

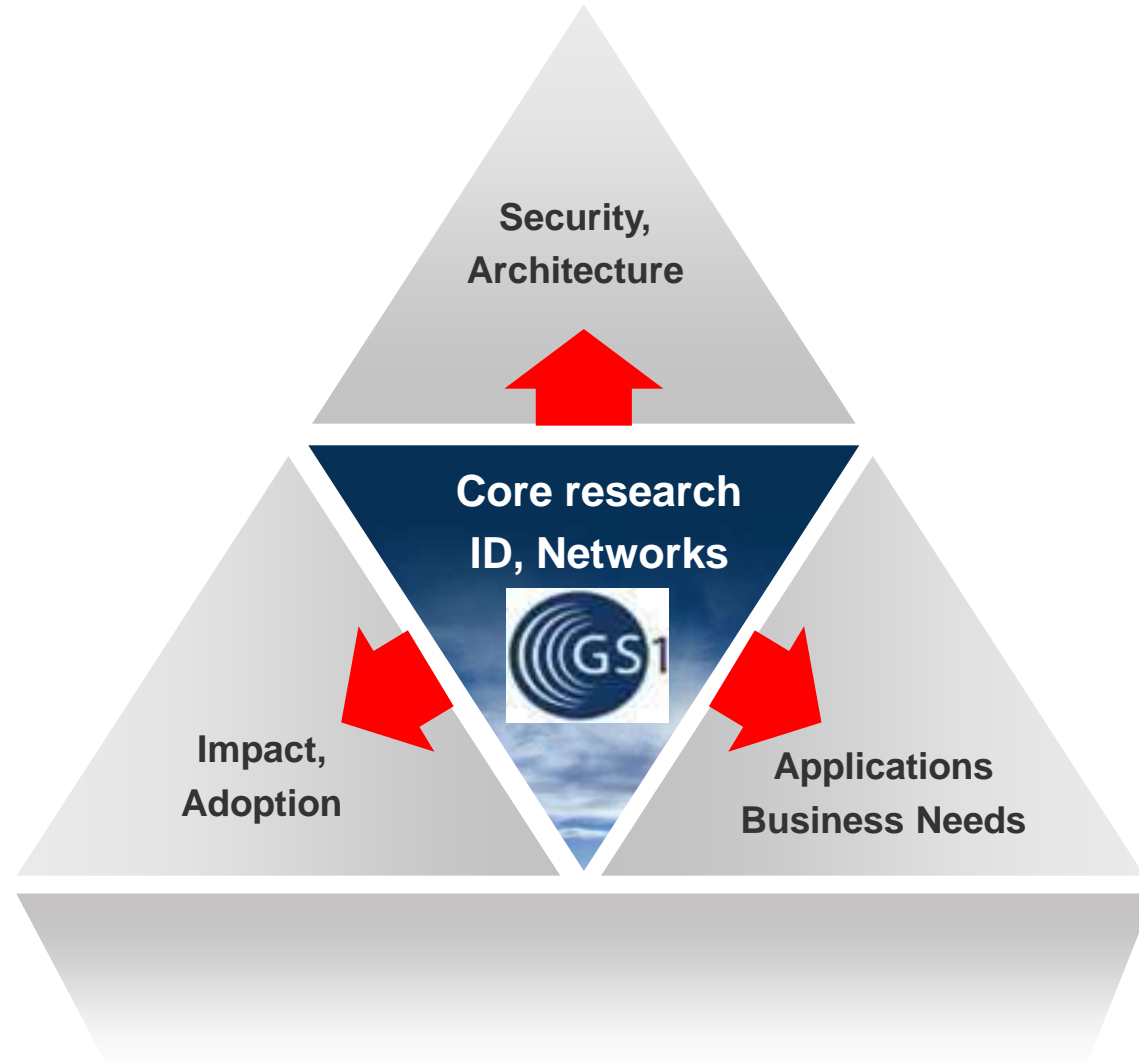


## → Research Update 2012 Auto-ID Labs

Ed Schuster (MIT),  
Jin Mitsugi (Keio Univ.),  
Mark Harrison (Cambridge),  
Florian Michahelles (ETH Zurich)



<b>9:00-9:05</b>	<b>Introduction</b>
<b>9:05-9:15</b>	<b>Auto-ID Labs Research Research Plan</b>
<b>9:15-10:00</b>	<b>Research Update from ETH Zurich/Univ St. Gallen NFC GS1 global services study Social media</b>
<b>10-10:15</b>	<b>Discussion about future research</b>





	<b>Proposed Workstreams</b>
<b>A. Adoption &amp; Accessibility</b>	(Mobile) Consumer Services
	Crowd Sourcing of Product Data
	Global Product Information consistency
	Software Tools (Fosstrak)
<b>B. Technology &amp; Performance</b>	Better Tag Performance – on metal, liquids via Meta-Materials
	Reduction of False Positive Reads – with Advanced Statistical Approaches
	Active Tag & Sensor Integration in EPC Network
	Sensor Tags – Towards 10 cent RFID Tag based Sensors
<b>C. Future Trends</b>	Emerging Auto-ID Technologies
	Usage GS1 System for Sustainability, Food & Product Safety and Cold Chain – benefits, use cases



Research Theme	Relevance	Deliverable
<b>EPC hardware/Software</b>	<b>New business models are emerging. How should Gen 2 and other standards evolve?</b>	<b>Proposed prioritization of EPC standards activities. Strategic suggestions.</b>
<b>Adjacent Technologies</b>	<b>NFC is becoming relevant in retail. How does GS1 play?</b>	<b>Proposed pathway and strategy for GS1 technology with or around NFC.</b>
<b>Emerging Trends</b>	<b>Big data is becoming a corporate priority: RFID is generating big data. What is our strategy?</b>	<b>1. Thought leadership on big data 2. Outreach on GS1's role on big data</b>



## Anticipating the Future

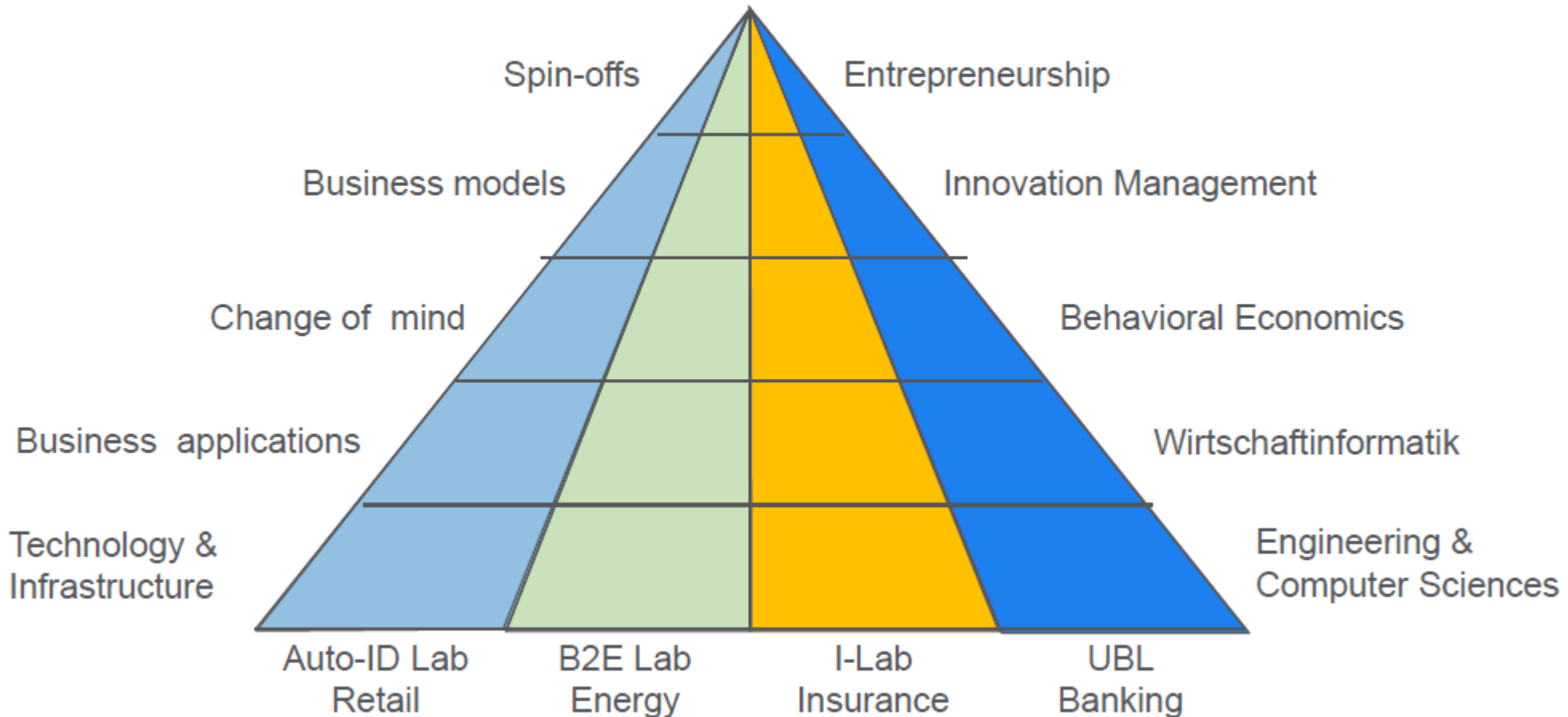
Research Theme	Relevance	Deliverable
Technology Watch	What are the new big things 3-5 years out that EPCglobal needs to prepare for?	Report/live document.

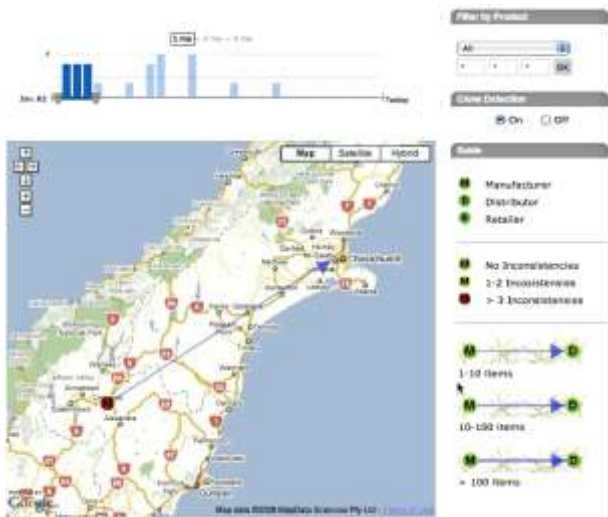
## Shaping the Future

	Relevance	Deliverable
Internet of Things	We coined the term and let others define it. Take it back, recast it, reshape it.	<ul style="list-style-type: none"> <li>Figure out how to reclaim though leadership.</li> <li>Outreach.</li> </ul>
Ubiquitous Sensing	Sensors are becoming more common. EPC is a transport channel. What is our hardware/software play?	Research papers, application scenarios, real-life application, thought leadership.
Supply Chain Visibility	How do we really digitize the supply chain and provide end-to-end transparency?	Research papers, application scenarios, real-life application, thought leadership.

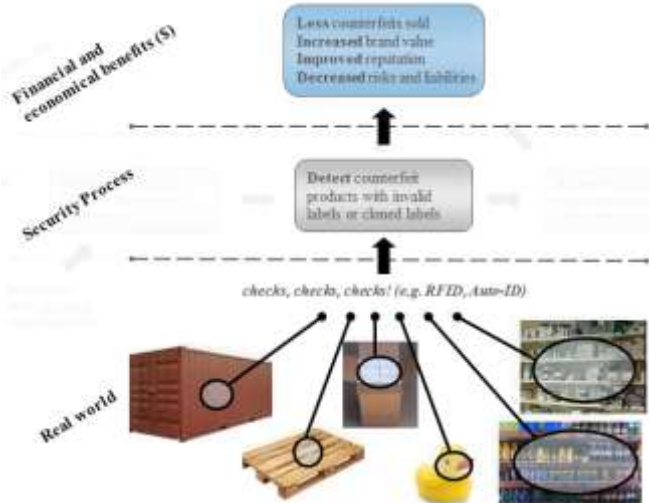
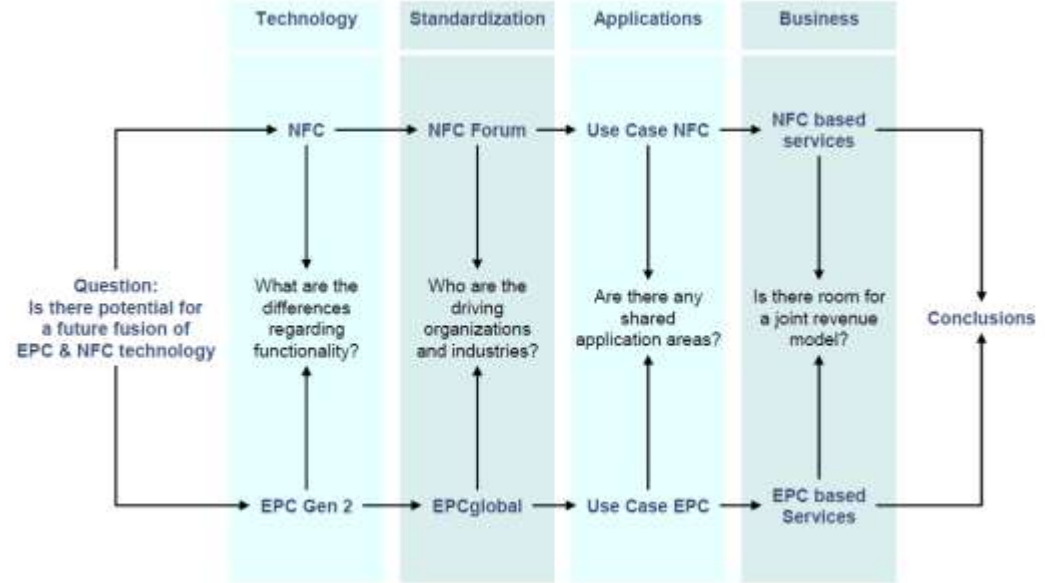


Internet of Things / Cyber Physical Systems





Supply-Chain Visualization



	NFC Use				RFID/EPC Use			
	Industry Publications			Company Whitepaper	Industry Publications			
	1	2	3	4	5	6	7	8
Mobile Payment	x		x	x				
Mobile Ticketing	x		x	x				
Physical Access Control	x							
Logical Access Control	x							
Contactless Loyalty Cards	x			x				
Health Care File Storage	x							



## Consumer Information



## Consumer Input



Brand

Customer

## Insurance

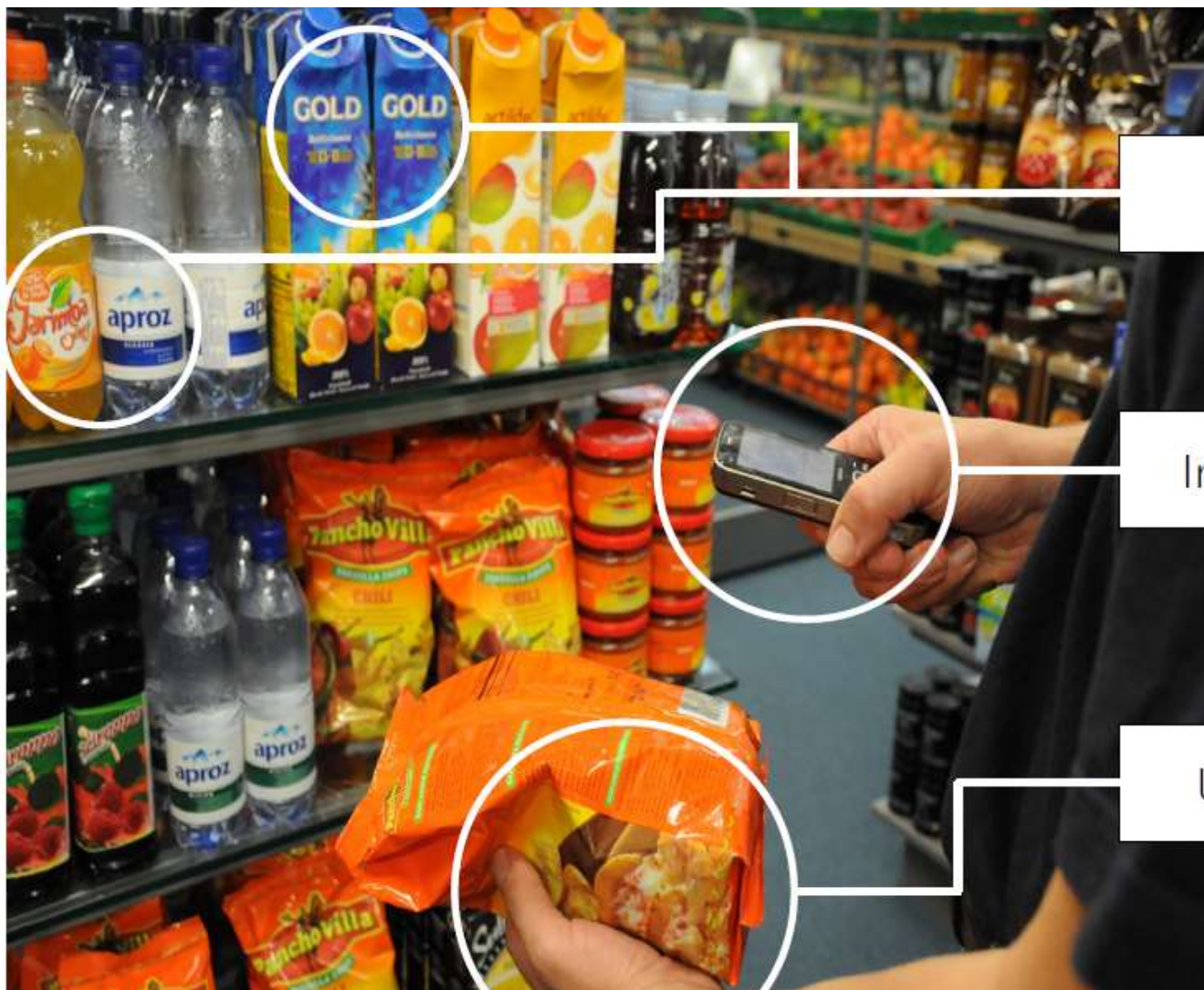


## Utility



BitsToEnergy lab / Project lead: Markus Weiss, Developer: Wolf Rüdiger

## → 2. What's the quality of master-data in practice?



Master data

Implementation

**my2cents**

Usage Analysis

**comparis.ch**

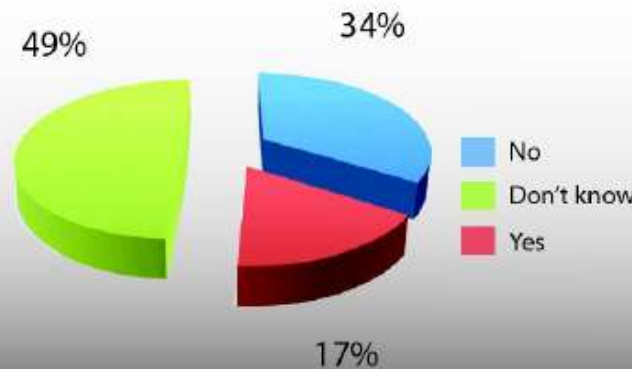
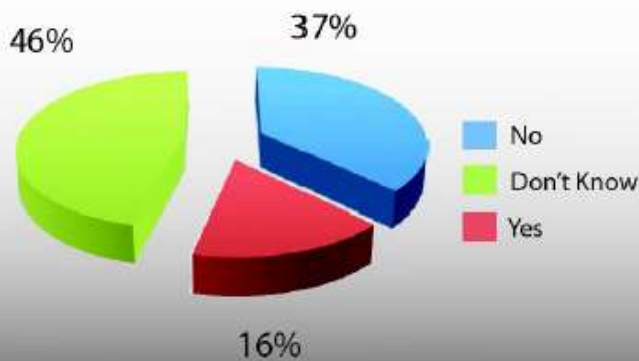
**CODECHECK.INFO**

UNABHÄNGIGE PRODUKTINFORMATIONEN DURCH STRICHCODES

# → Incorrect product data affect consumer's trust



Would you use this app again? Would you buy the product?



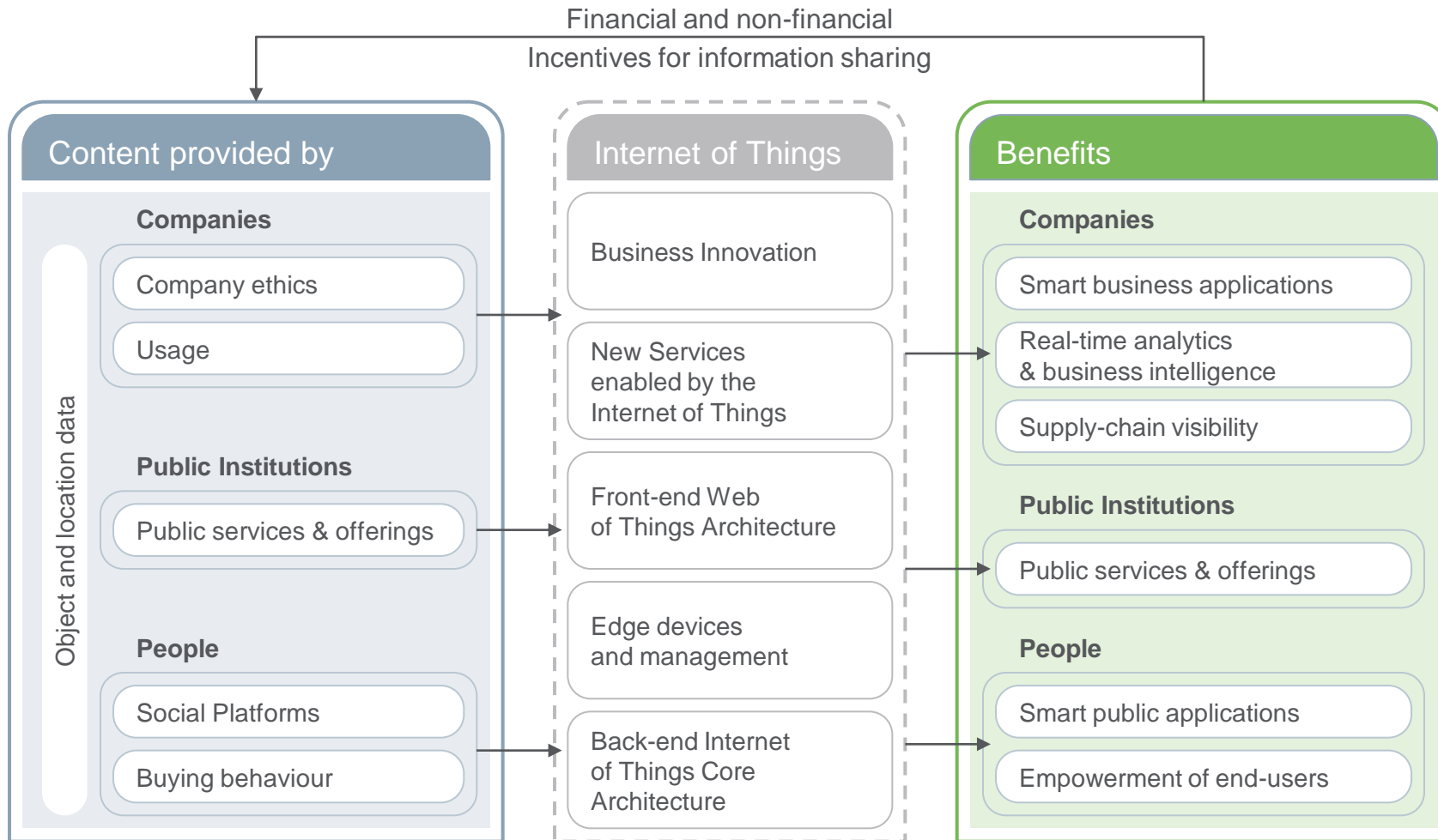
Coussins et al., GS1 UK  
 Mobile-Savvy Shopper report 2011  
 N = 1.068

Return code		All GTINs		MO GTINs		MOs	
<b>0</b>	<b>No error</b>	<b>74,850</b>	<b>54.58%</b>	<b>74,844</b>	<b>64.29%</b>	<b>81</b>	<b>74.31%</b>
<b>1</b>	<b>Missing or invalid parameters</b>	<b>3</b>	<b>0.00%</b>	<b>3</b>	<b>0.00%</b>	<b>1</b>	<b>0.92%</b>
<b>2</b>	<b>Prefix never allocated</b>	<b>18,756</b>	<b>13.68%</b>	<b>18,676</b>	<b>16.04%</b>	<b>92</b>	<b>84.40%</b>
<b>3</b>	<b>No exact match on GLN</b>	<b>1</b>	<b>0.00%</b>	<b>1</b>	<b>0.00%</b>	<b>1</b>	<b>0.92%</b>
<b>5</b>	<b>Unknown country code</b>	<b>20,679</b>	<b>15.08%</b>	<b>70</b>	<b>0.06%</b>	<b>4</b>	<b>3.67%</b>
<b>8</b>	<b>No catalogue exists</b>	<b>55</b>	<b>0.04%</b>	<b>55</b>	<b>0.05%</b>	<b>1</b>	<b>0.92%</b>
<b>9</b>	<b>Company information withheld</b>	<b>17,585</b>	<b>12.82%</b>	<b>17,585</b>	<b>15.10%</b>	<b>1</b>	<b>0.92%</b>
<b>10</b>	<b>Prefix no longer subscribed</b>	<b>2,741</b>	<b>2.00%</b>	<b>2,741</b>	<b>2.35%</b>	<b>9</b>	<b>8.26%</b>
<b>11</b>	<b>Country not on the GEPiR network</b>	<b>449</b>	<b>0.33%</b>	<b>449</b>	<b>0.39%</b>	<b>10</b>	<b>9.17%</b>
<b>13</b>	<b>Illegal Number</b>	<b>80</b>	<b>0.06%</b>	<b>80</b>	<b>0.07%</b>	<b>3</b>	<b>2.75%</b>
<b>14</b>	<b>Daily request limit exceeded</b>	<b>260</b>	<b>0.19%</b>	<b>250</b>	<b>0.21%</b>	<b>2</b>	<b>1.83%</b>
<b>99</b>	<b>Server error</b>	<b>1,668</b>	<b>1.22%</b>	<b>1,668</b>	<b>1.43%</b>	<b>13</b>	<b>11.93%</b>
		<b>137,12</b>		<b>116,42</b>			
		<b>7</b>	<b>100%</b>	<b>2</b>	<b>100%</b>		

Table 1. Return codes for GTINs and MOs.

- more meaningful response for unauthorized users when the daily limit is exceeded - return code 14 is not self explanatory
- Return GTIN with to analyze errors
- The GCP should always match the requested GTIN
- Provide more information about GTINs used by the publishing industry in GEPIR, e.g., ISBN and ISSN with prefixes 977, 978, and 979, like countries or even publishing companies.

# → The ultimate promise of the Internet-of-Things: Bring it all together



Architecting the Internet of Things, Uckelmann, Dieter; Harrison, Mark; Michahelles, Florian; Springer 2011





# News from NFC NFC2012 workshop



tuesday, march 13, 2012

## My picks from NFC2012

Together with Joseph Langer and Tuomo Tuikka I was involved in the organization of another issue of the NFC workshop series.

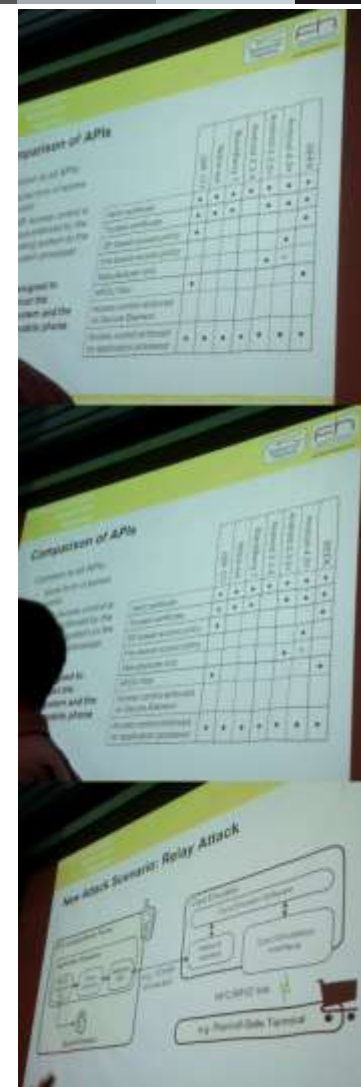
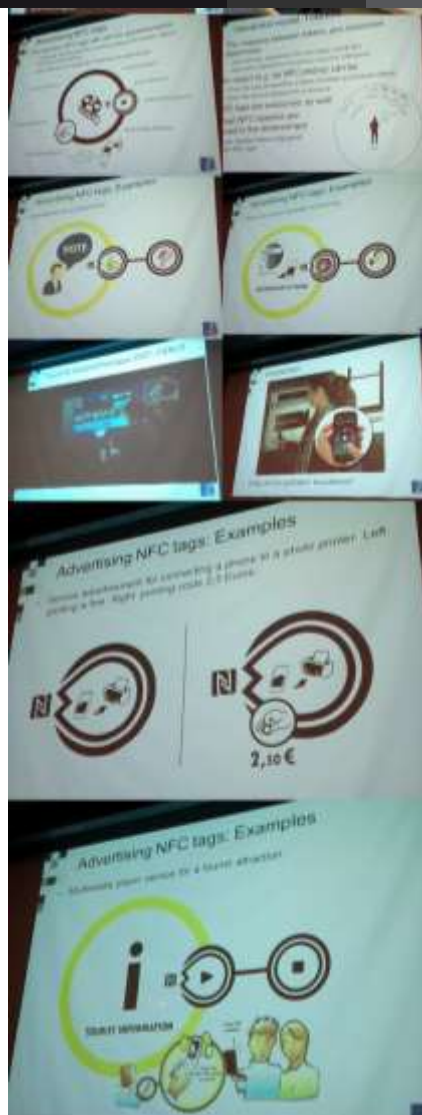
Jukka Riekkö open the workshop by giving a keynote on NFC as an interaction method in interactive spaces. He showed various examples where the user interface is spread in the environment [1]. The challenge he outlined here is that the user first has to find the interface!

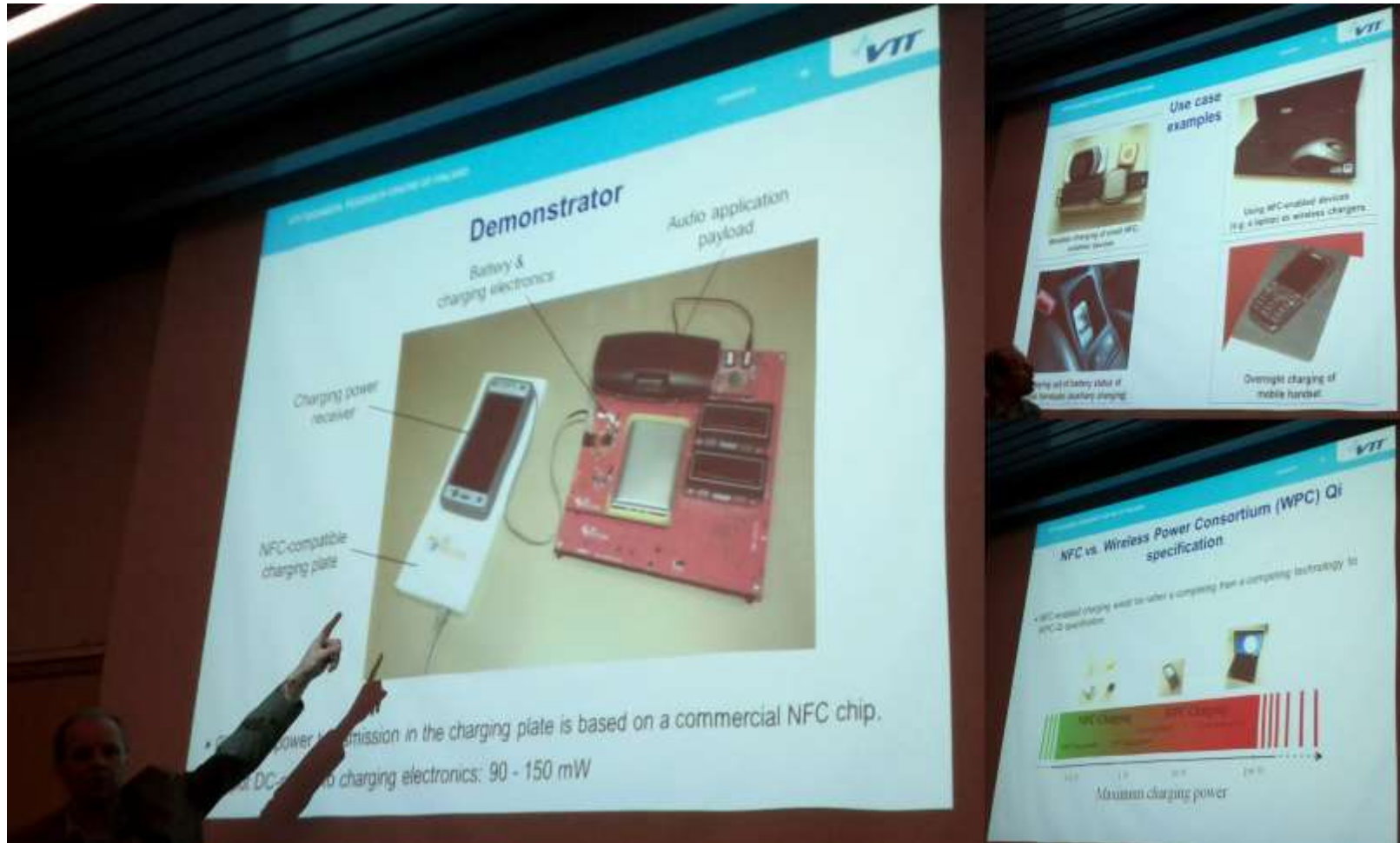
Accordingly, Jukka proposed a graphical language which would make the user aware of opportunities of interaction. He reported about studies with kindergarten children who learned reading the name tags by touching them with an NFC phone and listening to the audio voice [2]. His learning from that project was that the early simple NFC phones have the better usability: the reading zone of the antenna is more obvious and the phones are better to grasp.



Stefan Gruenberger from Hagenberg presented on the challenges of integrating NFC into existing electronic ticketing standards, such as VDV. Reading his paper [3] I got the impression that ticketing is a literal killer application by rather killing the application...

Michael Roland shared illuminating insights about the security challenges of emulating smartcards on smart phones. He reviewed [4] the various vendors' API's, such as JSR 177, Nokia's JSR extensions, Blackberry and Android. He concluded that the

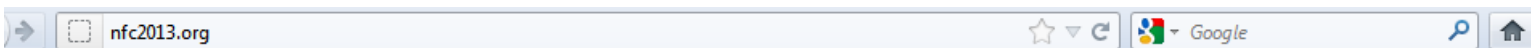








# NFC 2013 in Zurich, mark Feb 5, 2013



NFC 2013 Home About Contact

## NFC 2013

NFC 2013 is 5th International Research Workshop with focus on Near Field Communication (NFC). This conference covers the entire technological area, beginning from RF and hardware, smartcards approach, security, applications and services, business processes, up to usability and user experience. NFC 2013 is ideal for addressing the challenges facing multidisciplinary research, development, design, and proof of concepts, pilot projects, deployment and fundamental limits of the NFC technology.

- Date:
- Location: Zürich, Switzerland
- Venue: ETH Zürich

## Topics of interest

### RF & hardware related topics

High-speed RF interfaces; Modulation techniques; Circuits and antenna design; Power aware design; Modelling and simulation; NFC tests & measurements; Protocol analyses and verification methods; Physical interfaces & architectures; Interoperability between NFC devices, tags and smartcards; RF system-on-chip designs; Wireless charging

### Smartcards / SIM cards / Security

Single wire protocol (SWP); Global platform; Multi-application platforms (SIM centric or not); Secure & multi-secure elements; Secure over the air (OTA) services; Security solutions for readers and terminals; System security solutions

### Software platforms for NFC development

Solutions with NFC add-ons and NFC stickers, software architectures; Smartphones and NFC for location based information services, NFC and augmented reality platforms, NFC m-payment and m-transfer architecture, Interaction systems in ubiquitous information systems; Interoperability between NFC applications and services

### New applications & services

NFC and social media (Facebook, Twitter...); NFC applications for consumers and citizens; Mobile value added services (VAS) using NFC; NFC ecosystems (e.g. tag management); NFC in business processes; Integration of NFC into "Internet Of Things" (IOT); Street and POS marketing with NFC; NFC services in education Pilot projects, usability and user experience: NFC and digital cities, airports, homes; Wellness; Homecare; Business usage & leisure activities; User interaction models for NFC applications; Acceptance of NFC devices and services; Field trials and pilots; Secure NFC ecosystem; Virtual ticketing and couponing with NFC, fidelization of NFC cards; User experiences of NFC applications





# Internet of Things 2012

## 3rd International Conference for Industry and Academia October 24-26, 2012 Wuxi, China

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## WELCOME TO IOT 2012

The 3rd International Conference on the Internet of Things (IoT2012) will be held in Wuxi, China on October 24-26, 2012.

Wuxi is a city that has more than 2,000 years of history and has a population of more than 6 million. Wuxi city is located some 45 minutes by train north west of Shanghai. The city has been named the "Sensing China Center" since the year 2008 and is one of the leading centers of IoT-related research and industry in China. The conference will be held in the Wuxi InterContinental hotel, and there will be shuttle buses connecting the conference hotel directly to Shanghai International Airport.

In what is called the Internet of Things (IoT), sensors and actuators embedded in physical objects — from containers to pacemakers — are linked through both wired and wireless networks to the Internet. When objects in the IoT can sense the environment, interpret the data, and communicate with each other, they become tools for understanding complexity and for responding to events and irregularities swiftly. The IoT is therefore seen by many as the ultimate solution for getting fine grained insights into business processes — in the real-world and in real-time. Started one decade ago as a wild academic idea, this interlinking of the physical world and cyberspace foreshadows an exciting endeavour that is highly relevant to researchers, corporations, and individuals.

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