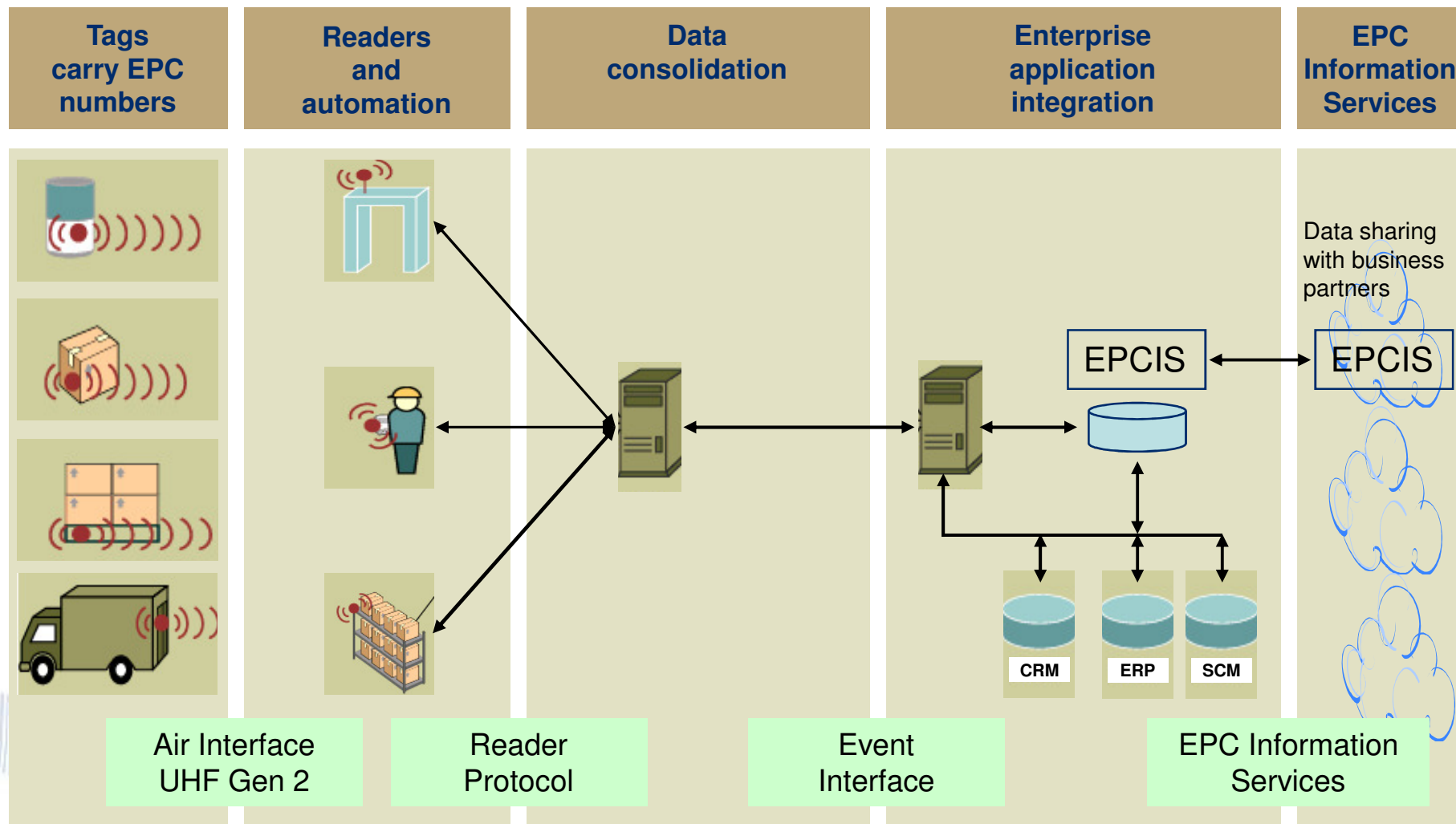


(01) 0 4012345 00734 3 (21) 2 X

EPC 96 Bit

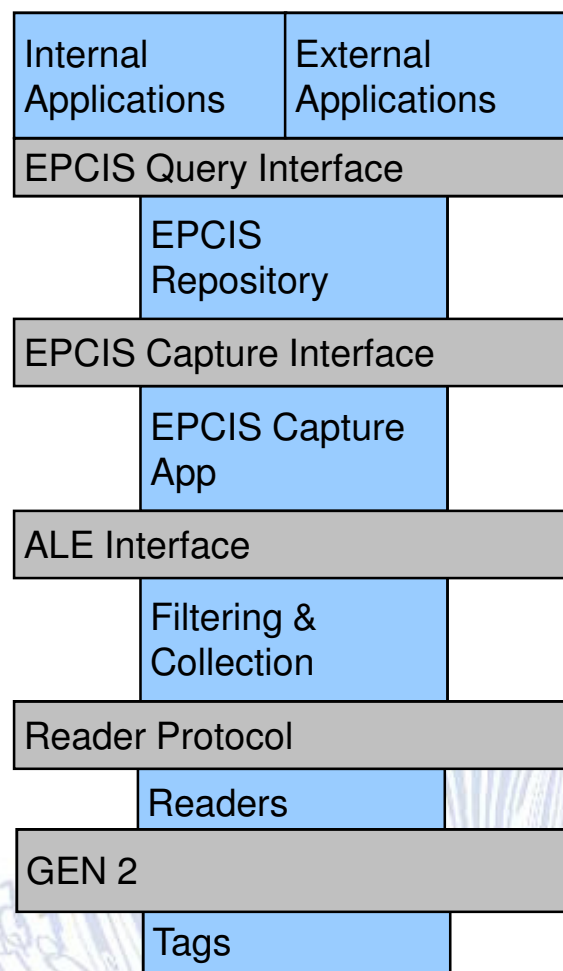
Header	Filter	Partition	EPC Manager	Object Class	Serial Number
8 Bit	3 Bit	3 Bit	24 Bit	20 Bit	38 Bit
0011 0000 binary	001 binary	5 decimal	4012345 decimal	000734 decimal	2 decimal

# The EPCglobal Network



# GS1 Healthcare EPCglobal Standards

Decouples data capture from data use by applications



What, When, Where and Why

Decentralised

Cross industry

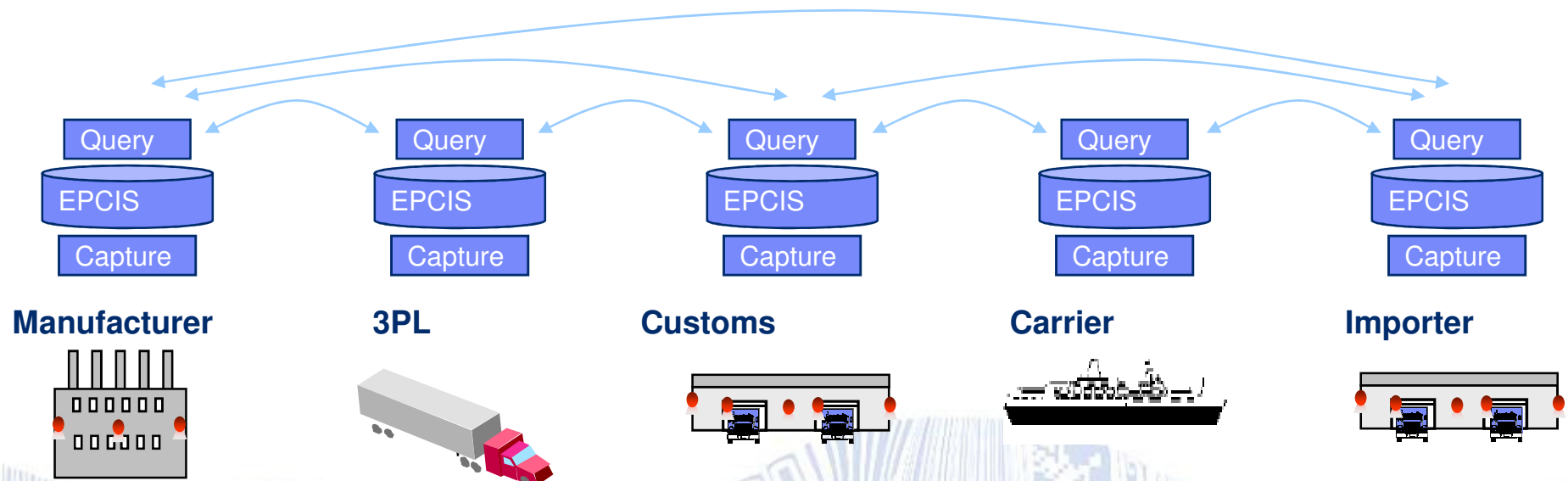
Technology Neutral

Sector extensible

IP Free

# Data Sharing with the EPCglobal Network

EPCIS instances at each enterprise communicate via the EPCIS query interface





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RFID Basics

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## 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



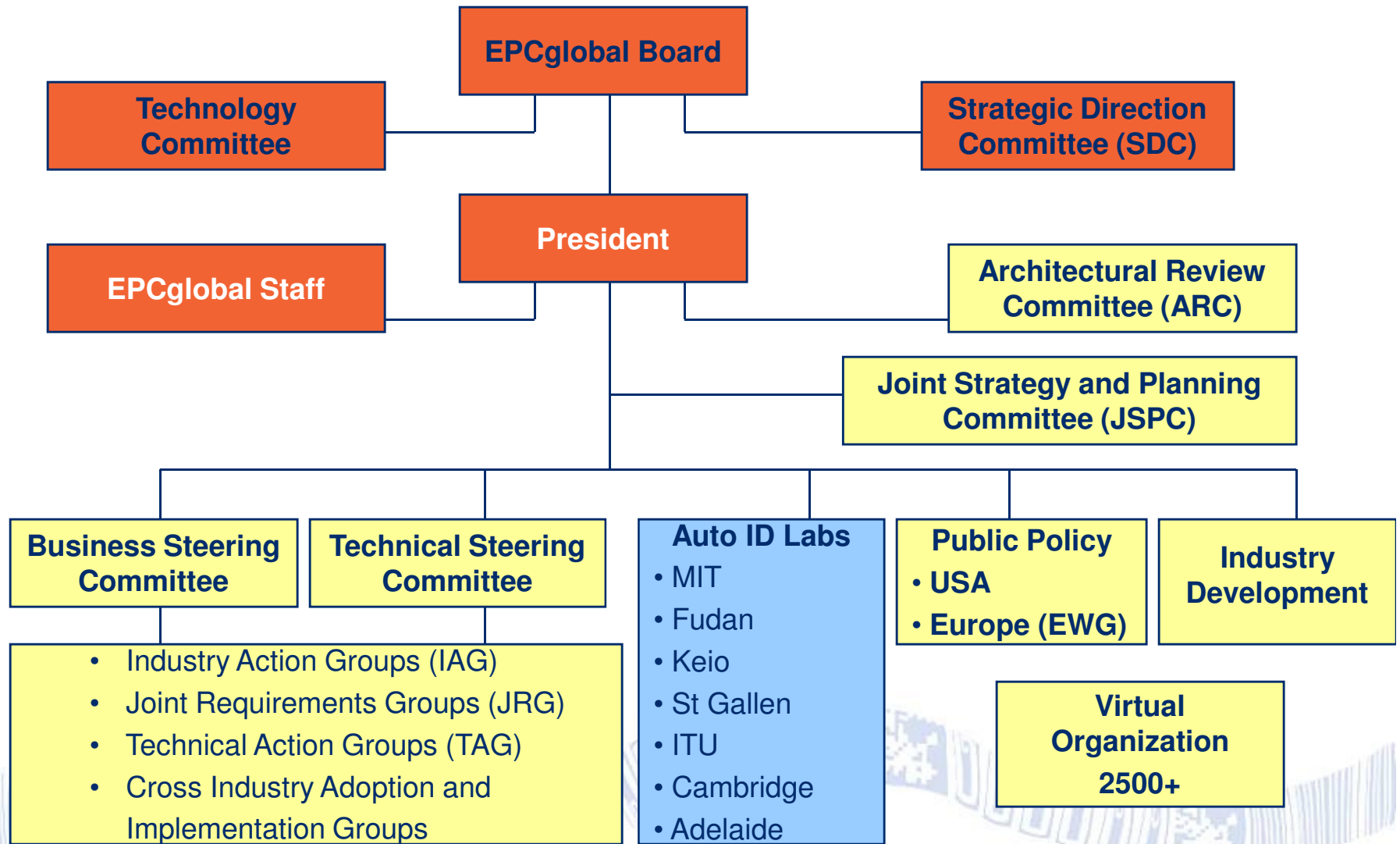
Global standards for RFID-based identification

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)



# Healthcare How the pieces fit together







# Healthcare EPCglobal purpose

Take a global leadership role in developing and promoting multi-industry, user driven standards for utilising the EPC and RFID

To deliver added value to our customers and stakeholders through our activities

Drive the global, multi-industry adoption of EPC via the GS1 Member Organisations

Recognized as the trusted authority on technical standards relating to the use of the EPC and RFID



# GS1 Healthcare Core Consumer Markets



# Growth Through New Industries

**Aerospace & Defense**



**Honeywell**



**Chemical**



**ExxonMobil**



**Industrial**

**3M**



**Footwear & Apparel**



Levi Strauss & Co



PERRY ELLIS



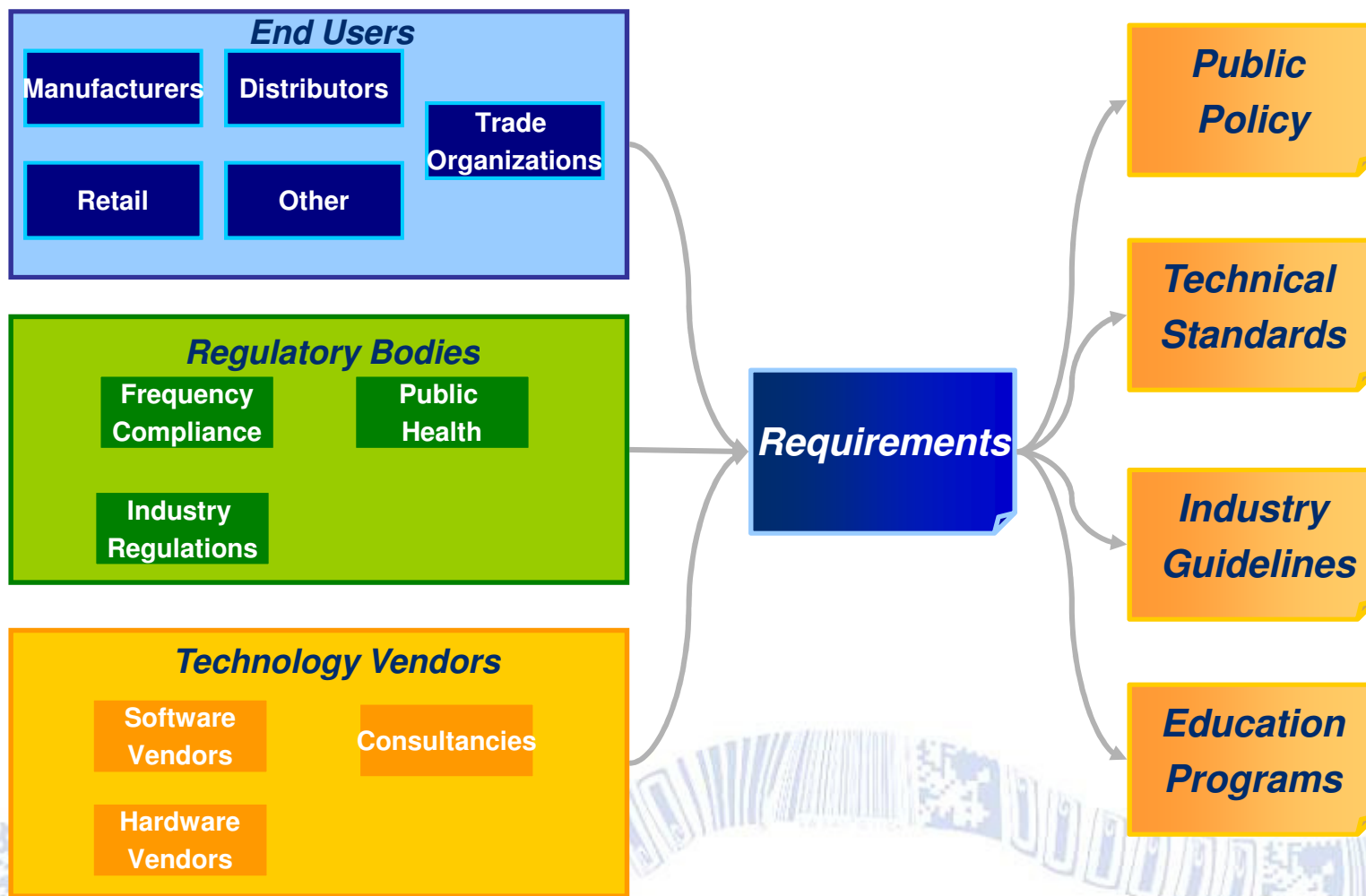
**Automotive**





# The EPCglobal Community

*Pulling diverse organizations together*





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EPCglobal Standards are the product of the collaborative efforts of global Subscribers from many industries, who participate in EPCglobal Action & Working Groups. To date, we have ratified 11 Standards:

- **EPC Tag Data Standard**

This EPC Tag Data specification defines the master structure and identification key formats for the Electronic Product Code (EPC) itself and how they are represented in an RFID tag.

- **EPC Tag Data Translation Standard**

This EPC Tag Data Translation (TDT) specification is concerned with a machine-readable version of the EPC Tag Data Standards specification. The machine-readable version can be readily used for validating EPC formats as well as translating between the different levels of representation in a consistent way. This specification describes how to interpret the machine-readable version. It contains details of the structure and elements of the machine-readable markup files and provides guidance on how it might be used in automatic translation or validation software, whether standalone or embedded in other systems.

Version 1.0 of the TDT specification is fully compatible with TDS  
Version 1.1 Rev. 1.27.



# Healthcare 11 Ratified Standards continue

- **Class 1 Generation 2 UHF Air Interface Protocol Standard Version 1.0.9: "Gen 2"**

Commonly known as the "Gen 2" standard, this standard defines the physical and logical requirements for a passive-backscatter, Interrogator-talks-first (ITF), radio-frequency identification (RFID) system operating in the 860 MHz - 960 MHz frequency range. The system comprises Interrogators (also known as Readers), and Tags (also known as Labels).

- **Reader Protocol (RP) Standard, Version 1.1**

Reader Protocol is an interface standard that specifies the interactions between a device capable of reading/writing tags and application software.

- **Reader Management (RM) Standard, Version 1.0**

This document defines Version 1.0 of the wire protocol used by management software to monitor the operating status and health of EPCglobal compliant RFID Readers. This document complements the EPCglobal Reader Protocol Version 1.1 specification [RP1]. In addition, this document defines Version 1.0 of the EPCglobal SNMP RFID MIB.



# Healthcare 11 Ratified Standards continue

- **Application Level Events (ALE) Standard, Version 1.0**

This EPCglobal Board-ratified standard specifies an interface through which clients may obtain filtered, consolidated Electronic Product Code™ (EPC) data from a variety of sources.

- **Object Naming Service (ONS) Standard, Version 1.0**

This document specifies how the Domain Name System is used to locate authoritative metadata and services associated with the SGTIN portion of a given Electronic Product Code™ (EPC). Its target audience is developers that will be implementing Object Naming Service (ONS) resolution systems for applications.







# Healthcare 11 Ratified Standards continue

- **EPCglobal Certificate Profile Standard**

To ensure broad interoperability and rapid deployment while ensuring secure usage, this document defines a profile of X.509 certificate issuance and usage by entities in the EPCglobal network. The profiles defined in this document are based upon two Internet standards, defined in the Internet Engineering Task Force's (IETF's) Public Key Infrastructure (PKIX) Working Group, that have been well implemented, deployed and tested in many existing environments.

- **Pedigree Standard**

Allows supply chain interoperability of ePedigree documents necessary to fulfill any pedigree regulation that is based on an open, nested document model. Works with EPC serialized and non-serialized products. Can be used as a platform for compliance with all known drug pedigree laws in the US (actual compliance is left up to the user). Provides an enveloping mechanism to help organize documents into shipment groupings. Eases the transition to other EPC standards while complying with pedigree regulations.





# Healthcare 11 Ratified Standards continue

- **Low Level Reader Protocol (LLRP) v.1.0**

The standard provides an interface for low cost readers so that they can be fine tuned to optimize performance in noisy business environments.

Specifies an interface between RFID Readers and Clients. The interface protocol is called *low-level* because it provides control of RFID air protocol operation timing and access to air protocol command parameters.

LLRP is air-protocol aware. Version 1.0 has been written specifically for Class 1 Generation 2 Air Interface Protocol.

- **Electronic Product Code Information Services (EPCIS) v.1.0**

The standard is used to track the progress of objects as they move through the supply chain.

EPCIS provides important new capabilities to improve efficiency, security and visibility in the supply chain. It is an industry-neutral, technology-neutral standard that is designed to fit within existing enterprise and security environments, and as such it is a supplement to, not a replacement for, existing enterprise information systems.

The EPCIS standard provides the foundation necessary for the capture, communication and dissemination of EPC data about goods and services products. The EPCIS standard includes a set of interfaces (capture and query) for obtaining and sharing data about unique objects and services both within and across organizations.



**Healthcare**

# Standards Support Material

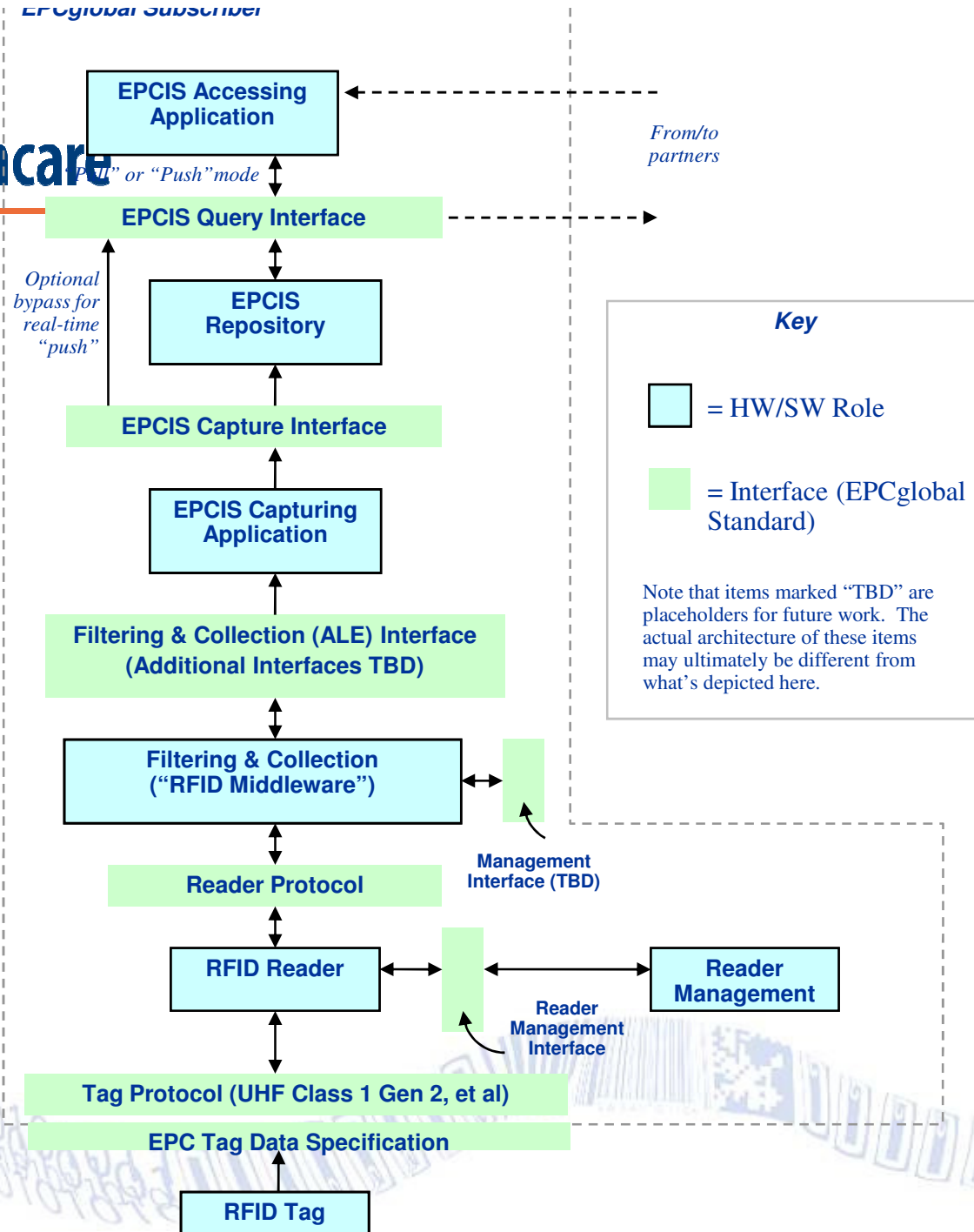
EPCglobal provides additional, technical information to use in conjunction with your standards-based systems:

**EPCglobal Architecture Framework:** identifies the relationship between EPCglobal hardware, software, and data standards and the EPCglobal Network components





# Healthcare



# **Healthcare Rapid progress continues**

11 ratified global standards

Network and security standards (supported by  
Architectural Review Committee Guidelines)

Item level tagging - UHF and HF work groups

- Other tag types to follow (EPCglobal is tag “neutral”)

Certification services - confident technology use



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# GS1 Healthcare Tangible Examples

- **Electronic proof of delivery**
  - Avoiding waste of resources.
  - EPC data was able to refute received amount 80% of occasions
- **Department of Defense**
  - Reduced order backlog form 92k to 11k orders
  - \$1.7bn ROI over 7 years
  - Improving “confidence” in the supply chain
- **Baggage tracking**
  - Improving control and accuracy
  - 99% read rate helping to solve a \$1.6bn problem

(Significant transport and logistics project now starting)



# GS1 Healthcare Tangible Examples

- **Apparel**
  - Improving customer availability
  - 20% improvement in accuracy (size and colours)
- **Prompt movement of promotional items to sales floor**
  - Retailer 19% sales lift
  - Supplier 26% sales increase





# GS1 Healthcare Business Case examples



## – Metro

- Process efficiency - 12% to 17% (incoming merchandise & shelving)
- Loss/theft - 11% to 18% (depends on category)
- Goods availability - 9% to 14% (reduction OOS)
- Incoming goods - € 8.5mio (German est. only)

## – Lemmi Fashion (*SME – 1 mio garments per year*)

- Stock turnover before tagging - 5,000 to 10,000 items per day
- Stock turnover after tagging - 20,000 items per day
- Increase of 250%-300% in receipt and shipment of goods





# GS1 Healthcare Overview

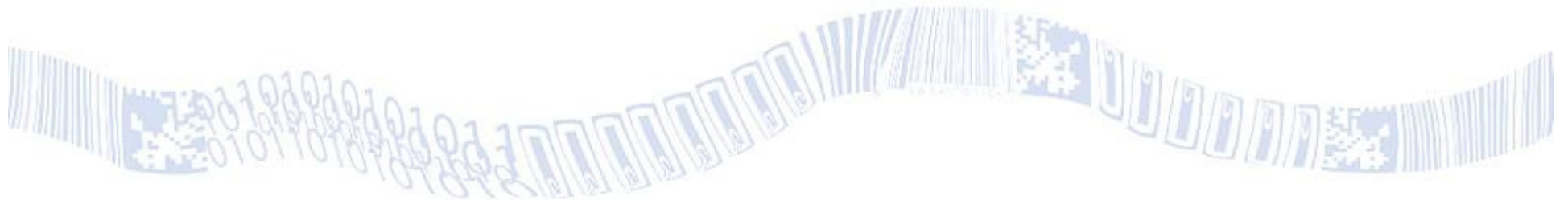
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The Need for Global Standards

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**Healthcare**

## **Radio Frequency Identification and business processes**

RFID by itself does not:

- Improve shelf availability
- Improve out of stocks
- Reduce inventory
- Reduce shrinkage
- Reduce labour
- Reduce Counterfeits

RFID can deliver business processes where:

- The operator and the process is controlled by the system
- Information is trusted, true and accurate
- Errors or deviations from the process can be immediately highlighted, against pre-set parameters



# **Healthcare RFID and business processes**

It is the **improved control of the process**/supply chain and, most importantly, **its operators**, provided by the correct implementation of RFID, that delivers the benefits

Focus on the process:  
RFID is the enabler not the solution





# Healthcare Key Take Aways

EPCglobal is driven by user's requirements

- The business process not the technology

The same data in bar codes and EPC/RFID tags

- RFID is just another data capture technology
- EPC/RFID tags and barcodes work together

The data is the data is the data

- EPC data is serialised

EPCglobal standards are in place now

- Cover data management as well as RFID



# Questions

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