

Internet-Of-Things (IoT) from Hype to Reality

by

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1. guerlet consulting
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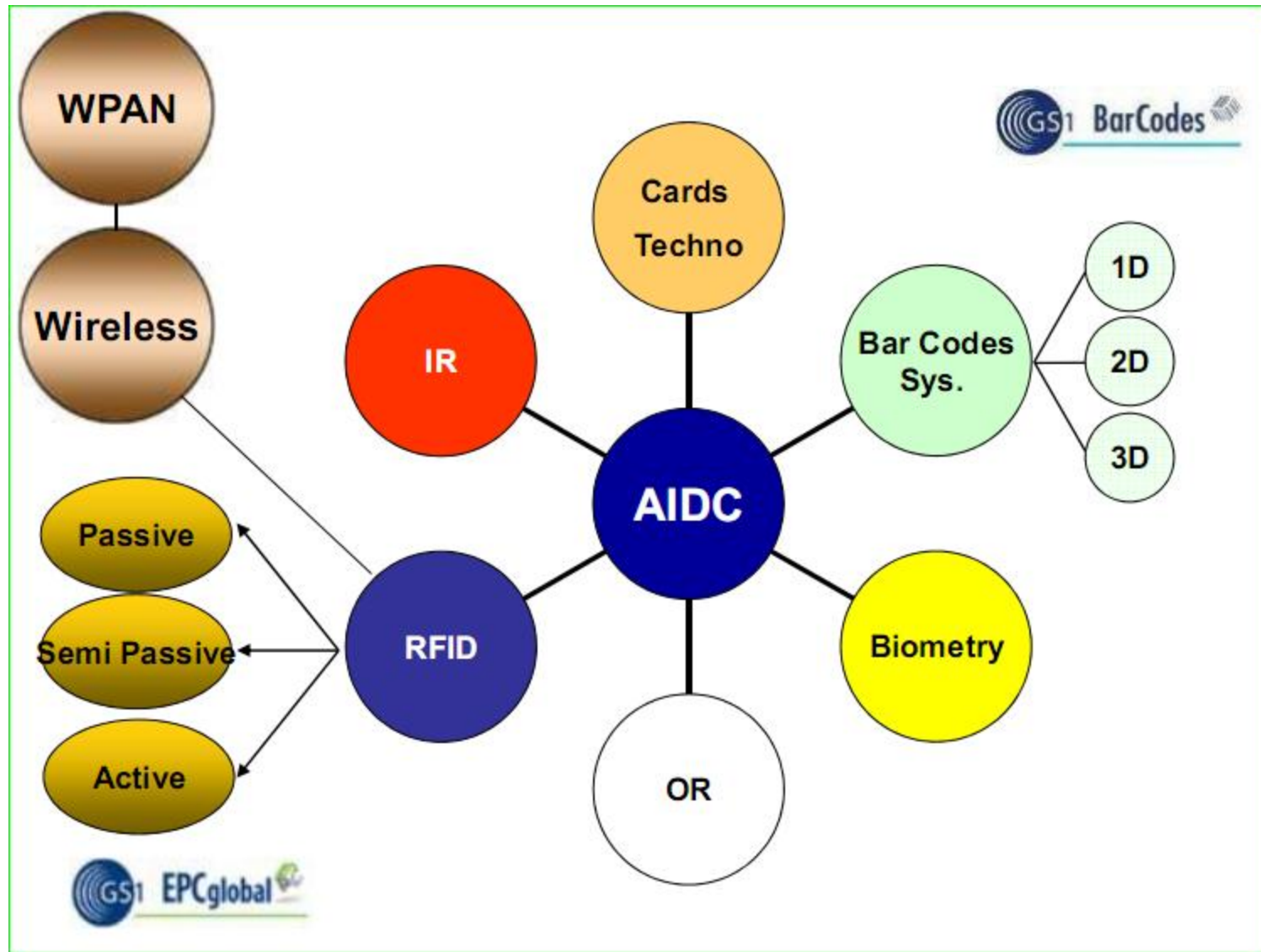
1. RFID – Organisations
2. RFID – Publications
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Ihr Ansprechpartner für:

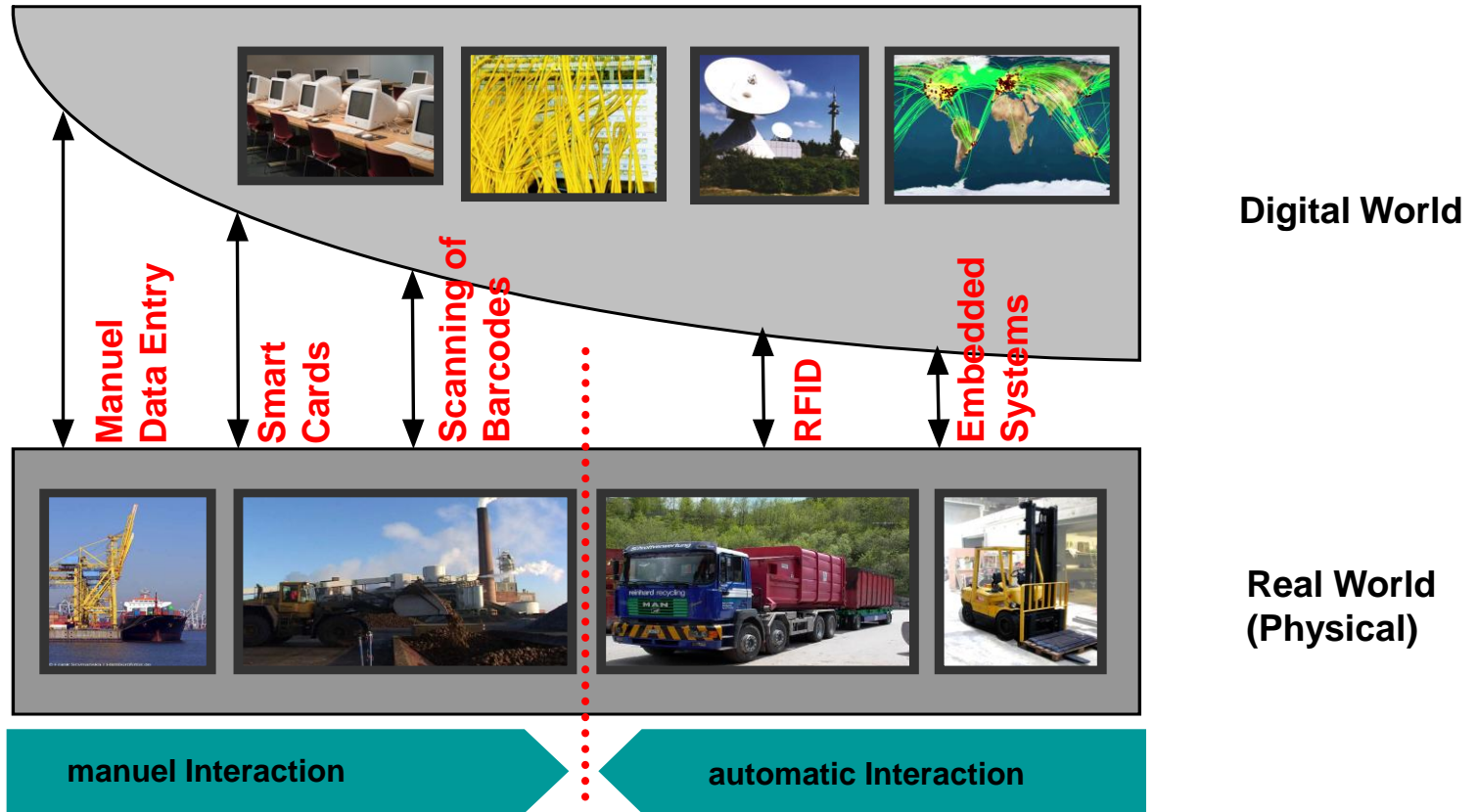
- Produkte-Neutrale Beratung für RFID-Produkte & -Systeme
- Durchführen von RFID-Ausbildungskursen (onsite & online=Webinare) von Technologie- bis Business-Schulungen
- Coaching von RFID- und IT-Projekten (von der Idee über Anforderungen und Evaluationen bis Abnahme)
- Finden von RFID-Lieferanten und -Kundenreferenzen, d.h. Globale RFID-System- und Produkte-Suche
- Technisches & kommerzielles Consulting für den RFID-Einsatz (techn. Problem-Solving bis Human-Mediation)
- Erarbeiten von RFID-System-Spezifikationen, Acceptance Procedures, Wirtschaftlichkeitsberechnungen
- Marktanalysen
- Markteintrittsunterstützung Schweiz
- Vermitteln von Business-Kontakten auf GL- & VR-Ebene
- Business- und Marketingpläne
- System- und Projekt-Audits
- Expertisen / Gutachten
- Mediation bei RFID- und ICT-Projektproblemen

2. Definition & Purpose of AIDC

2.1 Definition of AIDC



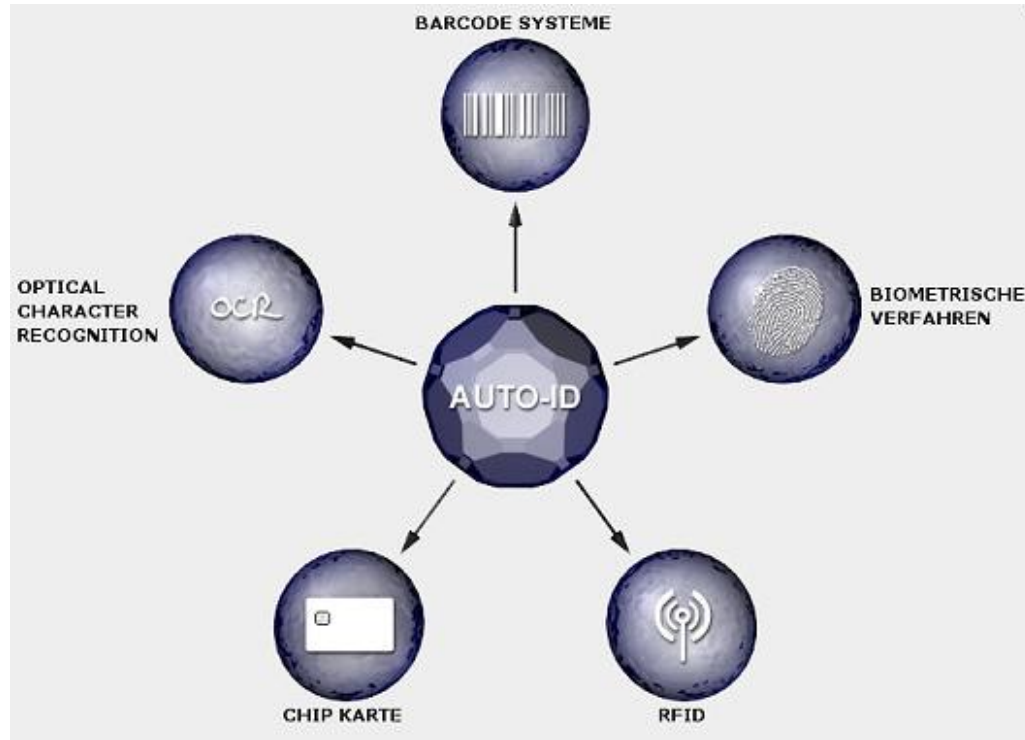
2.2 Purpose of AIDC



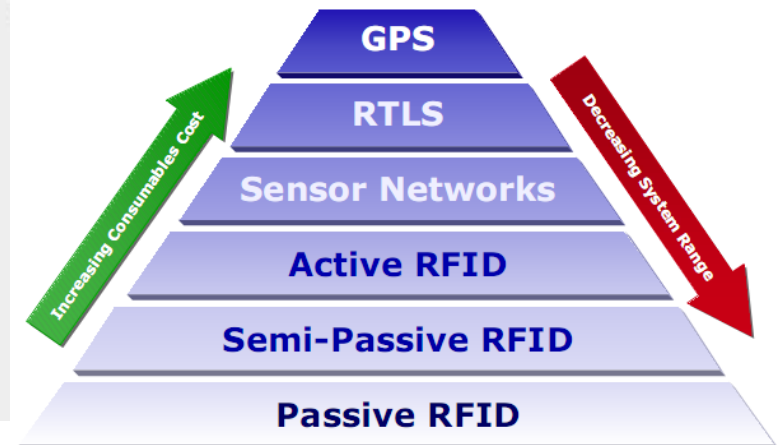
Source: E. Fleisch / M. Dierkes

2.3 Functionality of AIDC

1. Identification & 2. Localisation= Positioning



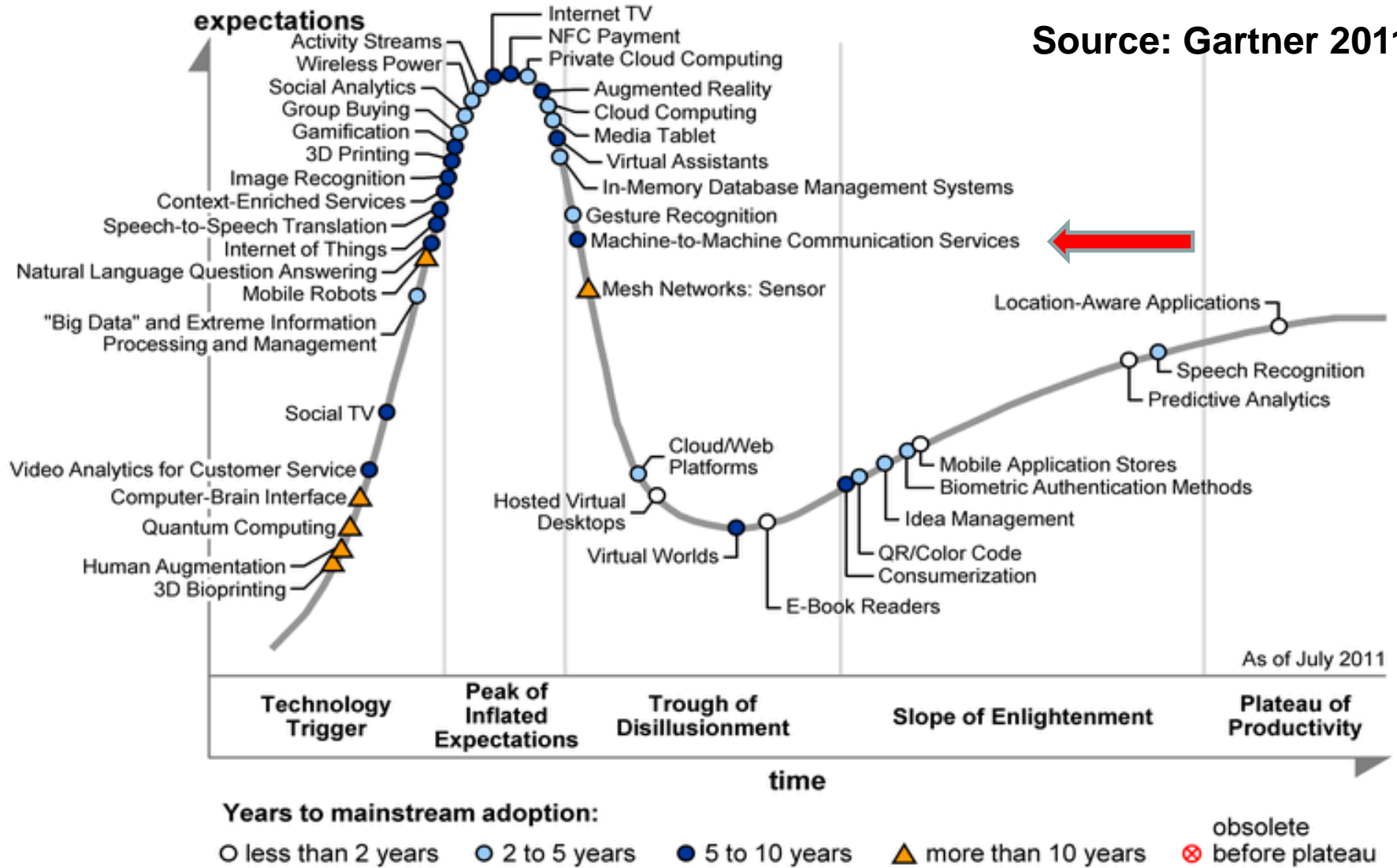
- Positioning :
- a. Indoor RTLS
 - b. Outdoor GPS/Galileo/Glonas



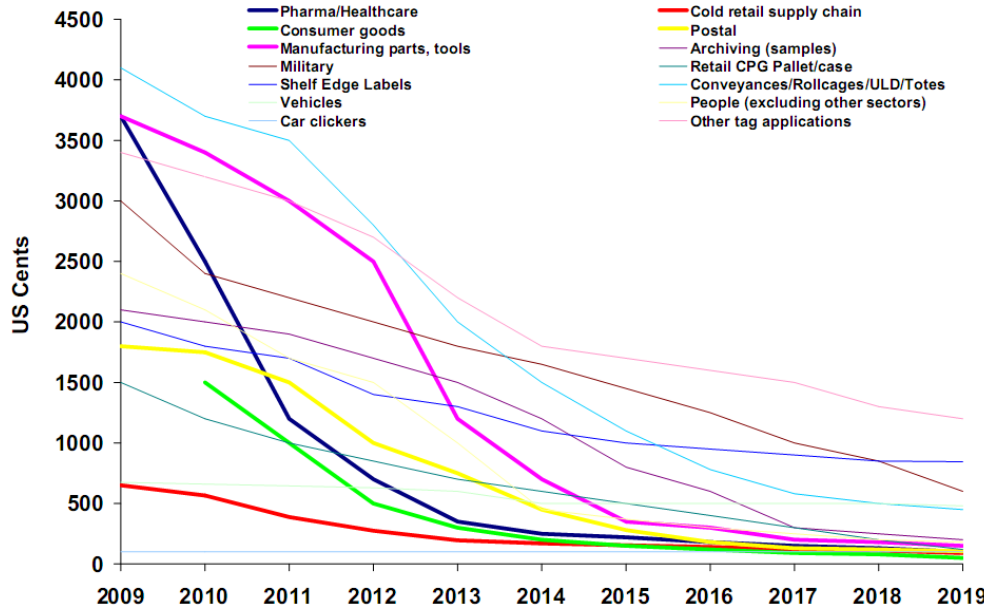
- *) and also :
- a. IRIS Detection
 - b. DNA/DNS
 - b. Handvene-Image

3. Sensoring = Condition Monitoring

2.4 Hype Cycle M-2-M (Gartner) guerlet consulting

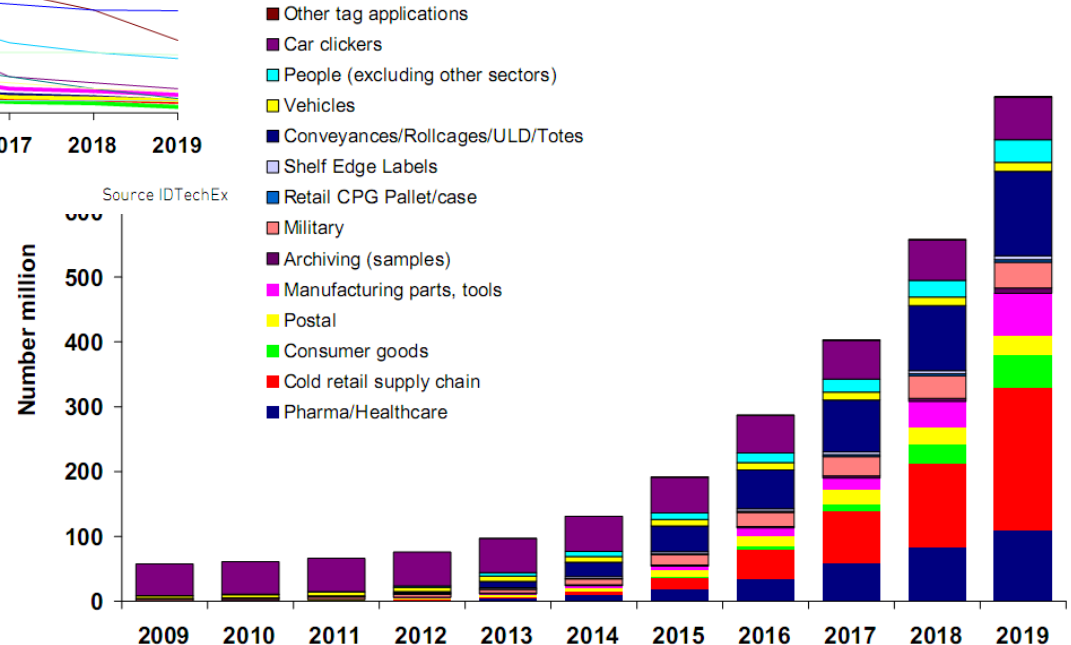


2.5 RFID-Active Tags → 2019



Price / Tag (US\$)-Cents

Value of active Tags



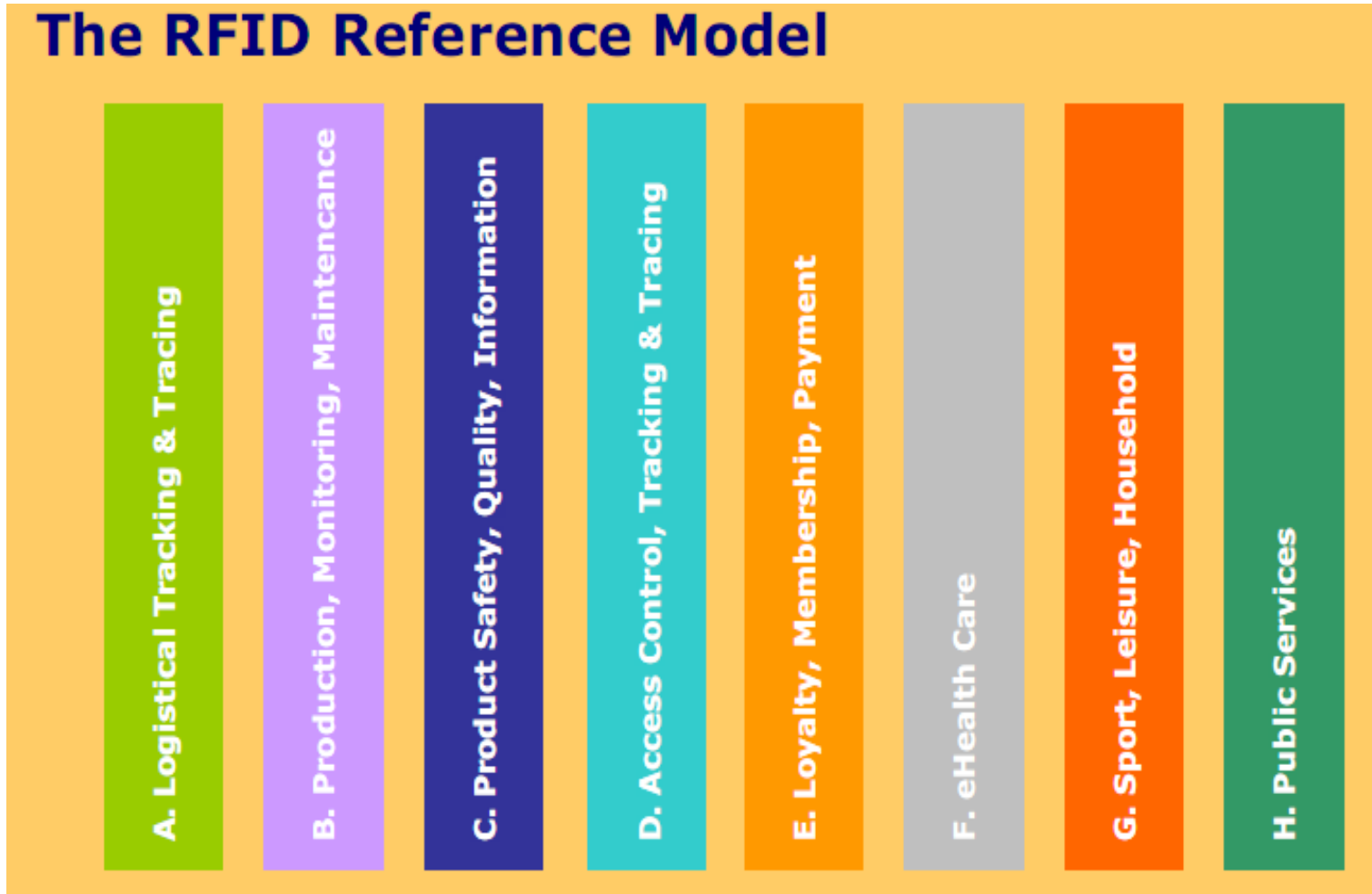
Source IDTechEx

Source IDTechEx

3. RFID-Markets & -Applications

3.1 RFID-Markets & -Applications

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3.2 RFID – Daily Applications



Source: Victor Vega, RFID Solutions Marketing Director NXP Semiconductors, RFID Journal Live 2011

3.3 List of RFID-Applications

- Asset Tracking
- Automation
- Automobilfertigung
- Automobilortung
- Baumanagement
- Beratung
- Behältermanagement
- Unternehmensmeldungen
- Personalie
- Bibliotheks- und Buchhandel
- Container Tracking
- Datenschutz
- Diebstahlschutz
- Dokumentenmanagement
- Facility-Management
- Forschung u. Entwicklung
- Forstwirtschaft
- Freizeit u. Entertainment
- Gepäckverfolgung
- Instandhaltung
- Medizin u. Pharma
- Plagiatsschutz

- Produktrückverfolgung
- Prozess Re-Engineering
- RTLS
- Sicherheit
- Systemintegration
- Tieridentifikation
- Verpackung
- Warehousemanagement
- Echtzeitverfolgung
- Ersatzteilidentifikation
- Qualitätsmanagement
- IT-Dienstleistung
- Labormanagement
- Palettenmanagement
- Veranstaltungen
- Logistikdienstleistung
- Wäschereimanagement
- Textil
- Standardisierung
- Handel
- Werkzeugverwaltung
- Luftfahrt
- Ticketing
- Transport und Verkehr

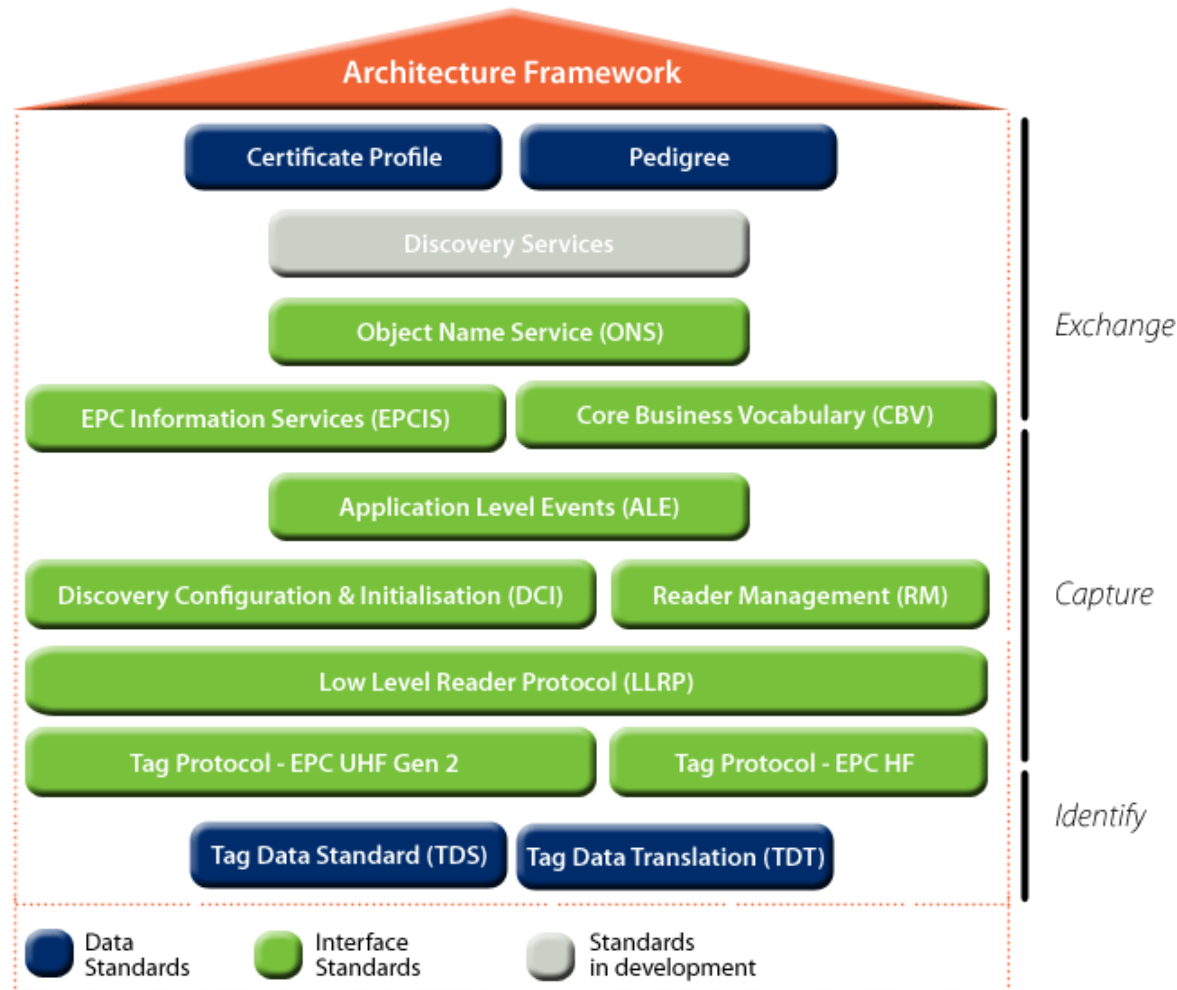
- NFC & Mobile Payment
- Entertainment
- Sales Promotion
- Zeiterfassung
- Zutrittskontrolle
- Value Services

4. GS1: EPC → EPCIS → ONS

4.1 GS1 – EPC-Standards

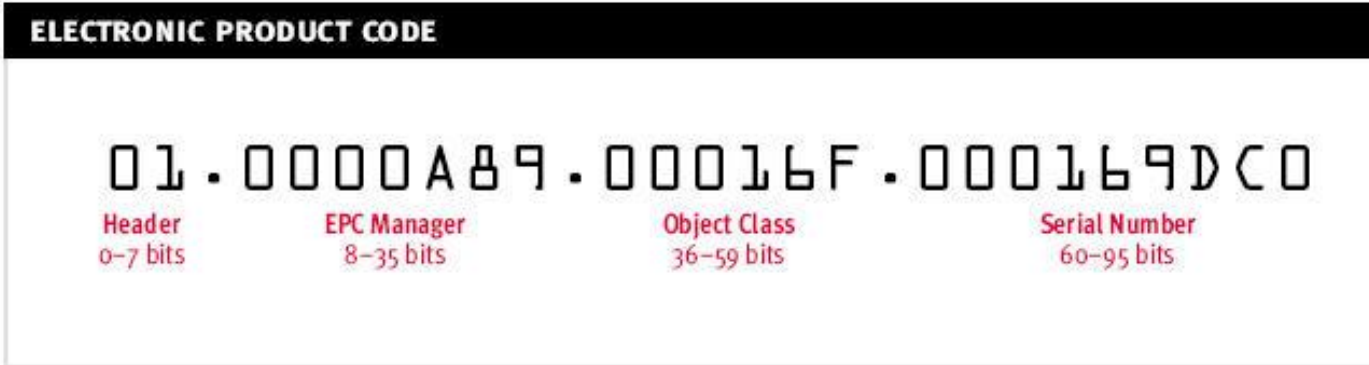
EPCglobal Standards Overview

Click the graphic buttons below to access the standard & supporting documents



<http://www.epcglobalinc.org/standards>

4.2 EPC – Electronic Product Code



The EPC manager partition spans a 28-bit section, encoding a maximum of $2^{28} = 268,435,456$, or approximately 268 million, manufacturers. This far exceeds the current allocation provided by the UPC-12 and EAN-13. It is likely, as with the current UPC codes, this allocation may eventually be insufficient. This is precisely why the EPC code is extensible. A repartitioning of the code may be necessary to accommodate, perhaps, billions of managers, who may oversee only hundreds of items. This may be necessary in the near future if many small entities or individuals use the EPC infrastructure to manage private, internal physical resources. The next partition, object class, will occupy the next 24-bits. The object class may be considered the product skew or stock keeping unit (SKU). It may also be used for lot number, or any other object grouping scheme developed by the EPC manager. Since each manufacturer is allowed more than 16 million object types, this partition could encode all the current UPC SKUs, as well as many other object classes. This is important as we expand beyond current retail applications into general supply chain and manufacturing. The final partition encodes a unique object identification number. For all objects of a similar type, the EPC serial number provides 36-bits, or $2^{36} = 68,719,476,736$, unique identifiers. Together with the product code, this provides each manufacturer with $1.1 \sim 10^{18}$ unique item numbers – currently beyond the range of all identified products.

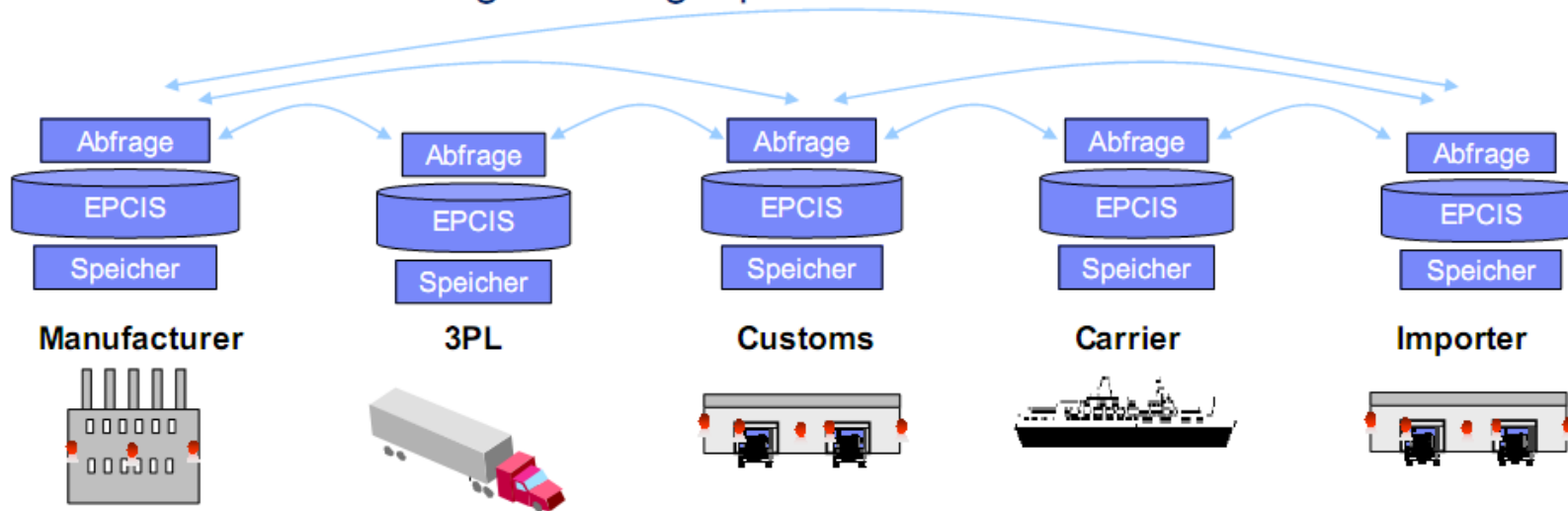
BITS	UNIQUE NUMBER	OBJECTS
23	6.0×10^6 per annum	Automobiles
29	5.6×10^8 in use	Computers
33	6.0×10^9 total	Humans
34	2.0×10^{10} per annum	Razor blades
54	1.3×10^{16} per annum	Grains of rice

IPv6-Adressen sind 128 Bit lang (IPv4: 32 Bit)

4.3 EPC – EPCIS

Wie funktioniert der EPCIS Datenaustausch?

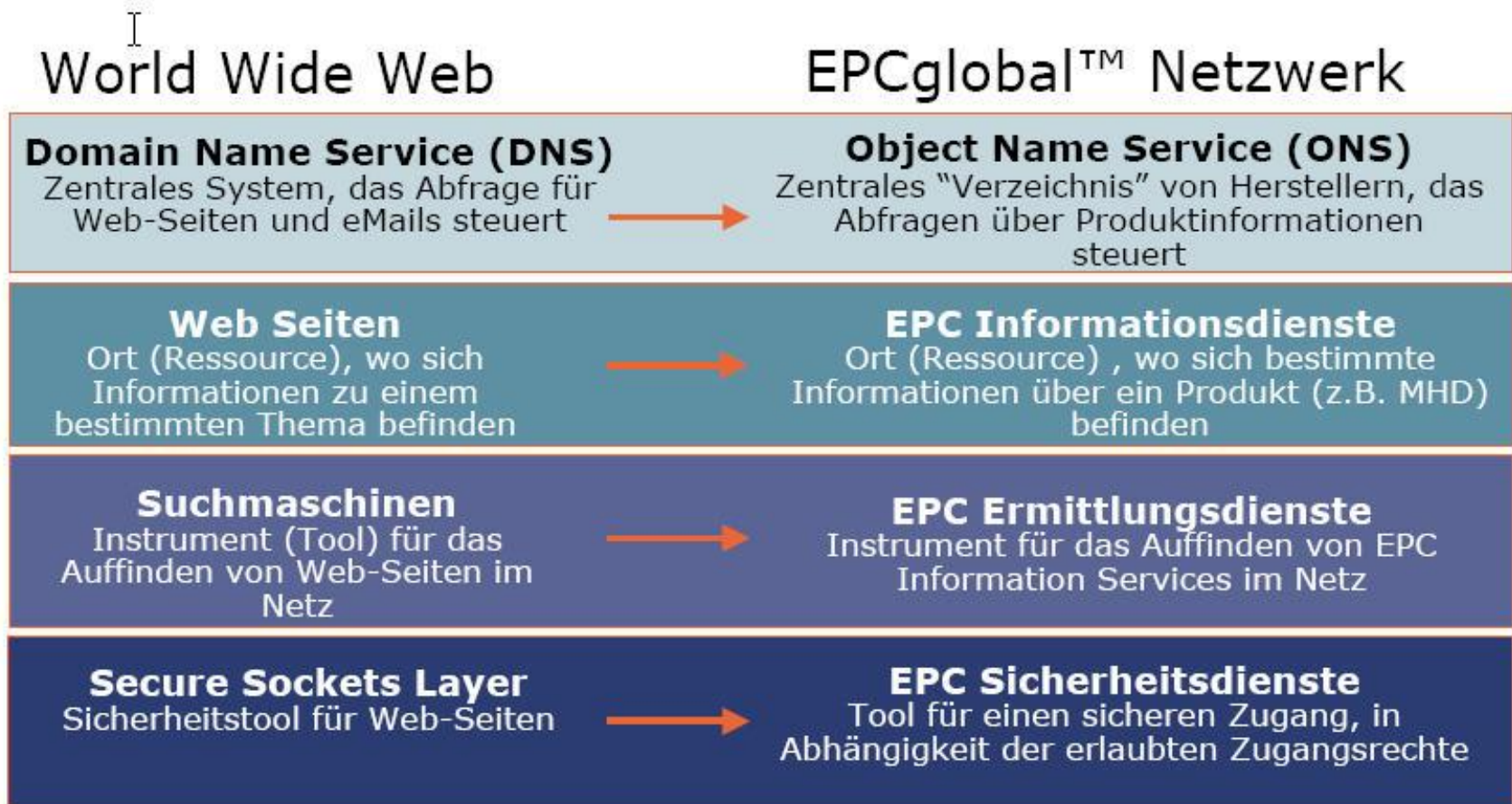
- ☛ Entscheidend für die Kommunikation im EPCIS Netzwerk ist, dass alle Unternehmen über die "Abfrage-Schnittstelle" kommunizieren
- ☛ Dabei wird von "Ereignissen" gesprochen



- ☛ Heute: Die Partner der Supply Chain kennen sich durch ihre Partnerverträge
- ☛ Zukunft: "Ermittlungsdienste" vernetzen die Partner und steuern die Kommunikation

4.4.1 DNS vs. ONS – Standards guerlet consulting

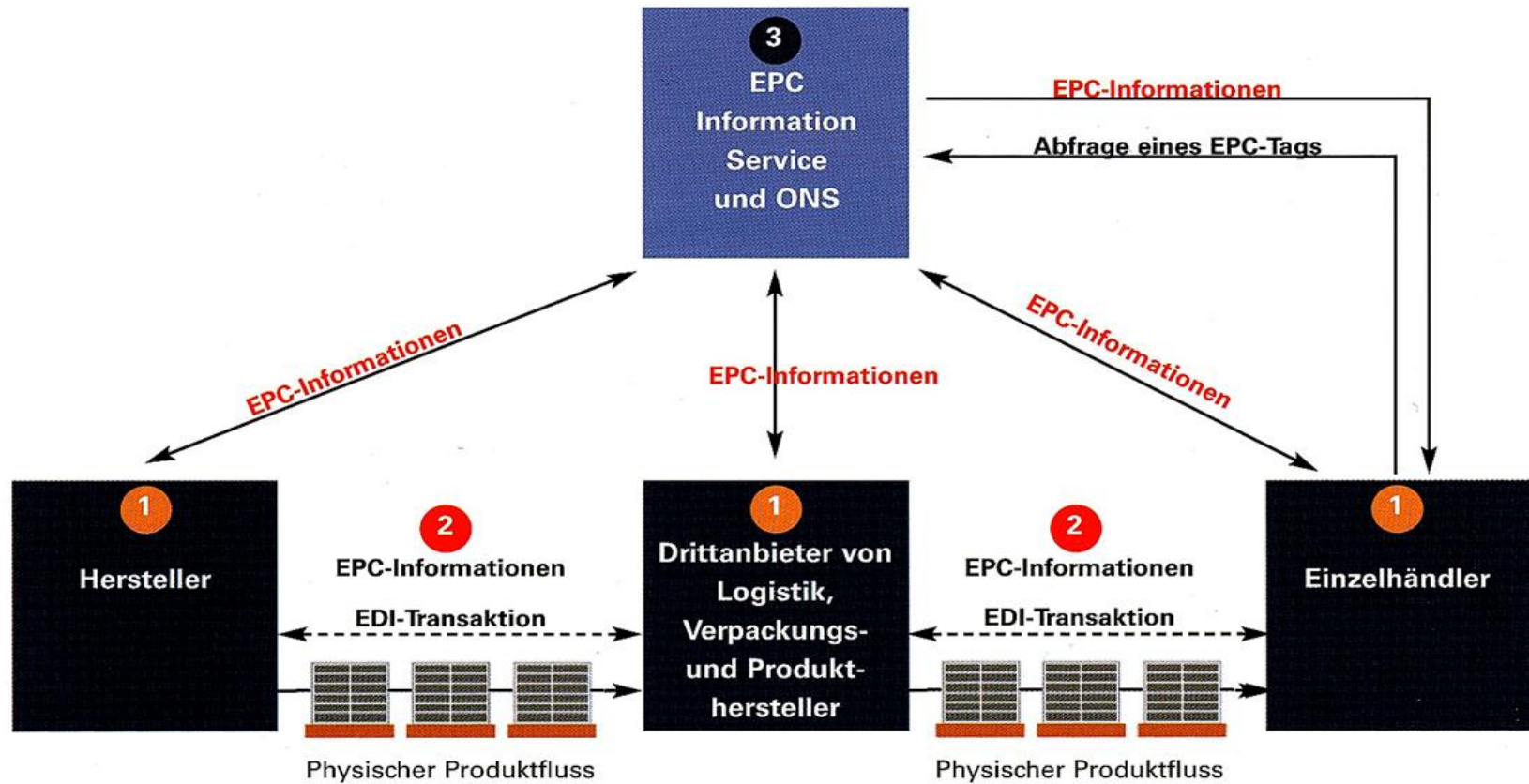
ONS (Object Name Services)



IPv6-Adressen sind 128 Bit lang (IPv4: 32 Bit)

4.4.2 ONS – Standard

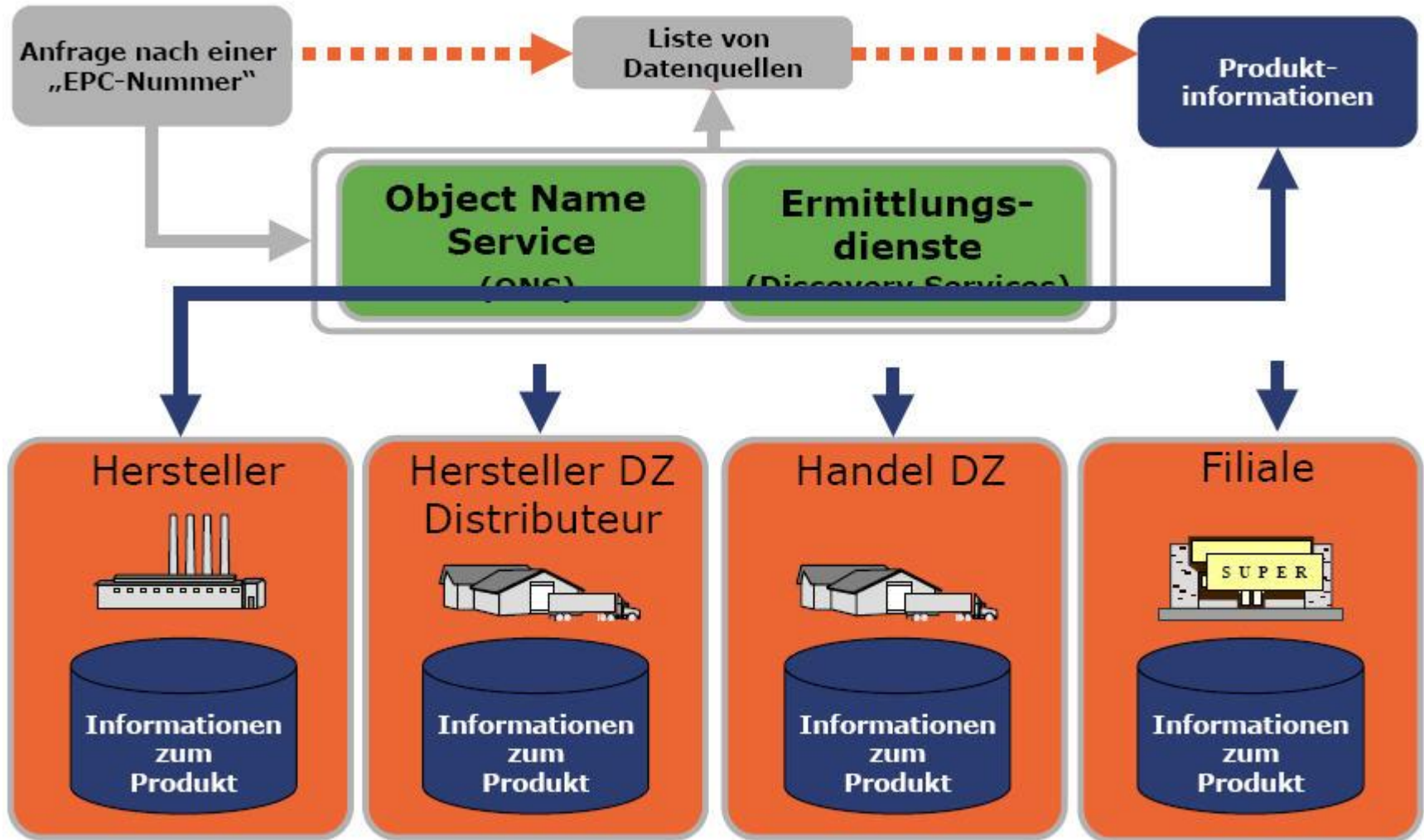
ONS (Object Name Services)



- 1 Internes EPC-Netzwerk
- 2 EPC-Netzwerk zwischen Handelspartnern
- 3 Branchenweites EPC-Netzwerk

EPC-Netzwerk im Aufbau

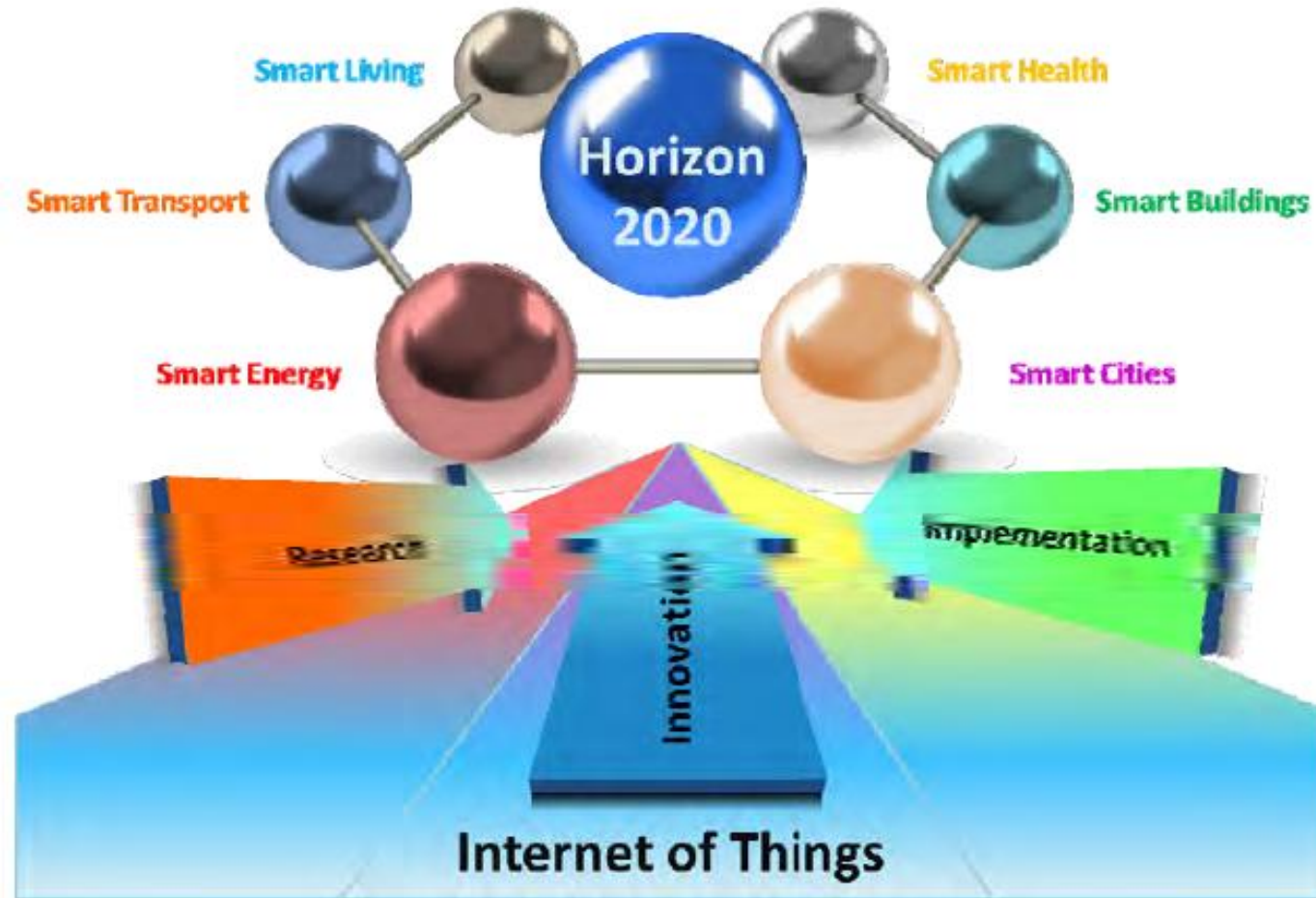
4.4.3 ONS – in Operation



5. From Internet of Things (IoT) → Web-of-Objects

5.1.1 The Internet-of-Things

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5.1.2 The Internet-of-Things



Smart Planet

Green Environment

- Environmental sensors
- Water, power leak detection
- Pollution, weather monitoring



Smart Cities

Connected Communities

- Lighting, water management
- Monitoring & security
- Traffic control



Smart Energy

Electric Grid

- Voltage and power sensors
- Motors and breakers
- Fault detection



Smart Buildings

Buildings, Smart Homes

- Thermostats, HVAC, lighting
- Presence sensors, lockers, actuators
- Meters, smart-plugs, HEC



Smart Transport

ITS, HEVs, EVs

- Electric Mobility, EVs and HEVs
- High Speed Trains
- Infrastructure, V2I, V2V, V2I+I



Smart Industry

Industrial Environments

- Lighting, security, actuators
- Production control
- Robotics



Smart Health

Healthcare System

- People monitoring
- Bio sensors, probes
- Remote health

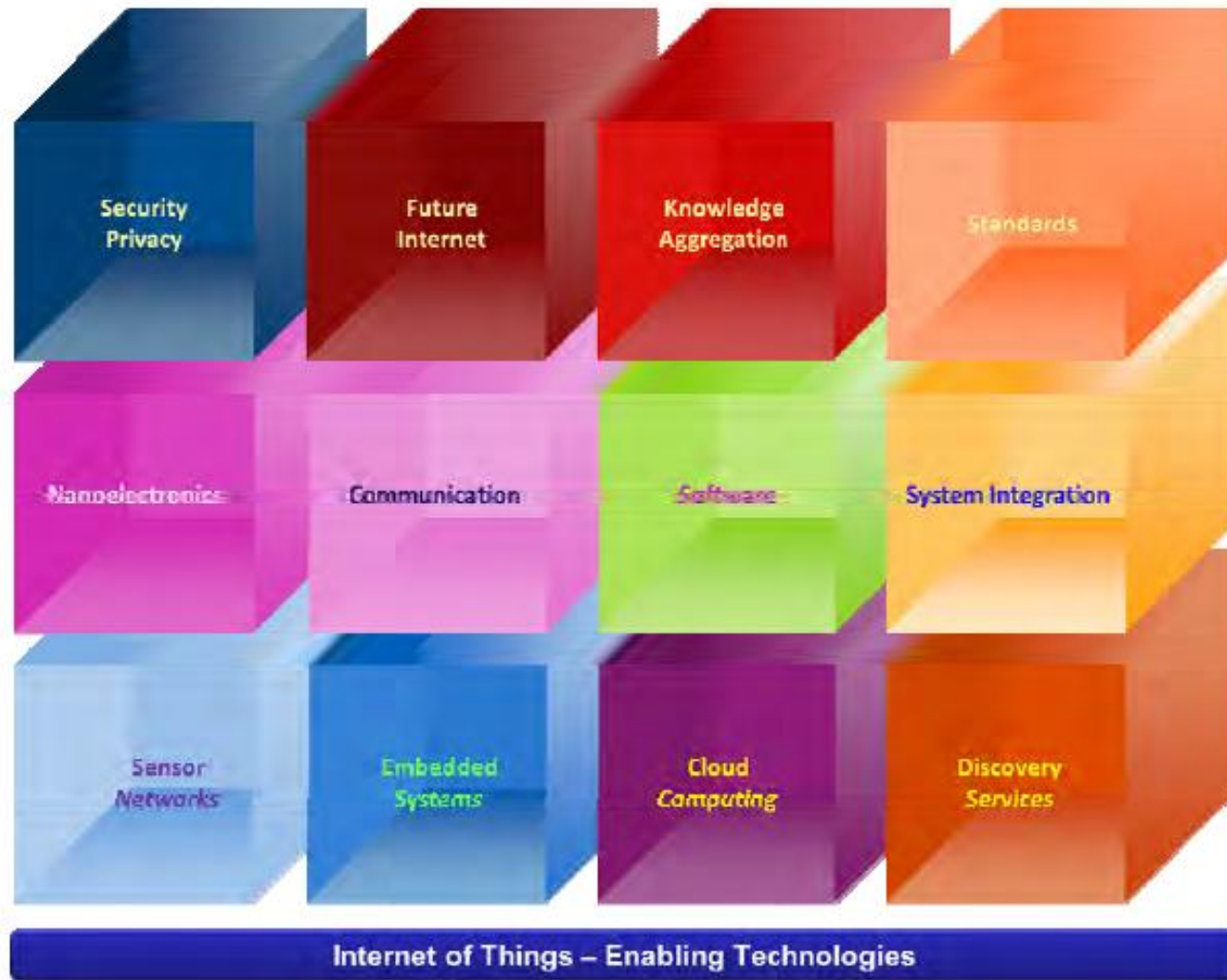


Smart Living

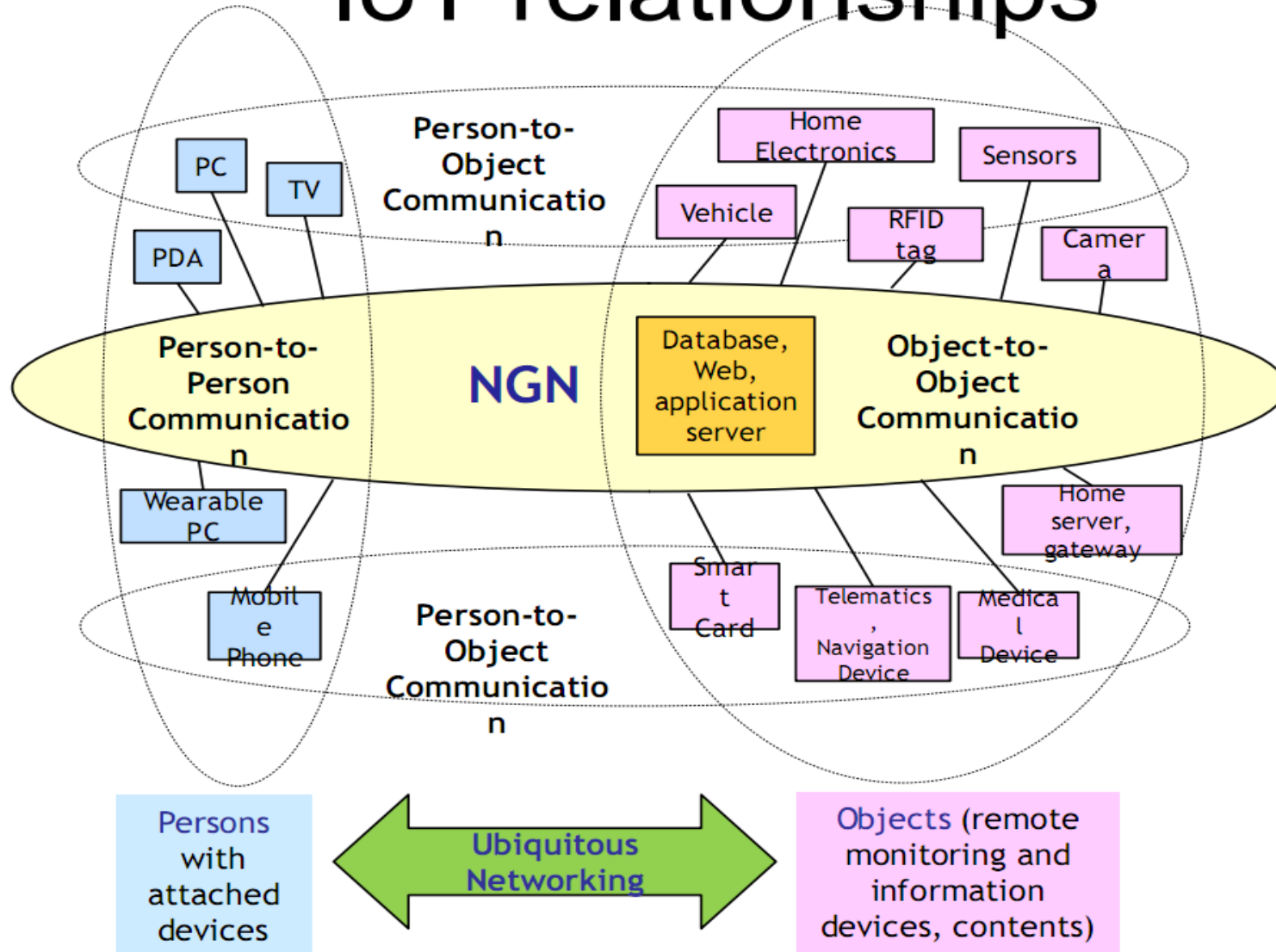
Entertaining, Leisure

- Independence through technology
- Information when you need it
- Connected when you need it

5.1.3 The Internet-of-Things



IoT relationships



Visions of IoT of KCC

Provisioning ubiquitous, intelligent information services

4S : For
Success

Safe Korea

All people lead their own healthy and pleasant life.

Smart Korea

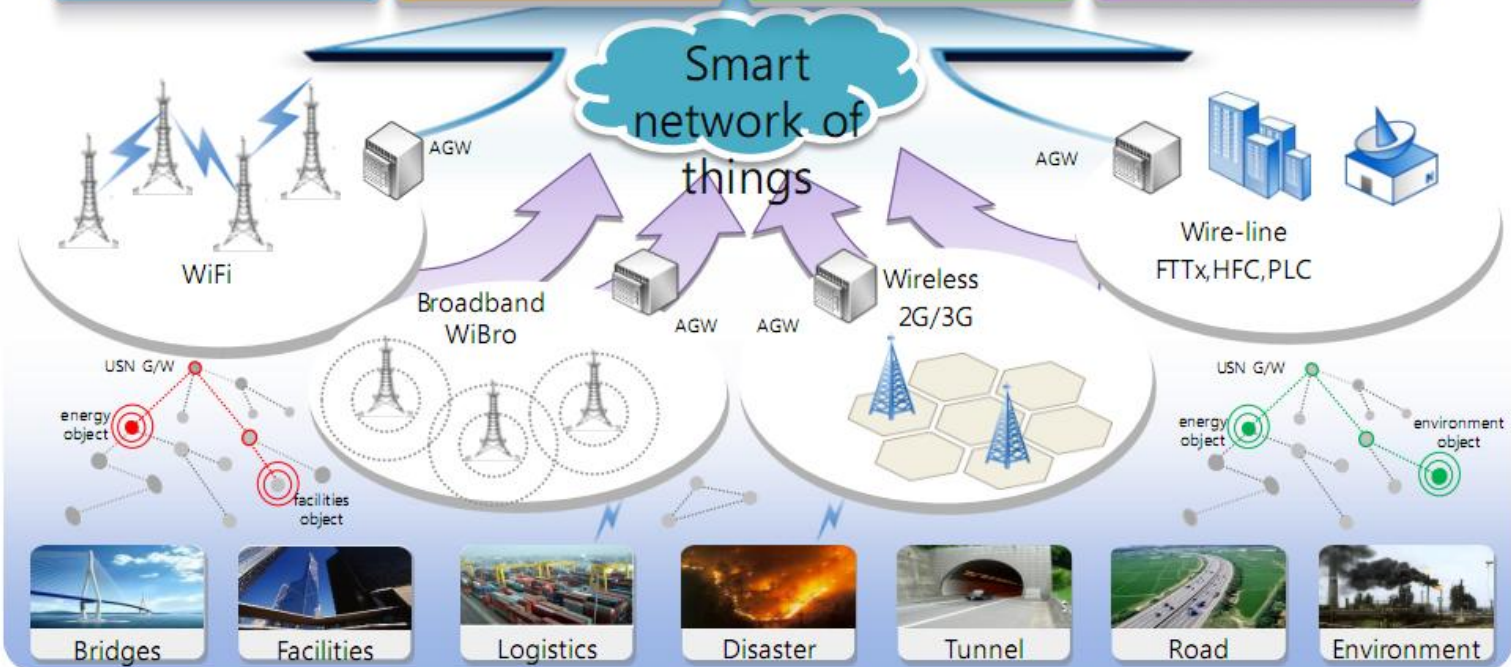
Mental and physical resources are intimately connected.

Strong Korea

Competitive in global markets.

Sustainable Korea

It preserves beautiful global environment.



An image of IoT in Korea



5.4 IoT – Architecture

IoT-enabling architectures



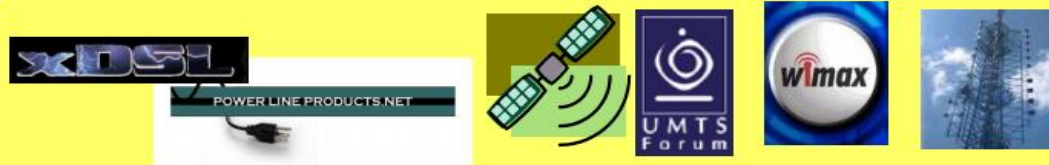
IoT, M2M, USN applications



Service networks

BcN, Next Generation Networks, Internet, Future Internet, etc.

Core networks



Access networks



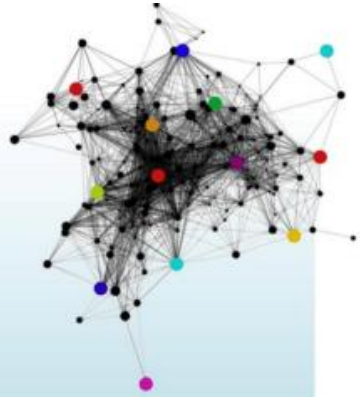
Connectivity

5.5 IoT – Luggage



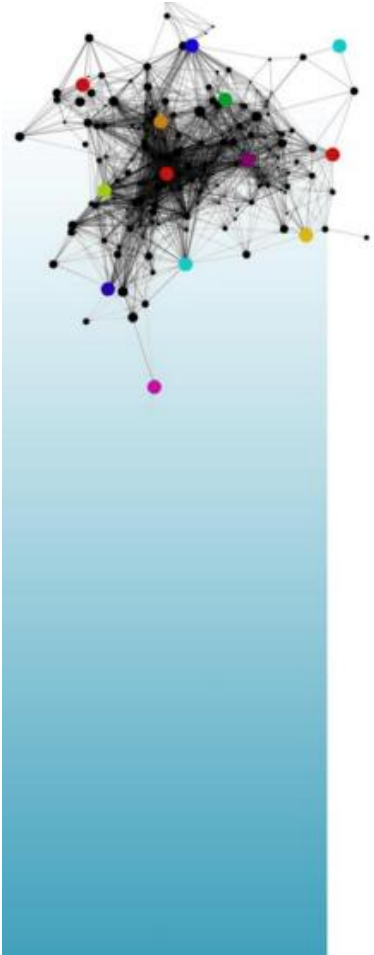
Did you know that objects can identify themselves and soon will be able to network (IoT)? Take one example: a suitcase itself can indicate which plane it should be sent to. This is possible thanks to Radio Frequency Identification (RFID). With RFID, more and more objects communicate with each other, slowly creating a network of information, a so-called "internet of things". This network could potentially make our lives much easier... No need to worry about your suitcase being sent to the wrong plane anymore!

5.6 IoT – Supermarket



Stock on a supermarket shelf talking to a customer's mobile phone, alerting him or her to allergy risks, country of origin or ingredients, carbon miles etc.

5.7 IoT – Stock



Stock in a department store talking to the store computer, alerting when it is moved to the wrong location, alerting when it is taken without payment

5.8 From IoT → Web-of-Objects (WoO) guerlet consulting



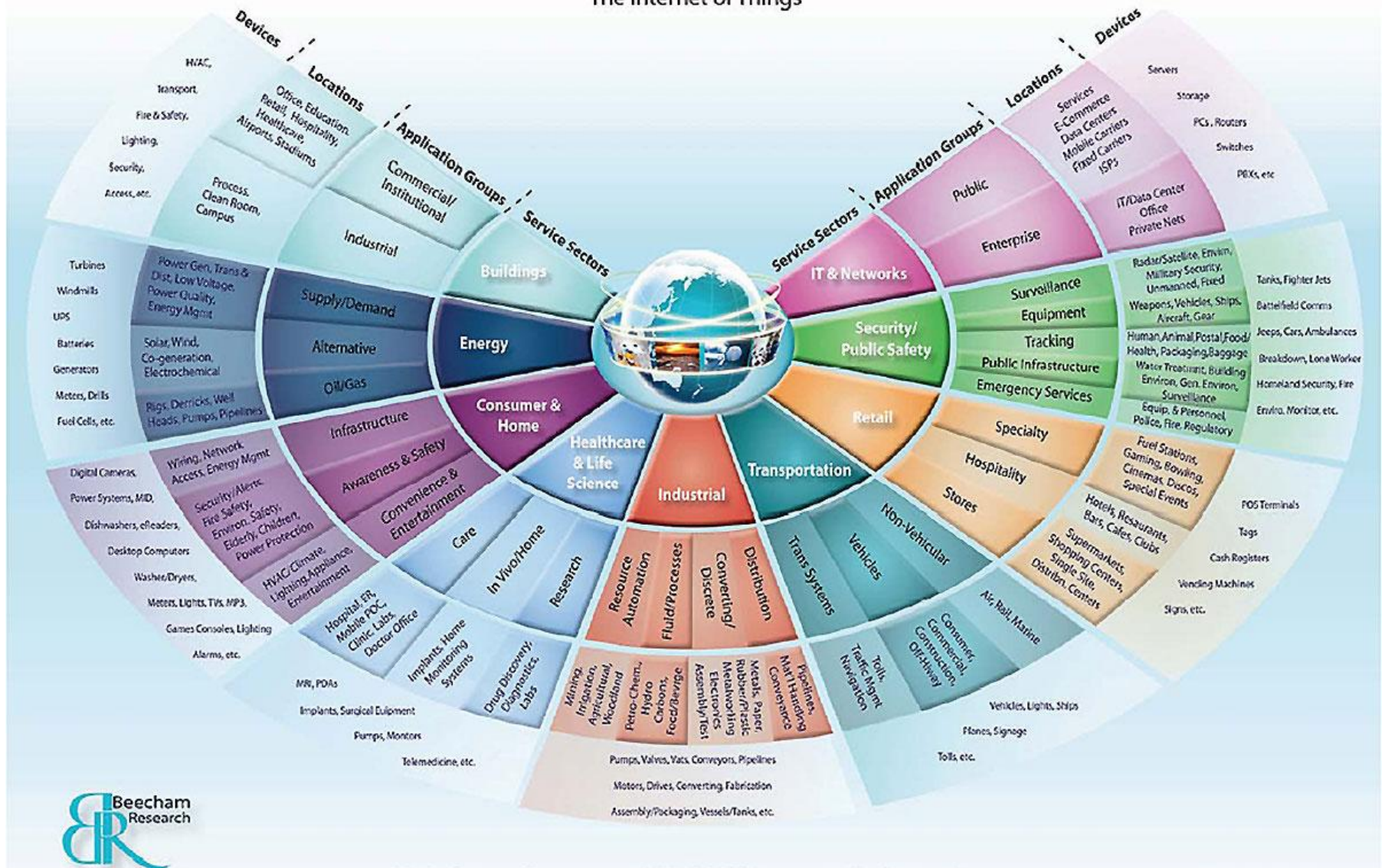
- ❑ 6 billions of persons -> 60 billions of objects
- ❑ Identification of objects and addresses
- ❑ Data volume
- ❑ Traffic diversity

Anyway
AnyThing

- ❑ Easy and ubiquitous connection
- ❑ Hybrid infrastructure/ad hoc networks
- ❑ Agile and self-reconfigurable networks
- ❑ Security, privacy, trust



The Internet of Things



6. RFID – Links

6.1.1 RFID – Organisations

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Switzerland

SwissTnet -
Sektion RFID (51) -

<http://www.swisst.net>
<http://www.swisst.net/cms/sektion51>

Swiss GS1
RFIDacademia

<http://www.gs1.ch>
<http://www.rfidacademia.ch>

France
CNR RFID
FIL RFID

<http://www.cnrfid.fr>
<http://www.filrfid.fr>

UK
RFID Competence Center UK
AIM UK

<http://rfidc.com/>
<http://www.aimuk.org/>

Europe
RFID community in Europe
EU-RFID
Informationsforum RFID
European CASAGRAS Project

<http://www.race-networkrfid.eu/>
www.rfidconsultation.eu/
<http://www.info-rfid.de/info-rfid/content>
<http://www.rfidglobal.eu/>

6.1.2 RFID – Organisations

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Global

GS1

www.gs1.org

EPC Global

<http://www.epcglobalinc.org/home>

ISO

<http://www.iso.org/>

CEN

www.cenorm.be

ETSI

www.etsi.org

Database of RFID tags

<http://veryfields.net/>

RFID community

www.rfidtribe.com

RFID for the consumer

www.discoverrfid.org

Odette

www.odette.org

AIAG

www.aiag.org

Oasis

<http://www.oasis.org>

Autoid Labs

www.autoidlabs.org

AIM Global

www.aimglobal.org

Database of major RFID standards worldwide www.grifs-project.eu/db

Updated List

<http://www.rfidnet.ch/ueber-rfid/organisationen/index.html>

6.2 RFID – Publications

RFID-Atlas	http://www.rfidatlas.de
RFID-Journal	http://www.rfidjournal.com
RFID im Blick	http:// www.rfidimblick.de
RFID Ready	http://www.rfid-ready.de
RFID ABC	http://www.rfidabc.de
RFID Solutions Online	http://www.rfidsolutionsonline.com
RFID-Exchange	www.rfidexchange.com
RFID Gazette	www.rfidgazette.org
RFID IDTechEx	www.idtechex.com
Info RFID Deutschland	www.info-rfid.de

List all RFID-Standards for Railroads, Automotive, Maritime und Aeronautics

<http://www.rfidnet.ch/downloads/list-of-standards.pdf>

Updated list

<http://www.rfidnet.ch/ueber-rfid/publikationen/index.html>

6.3.1 RFID – Portals

Umfangreichstes RFID-Portal der EU

<http://www.rfidconsultation.eu/menu/rfid-directory/db/>

RFID-Atlas mit Verzeichnis & Beschrieb von > 70 RFID-Projekten in Deutschland / Schweiz / Oesterreich ... <http://www.rfidatlas.de>

Informationenseite von EPCglobal für interessierte Verbraucher ... <http://www.discoverrfid.org/de>

Informationen für interessierte Verbraucher ... <http://www.rfidabc.de>

Fachinformationen rund um RFID ... <http://www.info-rfid.de>

Deutschland's RFID-Portal Link ... <http://www.rfidlinks.de>

EPCglobal: is leading the development of industry - driven standards for the EPC to support the use of RRID in today´s fast-moving, information rich, trading networks. A subscriber-driven organisation comprised of industry leaders and organisations focused on creating global standards for the EPCglobal Network... <http://www.epcglobalinc.org>

6.3.2 RFID – Portals

RFID Solutions Online: provides its readers with news and insight into RFID Solutions News and information... <http://www.rfidsolutionsonline.com>

RFID Australia: RFID Action Australia is an industry cluster which will assist in the development of expertise and experience with RFID within Victorian companies... <http://www.rfidaa.org>

RFID Nedderland: Dutch RFID Plattform... <http://www.rfidnederland.nl>

RFID Vidensbank:Siden der samler viden om RFID i Danmark...
<http://www.rfidvidensbank.dk>

RFID Tribe: a global organization with local chapters, is a rapidly growing forum for radio frequency identification. RFID Tribe has members in over 50 countries and in more than 300 companies... <http://www.rfidtribe.com>

rfid-chips.net Wissenswertes rund um die Übertragung von Identifikationsmerkmalen via Funk (Radio Frequency IDentification / RFID) – einer Schlüsseltechnologie der Zukunft.
rfid-chips.net ist ein redaktionelles Angebot der Kommunikationsagentur Schrader.... <http://www.rfid-chips.net>

Updated list <http://www.rfidnet.ch/ueber-rfid/portale/index.html>

6.4 RFID – Videos

1. <http://www.youtube.com/watch?v=Zg1VKJUrx4&feature=related> ... EU RFID Future
2. <http://www.youtube.com/watch?v=4Zj7txoDxbE&feature=related> ... METRO Future Store
3. <http://www.youtube.com/watch?v=95VOxKp0s74&feature=related> ... IBM Clipped Tag
4. <http://www.youtube.com/watch?v=oAvQcYcvyaw&NR=1> ... IBM Transport OFF Track
5. http://www.youtube.com/watch?v=_xNhL39uD7I&feature=related ... IBM RFID Shopping
6. <http://www.3sat.de/mediathek/mediathek.php?obj=28732&mode=play> 3sat– Gallileo GPS
7. <http://ubisense.net/en/resources/videos.html> ... UBISense (BMW, Dementia Detector, etc.)
8. <http://www.youtube.com/watch?v=HNte3k0pluY&feature=related> ... Mojix LH Maintenance, Cargo)
9. <http://www.airbus.com/video/a380-family> ... Airbus Videos (A380. Airshows, etc.)
10. <http://www.youtube.com/watch?v=81QktaEwux8> ... Liberty Bed Management
11. <http://www.youtube.com/watch?v=nvIXp9xxkKY&feature=related> ... SF1 Inselspital Bedmanagemt.
12. <http://www.youtube.com/watch?v=96RZJTESwZA&feature=related> ... EKAHAU Site Survey WiFi
13. http://www.youtube.com/watch?v=5_pzXiOR1mw ... EKAHAU Positioning Engine
14. <http://www.youtube.com/watch?v=ojWipyCw-N0> ... ODIN IATA Baggage Tag
15. <http://www.aeroscout.com/flash/NewHC/start.html> ... Cisco & Aeroscout AM@Hospital Video
16. <http://www.youtube.com/watch?v=sDyqhcy1L-0> ... Grosi Turbo-Shopping

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Danke für Ihre Aufmerksamkeit
Merci pour votre attention

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