Driving Internet of Things (IoT) standardization to build smart sustainable cities

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The world is changing!

Mobile-broadband penetration globally is reaching 47% in 2015, a value that increased 12-fold since 2007.
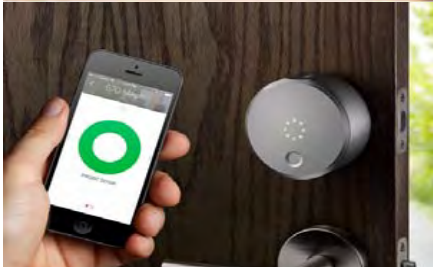
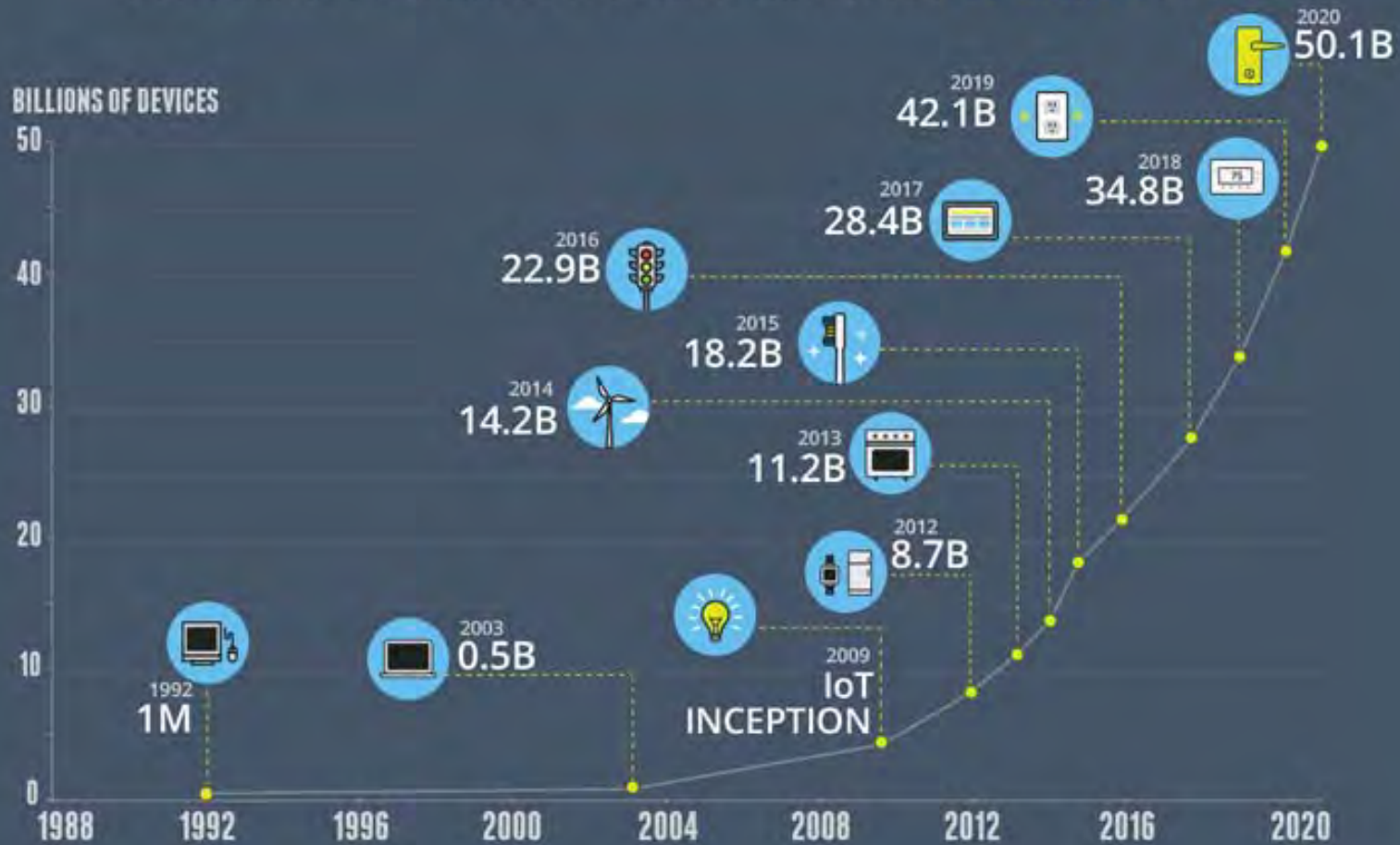By end 2015, there are more than 7 billion mobile cellular subscriptions.

Globally 3.2 billion people are using the Internet by end 2015, of which 2 billion are from developing countries.

- Network, connectivity, functionality are increasing

150 ITU 1865 2015

ITU

GROWTH IN THE INTERNET OF THINGS
THE NUMBER OF CONNECTED DEVICES WILL EXCEED 50 BILLION BY 2020

Source: Cisco (March, 2015)

Connecting the unconnected

Intelligent -> KNOW

Smart -> SHARE

An intelligent device is any type of equipment, instrument, or machine that **has its own computing capability**.

A smart device is an electronic device, generally **connected to other devices** or networks via different protocols.
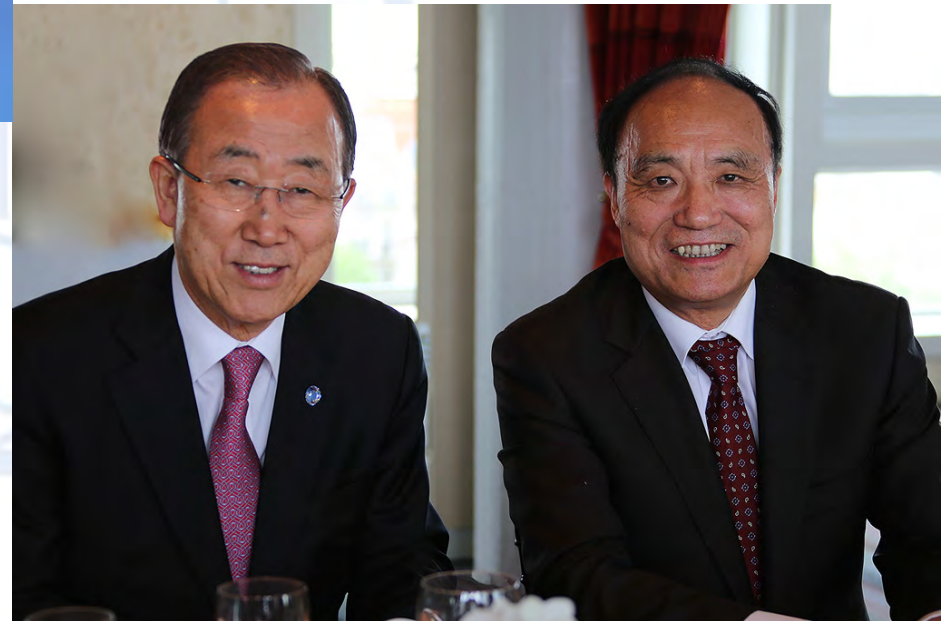
ITU

- UN specialized agency for ICTs
- standards developing organization
- unique public/private partnership

Members:

- 193 Member States (Governments and regulatory bodies)
- Over 700 Private Sector (Sector Members and Associates)
- Over 90 Academia

ITU-T develops international standards

Director, Telecommunication
Standardization Bureau (TSB), ITU

ITU-T Study Group 20 (SG20) on "Internet of Things and its applications, including smart cities and communities"

New: established in June 2015

SG20 management team

SG20 Chairman

- Nasser Saleh AL MARZOUQI (United Arab Emirates)

SG20 Vice Chairmen

- Fabio BIGI (Italy)
- Silvia GUZMÁN ARAÑA (Spain)
- Takafumi HASHITANI (Japan)
- Hyoung Jun KIM (Republic of Korea)

- Abdulrahman M. AL HASSAN (Saudi Arabia)
- Ziqin SANG (China)
- Sergio TRABUCHI (Argentina)
- Sergey ZHDANOV (Russian Federation)

SG20 areas of work

SG20 will develop standards and guidelines that leverage IoT technologies to address urban-development challenges.

Key work will include, *inter alia*:

- The standardization of end-to-end architectures for IoT and mechanisms for the interoperability of IoT applications and datasets employed by various vertically oriented industry sectors.
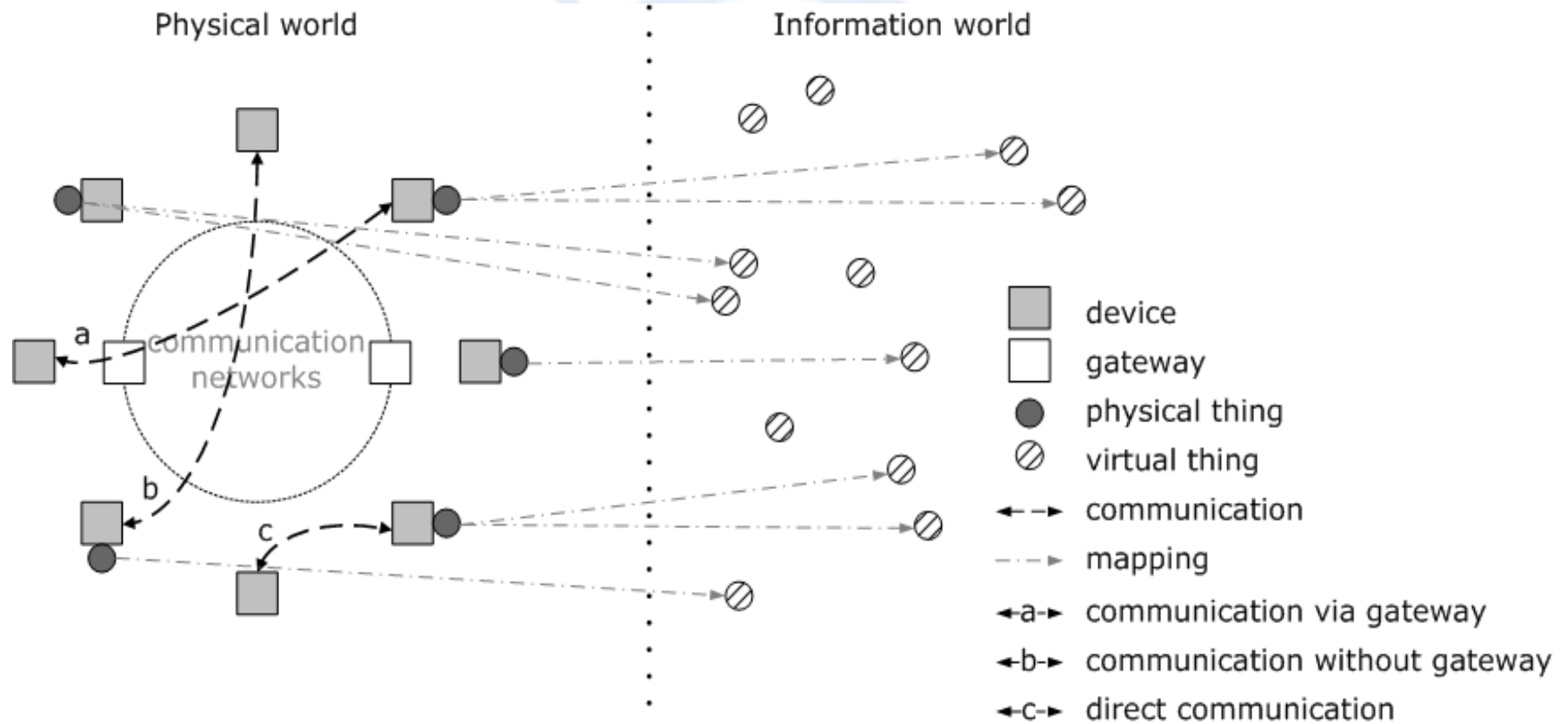
Photo credit: custominfographics.org

First meeting *When & Where:* 19-23 October 2015, ITU, Geneva.

What is IoT

A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable ICTs.

Characteristics:

- Interconnectivity
- Things-related services
- Heterogeneity
- Dynamic changes
- Enormous scale

How IoT works

Technical overview of IoT

Physical world

communication networks

a
b
c

Information world

Legend:
- device (grey square)
- gateway (white square)
- physical thing (dark circle)
- virtual thing (hatched circle)
- communication
- mapping
- a: communication via gateway
- b: communication without gateway
- c: direct communication

What IoT can do

Through the exploitation of identification, data capture, processing and communication capabilities, IoT makes full use of "things" to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.

ANALYTICS: Data processing

Data capturing

Data communicating

ACTION: Informed decision-making
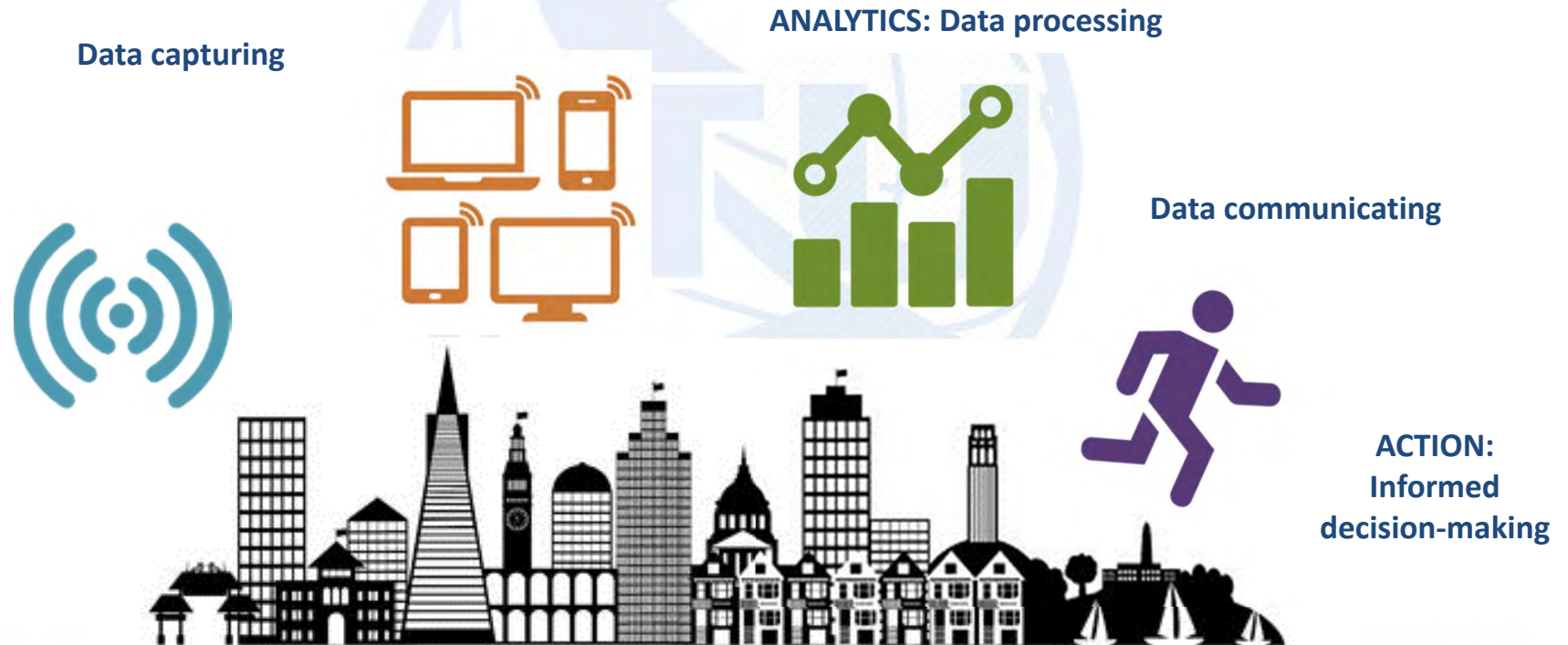
Source: Recommendation ITU-T Y.2060

IoT applications for smart sustainable cities and citizens

From 9.7 in 2015 to 23.4 in 2017

From 237.2 in 2015 to 371.0 in 2017

From 10.2 in 2015 to 33.9 in 2017

From 206.2 in 2015 to 648.1 in 2017

From 294.2 in 2015 to 1,067.0 in 2017

From 97.8 in 2015 to 159.5 in 2017

From 252.0 in 2015 to 371.1 in 2017

- Smart cities are projected to use 2.7 billion connected things in 2017

Source: Gartner (data in millions)

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Building smart sustainable cities

IoT enabled services and infrastructure to improve and manage power, resources and urban planning.

5G

5G

5G

First internationally agreed definition...

*"A **smart sustainable city** is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects"*

Source: ITU-T Focus Group on Smart Sustainable Cities

ITU-T Focus Group on Smart Sustainable Cities

Mandate and achievements

- Established in February 2013 and concluded in May 2015

- As an open platform for smart-city stakeholders

- Over 150 participants/collaborators from different stakeholders

- Liaison with other SDOs (ETSI, ISO, IEC etc) & IGOs (UNFCCC, UN-Habitat, etc)

- 21 technical specifications and reports approved

Working groups

WG1. ICT role and roadmap for SSC

WG2. SSC infrastructure

WG3. Standardization gaps, KPIs and metrics

WG4.Policy and positioning

FG-SSC technical reports and specifications

High Level and WG1 reports:

1. Smart sustainable cities: an analysis of definitions
2. An overview of smart sustainable cities and the role of ICTs
3. Smart sustainable cities: **a guide for city leaders**
4. **Master plan** for smart sustainable cities

WG3 reports:

1. Overview of KPIs in smart sustainable cities
2. KPIs definitions for smart sustainable cities
3. KPIs related to the **use of ICT** in smart sustainable cities
4. KPIs related to the **sustainability impacts of ICT** in smart sustainable cities
5. **Standardization roadmap** for smart sustainable cities
6. **Standardization activities** for smart sustainable cities

FG-SSC technical reports and specifications

WG2 reports:

1. Overview of smart sustainable cities **infrastructure**

2. Setting the **framework for an ICT architecture** of a smart sustainable city

3. **Multi-service infrastructure** for smart sustainable cities in new-development areas

4. **Anonymization infrastructure and open data** in smart sustainable cities

5. **Intelligent sustainable buildings** for smart sustainable cities

6. ICTs for **climate change adaptation** in cities

7. **Smart water management** in cities

8. **Cybersecurity**, data protection and cyber resilience in smart sustainable cities

9. **EMF** considerations in smart sustainable cities

10. **Integrated management** for smart sustainable cities

WG4 reports:

1. Setting the stage for stakeholders' engagement in smart sustaintable cities

Smart sustainable cities: a six step transition cycle

6. Ensure accountability

1. Set the vision

5. Measure success

2. Identify targets

4. Build your SSC

3. Political commitment

Six step transition cycle in details (1)

1. Set the vision

- Political priorities of the city
- Long-term development strategies
- Identify the relevant SSC stakeholders

2. Identify targets

- Development of an appropriate SSC infrastructure
- Development of SSC service by integrating ICT into existing urban services

3. Political commitment

- Achievement of consensus and support for the implementation of the SSC vision and targets

Six step transition cycle in details (2)

4. Build your SSC

- Establishment of a feasible master plan for the SSC transition
- Ensure good operation and maintenance
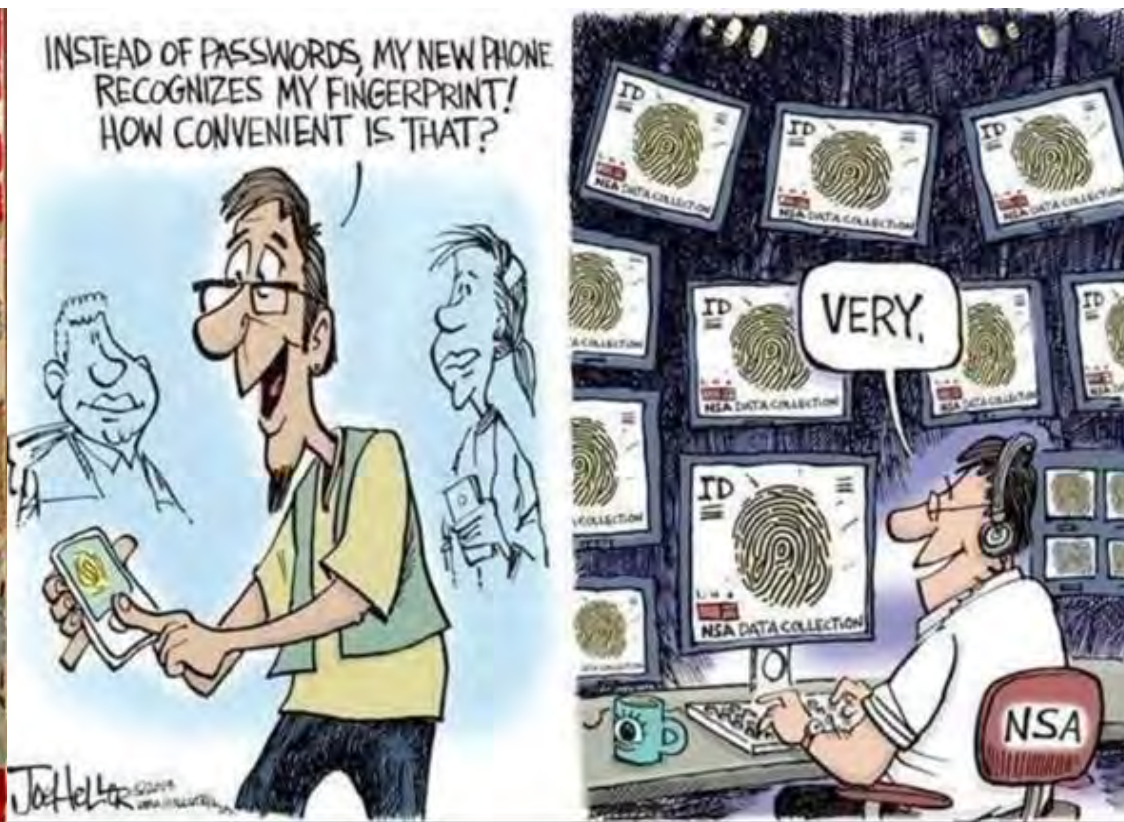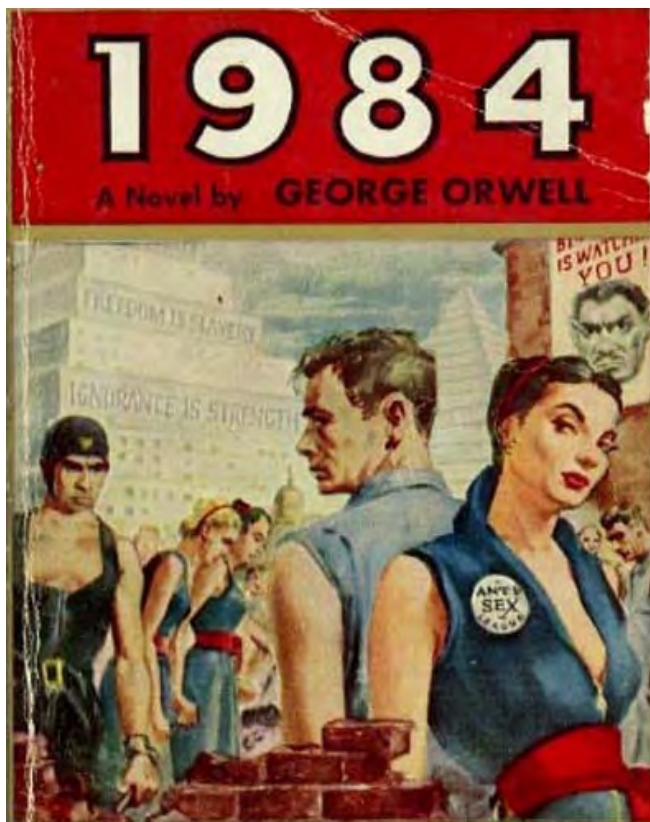
5. Measure success

- Monitor, evaluation and assessment of the implementation of the master plan
- *Use the FG-SSC KPIs as baseline*

6. Ensure accountability

- Analysis and reporting of the progress achieved
- Identification and preparation of future plans

1984, a society in which you can trust nobody – and "Big brother" sees it all…
And a reality of pervasive monitoring by security forces in 2013.

Openness

Privacy

Scalability

Building trust

Resilience

Data protection

Flexibility

Security

Cultural and age adaptation

Reliability

Pilot the ITU's SSC-KPIs in your city

Background

- A global project launched by ITU in cooperation with other UN agencies to support cities in the implementation and use of the ITU's SSC-KPIs developed by FG-SSC.

- Several cities are **testing** the ITU's SSC-KPIs and will get a **certificate** from ITU.

- ITU will also develop a **Global Smart Sustainable Cities Index**.

Benefits

- Cities will be able to **measure** current **performance** and identify opportunities to **improve** city services towards sustainability and operational eco-efficiency.

DUBAI MUNICIPALITY

First pilot project, May 2015

Join ITU' Smart Sustainable Cities Initiative!

Forum on "Internet of things: empowering the new urban agenda "

This forum will provide a platform to discuss why the Internet of things will be at the heart of smart city transformation.

When: 19 October 2015
Where: ITU Headquarters, Geneva, Switzerland

A win-win way forward for the future of IoT

IoT involves many manufacturers, spans multiple industries, and differs widely in application scenarios and user requirements.

Standardization can create the necessary framework for any large-scale IoT deployment and ensure commercial revenues in future.

THANK YOU

ITU-T, IoT and applications, smart cities

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