

Session One: ***RFID – Visions and Implications***

Chaired by: Lara Srivastava (ITU)

1. Visions of Ubiquity: Things in Cyberspace

L. Srivastava, Strategy & Policy Unit, ITU

2. RFID – A European Perspective

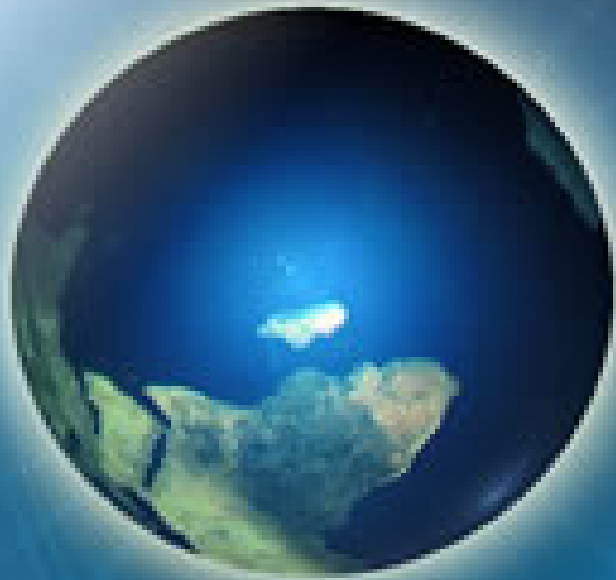
F. Frederix, European Commission

3. Visions and strategy in Japan

T. Tandai, MIC (Japan)

4. Vision and trends in US RFID markets

Y. Maguire, ThingMagic (United States)



International
Telecommunication
Union

Session One

Visions of Ubiquity: Things in Cyberspace

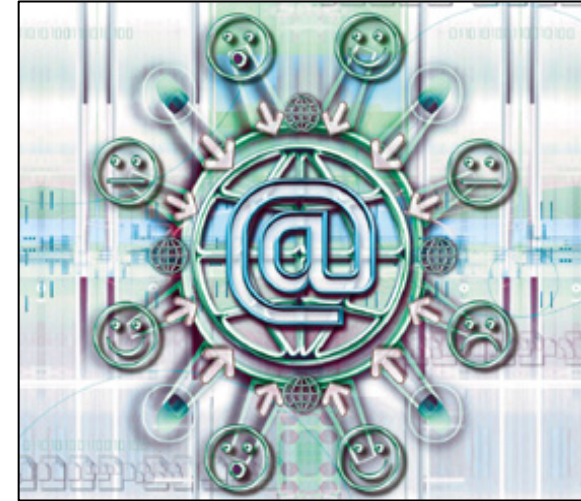
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Strategy and Policy Unit (SPU)
ITU

what is ubiquity?

- Ubiquity comes from the Latin “*ubique*”, signifying “everywhere”
- In the ICT world, it has come to refer to an environment in which technology becomes increasingly **pervasive** or **ambient**
- i.e. dedicated technical devices and networks eventually disappear, while information processing capabilities increasingly make their appearance...
- For the average user, ubiquity simply refers to unobtrusive connectivity **anytime and anywhere.**

but it doesn't stop there...


- Indeed, anytime and anywhere ...and by anyone... but it can and is going further still:
 - By **“anything”** ...
- This is the vision underlying the concept of a “network of things or objects”, and not only of people/data
- The internet now connects computers to one another, but imagine if it could also connect computers to things – a whole new dimension?



The dawn of an “Internet of things”?

what is required to get there?

- to realize this vision, we will need a paradigm shift in computing...
 - The ability to determine the status of everyday objects or thing in real-time, i.e. “object networking”



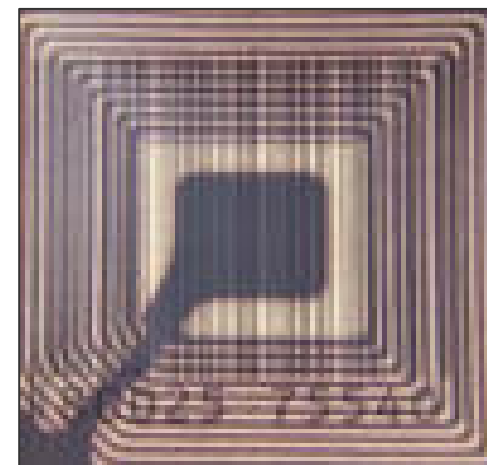
*This will enable us to map the real world
on a “virtual tapestry”*

- developments in miniaturization will further spur innovation in ubiquitous technologies, by driving both size and costs down
 - the disappearing processor...

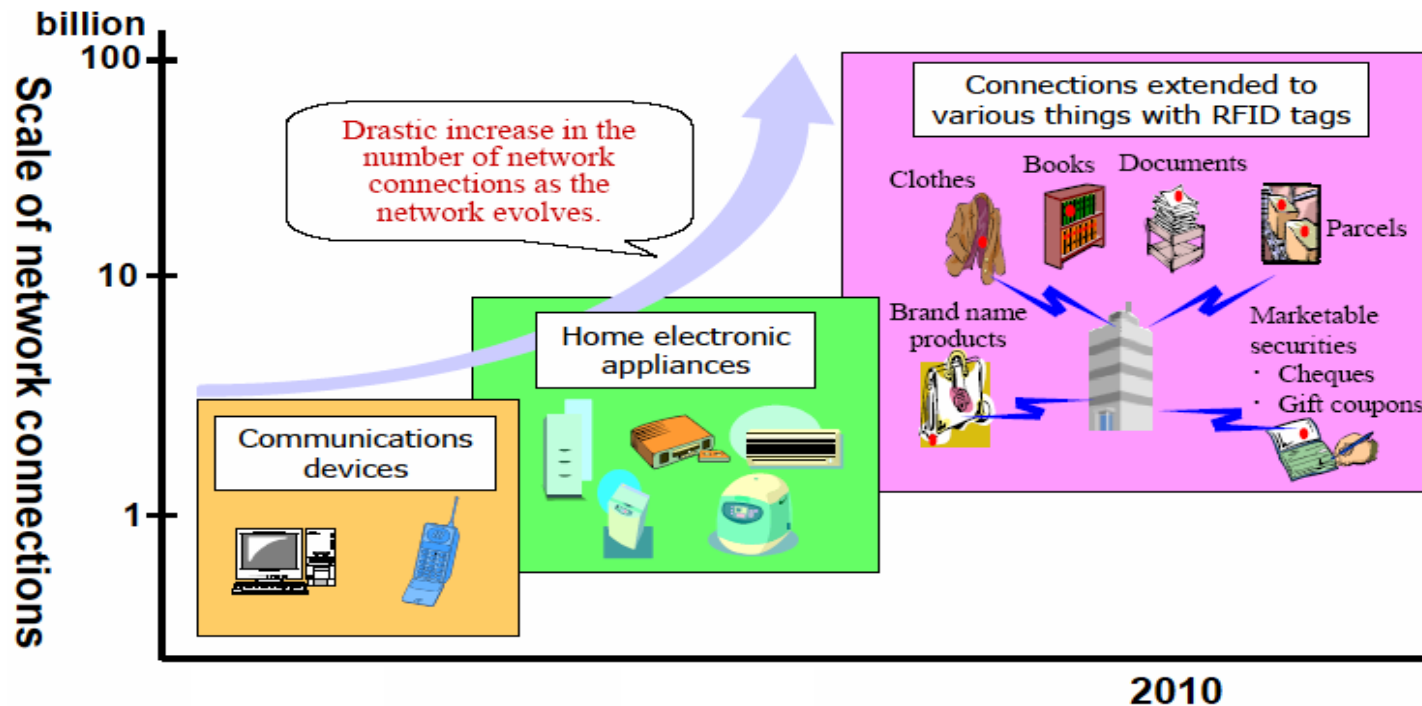
RFID offers a solution

- **R** RFID is a technology for identifying people and assets without human intervention
- It enables real-time identification but also tracking
- It can allow an understanding of a thing's 'status'
- As such, it is an integral and growing part of the “**internet of things**”

RFID Tag



connecting things with RFID drastically multiplies network connections



Source: Adapted from Murakami, ITU-T NGN Forum

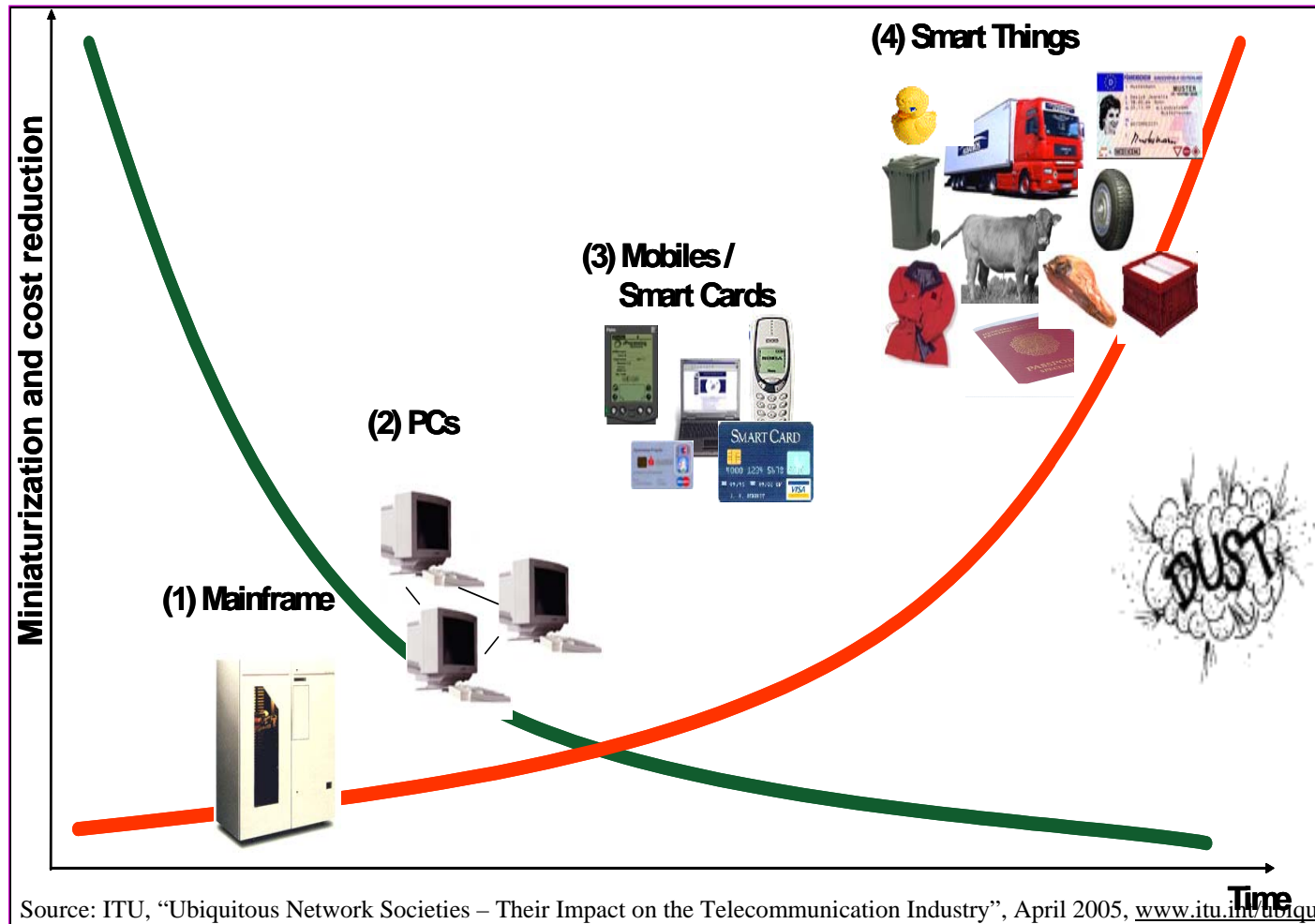
complementary technologies

- **Sensors:** *enable detection of environmental status and sensory information*
 - In combination with sensors, RFID can better track the status of things, e.g. their temperature, the presence of bacteria etc...
 - They can replace human senses to monitor the environment
 - As such, they act as a further bridge between the physical and virtual worlds
- **Nanotechnology:** *makes possible the “networking” of smaller and smaller objects*
 - Due to shrinking of the RFID tag or its successors, very tiny things could be mapped in the virtual world
 - One day, even “smart dust”?



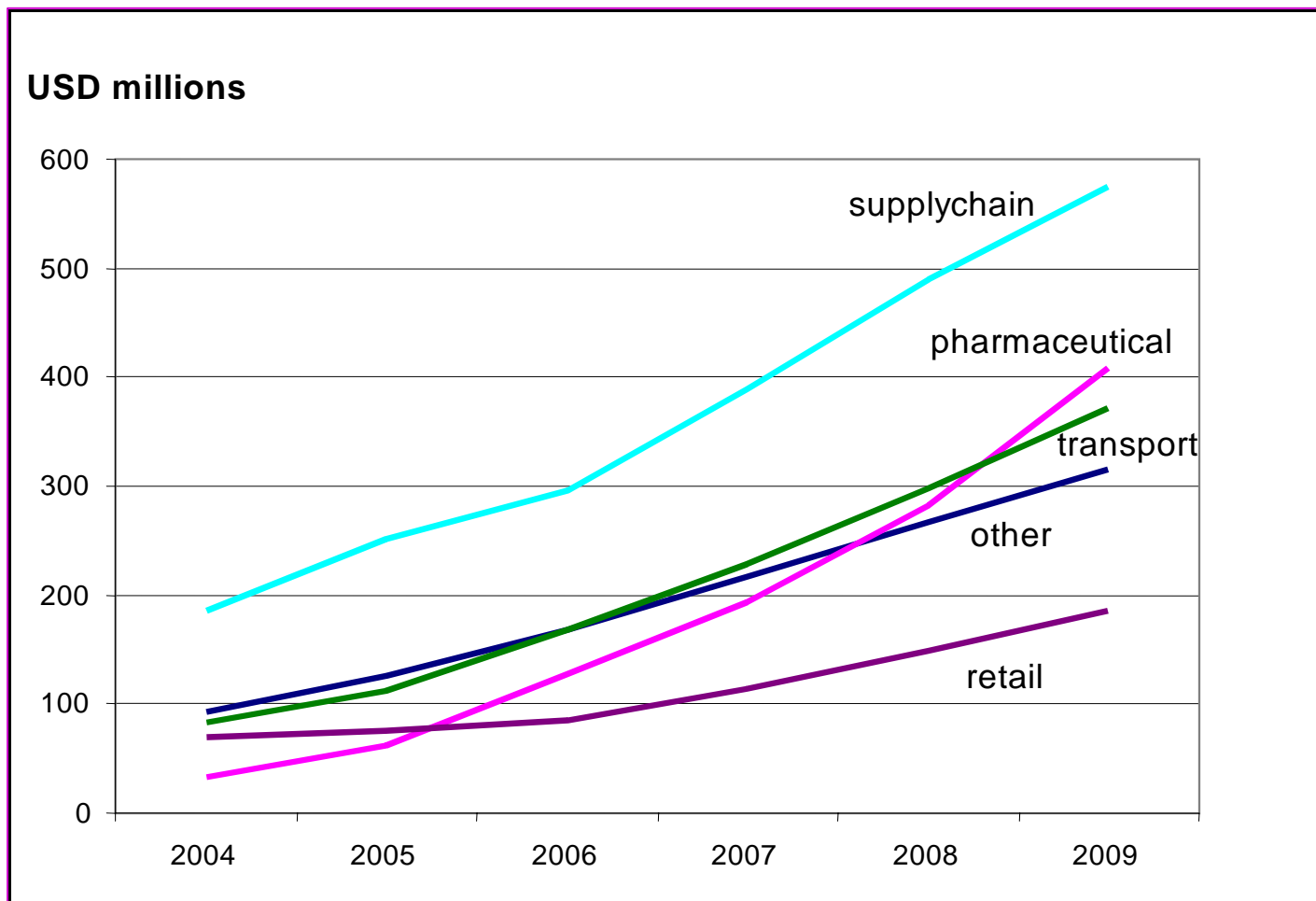
towards smart dust?

miniaturization and declining prices



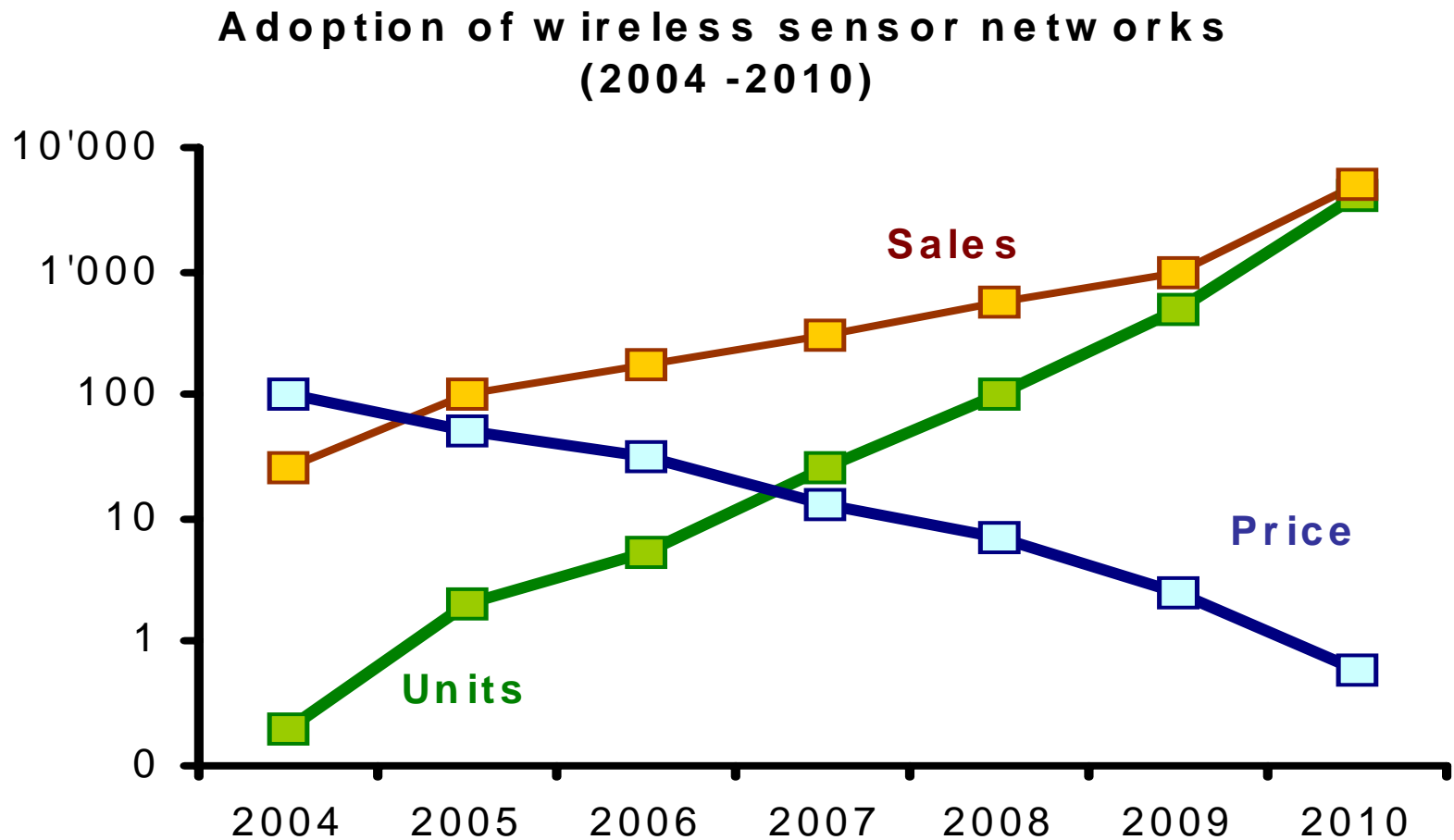
Source: ITU, "Ubiquitous Network Societies – Their Impact on the Telecommunication Industry", April 2005, www.itu.int/ITU-T/ubiquitous

RFID growth potential, by sector (Western Europe, 2004-2009)



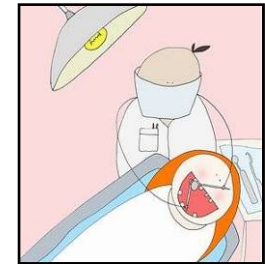
Source: [ITU Internet Reports 2005: The Internet of Things](#), adapted from Juniper Research

adoption of wireless sensor networks are also on the rise

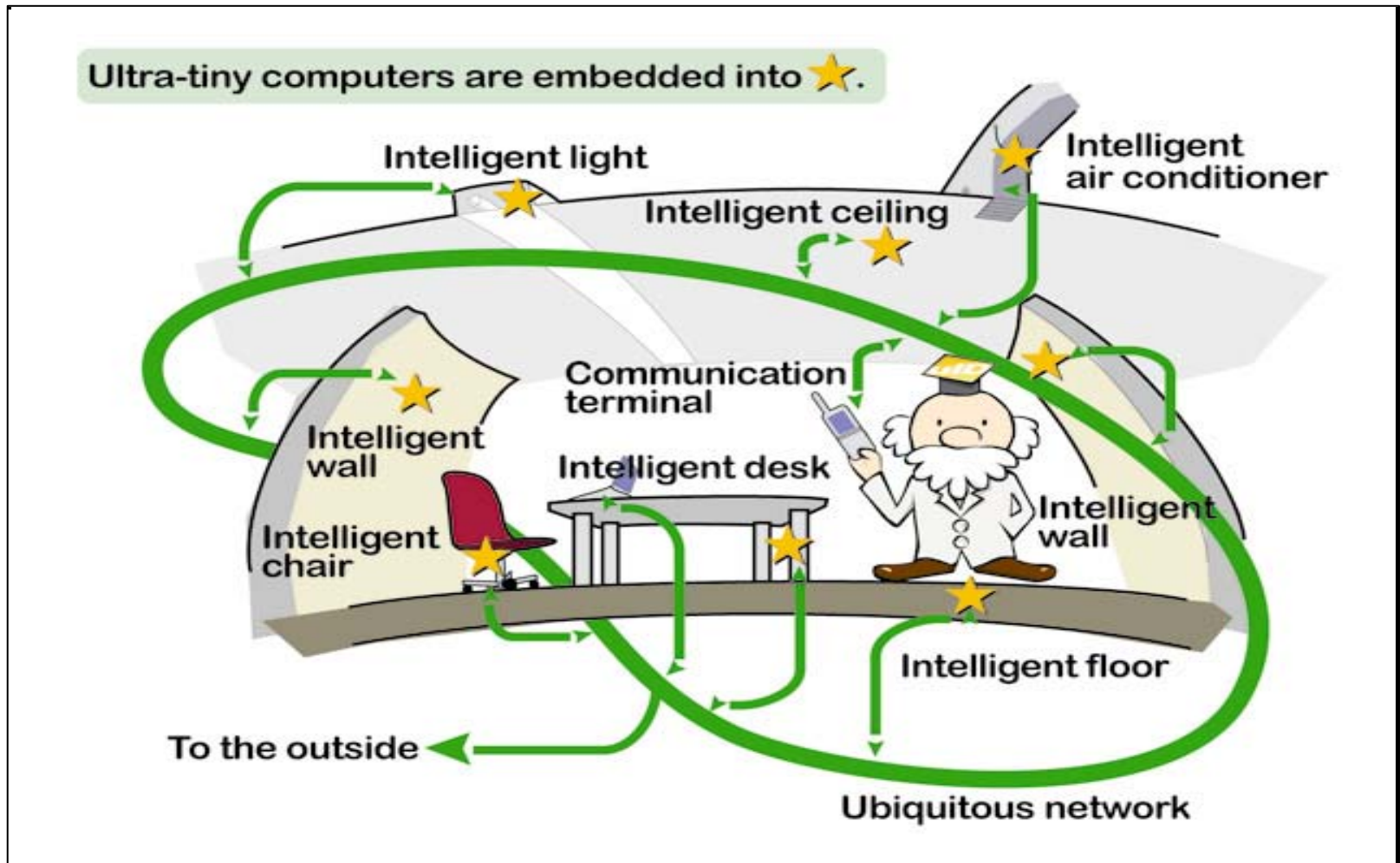


Source: ITU Internet Reports 2005: The Internet of Things, adapted from Harbor Research

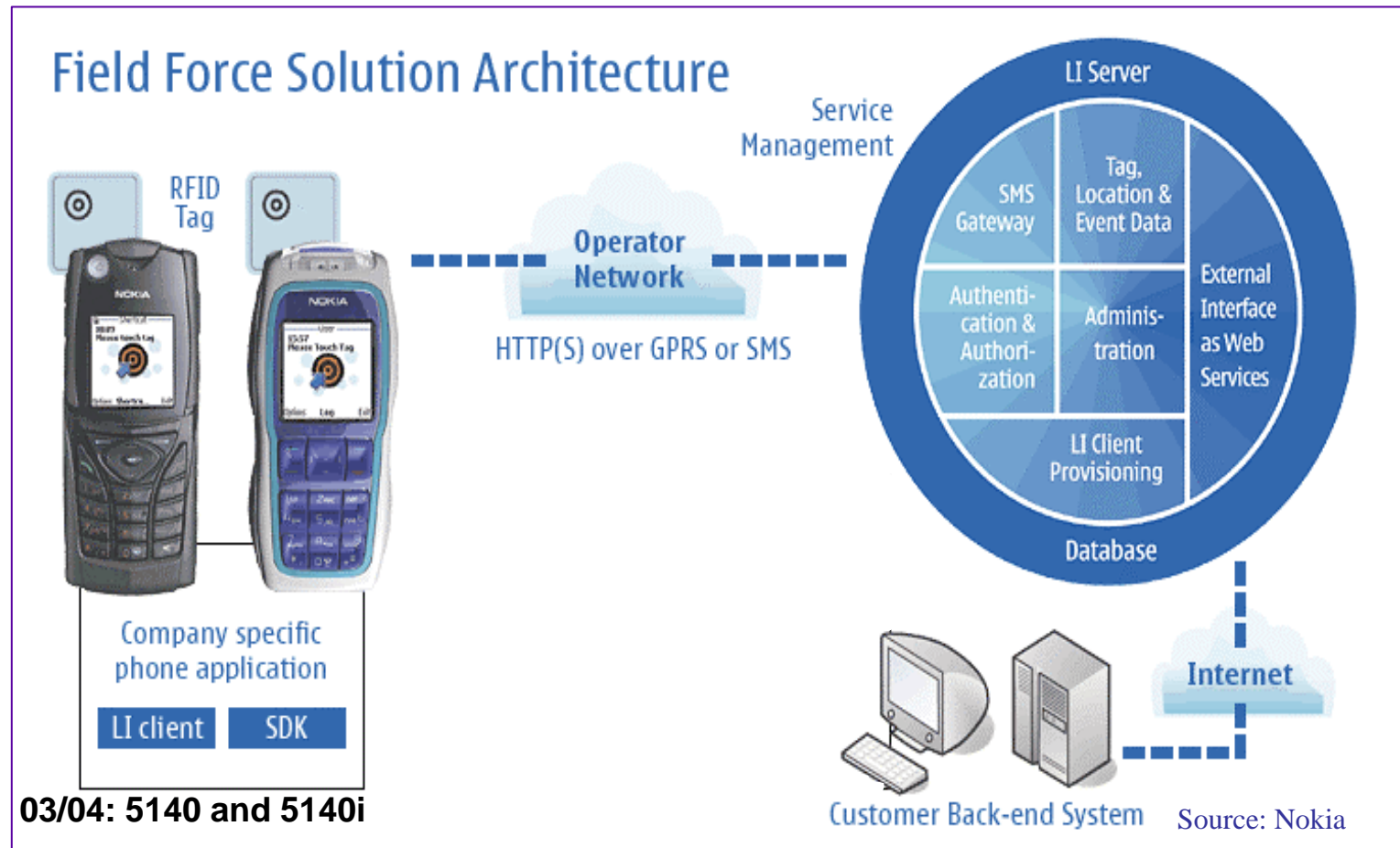
so, no dearth of applications, across sectors...



...applications embedding intelligence for “smart spaces”

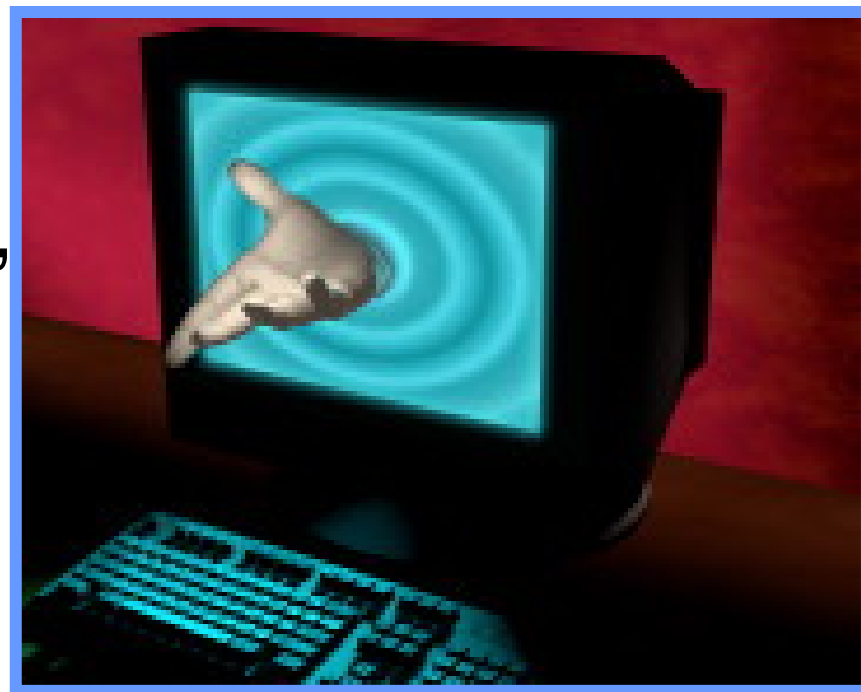


not surprisingly, mobile players are seizing the opportunity



Others players, too, are reaching out

- managed services for RFID networks are being deployed, e.g. Cisco, BT etc.
- Retailers are also rather keen, e.g. Metro AG, Wal-Mart etc...



with great opportunities, however...come challenges

- **Standards-setting and interoperability**
 - Though tag formats have *de facto* standard “EPC”, harmonization required particularly in the area of transmission protocols
 - Role for standards bodies, e.g. ITU
- **Governance of resources**
 - Who controls the unique identifiers?
 - More commercial value at stake than DNS?
- **Data protection & consumer privacy**
 - Information contained on tags should appropriately managed and controlled

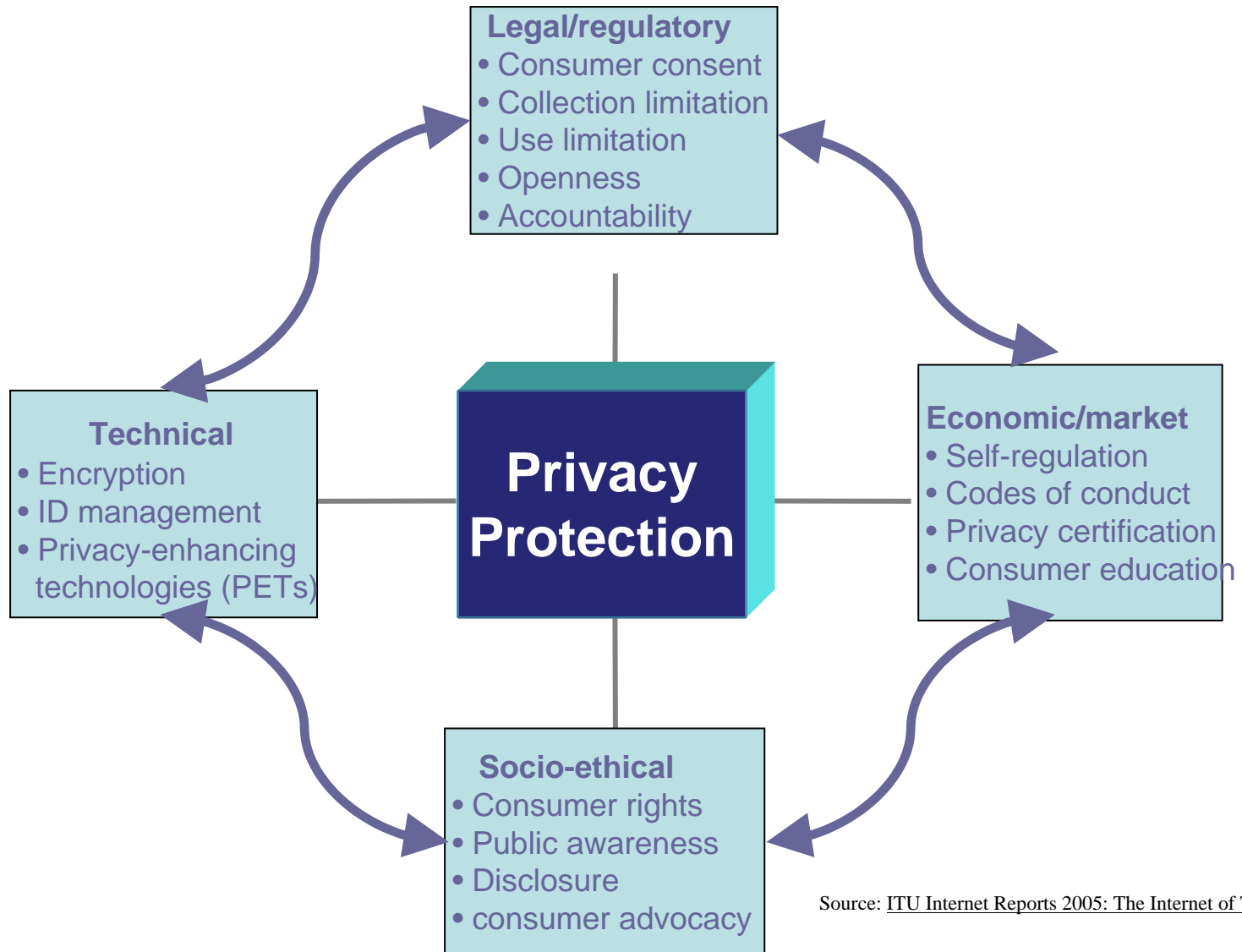


Protecting Privacy

- RFID has been plagued with delays due to consumer concerns over privacy
 - CASPIAN, EPIC, EFF
 - Based on uncertainty surrounding status of tag information after purchase
- Public sector has begun addressing the problem
 - EU Data Protection WP, Japan's RFID Guidelines
- Nonetheless, there remains a lack of clarity as to rules and guidelines for RFID use, combined with low consumer awareness of benefits
 - How to convince users to take up the technology amidst concerns over privacy
 - How to avoid a privacy divide?



privacy: a many-faceted thing



Source: [ITU Internet Reports 2005: The Internet of Things](#)

the growing nexus between technology and society

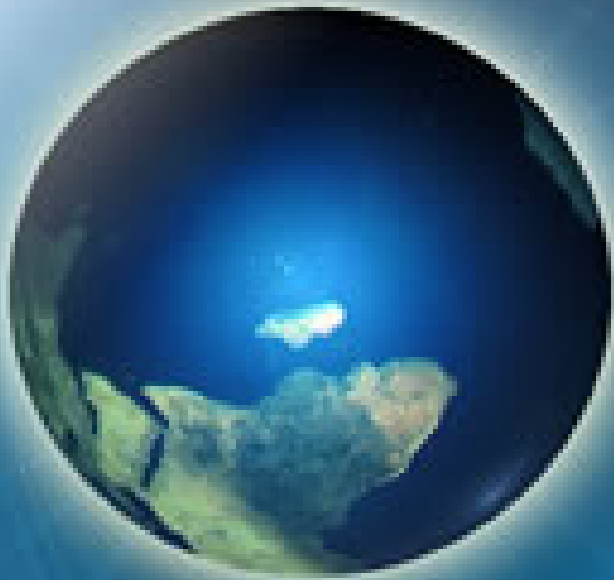
- new technologies like RFID have the potential to enhance quality of life, e.g.
 - enhanced security, convenience
 - better health care
- but we should be aware of other implications:
 - creation of a (perceived) environment of surveillance
 - numbering things...
numbering humans: impact on identity, individuality, self-expression
 - effect on human relationships, community life and intimacy



practical or cynical?



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<http://ibiblio.org/Dave/drfun.html>



thank you!

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www.itu.int/internetofthings/



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