

23rd September 2011
ICT Trends & Vision for 2020



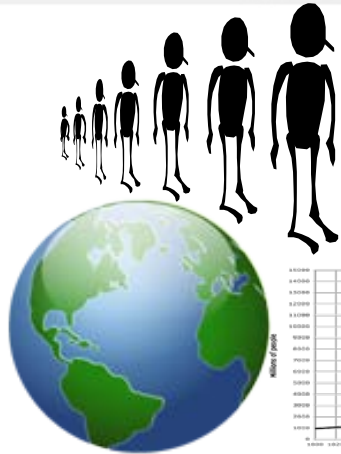
shaping tomorrow with you

Connected People and Environments

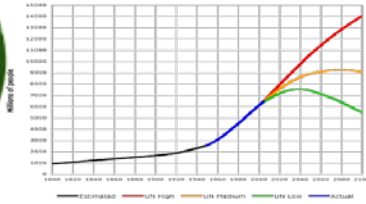
Sunil Vadgama

Fujitsu Laboratories of Europe Ltd

Mega-City Trends 2009 → 2050



Population Growth
6.8 → 9 Billion



50% → 75%
living in Cities



0.6 → 2-4 Billion Cars



20 → 50 cities
of > 10 Million
people

Growth

Urbanisation

Mega cities

Connected People and Environments

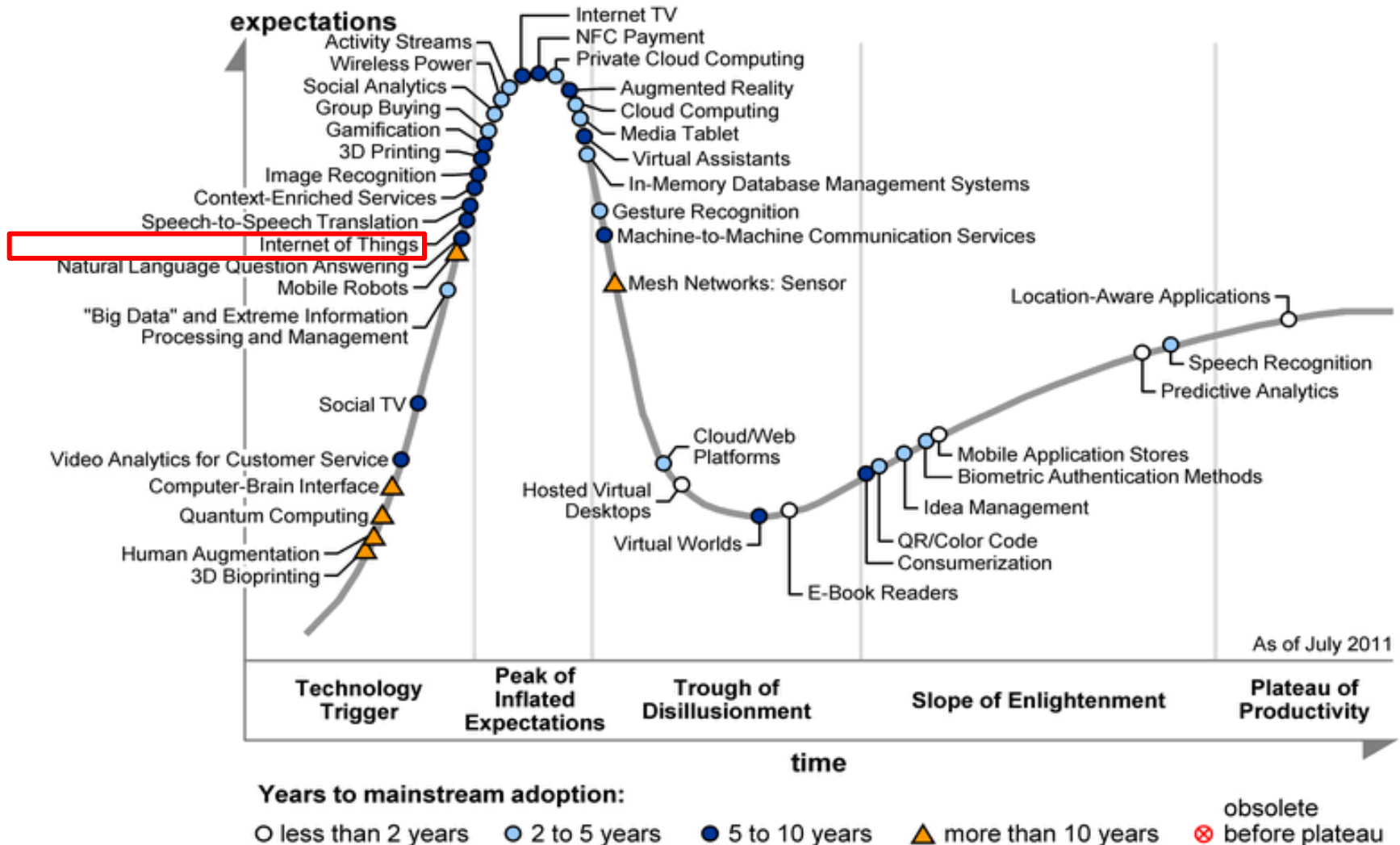


- Today:
 - ~ 5 billion Cell Phone connections worldwide
 - ⇒ Expected to grow to 8 billion by 2020
 - ~1.5 billion internet-connected PCs and over 1 billion Internet-enabled cell phones.
- The 2010's is expected to be the decade of "Internet of things"
- Tremendous growth of Machine Type Communications
 - Machine Type Communications can be defined as "Traffic originated or terminated by/at autonomous devices"
- Ericsson predicts by 2020 more than 50 billion devices connected to mobile networks
- EC predicts 50 to 100 billion devices connected to the Internet by 2020.
- MIT predicts 1 trillion devices on the internet by 2020



"Internet of Things" → Potential Market Size of Trillions of US\$

Gartner Hype-cycle



Source: Gartner, July 2011

Smart Environments

Wikipedia definition:

Smart environments is a technological concept in which "a physical world that is richly and *invisibly interwoven* with sensors, actuators, displays, and computational elements, *embedded seamlessly* in the everyday objects of our lives, and *connected* through a continuous network"

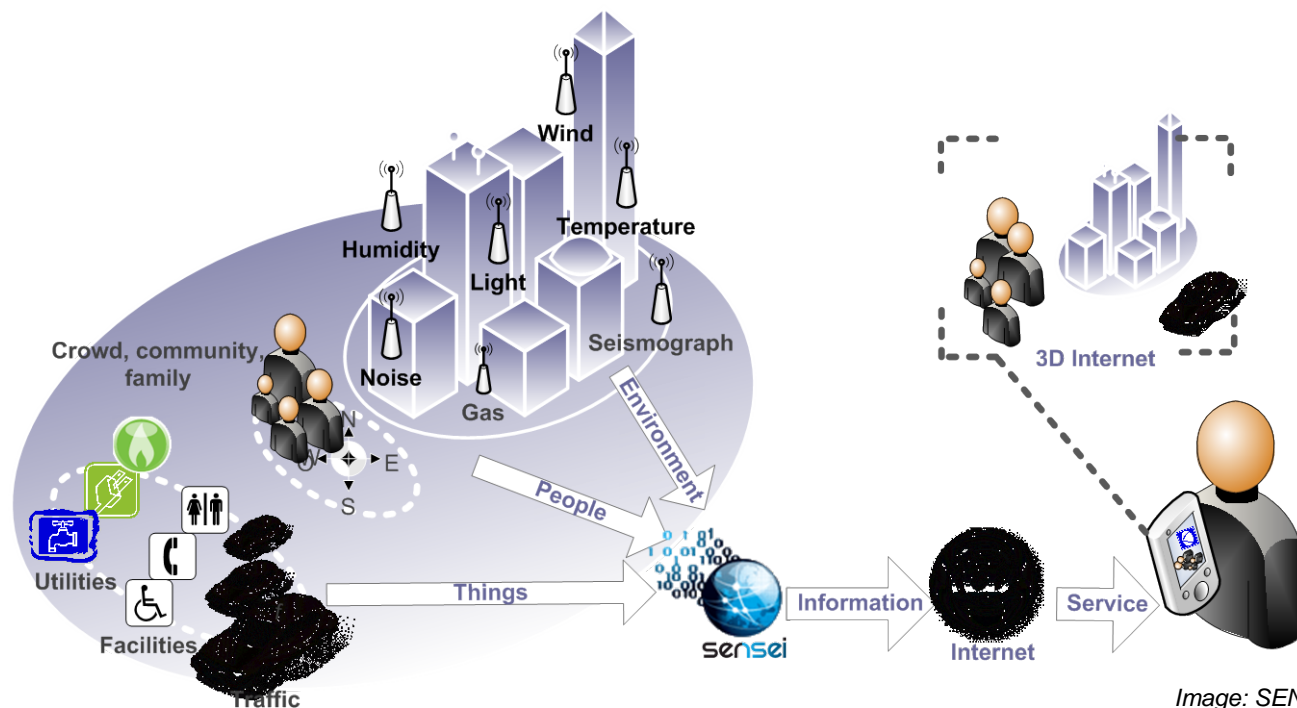
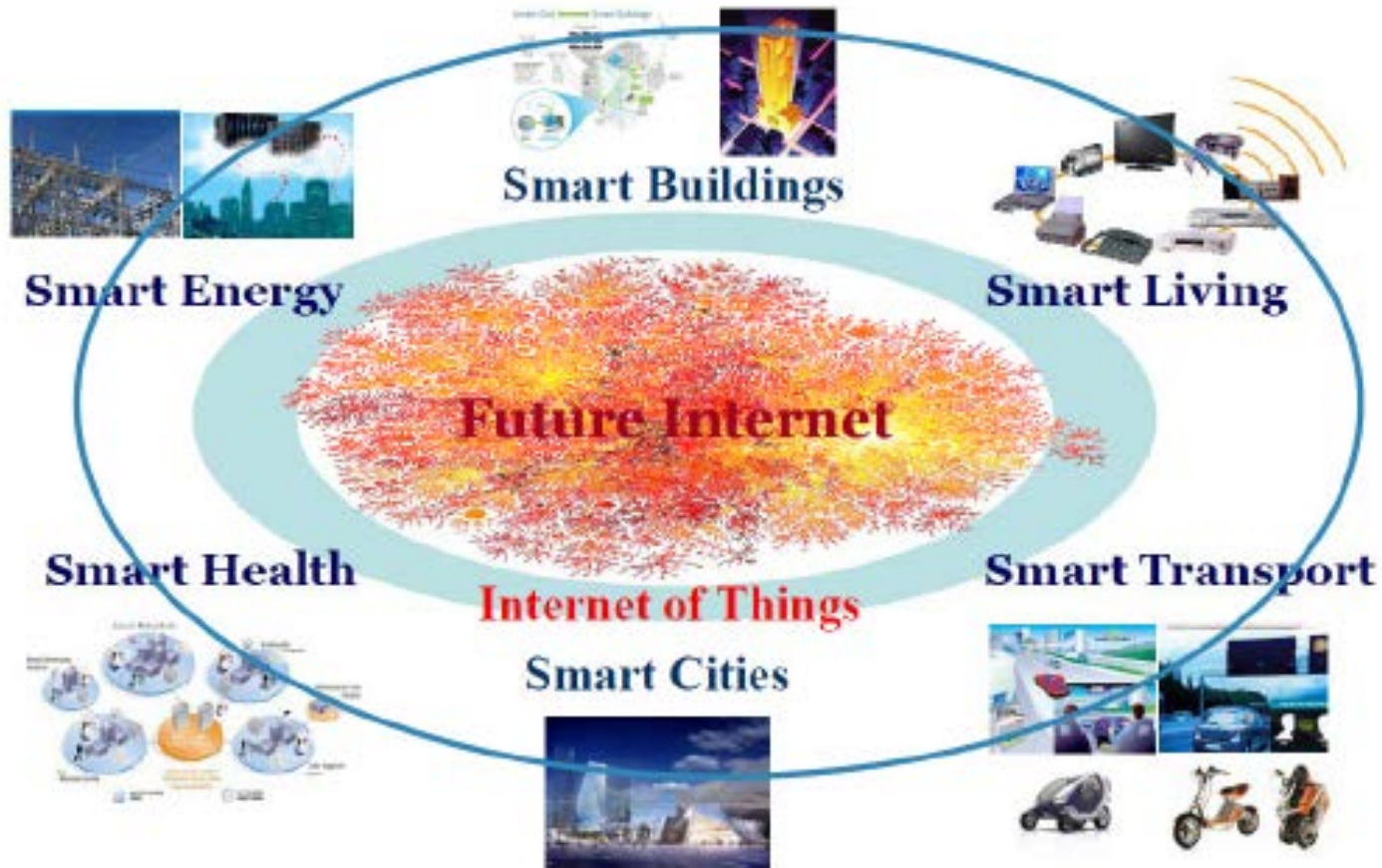
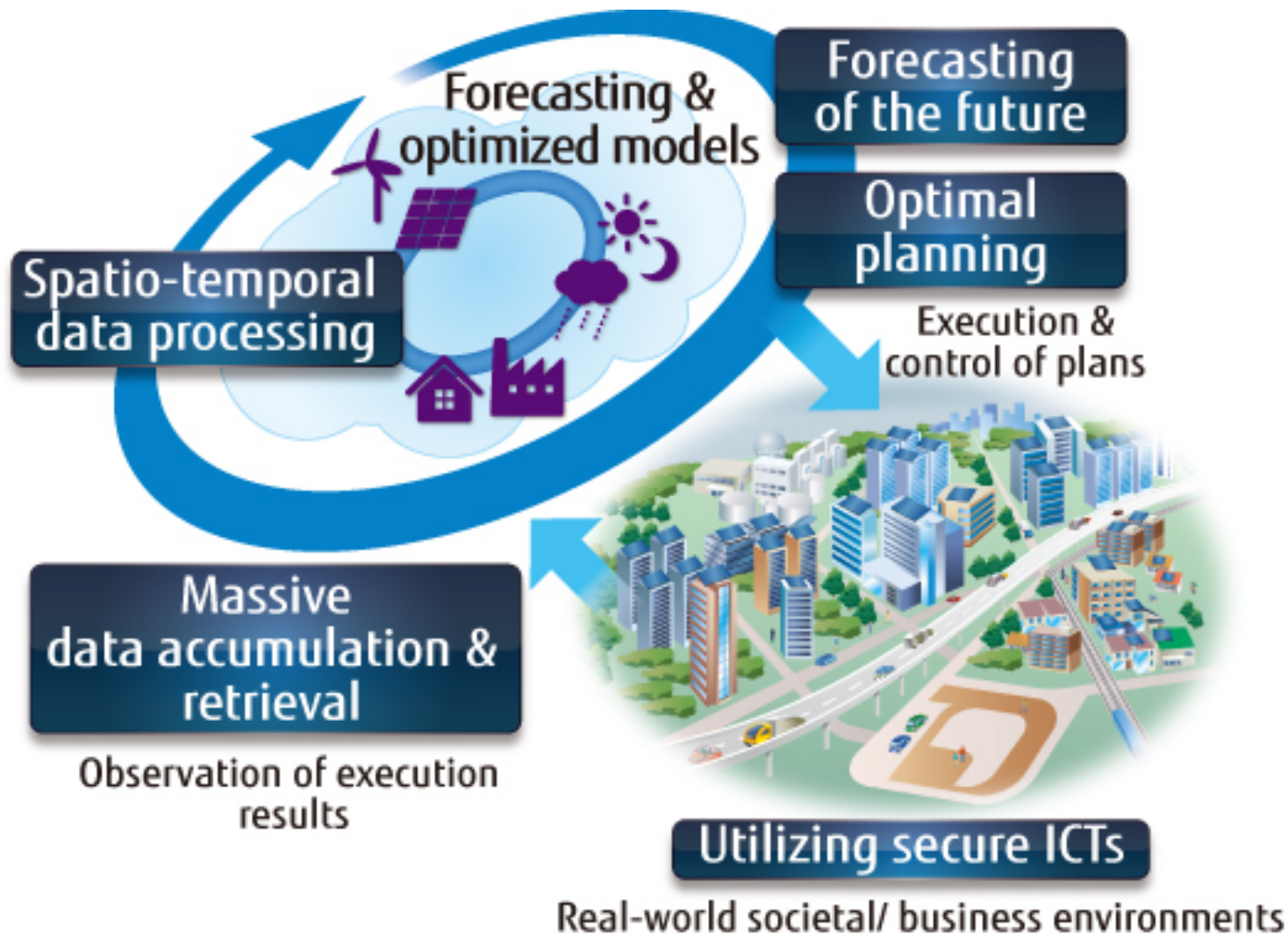


Image: SENSEI project, FP7 215923

Smart Environments



Intelligence & Automation



Smart Environments

Has the potential to assist in meeting the key societal challenges:-

- Improved health care and aging population,
- Improved Transportation
- Conservation of resources (energy, water, scarce materials, etc)
- Environmental protection and climate change
- Improved agriculture yields and food production
- Better personal safety and security
- Economic growth and prosperity

→ Improved Quality of Life

A view point on: Internet of Things



- “Designing our relationships to the objects will be the really interesting part.”
- “It is not about the thing, it is about the satisfaction of making it and the relationships which surround it. That is what will be so transformative and bewitching about the next technological revolution.”
- “It will not be about media and screens, it will be about our lives and the objects we surround our lives with.”

Drivers

Improved Technologies

Connectivity

Sensor Technology

Intelligence

enabling & enhancing

“Connected People
& Smart Environments”

Greater Efficiency
Improved Economics
Better Quality
Sustainability

Improved “Direct” Value

Social Status / Trendy,
Fashion Apps
& Gadgets

Improved Image
and Social Belonging

Technical Challenges : (IERC Cluster)



- Providing reliable, intelligent, self-managed, context aware and **adaptable network technology**, network discovery, and network management.
- Refining the interaction between hardware, software, algorithms as well as the development of **smart interfaces among things** (smart machine to machine, things to things interfaces) and **smart human-machine/things interfaces**, thus enabling smart and mobile software.
- **Embedding smart functionality** through further developments in the area of nanoelectronics, sensors, actuators, antennas, storage, energy sources, embedded systems and sensor networks.
- Developments across disciplines to address the **multi functional, multi-domain** communications, information and signal processing technology, identification technology, and discovery and search engine technologies.

Source: IERC book 2011

Technical Challenges: (IERC Cluster)



- Developing novel techniques and concepts to improve the existing **security, privacy and business safety** technologies in order to adapt to new technological and societal challenges.
- Enhancing standardisation, **interoperability**, validation and modularisation of the IoT technologies and solutions.
- Defining new governance principles that address the technology developments and allow for business development and free access to knowledge in line with global needs while maintaining respect for privacy, security and safety.

Technical Challenges

Some additional Challenges of Smart Environments:-

- Scalability (to billions of devices and large volume of small messages)
- Heterogeneity of devices and networks (smooth interoperability)
- Naming and Identity (including multiple identities)
- Real-time Cognition, Rapid & Real-time Self-Learning
- Real-time Network, Service, Data, Resource Discovery
- high degree of automation and self-healing
- Intuitive (and self-optimizing) & “natural” Human Machine interfaces
- Network connectivity resilience and robustness
- Low Energy consumption

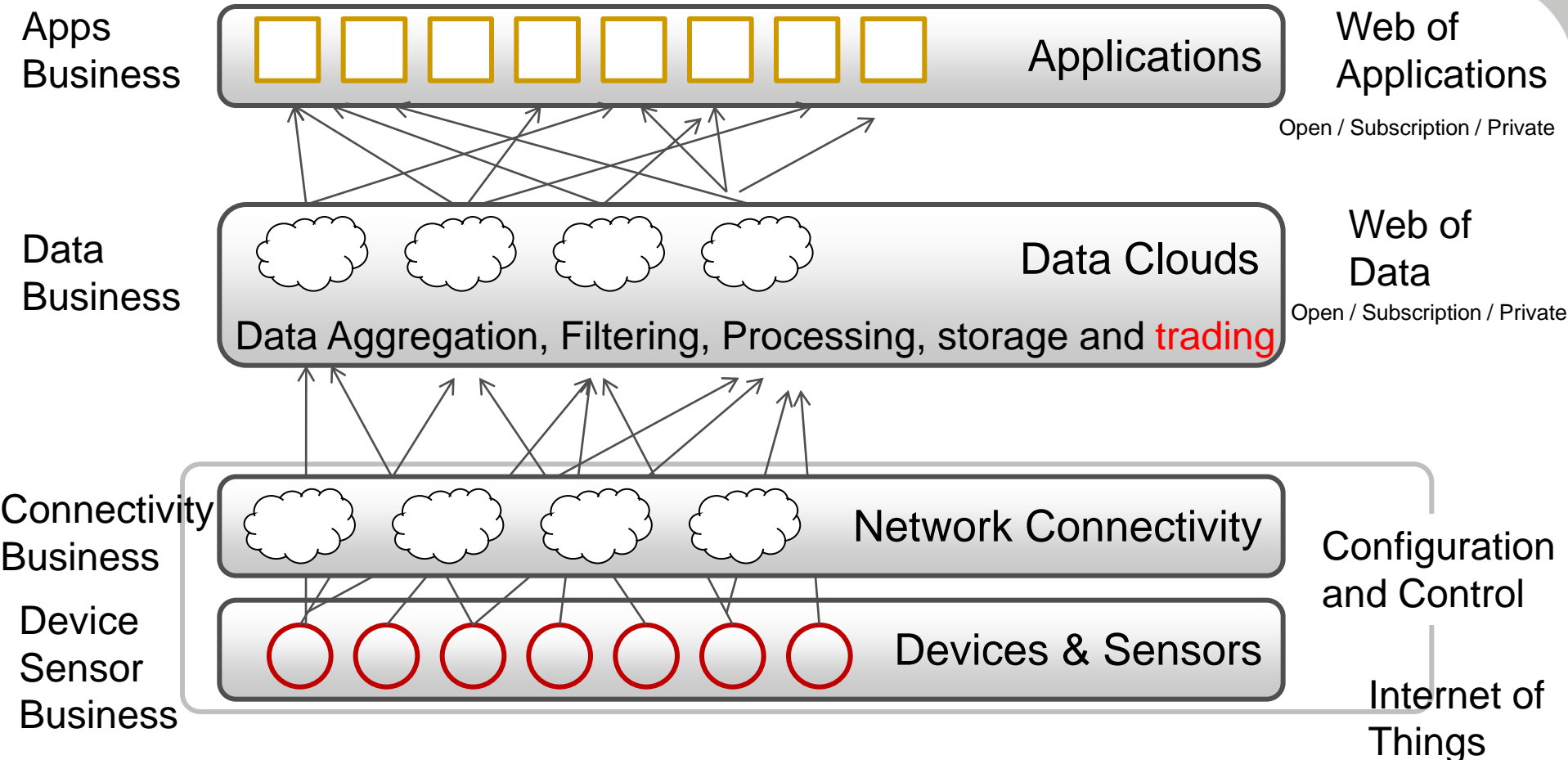
Non-Technical Challenges



For accelerated adoption and growth:

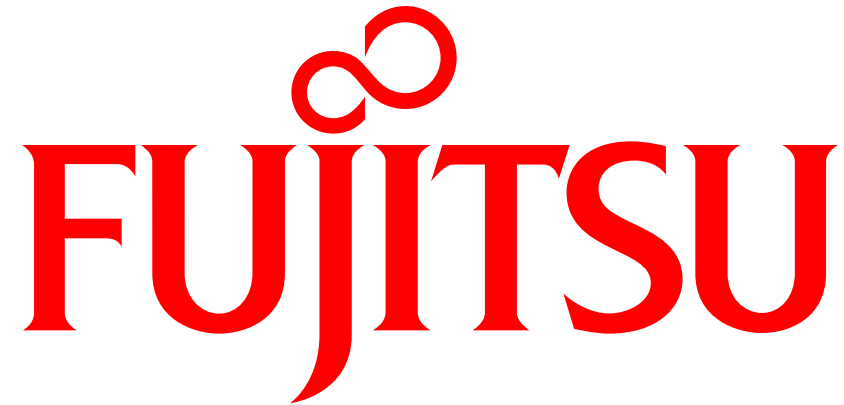
- Overcome domain-specific boundaries
 - Technology
 - Applications
- Overcome existing vertical silos / integration and fragmented market
- Creating an open and more competitive environment that fuel innovation amongst small and large companies
- Enabling a broader range of business models

Publishing Model



Summary

- 2010s: Connected People and Smart Environments decade
- To realise the vision of smart & connected society, one key challenge is to enable flexible business models that fuel the innovation and promote the growth of SMEs as well as large corporations.
- There are numerous technical challenges that need resolving



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