



EPCglobal – RFID standards & regulations

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EPCglobal 



Roots of EPCglobal

- Auto ID Center (launched in 1999)
 - Six world-class academia Labs: MIT (US), Cambridge (UK), Adelaide (Australia), Keio (Japan), Fudan (China), St Gallen (Switzerland)
 - 100 sponsoring User companies and Solution Providers
 - The Electronic Product Code (EPC), a unique identity to individual physical objects
 - Cheap sensing of object EPC codes using RFID
 - Access to EPC related data through the Internet
- GS1 launches EPCglobal in November 2003
 - Experienced standards making body
 - 30 years experience in barcodes & Electronic Data Interchange
 - 101 Member Organisations
 - 1.1 million firms in 140 countries



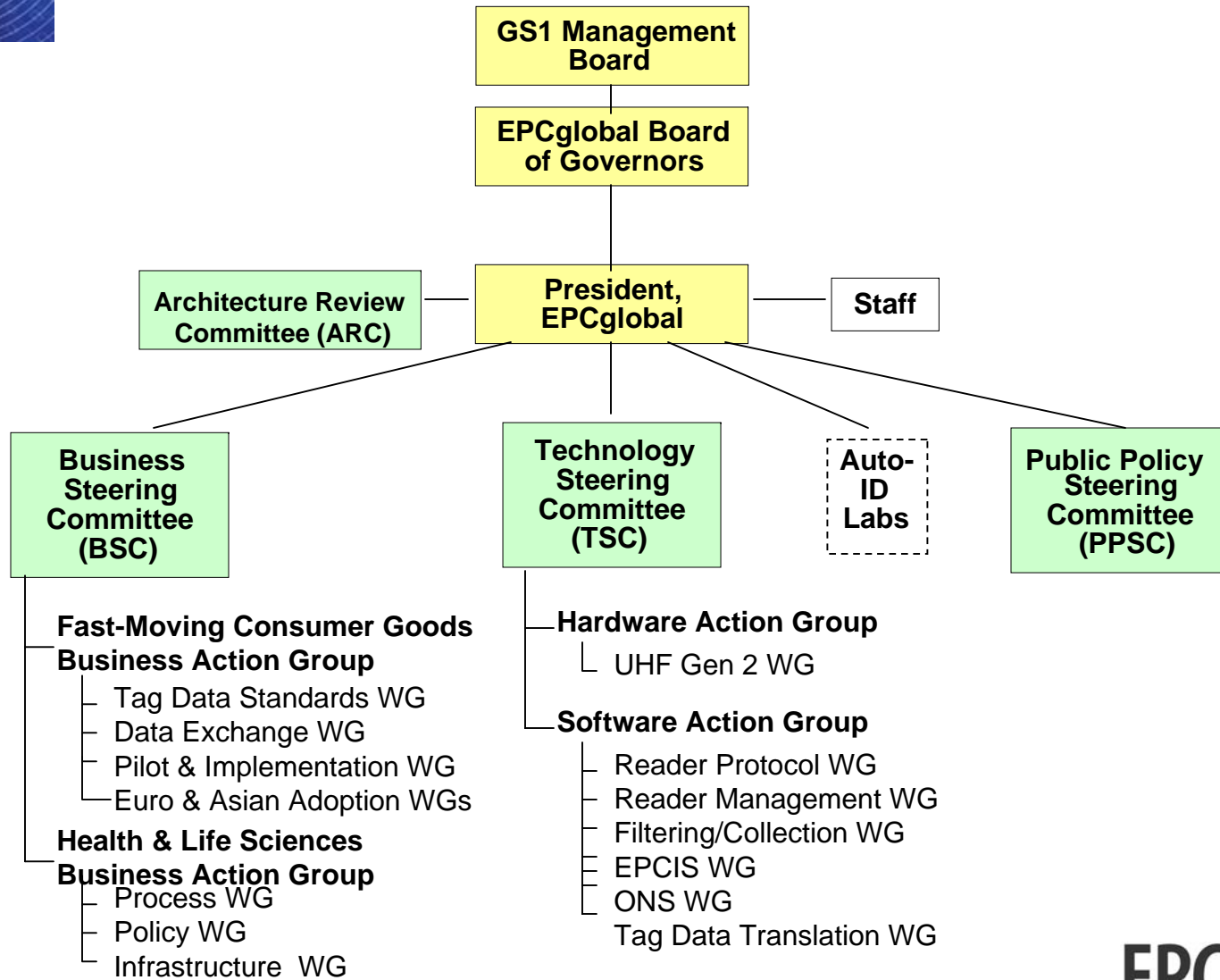


EPCglobal Mission

- Develop technical specifications and standards
- Facilitate mass adoption across all industries
- Provide compliance and interoperability services
 - RFID conformance certification run by MET Labs
 - Performance test center accreditation program
- Drive education and training
- Provide continuing support for cutting-edge research performed by Auto-ID Labs



EPCglobal Organisation





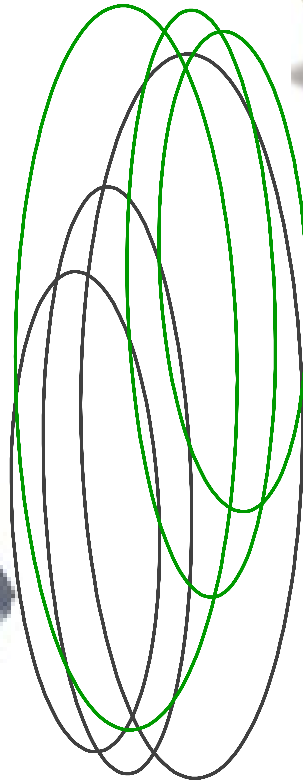
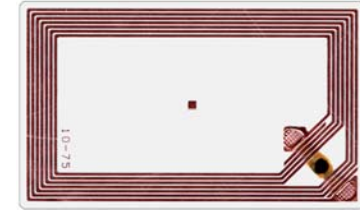
Intellectual property

- Complex and important issue
- Balance between commercial interests, technology development and affordable products
- EPCglobal aims to provide royalty free standards. However, Reasonable And Non Discriminatory (RAND) IP claims accepted exceptionally
- ISO Intellectual Property rights policy based on RAND
- Patent pool created recently for RFID Gen 2 products – Good approach for Users and Solution Providers: simple, fair and cost effective



RFID

Tag



Reader



Air Interface Protocol

Technical specifications

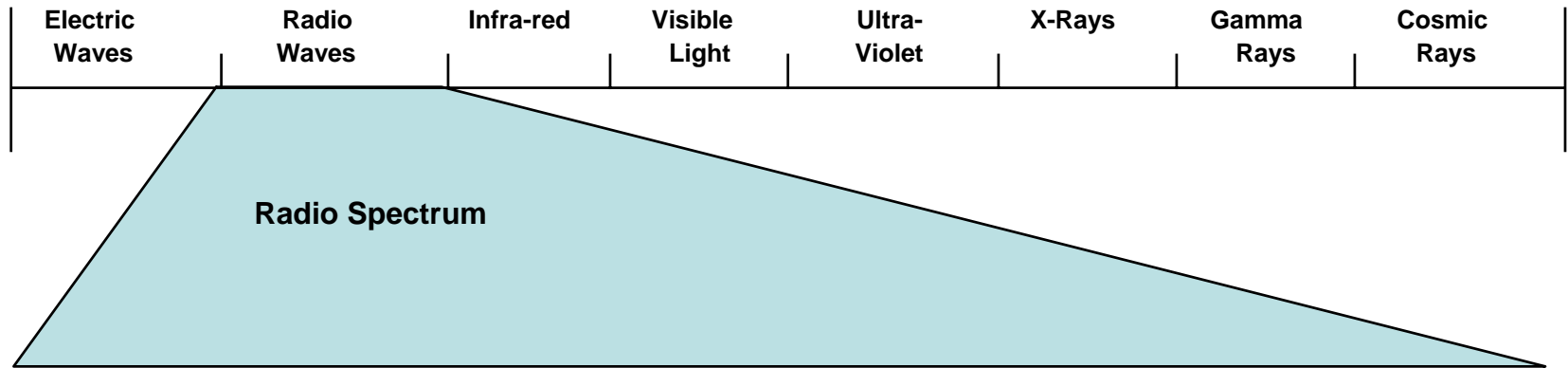
Regulations

Laws and rules on how the technology can be used





Electromagnetic spectrum



9kHz 30kHz 300kHz 3000kHz 30MHz 300MHz 3000MHz 30GHz 300GHz 3000GHz

VLF LF MF HF VHF UHF SHF EHF Not designated

Long Wave

Medium Wave

Short Wave

VLF
LF
MF
HF

Very Low Frequency
Low Frequency
Medium Frequency
High Frequency

VHF
UHF
SHF
EHF

Very High Frequency
Ultra High Frequency
Super High Frequency
Extremely High Frequency

The "RFID" Frequencies

125-134 KHz

13,56 MHz

433 MHz

860-960 MHz

2,45 and 5,8 GHz

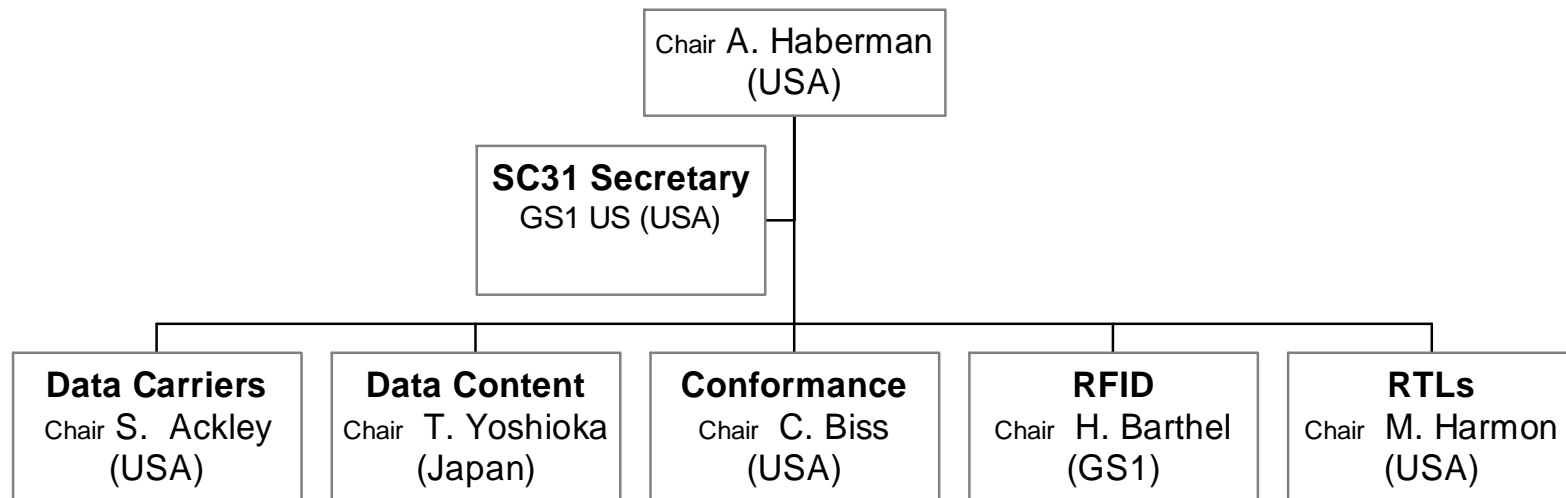


ISO standards for RFID

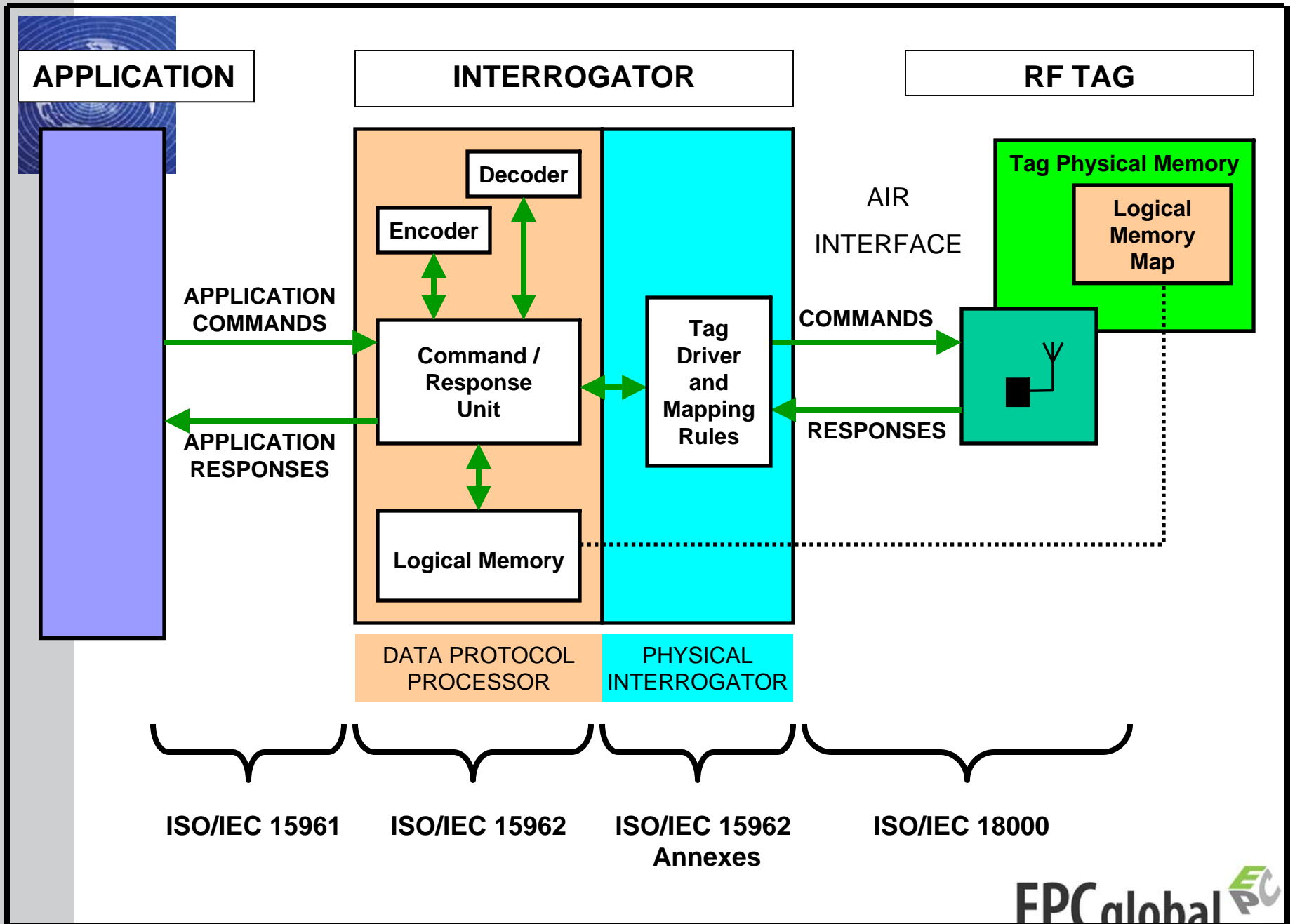
- Standards exist in different areas:
 - Animal identification
 - Cards and Personal identification
 - Containers ID
- For item management applications, standards are developed by SC31, a subcommittee of Joint ISO/IEC Technical Committee 1 (JTC 1) on Information Technology



ISO/IEC JTC1/SC31



Standardisation of data formats, data syntax, data structures, data encoding, and technologies for the process of automatic identification and data capture





ISO/IEC 18000 Air Interface specifications

- 18000-1: General guidelines
- 18000-2: less than 135 KHz
- 18000-3: HF 13.56 MHz
- 18000-4: 2.45 GHz
- 18000-6: UHF 860-960 MHz
- 18000-7: 433 MHz

These are all formal ISO/IEC standards

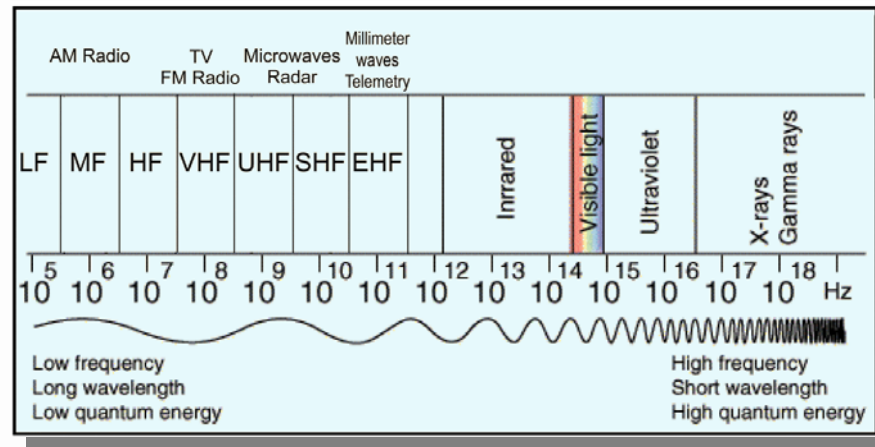


EPCglobal RFID standards

- The RFID technology that gets most attention today is UHF (Ultra High Frequency)
- UHF is a good compromise between reading speed, distance, multiple tags handling and cost.
- UHF Generation 2 specifications approved as EPCglobal standard in December 2004
- Gen2 has been submitted to ISO, should be published as ISO standard in March 2006

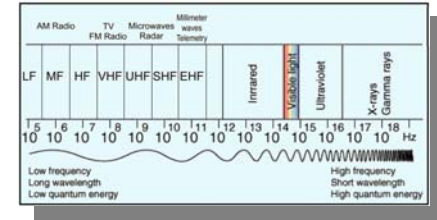


Frequency Allocation





Regulatory infrastructure



- Spectrum allocation to allow use of Gen2
- UHF spectrum (860-960 MHz) and power regulations (2w erp/4w eirp)
- Significant progress made:

ITU Region

1 EU and Africa

EU		
CEPT/ETSI		
South Africa		
Israel		

2 Americas

USA		
Canada		
Central America		
South America		

3 Asia

Australia		
New Zealand		
Japan		
South Korea		
Singapore		
Hong Kong		
China		
Taiwan		
India		



RFID UHF regulations in Asia recent developments

- **Japan** has formally allocated 952-954 MHz on April 5th 2005
- **India** has formally allocated 865-867 MHz (4W erp) on May 4th
- **China** is evaluating the possibility to release a band for RFID within the 917-925 MHz range
- **Malaysia** is working with the industry. New regulations being considered
- Other Asian countries are expected to adapt their existing regulations

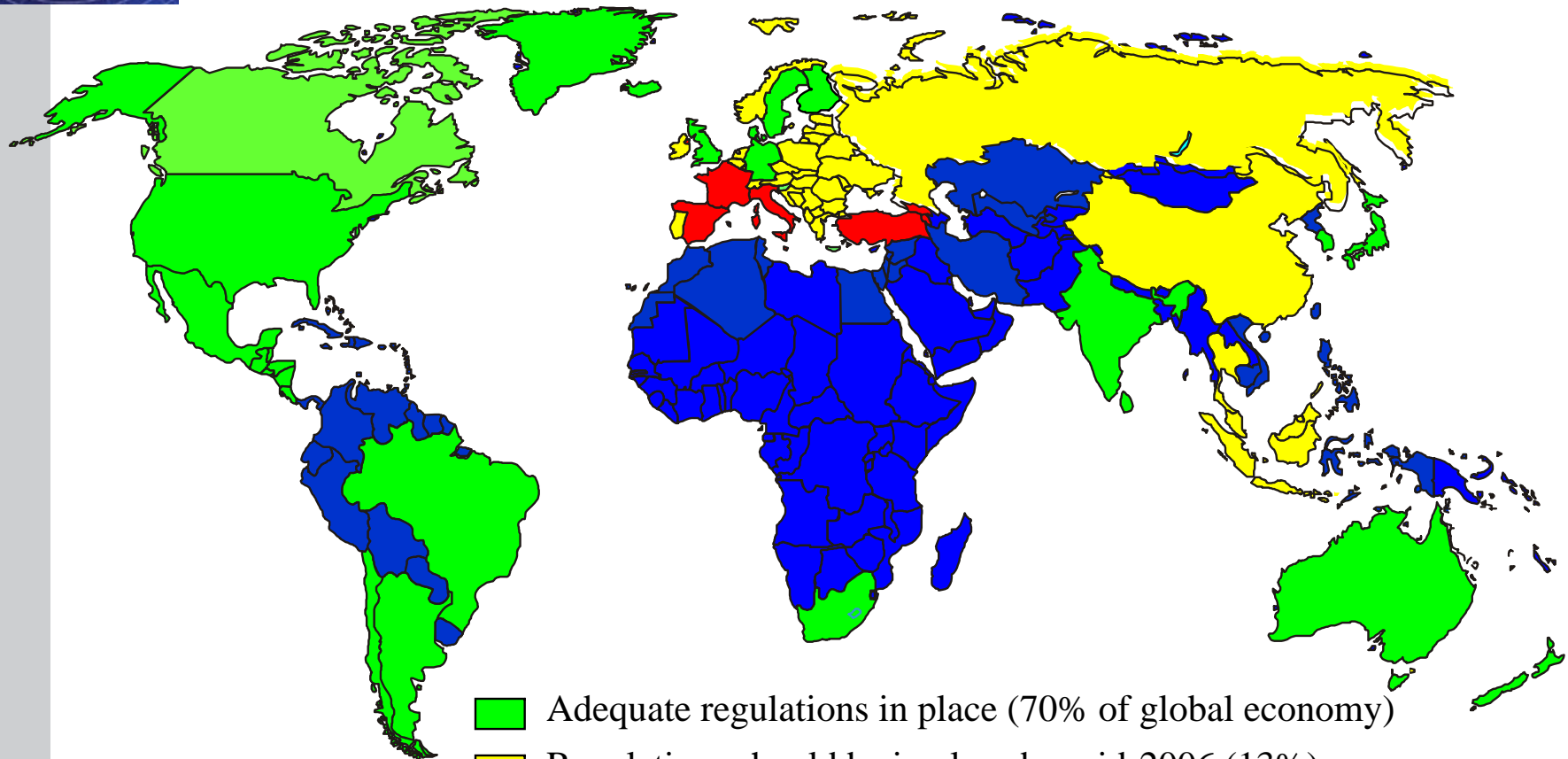






RFID UHF regulations in Europe

- New European regulations for RFID at UHF (ETSI EN 302 208) were approved in September 2004 and have to be translated into national laws
- Regulations in place in Cyprus, Denmark, Finland, Germany, Iceland, Latvia, Slovenia and Switzerland. Should be completed by October 2005 in Sweden and UK
- France, Spain, Italy, Turkey have an issue due to conflict with existing frequency allocations
- European Commission can speed up or enforce regulations



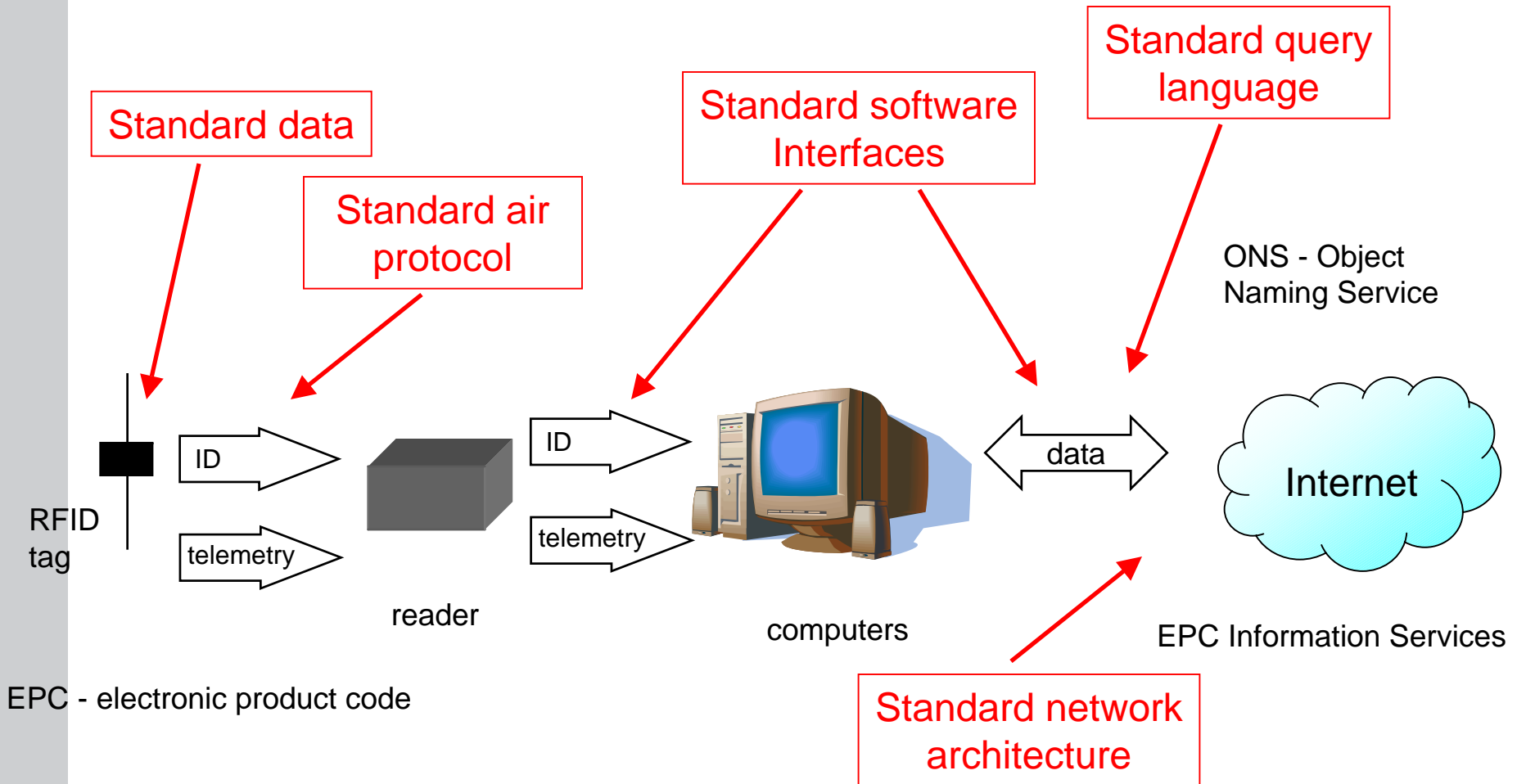
UHF regulations overview



-  Adequate regulations in place (70% of global economy)
-  Regulations should be in place by mid-2006 (13%)
-  Conflicts with established regulations (11%)
-  Information not available (6%)

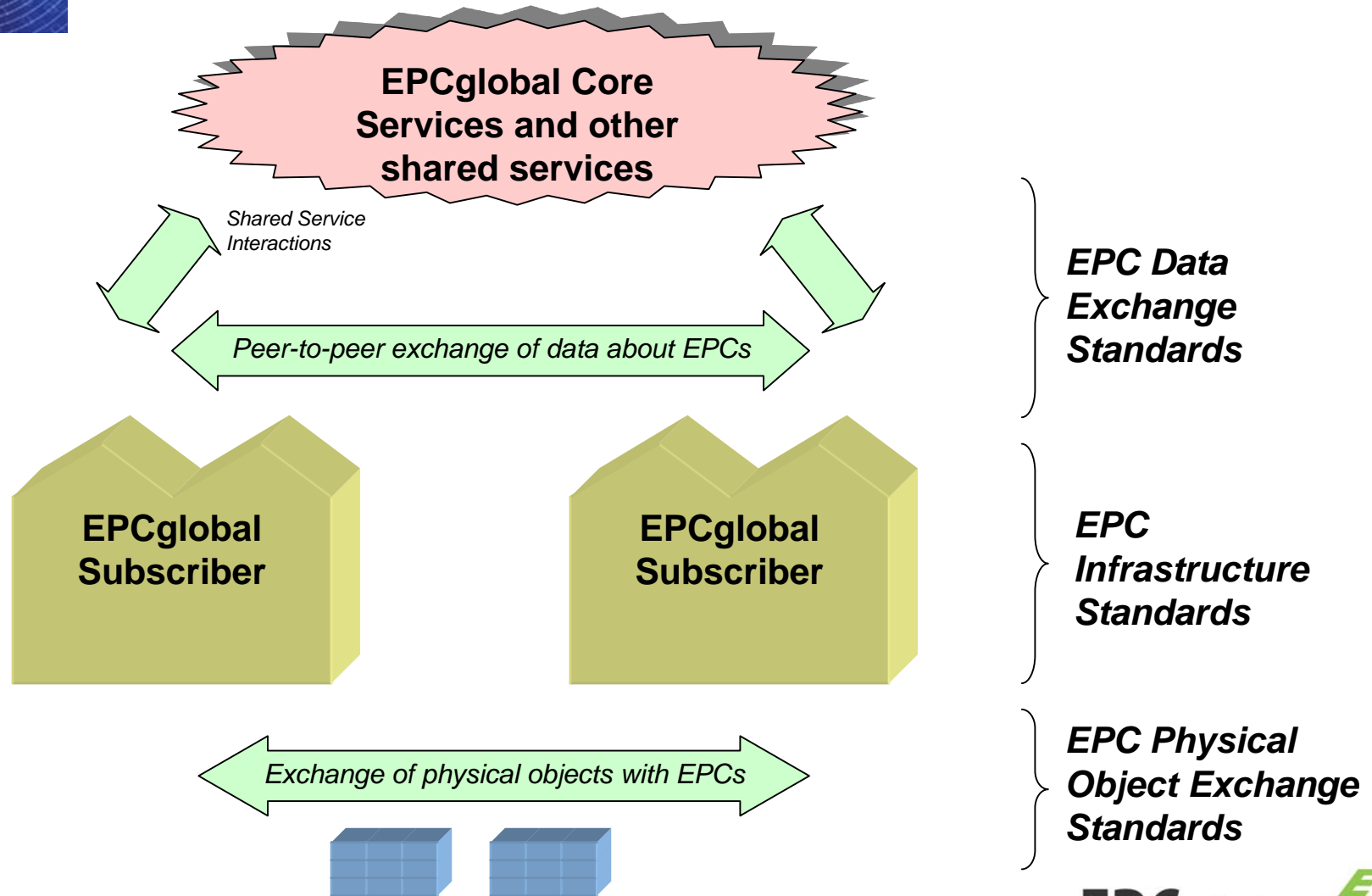


The EPCglobal Network Infrastructure



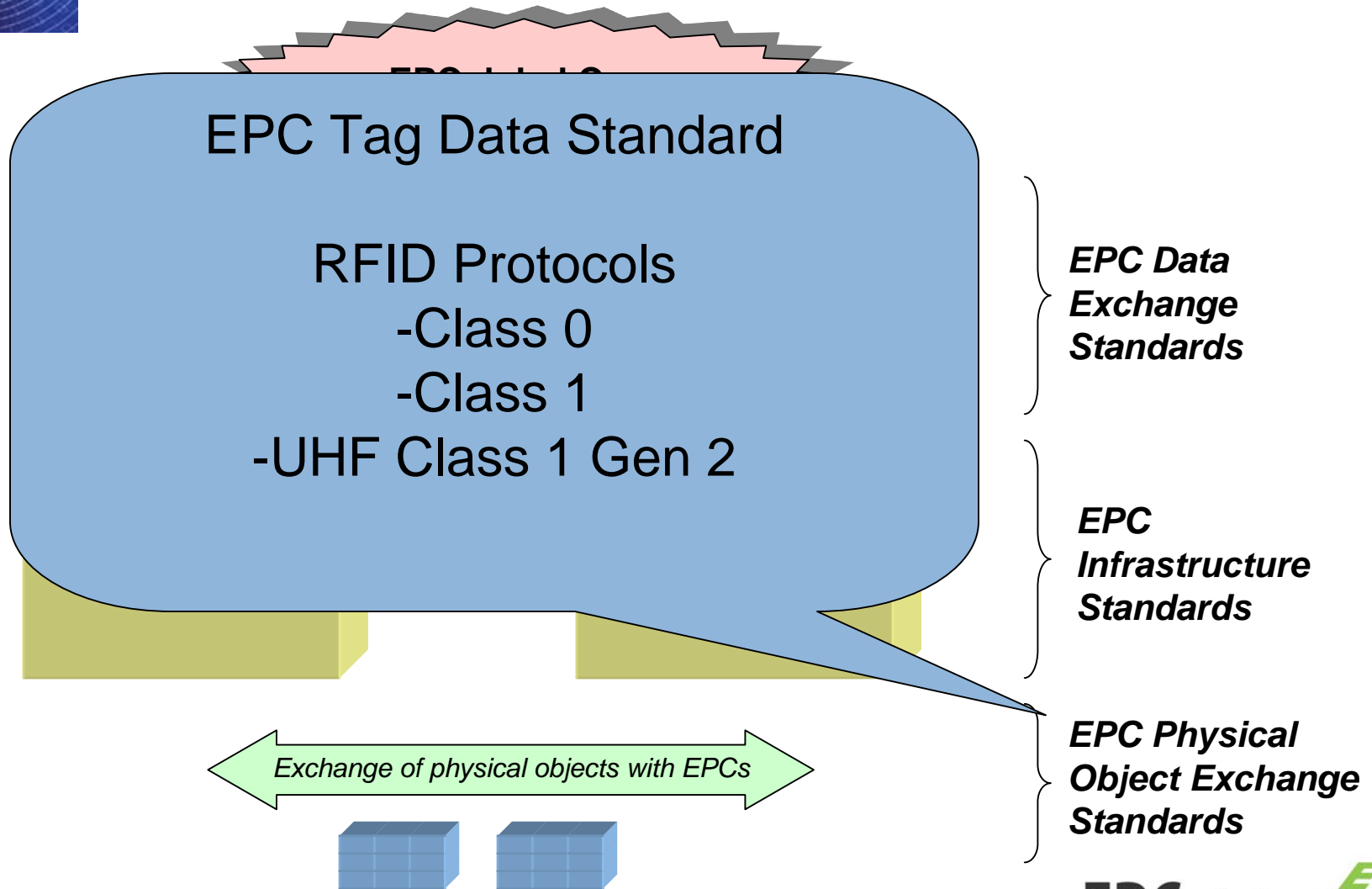


EPCglobal Standards Overview



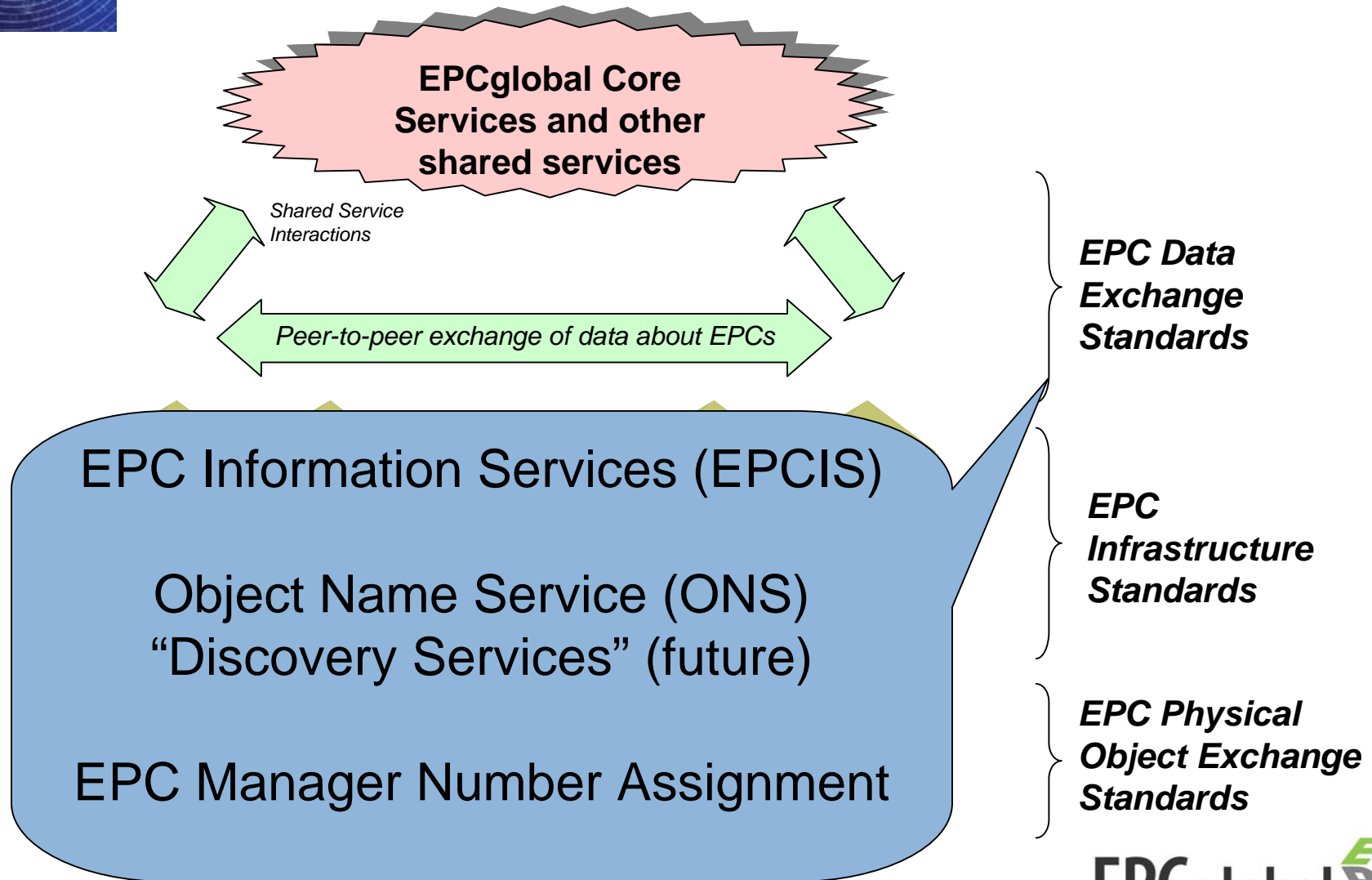


EPCglobal Standards Overview



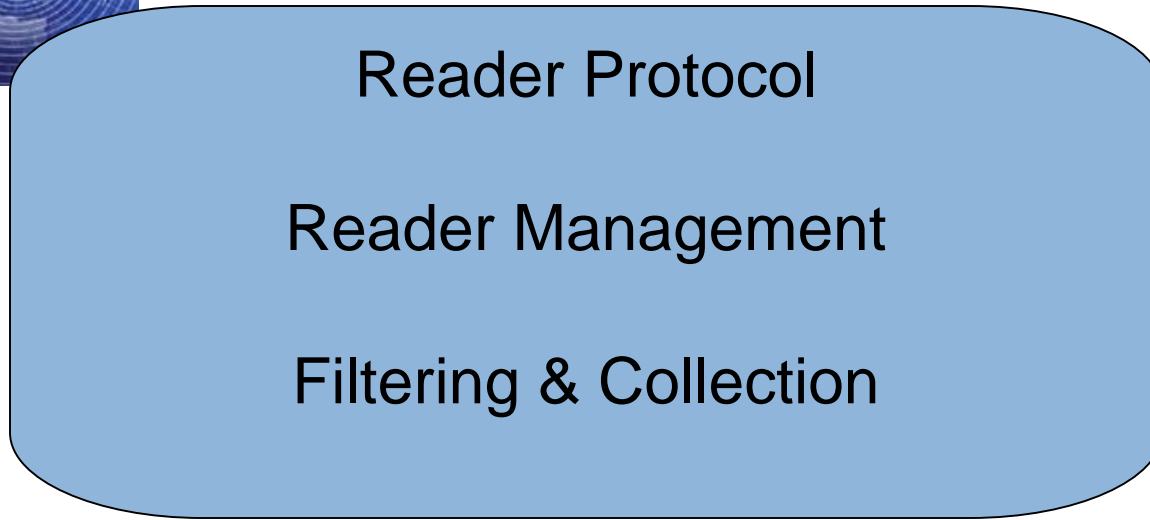


EPCglobal Standards Overview





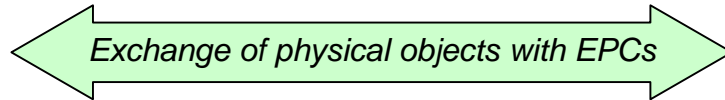
EPCglobal Standards Overview



***EPC Data
Exchange
Standards***



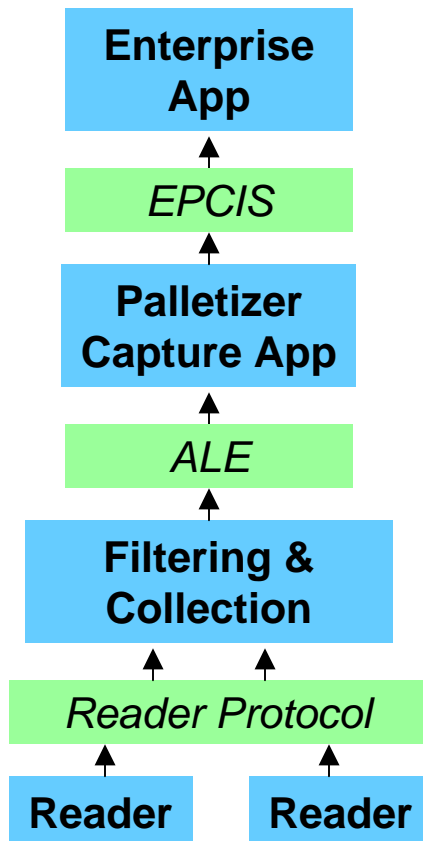
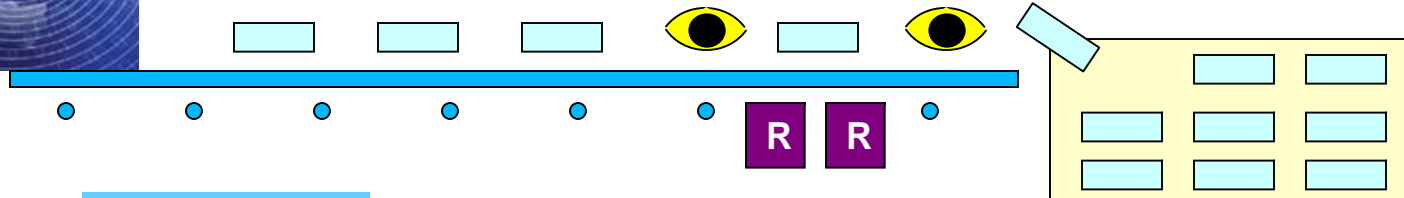
***EPC
Infrastructure
Standards***



***EPC Physical
Object Exchange
Standards***



Example – Palletizer



“at time T , the association of the following case tags to the following pallet tag was created at palletizer #3, to fulfill order #1234”

What, Where, When, Why

“between the time the case crossed the first beam and the second beam at location L , the following tag was read”

What, Where, When

dozens of individual tag read events from specific antenna



Conclusions

- Large-scale RFID implementation have started
- Standards and regulations are critical enablers
- The issue is broader than RFID, it is about transforming supply chains and access to information in a global collaborative framework

Thank you for your attention
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