

INTERNET OF THINGS (IoT)

PRESENTED BY:

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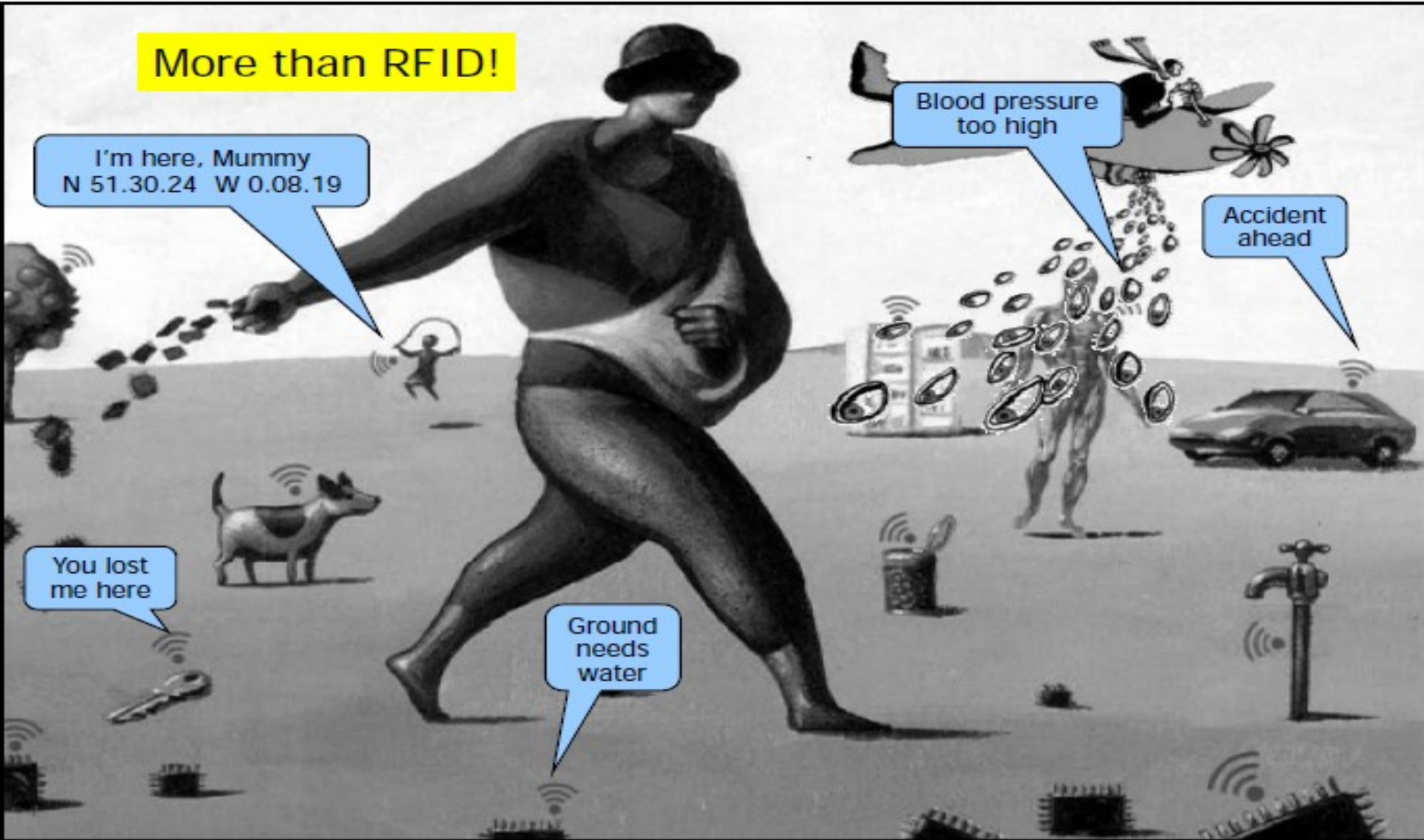


INTRODUCTION

- IoT: All about physical items talking to each other
- The term coined by Kevin Ashton in 1999
- Composed by two words and concepts:
 - _ “Internet” : “The worldwide network of interconnected computer networks, based on a standard communication protocol, the Internet suite (TCP/IP)”
 - _ “Thing” : “an object not precisely identifiable”
- “Internet of Things” means “a worldwide network of interconnected objects uniquely addressable, based on standard communication protocols”.



More than RFID!



INTRODUCTION

- Any object will have a unique way of identification in the coming future.
- The capacity of addressing each other and verifying their identities
- Objects will be able to exchange information
- Object knows its common properties such as creation, recycling, transformation, ownership change, or use for different purposes



INTRODUCTION

- Current Internet is a collection of uniform devices
- IoT will exhibit a much higher level of heterogeneity
 - objects of totally different in terms of functionality, technology and application fields can communicate



WHAT IS THE IoT?

- A new dimension added to world of information and communication technologies (ICTs):
 - Anytime connectivity
 - Any place connectivity
 - For anyone
 - Connectivity for anything



Any TIME connection

- On the move
- Outdoors and indoors
 - Night
 - Daytime

Any PLACE connection

- On the move
- Outdoors
- Indoors (away from the PC)
- At the PC

Any THING connection

- Between PCs
- Human to Human (H2H), not using a PC
- Human to Thing (H2T), using generic equipment
- Thing to Thing (T2T)



WHAT IS THE IoT?

- Connections will multiply and create an entirely new dynamic network of networks



TECHNOLOGY

- Depends on dynamic technical innovation like wireless sensors
- Four kinds of technology basically used.
 - RFID(Radio-frequency identification)
 - Sensor technologies
 - Embedded intelligence
 - Nanotechnology



TECHNOLOGY

- RFID
 - Item identification
 - Uses radio waves to identify items
 - Gives information about their location and status
- Sensor technologies
 - Data collection
 - For example, sensors in an electronic jacket collect changes in external temperature and parameters of jacket adjusted accordingly



TECHNOLOGY

- Embedded intelligence
 - Information processing
 - distribute processing power to the edges of network
 - empower things and devices independent decisions
- Nanotechnology
 - Miniaturization



WIDER TECHNOLOGICAL TRENDS

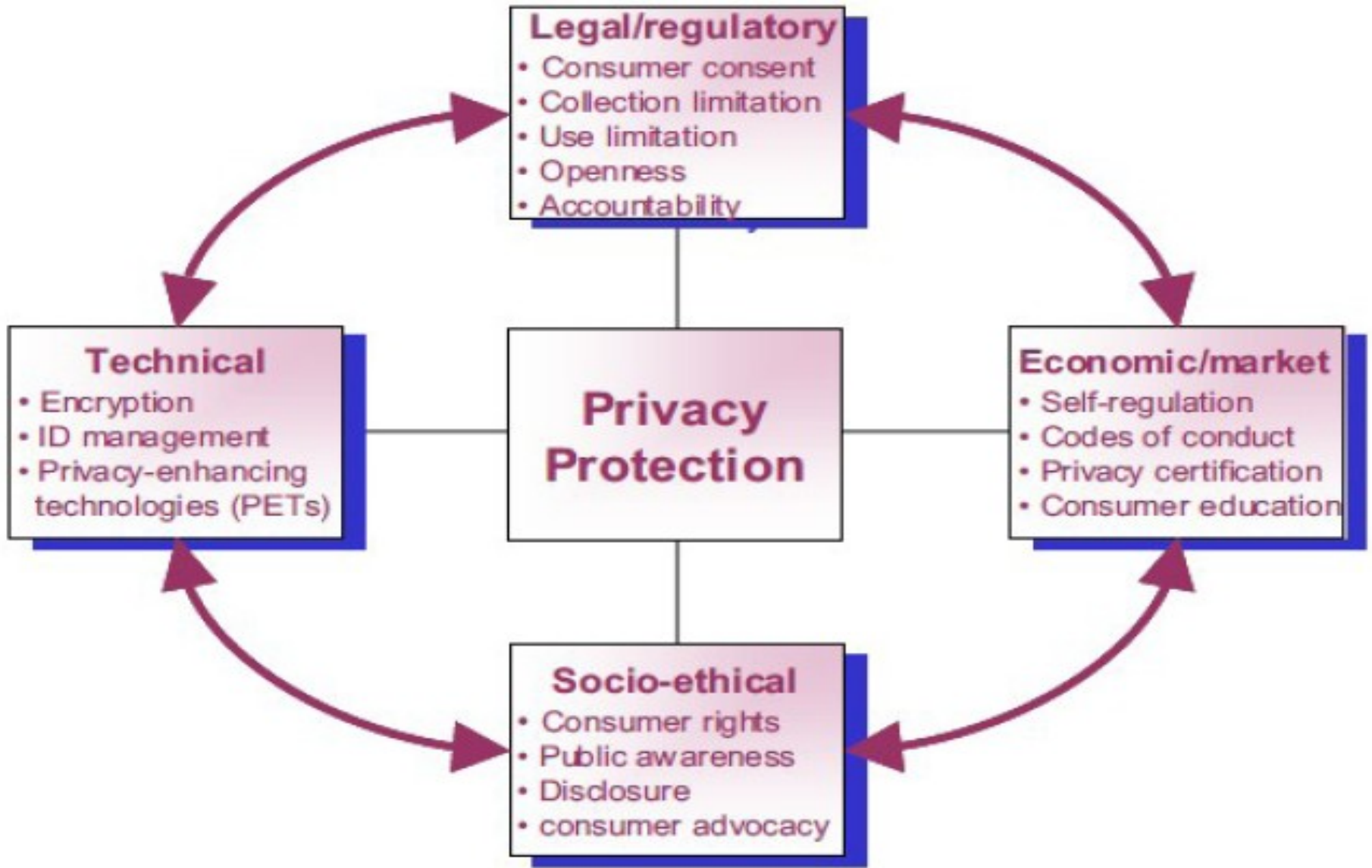
- For the years to come, four distinct macro trends that will shape the future of IT
 - “exaflood” or “data deluge”: explosion of the amount of data collected and exchanged
 - The energy required to operate the intelligent devices will dramatically decrease
 - Miniaturisation of devices
 - Autonomic resources



PROBLEMS AND CONCERNS

- Technological standardization
 - Standardization is essential for mass deployment and diffusion of any technology
- Protection of data and privacy
 - sensors and smart tags can track users' movements, habits and ongoing preferences





Source: ITU

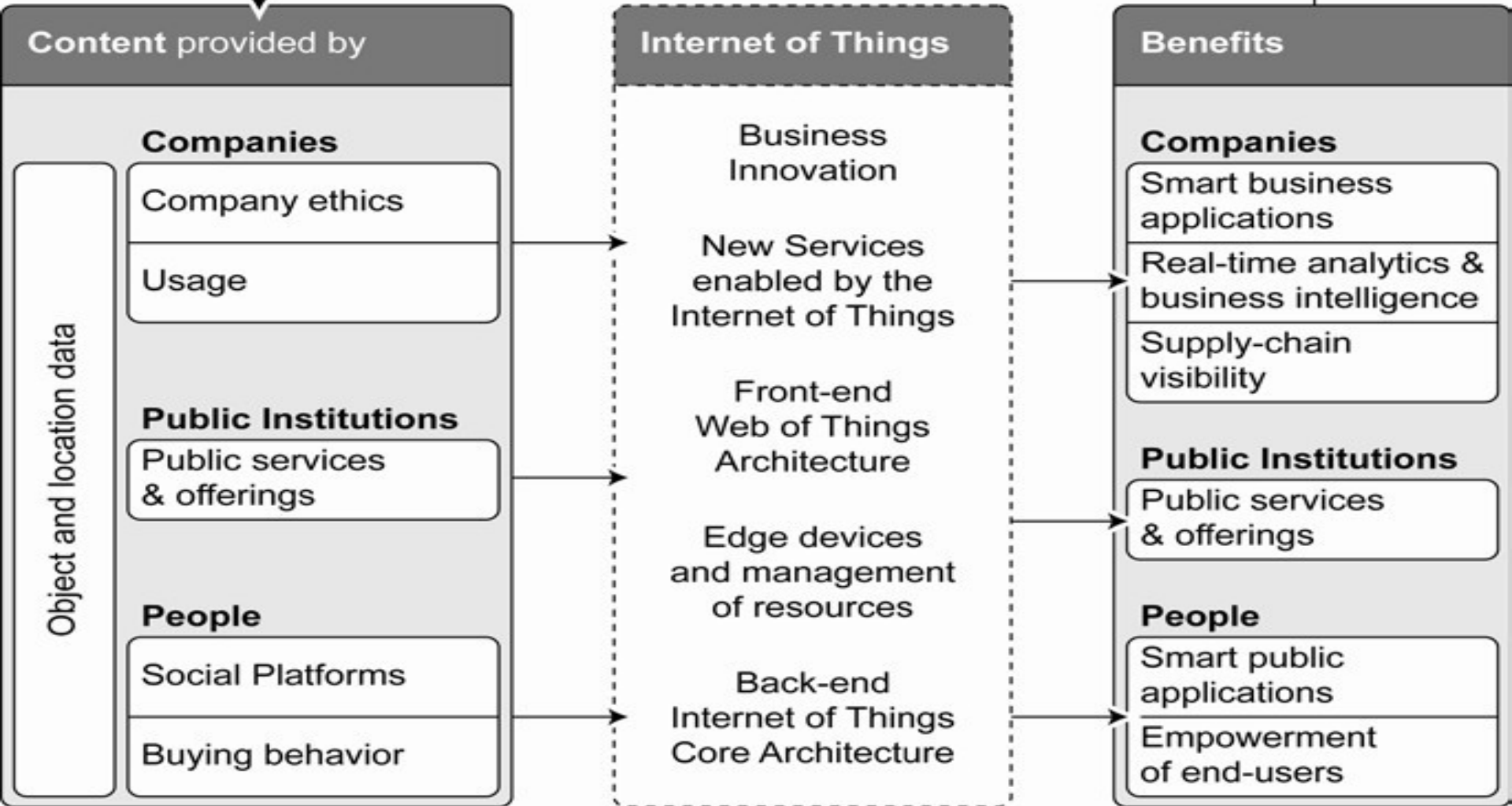


ARCHITECTURE

- There can be more than one architecture for Internet of Things
- The one explained here is standardised open architecture :the EPCglobal Network
 - widely accepted and has gained the biggest support from IT companies



Financial and non-financial incentives for information sharing



ARCHITECTURE

- Includes content providers (producers) and content users (consumers) that utilise the Internet of Things and share benefits
- New services and business innovation will be enabled by an enhanced Internet of Things infrastructure
- Companies, public institutions and people will access data for their own benefits and financial as well as nonfinancial benefit



ARCHITECTURE

- Key goals for Internet of Things architecture to achieve are:
 - _ An open, scalable, flexible and secure infrastructure
 - _ A usercentric, customisable 'Web of Things'
 - Interaction possibilities for the benefit of society
 - _ New dynamic business concepts
 - flexible billing and incentive
 - _ Capabilities to promote information sharing



ARCHITECTURE

- Includes the following components:
 - *Extended static data support*: There is a need to support all things that carry a unique ID
 - *Integration of dynamic data*: a need to sense environmental conditions as well as the status of devices



ARCHITECTURE

- *Support for nonIP devices*: NonIP devices offer only limited capability.
 - Can be integrated in IoT through gateways
- *Integration of an actuator interface*: Actuators execute decisions either rendered by humans or software agents on their behalf



ARCHITECTURE

- *Optional integration of software agents:* For automated decision making
- *Data synchronisation for offline support*



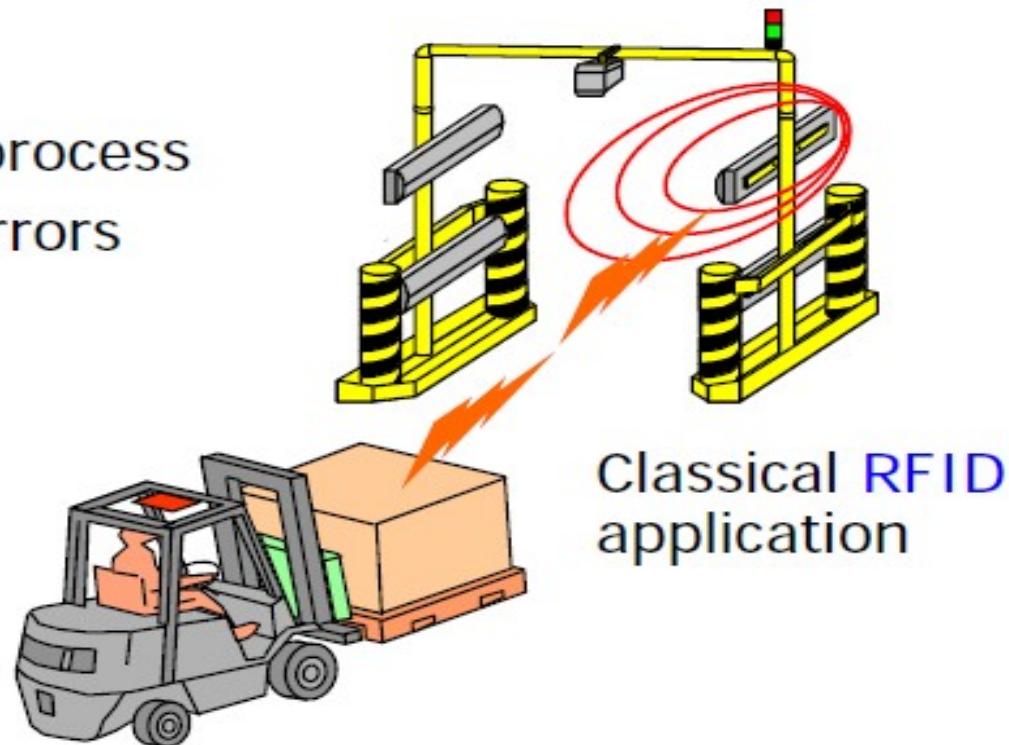
APPLICATIONS



Pallet Communicates with Gate

Logistics:

- Speed up process
- Minimize errors



Clothes Communicate with Display



Value for end consumers! (RFID)

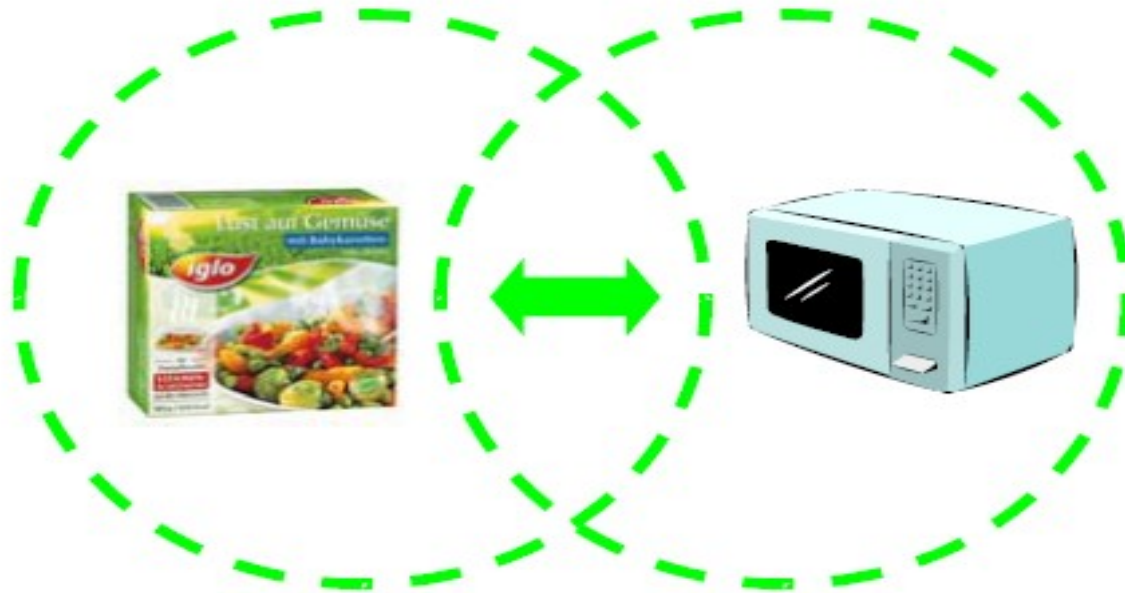


- Virtual shop assistant
- Context recognition

→ value for end consumers!



Packaged Food Communicates with Microwave Oven



Cooperating Smart Everyday Things?

When the **tooth brush** talks
to the bathroom **mirror**



Real-World Awareness

Intuitive way of interaction

- access content and services by touching objects
- NFC (Near Field Communication)

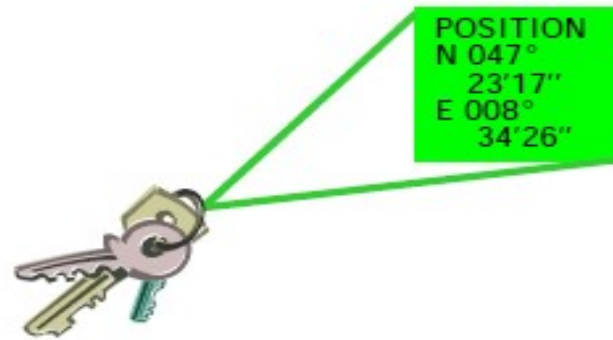


Power [7 days]: 5.4 kWh
CO₂: 3.1 kg; Cost: 1.25 \$

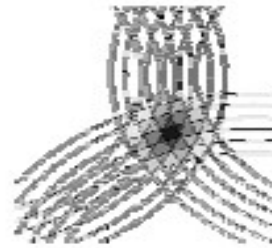


Use Case: Locating Lost Objects

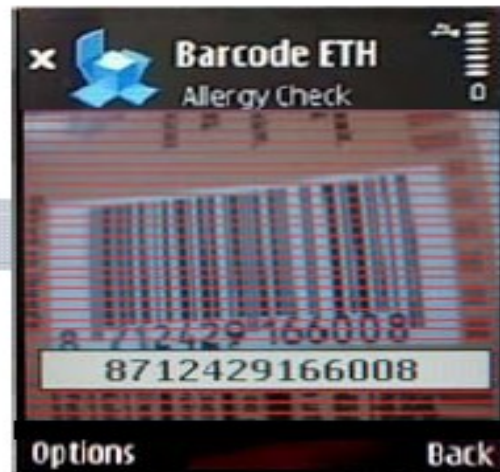
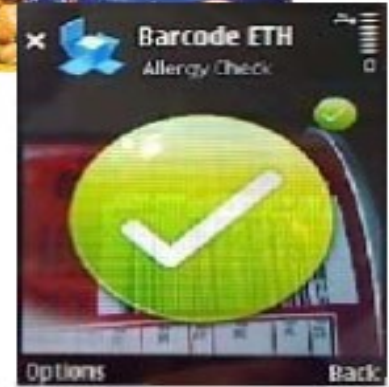
- Locate lost or misplaced personal items
 - wallets, keys, sports bags,...



- Opportunistic use of mobile phones and their infrastructure



Allergy Checker



Communicating Products

- **Weapon** or **credit card** that only works in the hand of its owner



FUTURE

- Standardization
- Technologies necessary expected to enter the stage of practical use
- Used in monitoring buildings, environmental monitoring, home automation, personalization, localisation, positioning

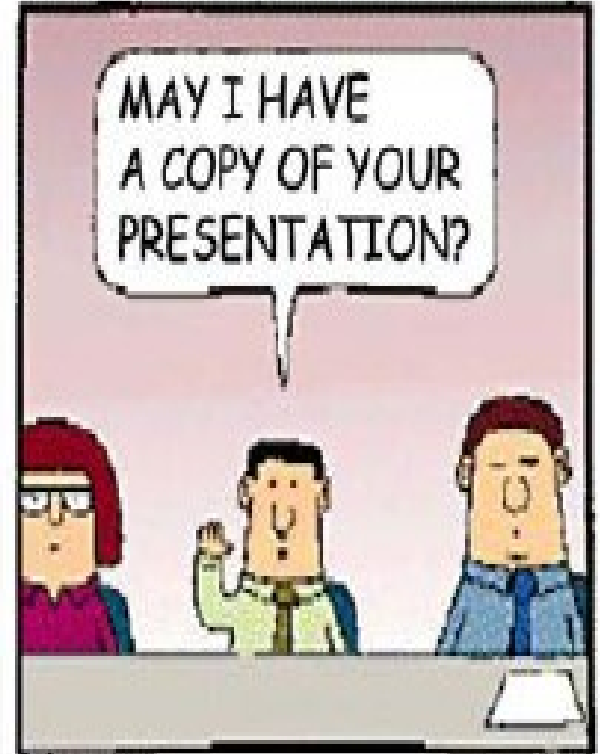
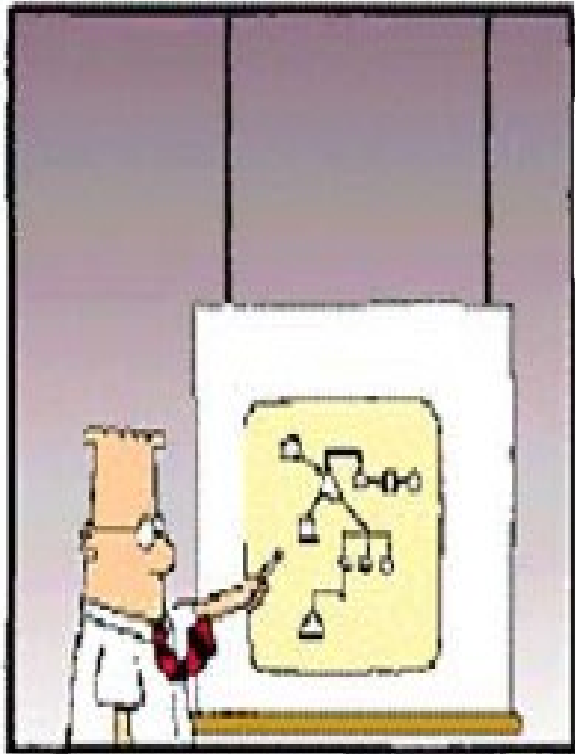


CONCLUSION

- The Internet of Things is a movement towards using realtime data to become more intelligent in the decisions we make
- Our physical things will become connected in our virtual world
- But it may arise privacy concerns



QUESTIONS???





Show is over

YOU MAY NOW RELAX!

