

Emerging IMT Applications

Meet new market requirements and demands

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Huawei Technologies

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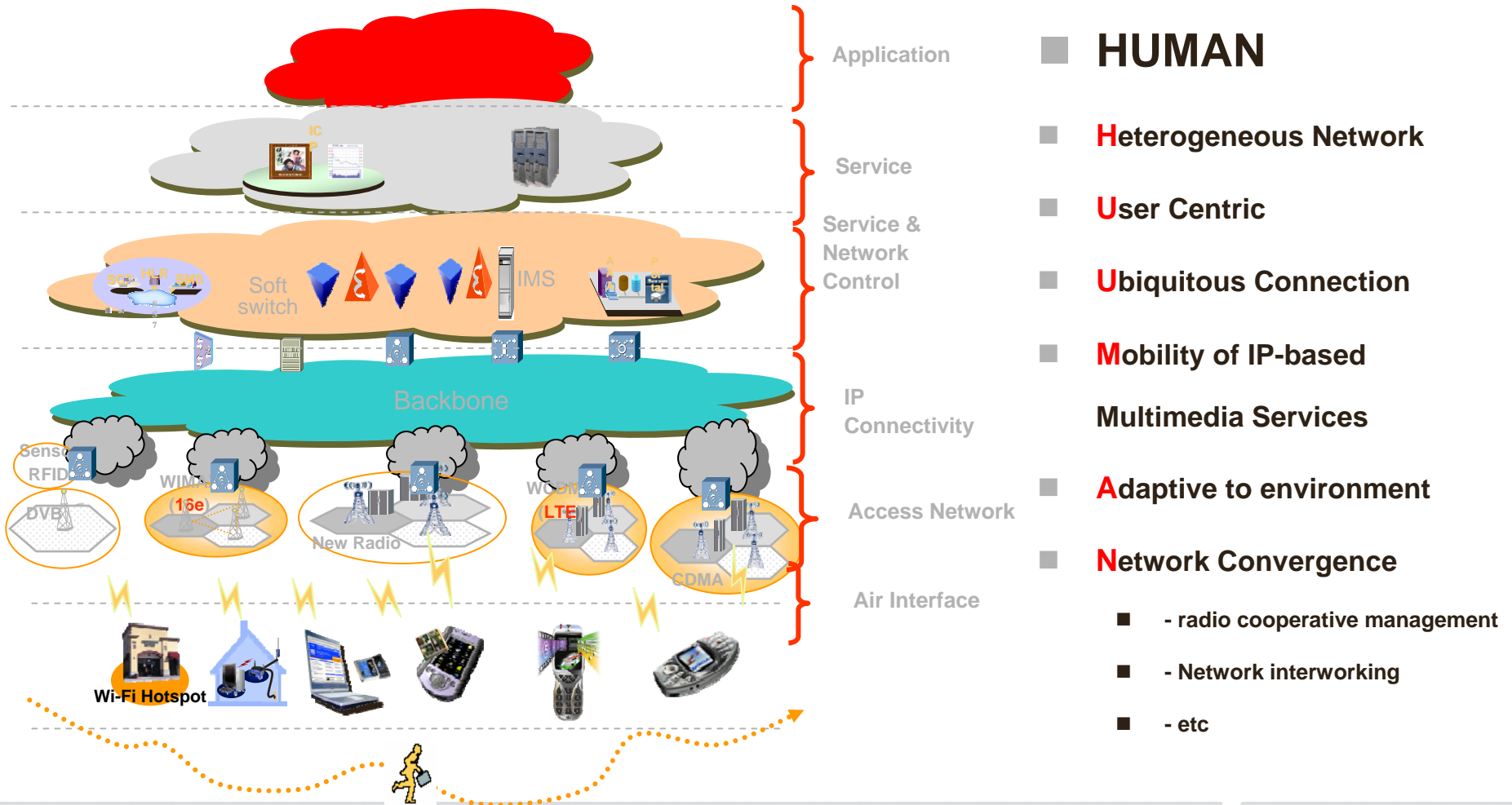
- **General View on IMT-Advanced**
- **Ubiquitous Connected World**
 - Key IMT applications for IoT
 - Mobile Health
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 - Smart City
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- **Conclusions**

IMT Technologies

- **IMT-2000**
 - **6 terrestrial interfaces agreed by ITU-R**
 - DS – Direct Sequence
 - TC – Time Code
 - SC – Single Carrier
 - MC – Multi-Carrier
 - FT – Frequency Time
 - OFDMA – Orthogonal Frequency Division Multiple Access
 - Adoption by most telecom operators in the world
 - **1 Billion** 3G subscribers already in 2010, ¼ of total mobile subscribers
- **IMT-Advanced**
 - Several candidate technologies under evaluation
 - More bandwidth & more flexible network
 - 1Gbps peak data rate
 - Higher spectrum efficiency
 - Heterogeneous network
 - Interference management

General View on IMT-Advanced

- To provide PUT (Personalized, Ubiquitous and Trustable) services



Key IMT Applications for IOT

Energy efficient



Increased productivity



Enhanced safety & security



Healthcare



High-confidence transportation



Disaster recovery



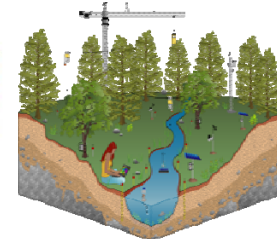
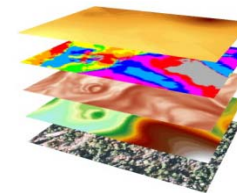
Ease of life



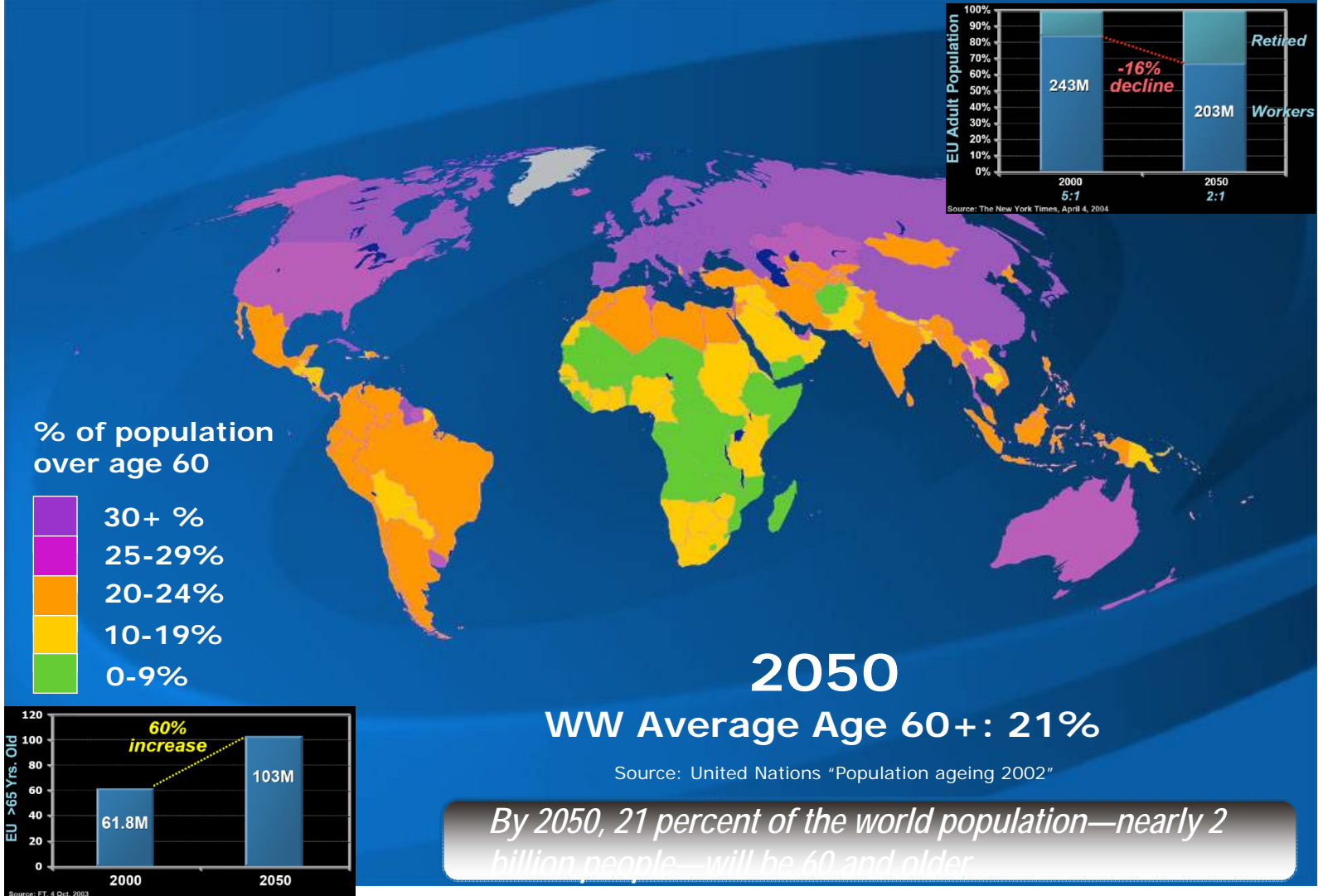
Better quality of life & eco-friendly



Enabler of new knowledge



The World is Ageing

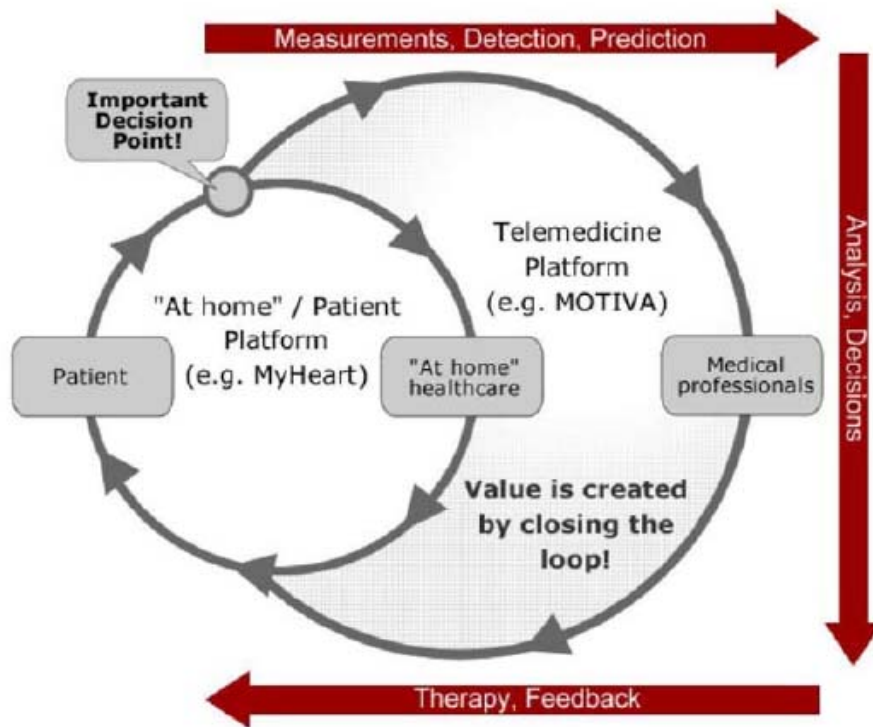


Mobile Health

- **eHealth is driven by governments to:**
 - Expand healthcare coverage especially for developing region;
 - Cut down unnecessary expense for government, hospital & patients;
 - Ease burden for traditional healthcare;
 - Keep fairness of healthcare condition & facility in different areas.
- **Mobile communication is the best choice for eHealth**
 - Easy-to-carry devices on body;
 - Cell phone penetration rate is higher than any terminal type;
 - Large & seamless coverage for real-time monitoring;
 - Backhaul capability for other low-power body sensor network.



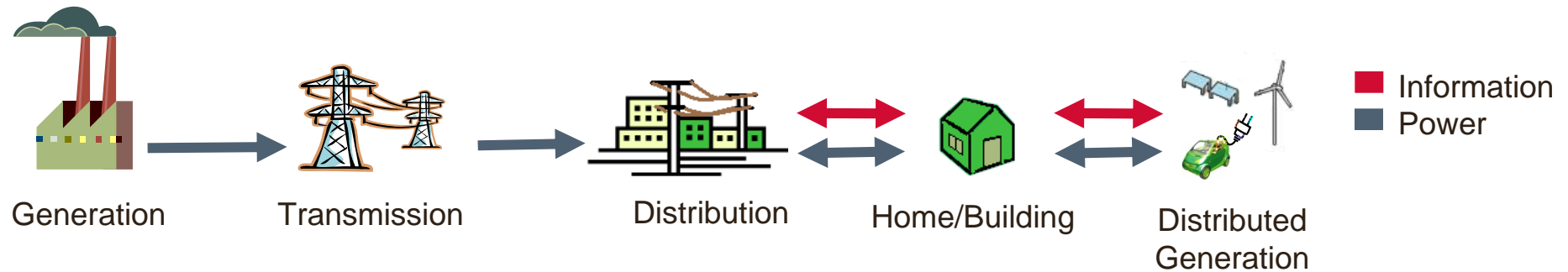
Mobile Health – How it Works?



The closed-loop management approach, consisting of two loops

- **Two loops choice:**
 - eHealth can make decision when you don't need professional care
 - Cost-saving for most healthcare customers
 - Resource reserved for the ones who really need
- **“Quality of Service”**
 - Fast even real-time
 - Accurate information
 - Assisted decision

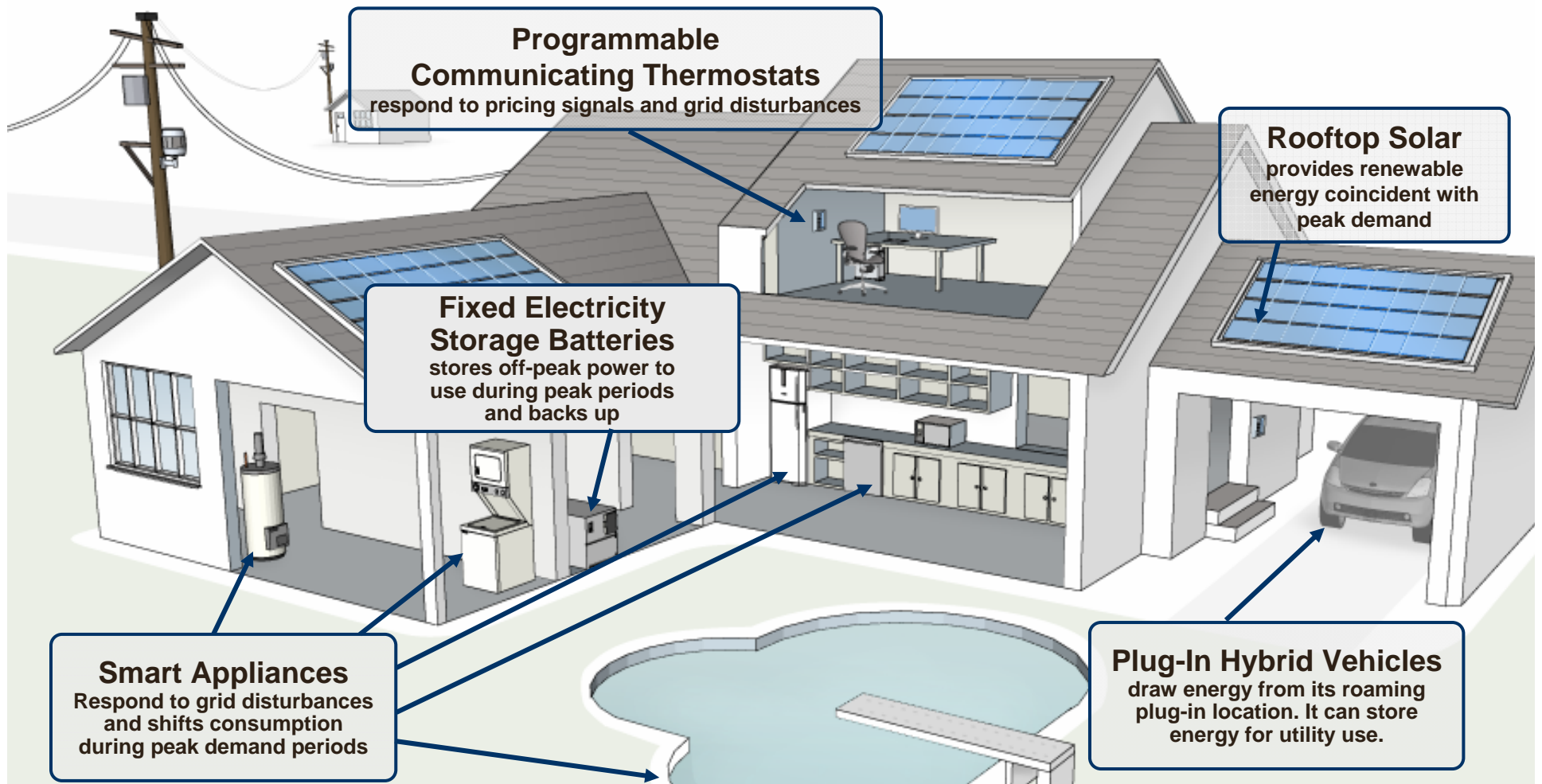
Smart Energy – Value Chain



Smart Grid consists of end-to-end, bi-directional flow of energy and communication capabilities from generation to consumption to:

- Improve power reliability and quality;
- Increase resiliency of the grid;
- Increase capacity through optimized generation efficiency;
- Allow easier use of renewable energy and distributed generation, including load shifting;
- Reduce consumption on a per user basis;
- Increase consumer awareness and choice.

Smart Energy at Home



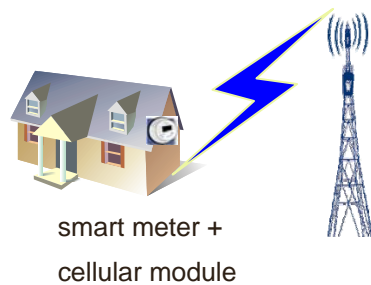
Source: wsj.com
ITU Regional Workshop on IMT
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How IMT Enable Smart Energy?



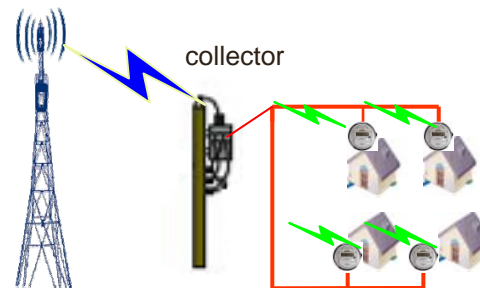
Sparse/low density residential area, industrial area

Cellular only



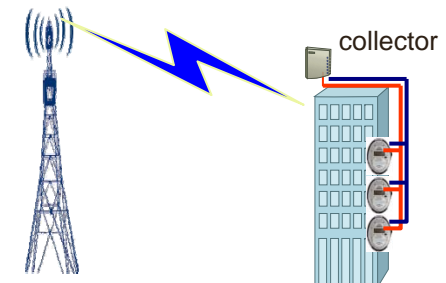
medium to high density residential area

WiFi/PLC+Cellular



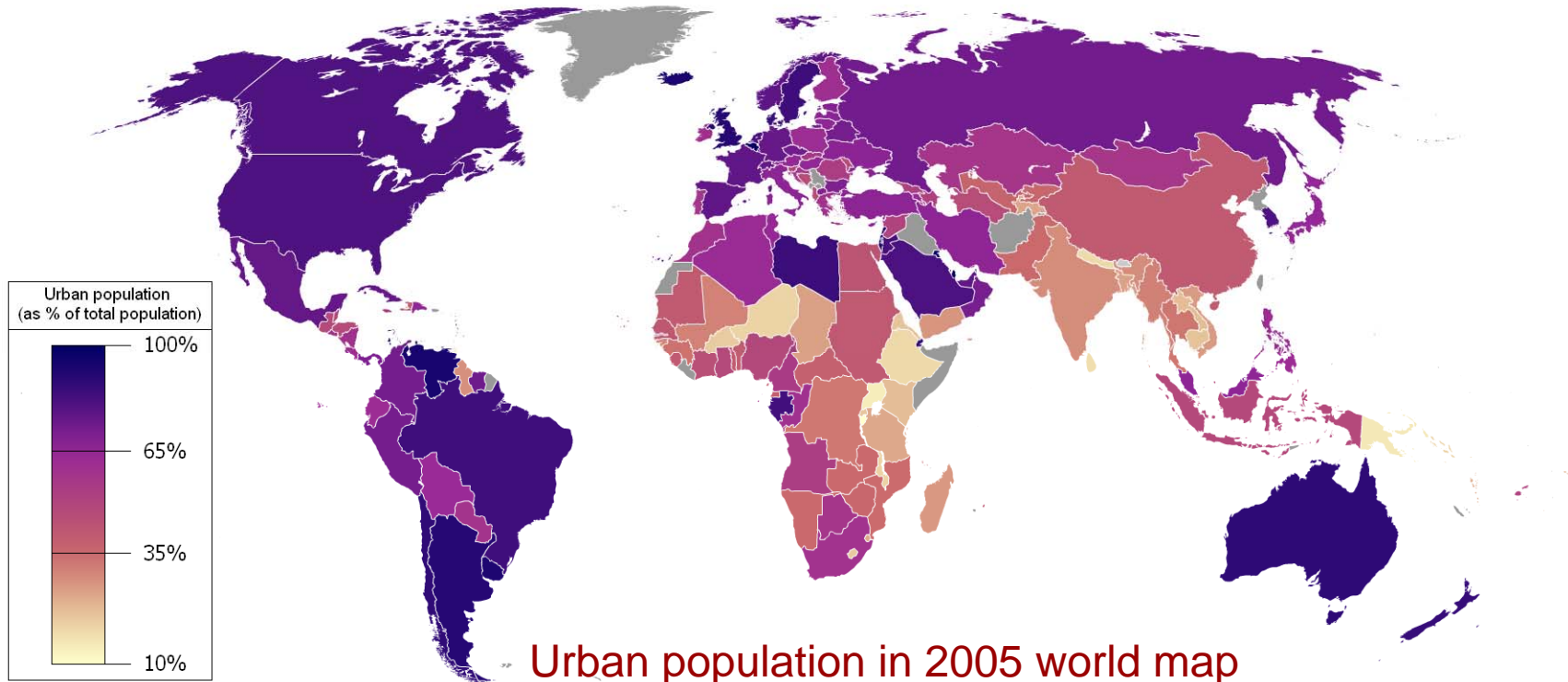
Apartment residential, building

PLC/RS485/Ethernet + Cellular



Smart City – Basic Facts

- **Urban areas become more and more crowded**
 - 20 megacities emerge in 2010. Each has a population in excess of 10 million people;
 - More than 3 billion live in urban areas now;
 - An estimated 5 billion people will be in cities till 2030.

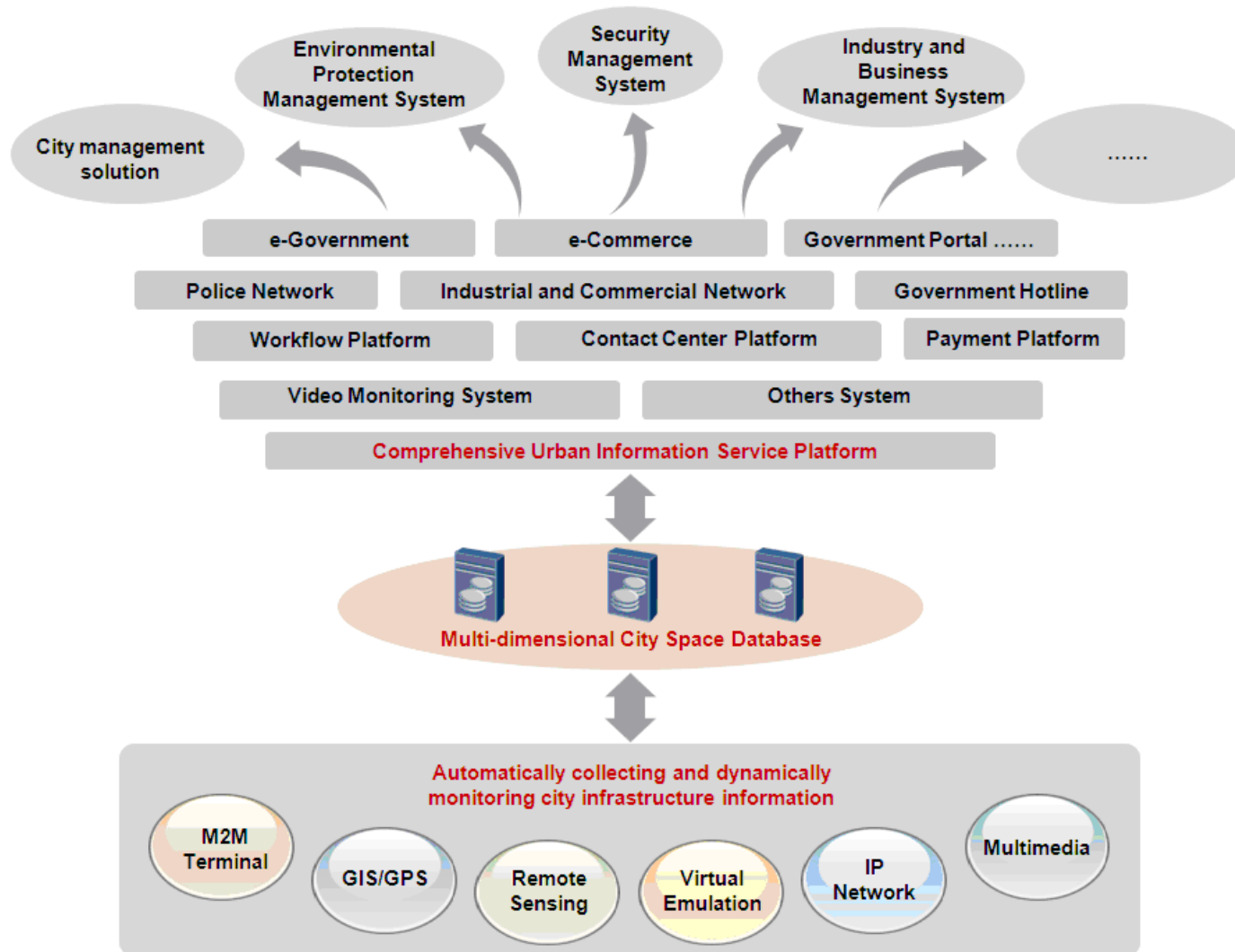


Source: UN Human Development Report 2007/2008

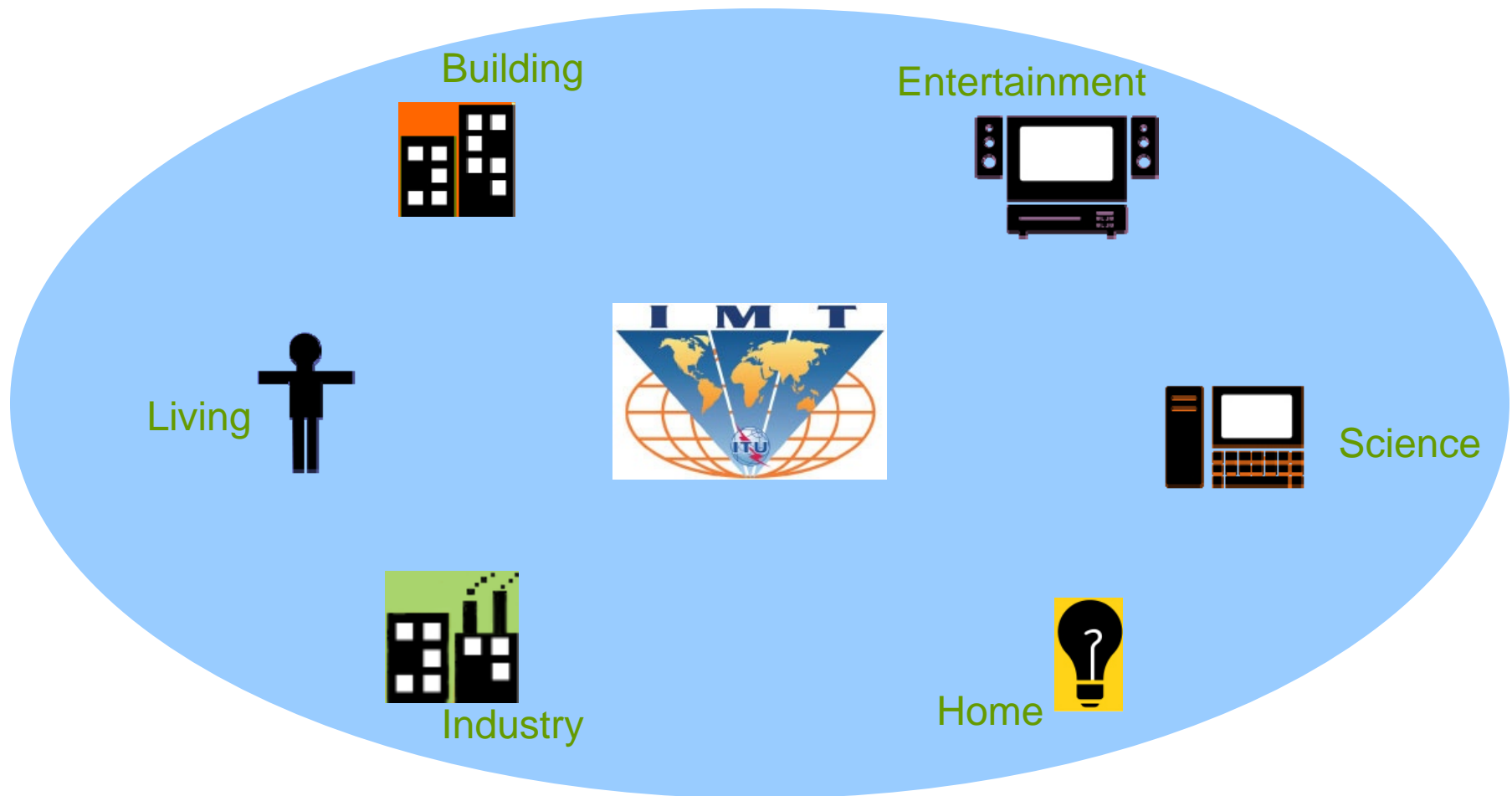
IMT Help City Become “Smart”

- **Telematics**
 - Intelligent transportation service is a major application for a smart city;
 - Real-time road status collection & delivery can reduce most congestion and accidents;
 - IMT with full mobility support can achieve it easily
- **Environment**
 - Pollution (e.g, rubbish, gas, water, sound, light, etc) crisis become an immediate concern in most cities;
 - Distributed sensors with probe can monitor all living and business areas;
 - Cellular module can connect the sensors to city management center with better coverage than fixed line.
- **Public Security**
 - Emergency need to be alarmed to citizen in timely manner;
 - Mobile broadband based WebCam provides live video for security.

Smart City Vision

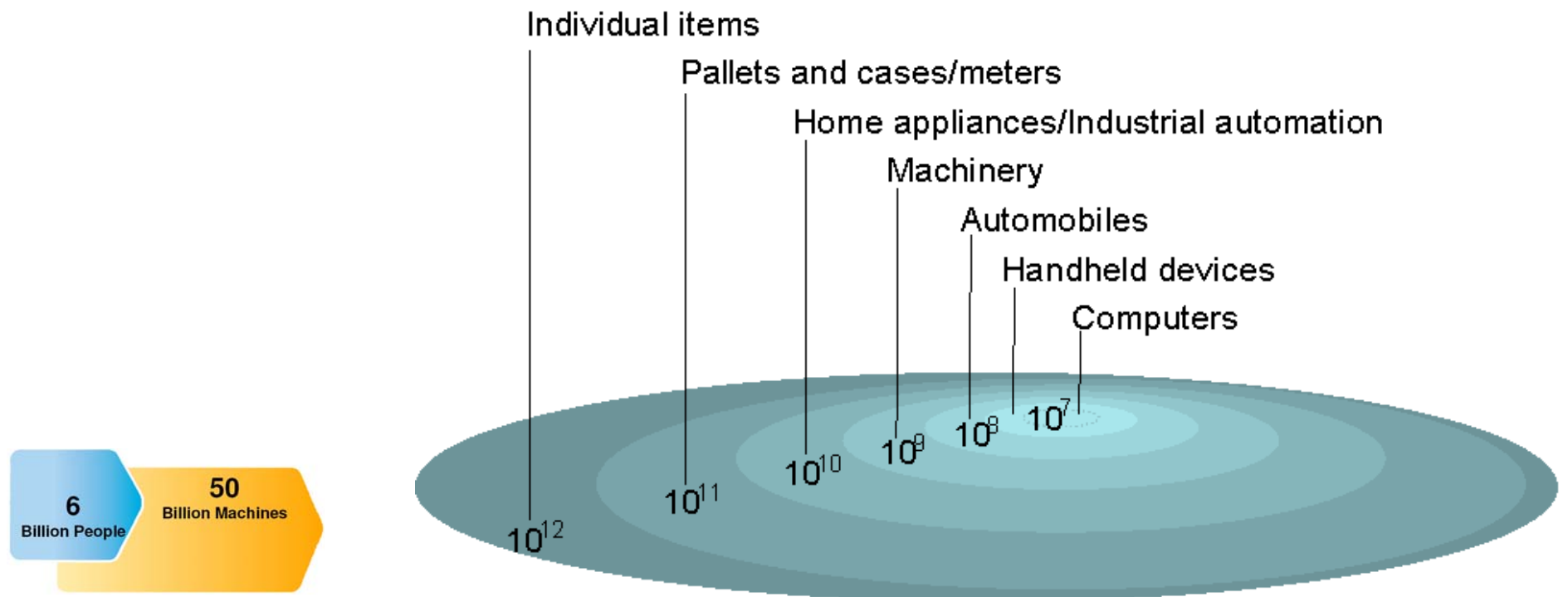


IMT: Key Enabler for Emerging Apps

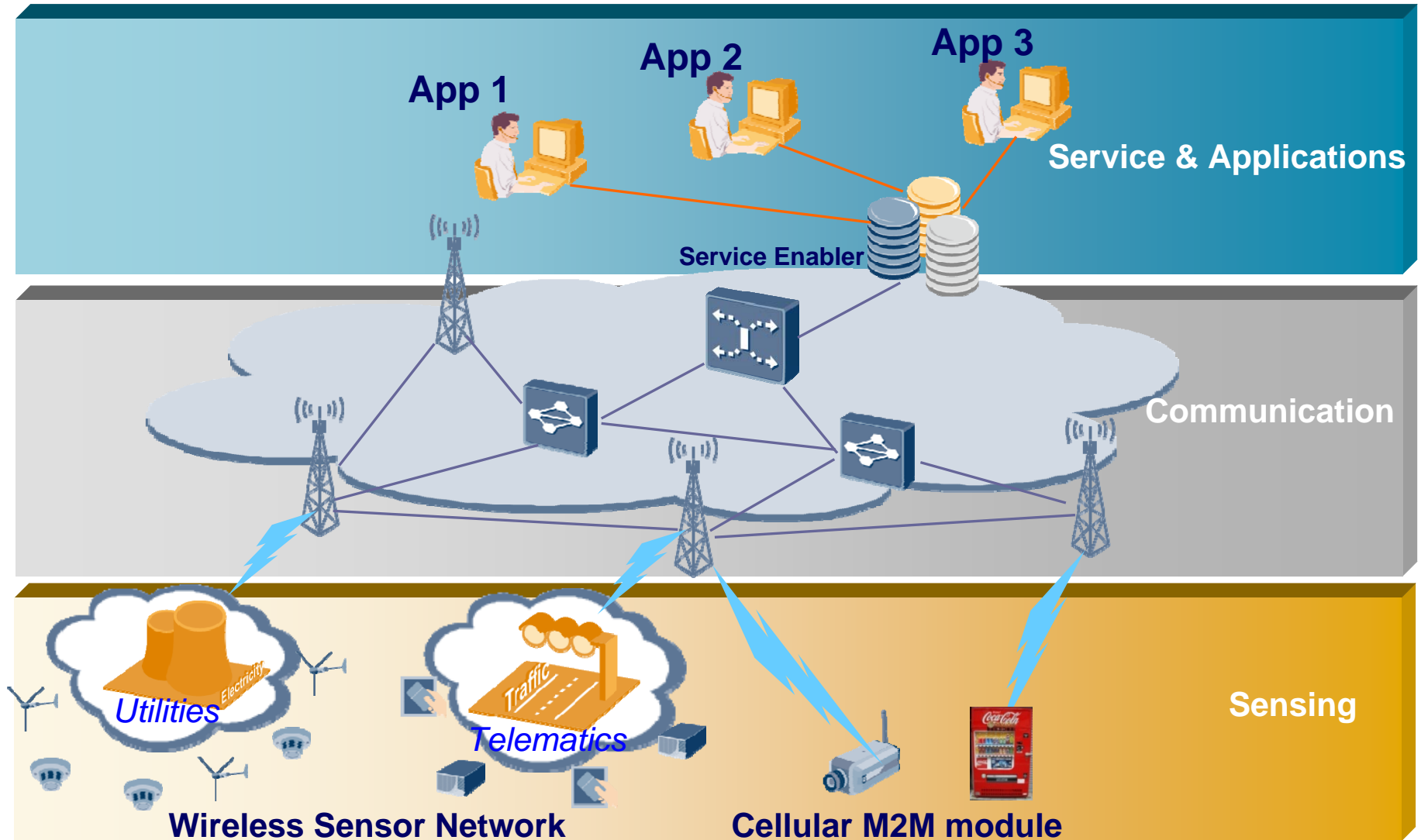


Ubiquitous Connected World

- **Demand of Internet of Things (IoT)**
 - Ubiquitous: 6B v.s 50B
 - Low cost: Shared cost across many things
 - low power: Longer battery life
 - Coverage: Wider coverage than current cellular
 - Flexible bandwidth: From bps to Gbps
 - Flexible architecture: Star-tree-ad hoc-mesh



Architecture of IoT



Conclusions

- **Today mobile communication systems are serving more than 5 billion people of the world**
 - IMT-2000 systems are the most advanced and widely deployed
 - Growth trend continues for coverage, data rate and penetration rate
 - New services and applications emerge everyday
- **IMT-Advanced systems: coming in a few years**
- **Meet new requirements and demands with wider impact**
 - IMT systems: infrastructure to support new services & applications addressing requirements and demands with wider impact
 - eHealth, ageing, smart energy, smart city
 - New communication paradigms: machine-to-machine communication, human-to-machine communications

Thank You

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Biography

- **Sun, Lixin**

- Sun Lixin is the Chair of WG Technology of ITU-R WP 5D and the head of Mobile Network Research and Standard for Huawei Technologies.

- He is responsible for Radio Regulation, IPR, Standards, Pre-Research and Strategy issues in wireless area.

- During 1996 to 1999, Mr. Sun was the Chief engineer of Wireless Standard Department, RITT, MII of China.