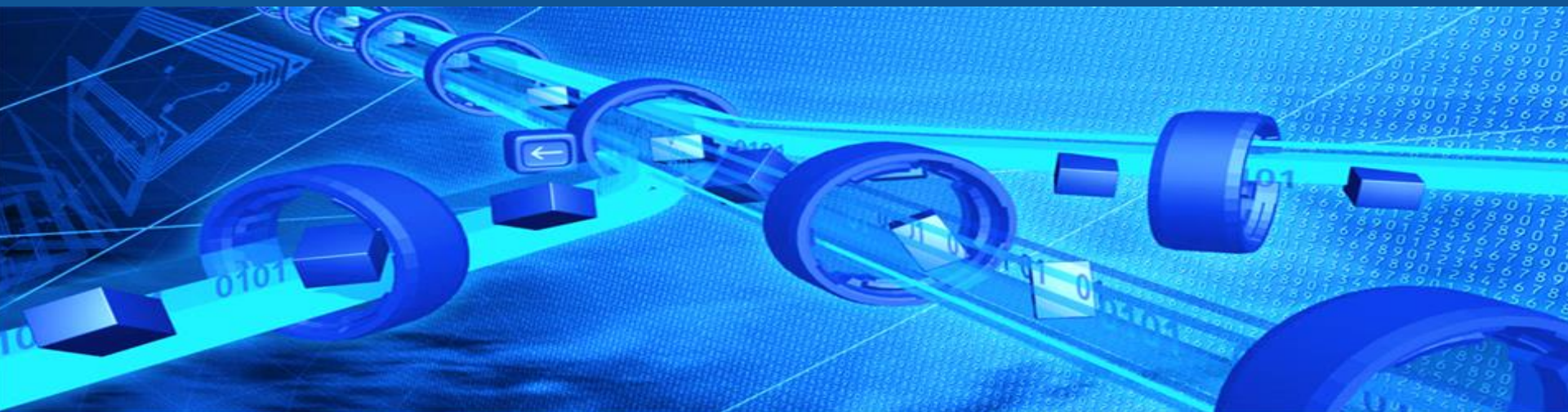


# Internet of Things: Europe takes up the challenge!

European Commission - DG CONNECT  
Gérald Santucci, Head of Unit 'Knowledge Sharing'

Global Forum, 17-18 November 2014, Geneva





# **Internet of Things is there!**

**Sensors and objects deployed everywhere**

**Business adopt IoT**

**End-users embrace IoT**



# **Internet of Things is NOT there!**

**No integrated solutions / standards missing**

**No generic reliable connectivity**

**Short-term perspective only**

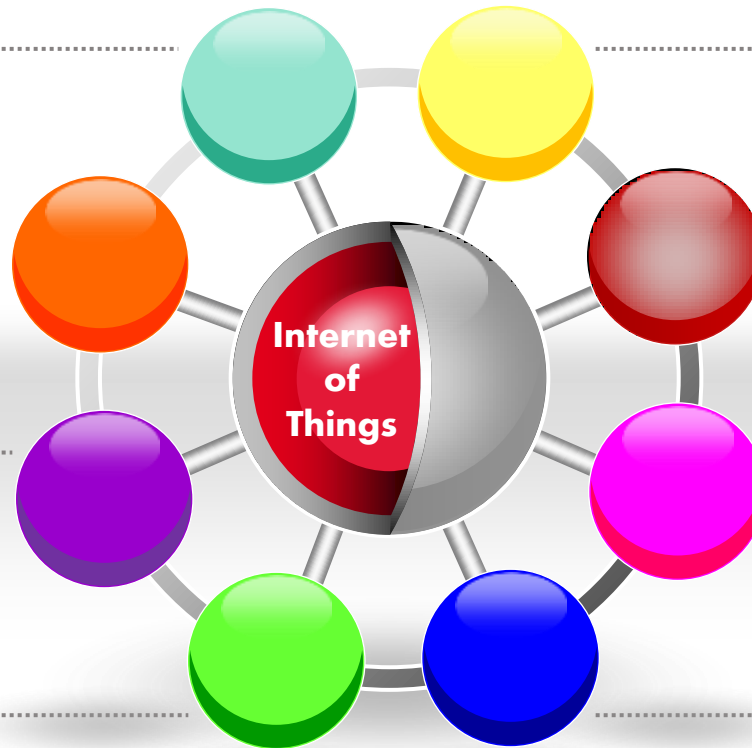
# Definition of the Internet of Things

**A dynamic global  
network infrastructure**

**with self configuring  
capabilities**

**based on standard and  
interoperable  
communication  
protocols**

**where physical and  
virtual "things"**



**have identities,  
physical attributes,  
and virtual  
personalities**

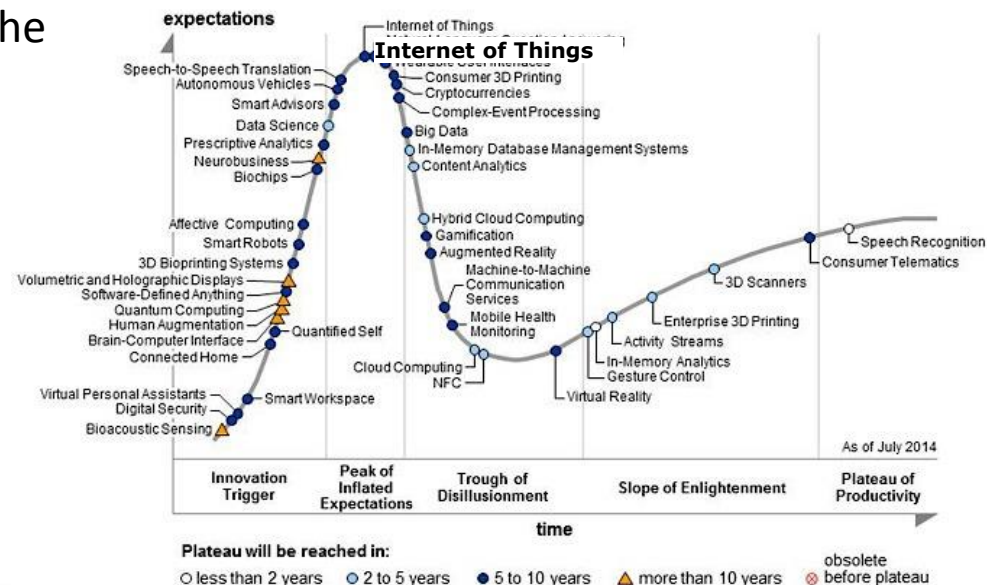
**use intelligent  
interfaces**

**can sense and  
actuate**

**into the  
information  
network.**

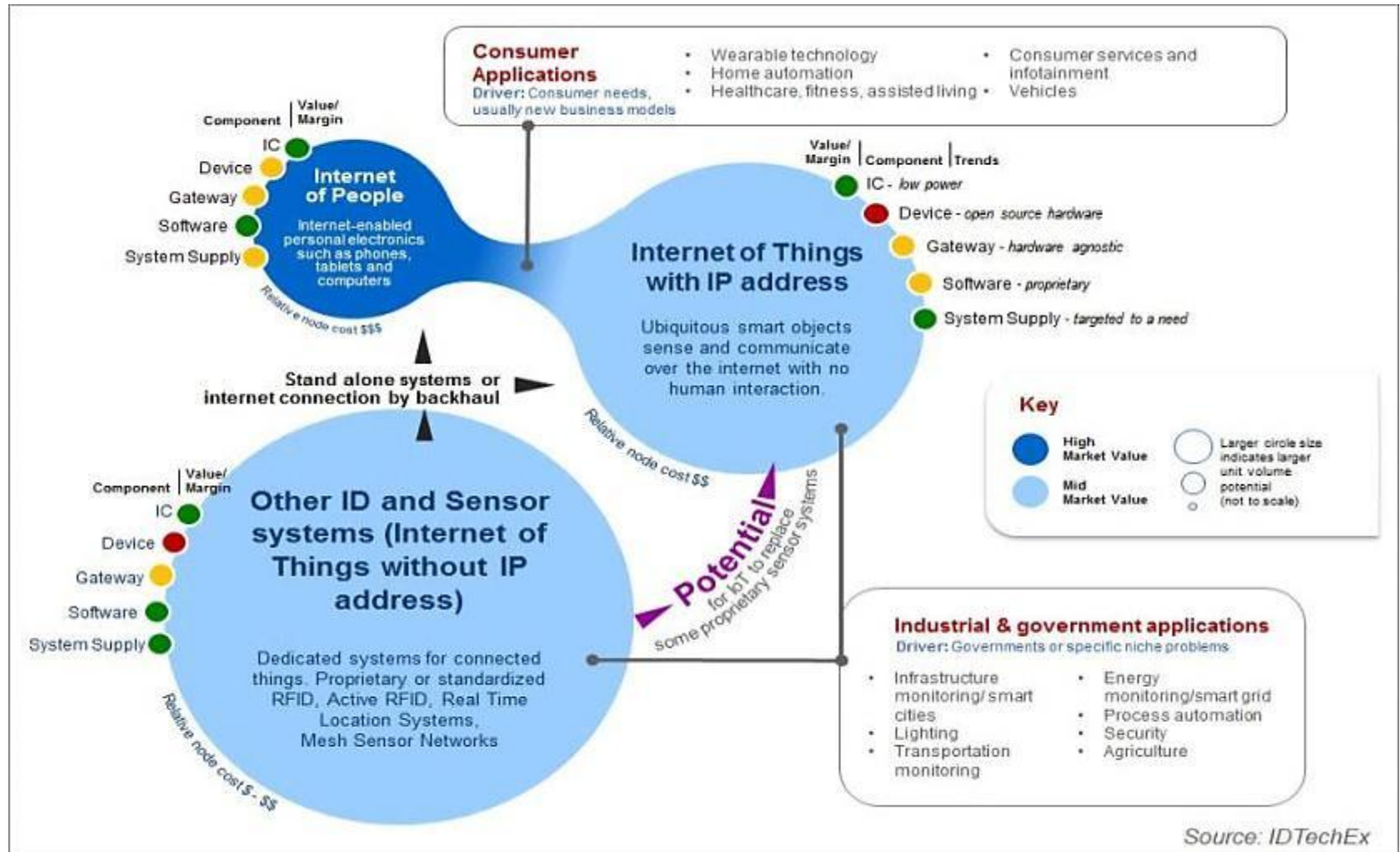
# The Internet of Things is on its way forward

- 9 billion 'things' connected to the Internet today – Gartner says 26 billion online by 2020; ABI Research puts that number at 30 billion; Cisco estimates about 50 billion...
- McKinsey estimates 2-6BEUR annual turnover in the coming years
- Large players and SMEs (infrastructure equipment suppliers, telcos, component / system manufacturers, application designers,...) take up IoT
- Stakeholders on all levels to exploit the potential of connectivity and embedded intelligence mix
- Powerful combination of IoT with Cloud, Future Internet, Big Data, Cyber-Physical Systems, Robotics...





# Internet of Things Market Potential



# Internet of Things has been continuously supported on research and policy level during FP7

- **Research funding over seven years (FP7, CIP, joint calls)**
  - Creation of research portfolio - 3 FP7 calls with a direct budget of 100 MEUR
  - 5 IPs for conception R&D and piloting
  - > 15 STREPs for specific challenges (e.g. security)
  - 5 CSAs for innovation support and international co-operation
  - Application areas: Smart City, e-Health, Industry, Logistics, ...
  - Support by European Technology platforms – EPoSS, ARTEMIS
  - Creation of IERC – Internet of Things European Research Cluster
  - Link to Future Internet PPP (Generic Enabler)
- **Policy support towards innovation and take-up**
  - Driving IoT Standardisation initiatives
  - Convocation of a dedicated IoT Expert Group on IoT Governance
  - Exchange and cooperation with MS government initiatives on IoT
  - International co-operation on IoT with China, Japan, Korea, Taiwan, US and Brazil
  - CAF – Connect Advisory Forum IoT workgroup (innovation stakeholder)
  - Link to new EC Data Protection Regulation



# Results and achievements in wider context

## IoT ARCHITECTURES

- IoT Reference Architecture and Open IoT platform
- Clouds of internet-connected objects, Open source middleware framework
- City infrastructure as a cloud service (CIaaS)
- Future Internet PPP Generic Enablers and platform approaches (FI-WARE, FI-CORE)
- Adaptive middleware for small solutions and virtual objects
- Open platforms ReAAL and Universaal for home environment (smart home)
- Cyber-physical systems (I4MS) for manufacturing



## IoT SOLUTIONS

- IP-based smart objects connectivity with low power consumption
- Naming and identification systems
- Ubiquitous, secure location-based IoT
- Semantic interoperability approaches
- Reliable communication and self-configuration mechanisms in industry
- Embedded smart objects / Cyber-physical systems
- real-time measuring and decision making solutions



# Results and achievements (cont'd)

## **IoT DEMONSTRATORS**

- Use-cases in e-Health, Smart Mobility, Smart Office, Smart Shopping, Smart Home, Tourism, Smart Toys, Smart Agriculture
- Use Cases in European Smart Cities (energy, environment, open data, transport, security, water mgt., social communities, urban regeneration)

### Examples

- City-scale smart city experimental research facility (Santander)
- Smart Agrifood for planting and machining (Netherlands, Hungary and Spain)
- Smart Manufacturing for textiles (Pamplona, Naples, Torre de Moncorvo (PT))
- Eco-hotel (Espoo)
- "Citizen as a Sensor" (Malaga)
- Smart Campus platform for future smart spaces (Surrey, Trento)
- Social Connected TV combined with device management (Berlin, Cologne, Lancaster)
- City environment parameter measuring (Las Palmas de Gran Canaria)
- Creative Industry support (CREATI-FI)
- Smart Care / advancing active and healthy ageing





# ICT 30 - Internet of Things in WP 2014-15

## Internet of Things and Platforms for Connected Smart Objects

- Cutting across several LEIT-ICT areas (smart systems integration, cyber-physical systems, smart networks, big data)
- Bringing together different generic ICT technologies and their stakeholder constituencies
- 51 M€, 2<sup>nd</sup> call of WP 2014-15 (publication: 15 October 2014)
- Research and Innovation Actions (100% funding) + Coordination and Support Action
- Large Projects
- Mechanism of open competitive calls up to 30% of total budget

# ICT 30 – Scope of Research & Innovation Actions

- Architectural concepts and concepts for semantic interoperability for "Platforms for Connected Smart Objects"
  - Dynamically configured infrastructure and integration platforms for covering multiple technologies, multiple devices including robots, and heterogeneous integration levels
  - Integration of smart devices into self-adaptive, robust, safe, intuitive, affordable and interconnected smart network and service platforms
- Reference implementations, including proof-of-concept, large-scale demonstrations and validation driven by innovative use scenarios, e.g. in
  - Smart homes, public spaces and context aware commercial environments
  - Potential use scenarios include health, energy, mobility and commercial services



## ICT 30 – Scope of Coordination / Support Action

- Measures for development of ecosystems around the platforms e.g.
  - Communities of open API developers for low cost applications, networking of stakeholders
  - Contribution to pre-normative activities / standardisation, development of business models, innovation activities which aim at stimulating platform adoption
  - Activities to increase societal acceptance and foster specific education
- Funding of one Co-ordination and Support Action to stimulate the collaboration between selected projects and between the potential platforms (including research clusters)
- Preparing for follow-up Work Program, in particular innovation actions

## ICT 30 – Expected impact

- European offer for integrated IoT systems and platforms
- Availability of architectures and methodologies to provide IoT turn key solutions
- Dissemination and availability of results for technology adoption and pre-normative activities e.g. in standardisation fora and bodies like the EIT
- Facilitation of platforms for co-creation of products and services in open innovation ecosystems including all relevant stakeholders.

## Next steps

- Publication of Call in 2<sup>nd</sup> half of 2014
  - Publication date: 15<sup>th</sup> October 2014
  - Deadline: 14<sup>th</sup> April 2015, 17.00
- 2014 Community building
  - Networking day at IoT Week, London: 20<sup>th</sup> June 2014
  - Networking event in Brussels: 07<sup>th</sup> November 2014  
Registration: <https://ec.europa.eu/digital-agenda/en/news/community-building-event-internet-things-and-platforms-connected-smart-objects>
  - Networking day at CPS info event, Brussels: 17<sup>th</sup> Dec 2014





## **Challenges for deployment**

- **Create sensor environments/platforms**
- **Customised and Do-it-yourself solutions**
- **Innovation/business match-making**
- **Achieve user acceptance**
- **Evolution of regulations/law**

# Key challenges

## *Remaining technological challenges*

**Security and privacy**, connectivity and reliability of data transmission at large scale, semantic interoperability

## *Risk of fragmentation*

**Between siloes, between standards, between MS**

## *User acceptability*

**Privacy**, user-friendliness

## *Moving mainstream without interoperability*

**Google, Apple, Samsung, General Electric, ...**



# IoT + Cloud + Big Smart Data

Generic  
connectivity

Security & Privacy

Application  
areas

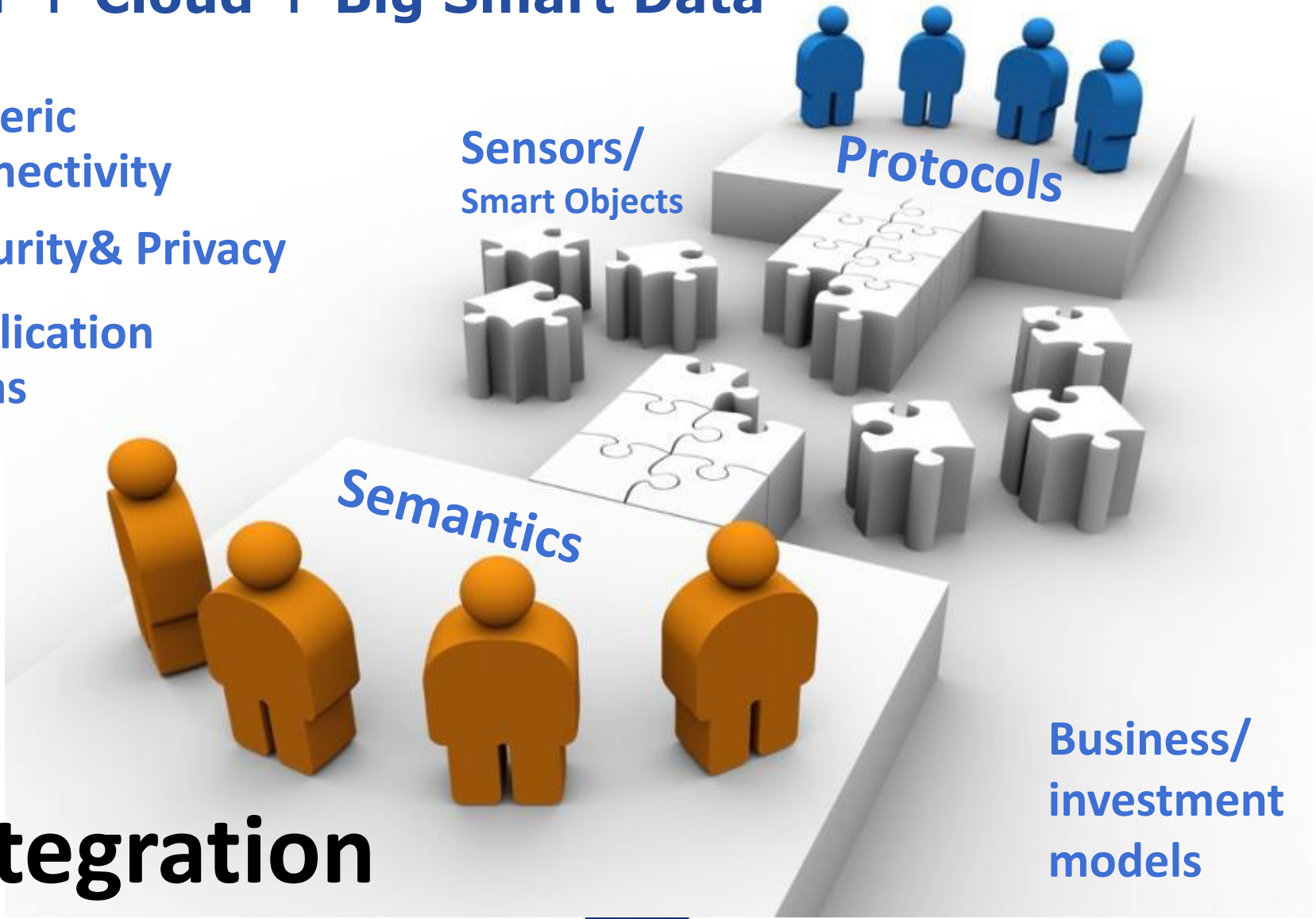
Sensors/  
Smart Objects

Protocols

Semantics

Business/  
investment  
models

# Integration





# **Realising the Hyper-connected society**

**Utilise full potential of Smart objects**

**Generic connectivity (part of 5G)**

**Towards a society of trust**