Internet of Things, 5G, Big Smart Data Interplay

The Convergence and Integration of Mobile Communications, Internet, and Smart Data Processing

01st July 2015, Paris, France

Name, Position, Company, Country

www.internet-of-things-research.eu
IoT, 5G, Big Smart Data Interplay Panel

- Laurent Schmitt, Vice President Strategy & Innovation, ALSTOM Grid, France
- Nozha Boujemaa, Director of INRIA Saclay Research Center, France
- Angel Hernandez Bravo, Distinguished Chief Architect, IBM, Spain
- Daniel Pakiry, Consulting and Sales Manager for Utilities, ERICSSON, France
- Chair (organizer and moderator): Ovidiu Vermesan, Chief Scientist, SINTEF, Norway
Developments in nanoelectronics and integrated circuits
- Embedded sensor/actuators
- Miniaturisation and advances in integration technology
- Advances in flash
- Low-cost, low-power, high performance MCUs
- Communication technologies
- Cloud and Edge Cloud Technology
- Cloud-based services
IoT Integration

- Cloud Services
- IoT Data Services
- Device Connectivity Platforms
- Device Clouds
- Business Applications
- Social Services
- IoT Platforms
- Big Data Analytics
- Industrial Systems and Protocols
- Human Interface

Sensors, Devices, Gateways, Equipment, Mobile Assets

- Home
- Energy
- Healthcare
- Industry
- Signage
- Tourism
- Security
- Automotive
- Transportation
- Environment
IoT Architectural View

1. Physical Layer
   - Devices and Controllers
   - Devices and Edge Computation

2. Network Communication Layer
   - Connectivity Elements
   - Gateways
   - Communication and Processing Units

3. Processing Layer
   - Edge Computing
   - Data Element Analysis and Transformation

4. Storage Layer
   - Data Abstraction
   - Data Accumulation

5. Abstraction Layer
   - Management Capabilities
   - Specific Management Capabilities
   - Specific Security Capabilities

6. Service Layer
   - Services
   - Reporting, Analytics
   - Control

7. Application Layer
   - Dynamic Applications
   - Reporting
   - Analytics

8. Collaboration and Processes Layer
   - People and Business Processes

- Health
- Wearables
- Wellness
- Environment
- Energy
- Mobility
- Buildings
- Cities
- Education
- Manufacturing
- Agriculture
- Smart Venues
- Security
- Privacy
- Trust
- Ethics
- Transparency
- Integrity
- Safety
- Dependability

IoT Platform
- Reusable capabilities / enablers for applications
- Managed access to information based on secure, distributed and referenceable data
- Brokering for capability interaction plus export and import of enablers
- Support of different communication patterns
- Integration of different heterogeneous systems, devices and networks
- Abstraction, hides details of underlying (networking) technologies
IoT - Wearables

World of Wearable Technology Applications:
Towards Function With Style
IoT – Industrial Internet

INDUSTRIAL INTERNET OF THINGS
SMART MANUFACTURING
Integration of energy, charging infrastructure with vehicle fleets for public and private transport, including logistics and freight-distribution including their management and deployment.

Micro/Nano Grids
Renewables (solar/wind),
Energy Storage,
Energy Virtual Plants

Urban Life
Cluster of EVs for several application and their fleet management (parking/charging/navigation)

Fleet Delivery Service
Post Services
Vehicle Sharing
Healthcare Services
Logistics
Freight Distribution
Autonomous Vehicles

Energy Efficiency
Multimodal Mobility

DSO/TSO
Renewables
Fleet Operator
Autonomous Vehicle Vision

Source: Google
Smart Farming and Food Security

Source: Beecham Research Limited
IoT – 6As

Connecting: 6As

Any Device

Any Business

Anywhere

Any Network

Any Service

Anywhere

Any Context

Any Path

Anytime

Anybody

Anyone

Anything

Any Business

Anywhere
Big Data – 6Vs

- **Viability**: User/device data. Geolocation data.

- Variable selection.
- Variable relevance.
- Variable relationship.
5G

1. Speed
2. Traffic Capacity
3. Mobility and Coverage
4. Energy Efficiency
5. Number of Devices
6. Reliability
7. Latency
8. Spectrum and Bandwidth Flexibility

Source: ITU-T
IoT Challenges and Smart Data

Data Latency Versus Business Value

IoT Development Tools

Enterprises

Bandwidth

Consumer Privacy

Power Consumption

Storage Management

More Sensor/Actuator Innovation

Inconsistent Network Availability

IoT Devices Vertical and Horizontal Integration

Integration

Security

Server Technologies

Signalling

Nanoelectronics Innovation

Presence Detection

Smart Data
The Internet of Things is the next digital revolution
- IoT, Industrial IoT, Internet of Everything
- Everything Connected = Convergence - Physical + Digital + Cyber
- IoT + Cloud Computing + Big Data + Real Time Smart Analytics
- Cyber-physical Systems - Robotics - Augmented Reality
- Smart products and services – Smart Environments

The Internet of Things is not just hype
- Research cycle is maturing
- Demand is consolidating
- Leading to innovation and tremendous economic opportunities

Europe has the capacity to lead
- We have all the ingredients (research, players, eco-systems…)
- But there is a big risk of fragmentation and delay in front of international competition
Contribute to Large Scale Pilots to foster experimentation, replication and deployment and to support convergence & interoperability of IoT standards

Develop IoT ecosystem across vertical silos including startups and SMEs

Identify, communicate and champion EU spearheads to speed up the take up of IoT

Gather evidence on market obstacles for IoT deployment in a Digital Single Market context.

Mapping & Bridging global, EU and Members States’ IoT innovation activities
AIOTI

ALLIANCE FOR INTERNET OF THINGS INNOVATION

VISION
CREATIVITY
IDEAS
INSPIRATION
COOPERATION
SOLUTIONS

www.aioti.eu
- WG 01: IoT European Research Cluster
- WG 02: Innovation Ecosystems
- WG 03: IoT Standardisation
- WG 04: Policy Issues (Trust, Security, Liability, Privacy)
- WG 05: Smart Living Environments for Ageing Well (e.g. Smart House)
- WG 06: Smart Farming and Food Security
- WG 07: Wearables
- WG 08: Smart Cities
- WG 09: Smart Mobility (Smart Transport/Smart Vehicles/Connected Cars)
- WG 10: Smart Environment (Smart Water Management)
- WG 11: Smart Manufacturing
IERC - European Research Cluster on the Internet of Things

Thank you!