ITU Conformity and Interoperability & IOT Programme, Strategy and Implementation

30 October-3 November, 2017
Shanghai, China

Sameer Sharma , Senior Advisor ITU

What we do

‘Committed to Connecting the World’

3 Sectors

ITU Radiocommunication

Coordinating radio-frequency spectrum and **assigning** orbital slots for satellites

ITU Standardization

Establishing global standards

ITU Development

Bridging the digital divide

Who are we?

Our members

193

MEMBER STATES

+700

INDUSTRY & INTERNATIONAL ORGANIZATIONS

+150

ACADEMIA MEMBERS

C&I Programme

To tackle different obstacles to the achievement of conformity and interoperability, expressed by member states in ITU`s Decisions.

Regional Presence

C&I Task Force

CELEBRATING 25 YEARS OF ACHIEVEMENTS

Conformity Assessment Benefits

- Conformity assessment builds consumers' trust and confidence in tested products and consequently strengthens business environment and, thanks to interoperability, the economy benefits from business stability, scalability and cost reduction of systems, equipment and tariffs.
- While economically Conformance and Interoperability (C&I) increase market opportunities, encourage trade and technology transfer and contribute to the removal of technical barriers, they socially help spreading ICT services availability and affordability to all people at a good level of quality.

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ITU's Decisions – C&I Action Plan

- **Resolution 177** ITU Plenipotentiary Conference

  (PP-14, rev. PP-10)
- **Resolution 47** ITU World Telecommunication Development Conference (WTDC-14)
- **Resolution 76** ITU World Telecommunication Standardization Assembly (WTSA-16)
- **Resolution 62-1** Radiocommunication Assembly (RA-2012, rev. RA-2015)
- **ITU Council Decisions** (2009-2016)

WTDC-14 Outcomes on C&I

- **The Dubai Declaration** recognized that conformance and interoperability of telecommunication/ ICT equipment and systems can increase market opportunities and reliability and encourage global integration and trade.
- **Resolution 47** was amended, reaffirming the importance of collaboration and coordination between the three ITU Bureaux in implementing the ITU C&I programme.

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WTDC-14 Outcomes on C&I

- **Study Group Question 4/2 – Assistance on C&I,** mandate:

"Studies of various issues related to conformance and interoperability are to be reported, and among others the description of the technical, legislative and regulatory framework that would be needed to implement appropriate C&I programmes by developing countries. Specifically, the following outputs are envisaged:

- Final Report of Question 4/2
  - To be concluded by the last Study Group Meeting on the 7th April 2017, in Geneva, ITU Headquarters (http://itu.int/go/CI_Question4_2)

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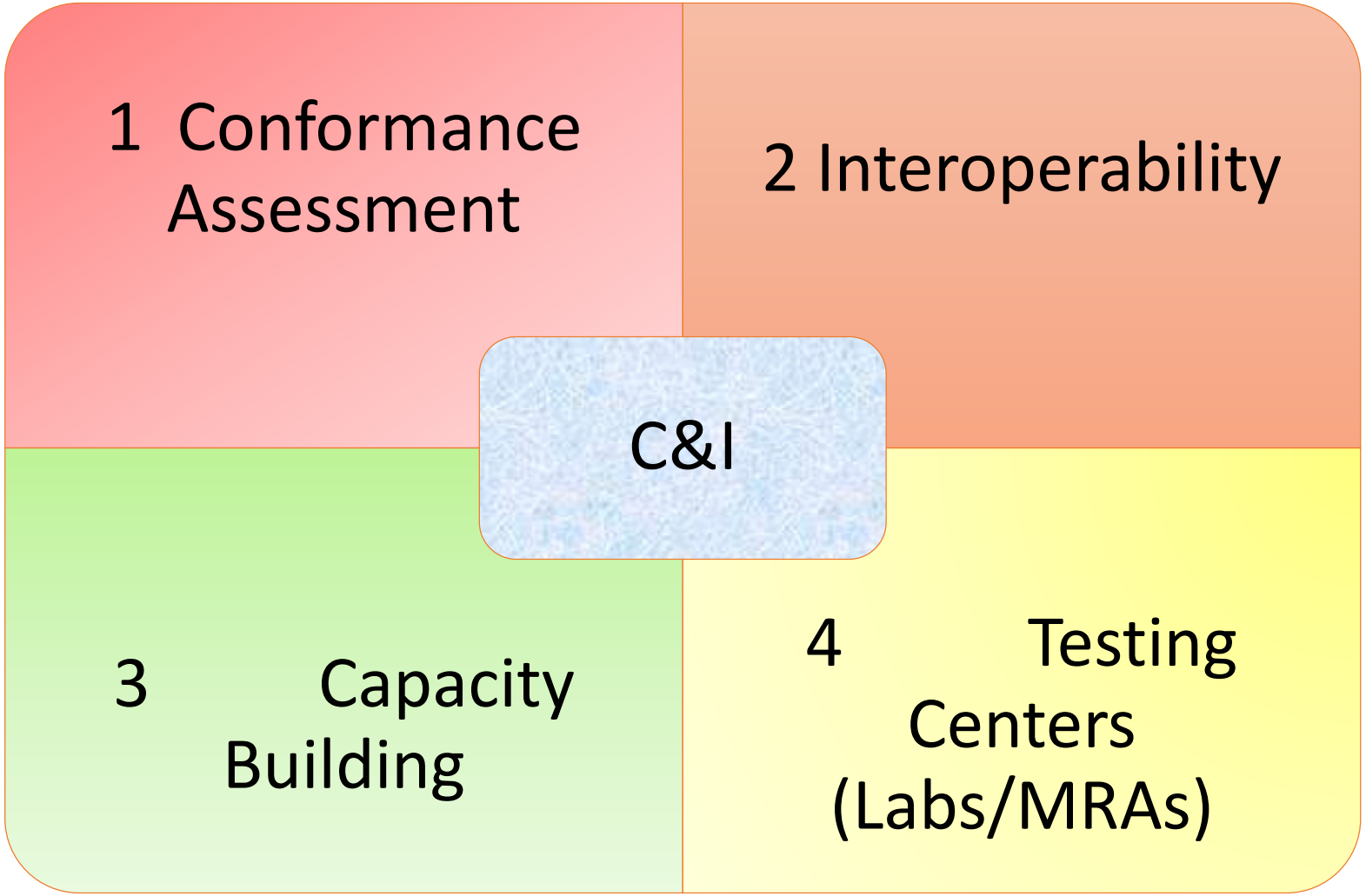
The ITU 4 Pillars



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The ITU 4 “Pillars”

The Standardization Sector Side

- Conformity Assessment
- Interoperability Events

The Development Side

- Capacity building
- Establishing C&I programmes in developing countries

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Telecommunication Development Bureau Side

- Capacity building
- Establishment of test centres and appropriate C&I Regimes including MRAs in developing countries.

ITU Forums with in-deep consideration for test centres and Capacity Building in the Regions

Held 2010 -2013:

- Africa (Kenya 2010, Ghana 2011)
- CIS (Moscow 2011)
- Americas (Brasilia 2012)
- Arab States (Tunis 2012) Forum and Training
- Asia Pacific (Myanmar 2013)

Held 2014:

- CIS (Moscow)

Capacity Building and Test Centres

- ITU is implementing proposals on human ***capacity building***

- ITU will assist developing countries in the establishment of test facilities and in cooperation with ***international institutions***:
  - UNIDO
  - International Laboratory Accreditation Cooperation (ILAC)
  - International Accreditation Forum (IAF),…)
  - Labs and R&D institutions

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Needs in Developing Countries for Test Labs /MRAs

- Conformity Assessment Bodies to contribute to create an orderly telecom apparatus market place
- Once reference standards and procedures are in place, test labs and/or MRAs can approve equipment for compliance
- Sharing test labs resources and using same procedures amongst countries and regions may lowering overall costs while continuing addressing regional priorities
- A robust framework (following international procedures – ISO/CASCO) needed for trust and confidence in test results and among test labs (MRAs)

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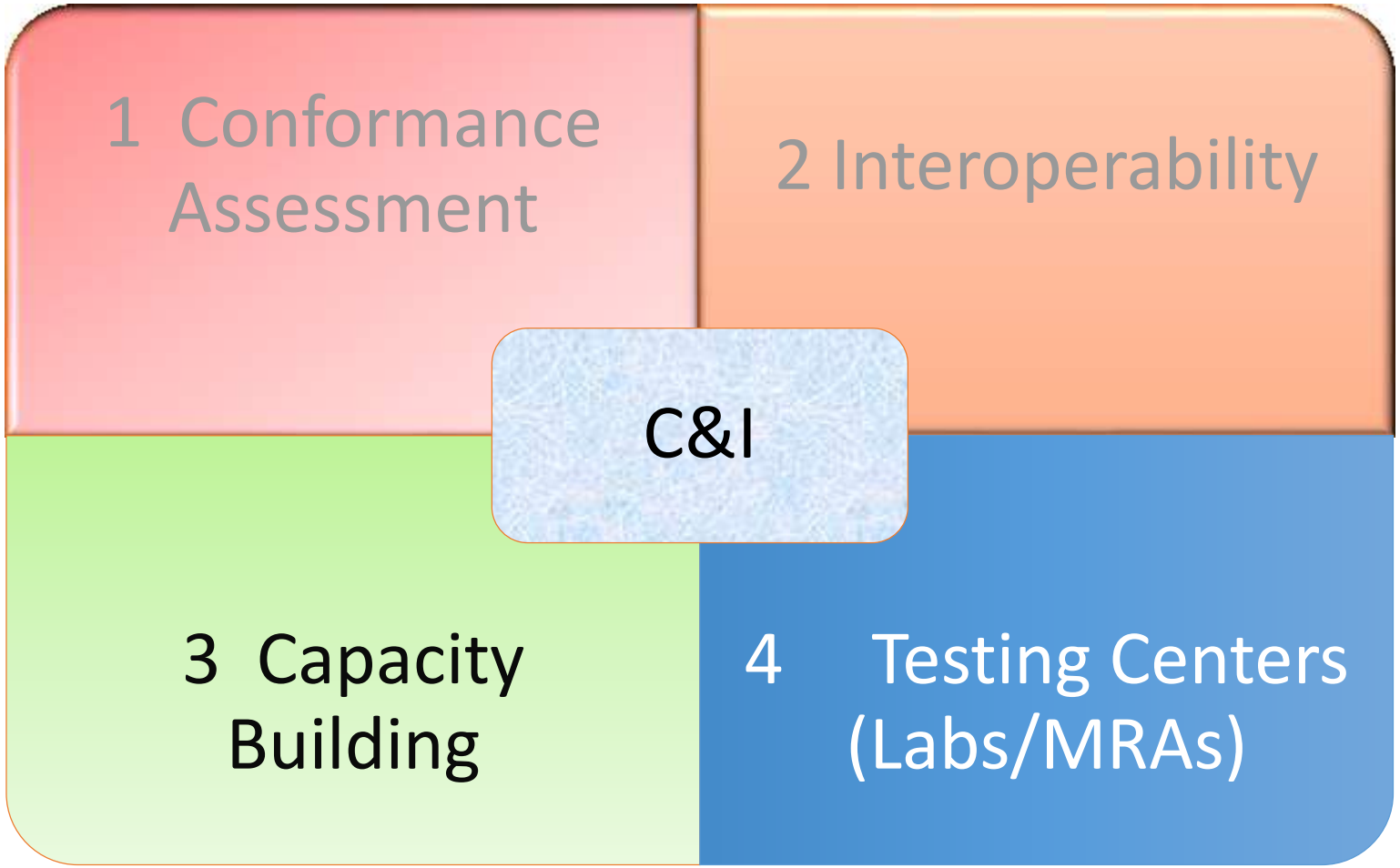
Pillar 3


1 Conformance Assessment
2 Interoperability
C&I
3 Capacity Building
4 Testing Centers (Labs/MRAs)

C&I Development Tools

Guidelines

C&I Regimes:

- Regulatory Framework
- ICT Standards and test suites
- Type Approval, Certification and Self-declaration processes
- Regulatory Authority; Accreditation Bodies; Certification Bodies and Laboratories
- Institutions
- Roadmap

Establishing Test Labs in Different Regions

Feasibility Study

MRA

Principles:

-Efficiency and Effectiveness

-Partnership and collaboration

-Mutual Benefit

-Regional Development

Guidance on:

- Development
- Implementation
- Management

Assessment Study on Regional Basis

ITU Assistance

C&I Portal

Training Events

Projects

Including Virtual Laboratories

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C&I Activities in 2016

Assessment Studies

- Follow-up activities for Maghreb, SADC, EAC, Central America, the Caribbean
- Coming up events:
  - 2nd C&I Workshop for Central America. **5-6 December 2016, Managua/Nicaragua**
  - 2nd ITU/UMA Arab Maghreb Countries Experts meeting for the establishment of MRA on C&I in the Maghreb sub-region, **Rabat, Morocco 14-15 December 2016.**

Direct country assistance

- Revision of national C&I procedures
- specific training for Ghana in testing procedures

Training on C&I

- AFR, Tunis 30 May-3 June 2016;
- AMS, 27 June – 1 July;
- ARB, Tunis 11-14 April 2016;
- ASP April and October 2016;
- CIS, Moscow 22-24 March 2016, Moscow.

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C&I Training Goals

- The ITU Training on C&I – is a capacity event in the framework of the Conformity and Interoperability Programme that has as objective:
  - **Improve knowledge** of participants through the presentation of up-to-date information/technologies
  - Contribute to **increase awareness** on the relevance of C&I testing
  - Provide the necessary tools for participants to **replicate knowledge in their country**, taking into consideration national specificities
  - **Promote experience-sharing** on Certification/Homologation process, Lab. Accreditation and testing among the participants from different countries in Conformance and Interoperability field
  - Present a practical learning on **standards**, **regulations**, **real Lab experience** and **accreditation procedures**.

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C&I Training :ITU-CAICT China 2016

- ITU ASP COE Training on Conformity and Interoperability 17 – 21 October 2016, Chongqing, China
- The course objectives included :
- To equip participants with an understanding of Strategic of ITU Conformity and Interoperability, Programme, Implementation, Conformity Assessment Principles and to build participants' knowledge and skills with the strategies, regulations, technical standards, network technology and conformity and interoperability of 4G-LTE

Learning Outcomes:

✓Understand the development and implementation of conformity assessment programmes;

✓Understand the basic C&I frame for new technology , focusing on what to do, how to do;

✓Understand the network technology and services interoperability of IMS;

✓Understand the strategies, regulations, technical standards, network technology and conformity and interoperability of 4G-LTE. .

✓The training course was attended by 49 registered participants

C&I Training :ITU-CAICT China 2017

- ITU Asia-Pacific Centres of Excellence Distance Learning Course “Conformity And Interoperability (C&I) For 4G LTE” 17 April to 15 May, 2017. The course objectives included :

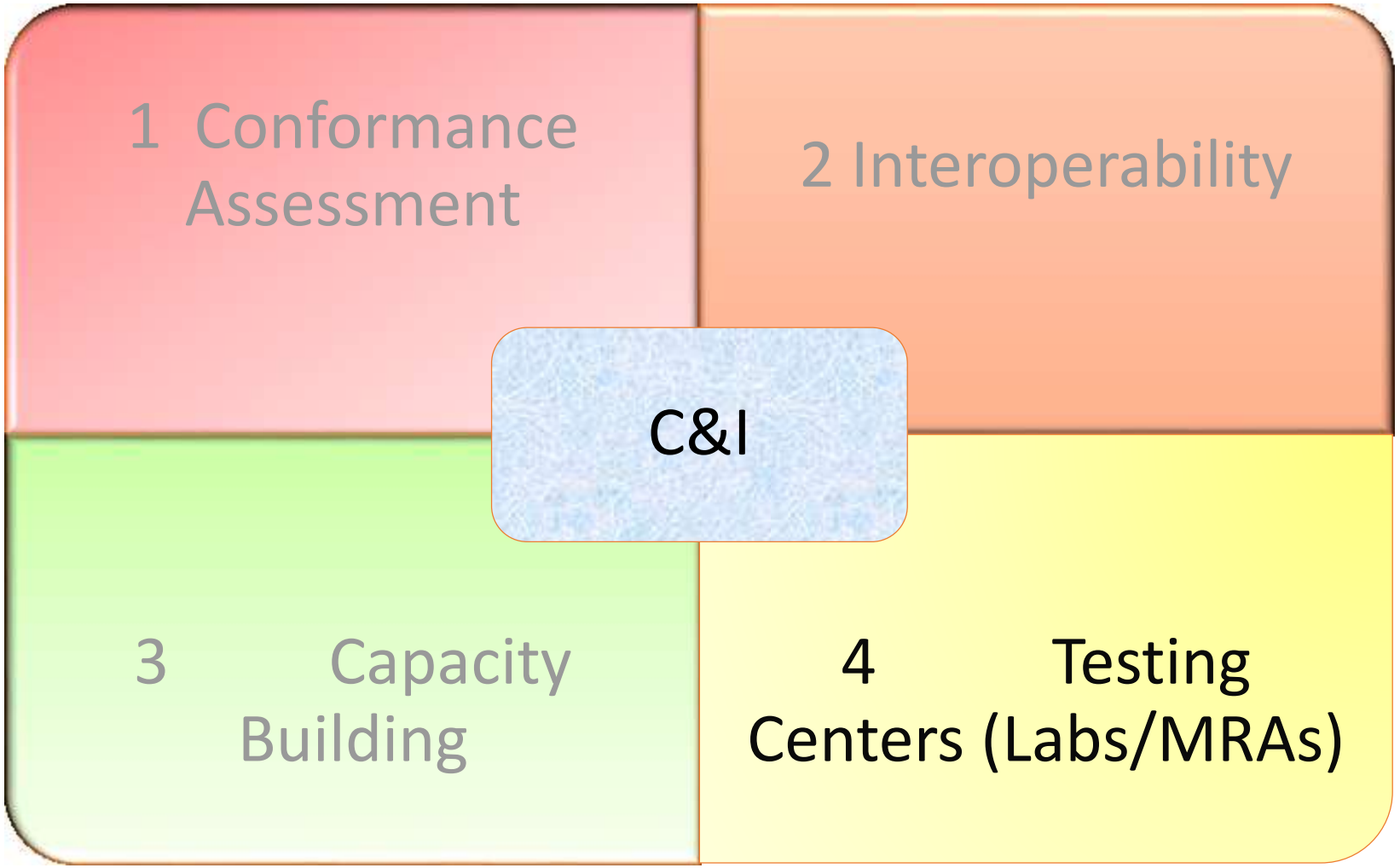
- To develop basic knowledge of conformity assessment programme based on ITU and Chinese framework and experiences; To understand technology of 4G LTE; To understand the C&I for 4G LTE network and terminal; Share experiences and challenges concerning C&I for ICT products

Methodology:

- ✓Course materials: Each week one module was discussed and the relevant course material were made available on the website.
- ✓Online Discussion Forums: Participants were expected to participate actively in discussion forums on selected topics throughout the week.
- ✓Chat sessions: Chat sessions were conducted in real time every week where discussions were held with the instructor (s) on a particular topic.
- ✓Quizzes: Two mandatory quizzes were held during the course

✓73 participants registered while 36 participants from 16 countries undertook the course while (joined an exercise that involved evaluation). 23 participants successfully completed the course.

Pillar 4


1 Conformance Assessment
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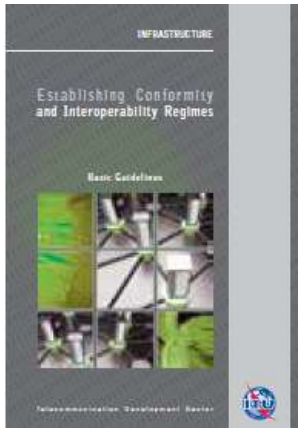
ITU C&I Guidelines

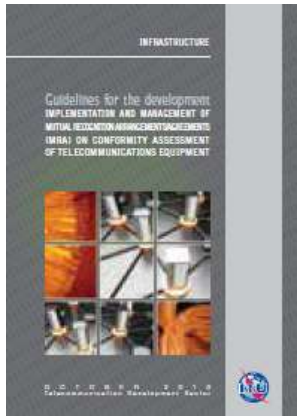


Establishing Conformity and Interoperability Regimes – Basic Guidelines (2014)

These Guidelines address challenges faced by developing countries as they plan and review their own C&I regimes. Aspects covered by this publication include, inter alia, conformity assessment procedures; legislation to promote an orderly equipment marketplace; surveillance; coordination across regulatory agencies; and relevant international standards.

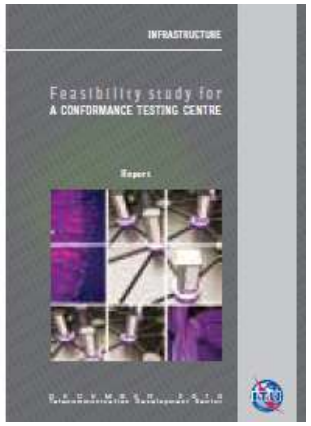
Guidelines for developing countries on Establishing Conformity assessment Test Labs in Different Regions (2012)

This set of guidelines is the first publication on C&I, its valuable content includes information concerning: The process required for building testing labs; A site analysis (e.g. existing testing labs, know-how);Collaboration mechanisms; Best practices; Reference standards and ITU Recommendations



Guidelines for the Development, Implementation and Management of Mutual Recognition Arrangements/Agreements on Conformity Assessment (2013)

These guidelines promote the understanding and establishment of Mutual Recognition Agreements (MRAs)
on conformity assessment that are intended to promote efficiency and resource sharing as well as to streamline the flow of products among participating Parties such as ITU Member States and private sector organizations, such as testing laboratories



Feasibility Study for the establishment of a Conformance Testing Centre (2013)

This feasibility study describes environments, procedures and methodologies to be adopted to establish, manage and maintain a testing center covering different kinds of conformance and interoperability testing areas

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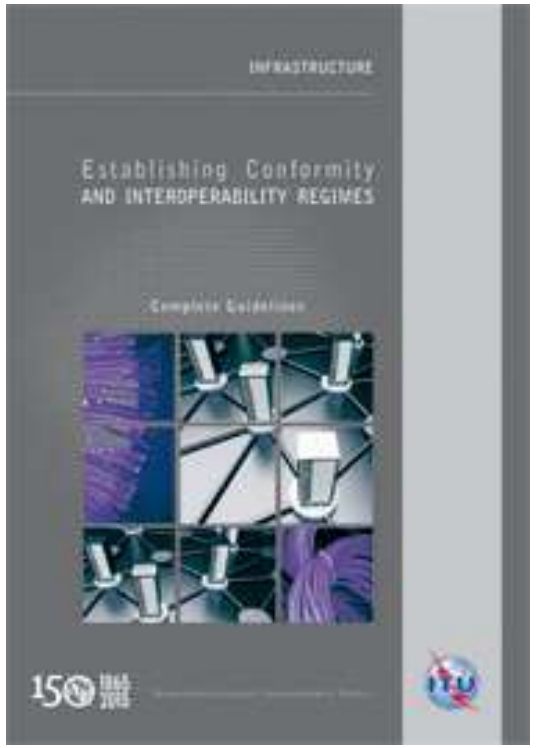
New ITU C&I Guidelines



Establishing Conformity and Interoperability Regimes – Complete Guidelines (2015)

These Guidelines compiled from a careful collection of international best practices, address challenges faced by developing countries as they plan and review their own C&I regimes. Aspects covered by this publication include, inter alia, conformity assessment procedures; the right type of approval system, the legislation required to promote an orderly telecommunication service and marketplace; the calculation of fees, and the ideal enforcement and Surveillance; coordination across regulatory agencies; relevant international standards.

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Direct Assistance on C&I

A number of countries have expressed strong interest and requested direct assistance (e.g. Sri-Lanka, Kiribati, Mongolia, Zambia, Cameroon, Cote d'Ivoire) in establishing C&I infrastructure and procedures

The Direct Assistance provided through the Regional Offices will provide support taken into consideration all C&I aspects, as:

- Regulatory framework
- Institutions roles and typical procedures
- Mutual Recognition Agreements
- Funding
- National and Regional test centres and harmonized C&I programmes: Roadmap and Feasibility Study

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Conformance Assessment Procedures

Procedures for establishing a conformance assessment regime may include the following procedures:

A. Query for new products to be homologated

B. D. Import procedures for testing proposals

C. Reference Standards for conformity assessment

D. Test, Recognized Laboratories, Test Reports

E. Issuing and/or validating a Certificate of Conformity

F. Issue of the Homologation (or acceptance)

G. Suspension and Withdrawal of the Homologation Certificate

H. Monitoring, Enforcement, and Sanctions and Post-Market Surveillance

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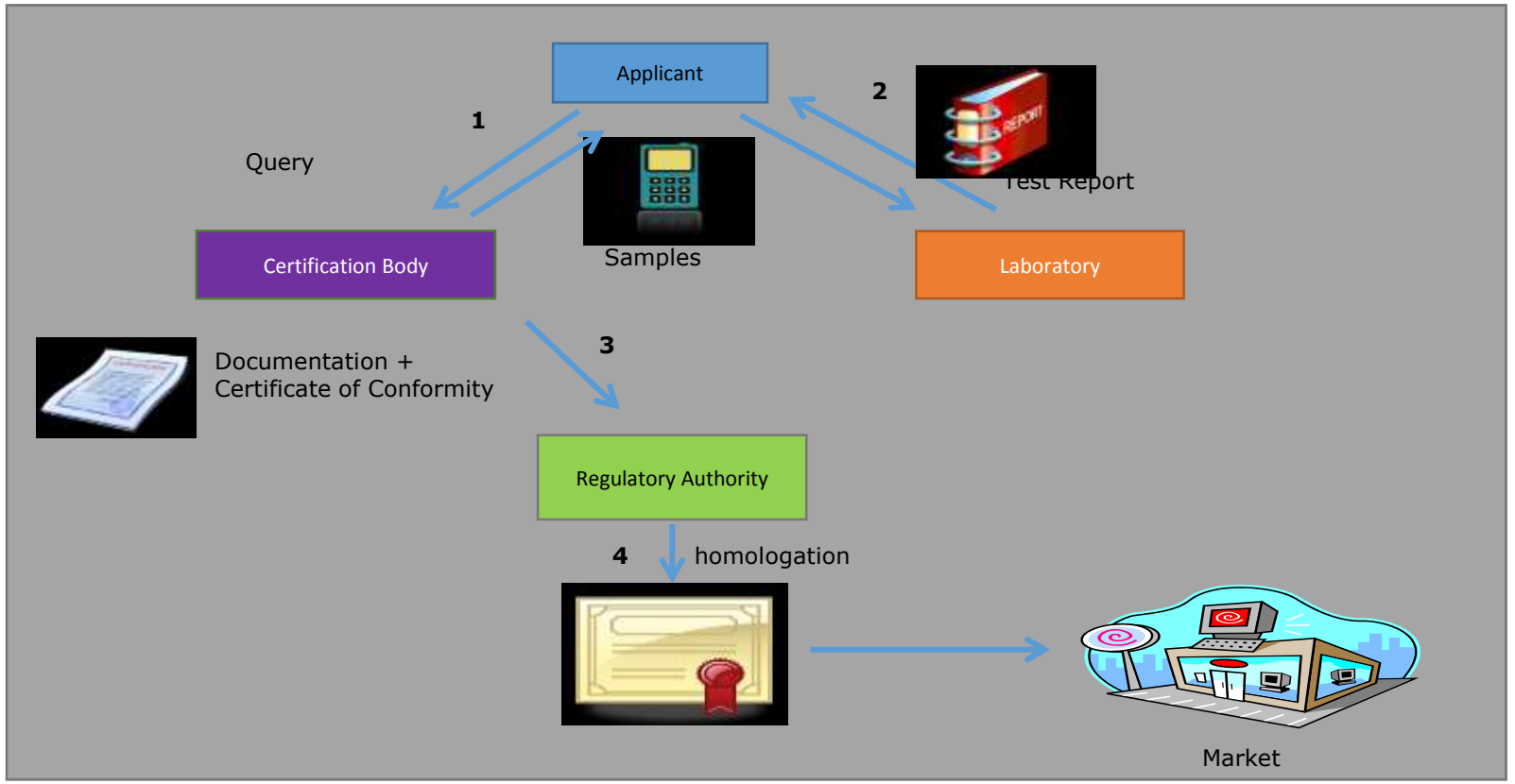
Regulatory Aspects Conformance Assessment Procedures

Example of interactions that may exist among the entities participating in a conformity assessment process that uses certification mechanism:



C&I Regional Assessment Studies

The C&I Assessment Studies looks for promoting the establishment of Harmonized C&I Programmes, when possible.

It will collaborate to improve regional integration and foster the availability of highly qualified institutions (as Laboratories, Certification and Accreditation Bodies)

In an overall analysis, the Assessment Studies contributes to:

- Bridging the Standardization Gap,
- reducing the Digital Divide, and
- as is inherent to ICT technologies development, strengthens business environment for global players.

C&I Regional Assessement Studies

- C&I infrastructure in regions/sub-regions/countries are being assessed
- Analysis of the status in the regions are being conducted
- Looking for promoting regional agreements about possible locations for resources (Labs), agreements and testing capabilities
- Close collaboration with regional experts in addressing capacity building activities, accreditation and type approval testing.
- Moving forward to establishing regional test centers / MRAs as appropriate

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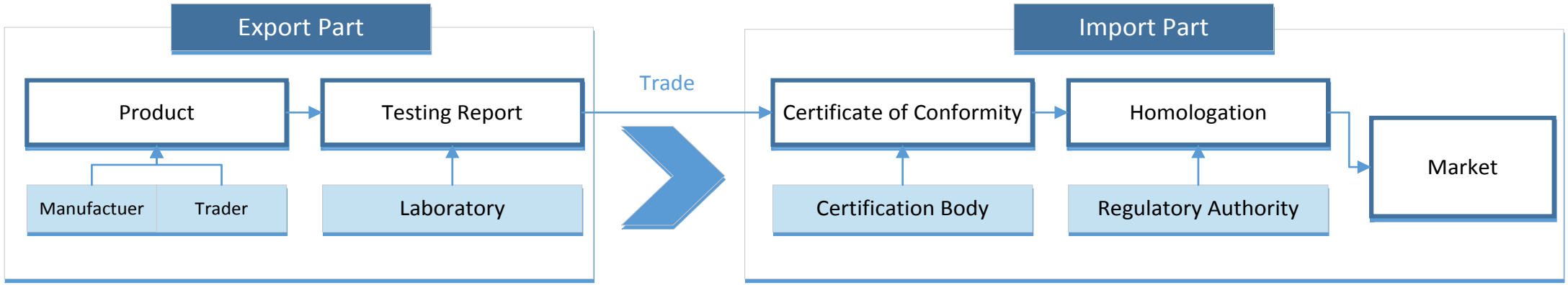
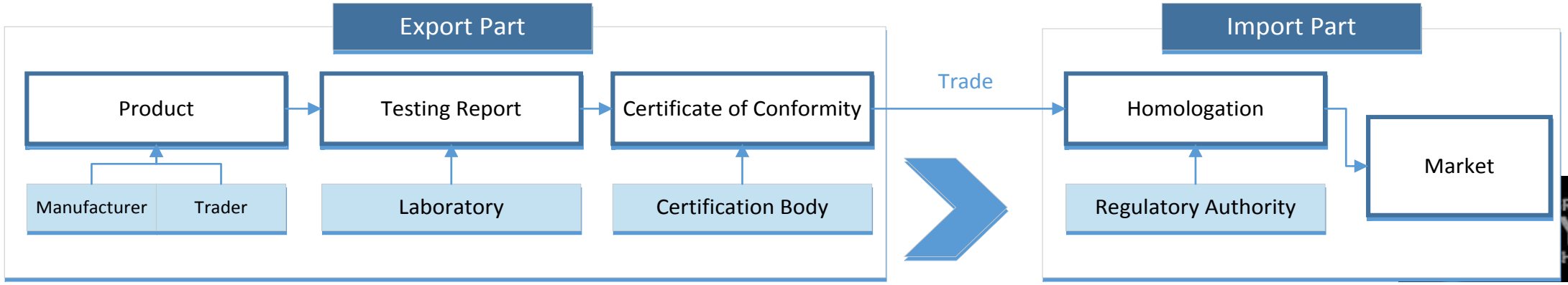
Implementation of an MRA

Phase 1. Mutual Acceptance of Testing Reports



Phase 2. Mutual Acceptance of Certification



C&I Regional Assessment Studies

Roadmap

- Conformity Assessment Bodies will contribute with an orderly telecom apparatus market place
- Once standards and procedures are in place, test labs and/or MRAs can approve equipment for compliance
- Sharing test labs resources and using same procedures amongst countries and regions, lowers overall costs while continues addressing regional priorities
- Setup of a robust framework (base on international procedures – ITU, ISO, IAF, ILAC, etc.) needed for trust and confidence in test results and among test labs

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ITU Initiatives on IOT

The Internet of Things has the power to revolutionize everything

Our Homes…

Our Businesses…

Our Cities…

Internet of Things

The ITU-T's definition of the IoT calls it "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies"

What Is It?

"A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication" (ITU-T)

Who Makes It?

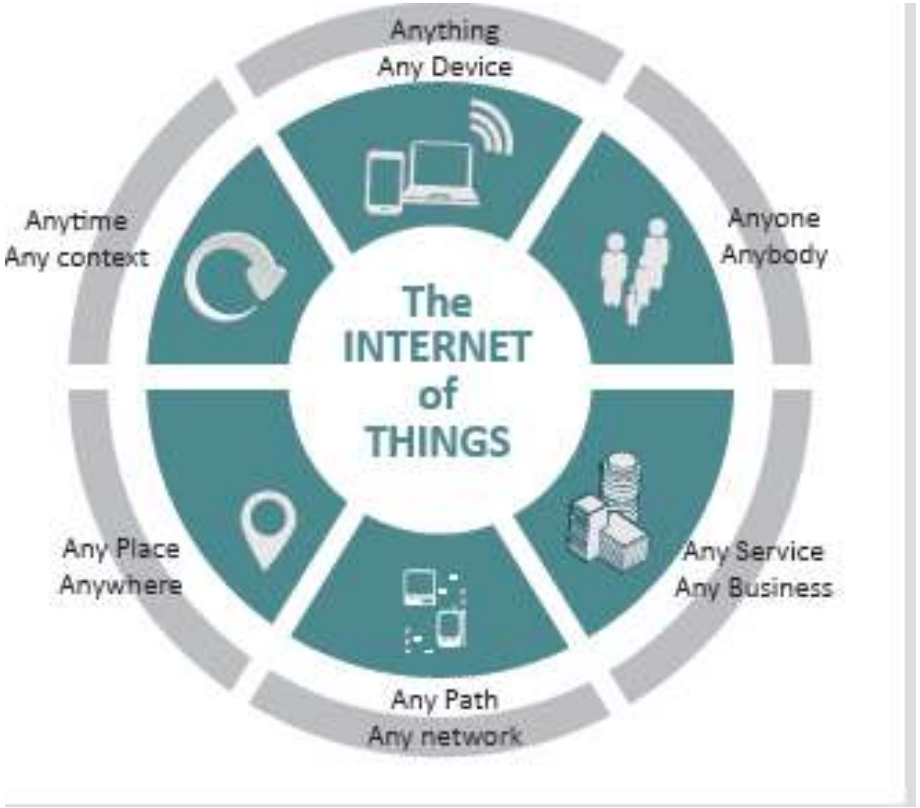
Device manufacturers, network operators, application platforms, software developers and (cloud-based) data analytics services providers

How Is It Accessed?

Connection of IoT devices via Wi-Fi, Bluetooth, mobile phone networks, specialized radio networks, global Internet

Main current areas of investment

- Smart cities
- Smart metering & grids
- Connected vehicles
- Healthcare



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Emerging ICT Infrastructure

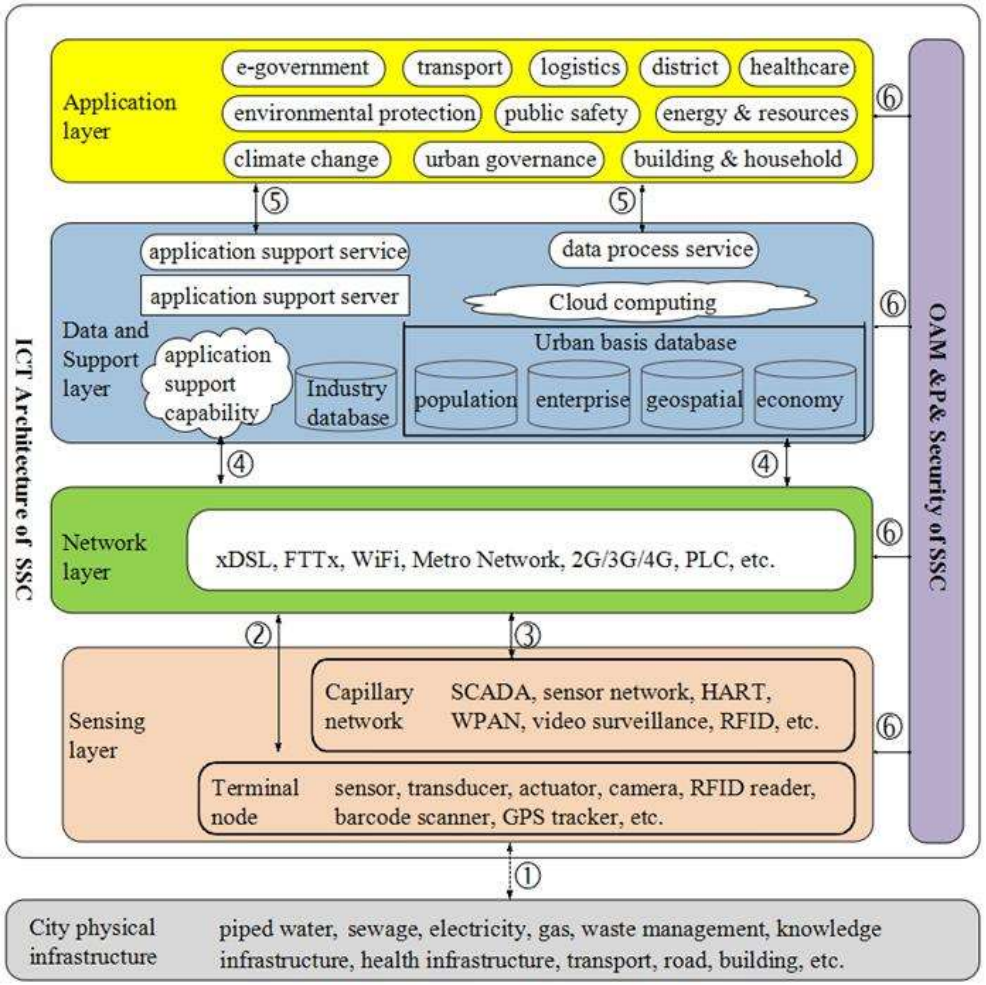
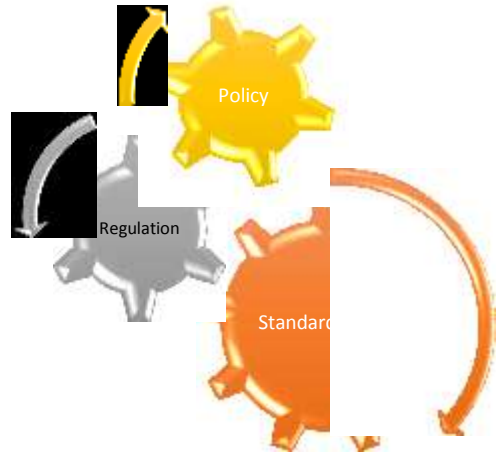


Figure source: ITU-T Focus Group on Smart Sustainable Cities: *Overview of smart sustainable cities infrastructure*

A multi-tier SSC (smart sustainable city) ICT architecture from communication view (physical perspective)



Internet of Things use a wide variety of networks: mobile and fixed

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ITU-T Activities on IoT & Smart Sustainable Cities

Development and implementation of standards

ITU-T Study Group 20

Research & pre-standardization work

Focus Group on **Data Processing Management (FG-DPM)**

Open platform for knowledge sharing & Forward looking research

United for Smart Sustainable Cities (U4SSC)

Resolution 98
Enhancing the standardization of IoT and Smart Cities and Communities for global development

IoT4SDGs: *Considers the importance of IoT to contribute to achieving the 2030 Agenda for Sustainable Development.*

ITU-T Study Group 20: Internet of things (IoT) and smart cities and communities (SC&C)

Responsible for studies relating to IoT and its applications, and smart cities and communities (SC&C).

It includes studies relating to Big data aspects of IoT and SC&C, e-services and smart services for SC&C

Lead study group on

- Internet of things (IoT) and its applications
- Smart Cities and Communities (SC&C), including its e-services and smart services
- IoT identification

Last meeting: 4-15 September 2017

ITU-T SG20 main results

October 2015 – August 2017

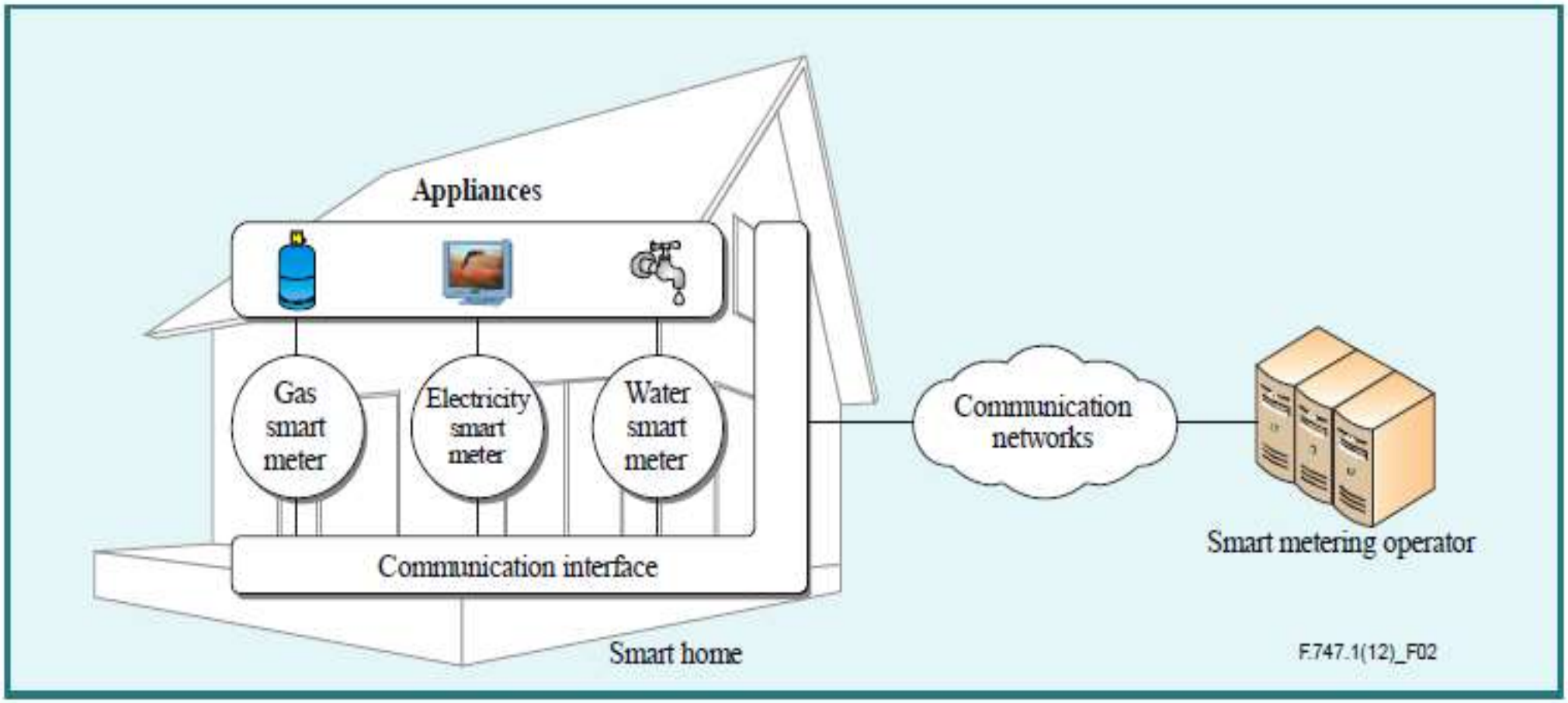
9 New Recommendations approved

- ITU-T Y.4113 **"Requirements of the network for the Internet of Things"**
- ITU-T Y.4114 **"Specific requirements and capabilities of the IoT for Big Data"**
- ITU-T Y.4115 **"Reference architecture for IoT device capability exposure"**
- ITU-T Y.4451 "**networking in**
- ITU-T Y.4452 "**Objects"**
- ITU-T Y.4453 "**devices"**
- ITU-T Y.4553 "**node for IoT a**
- ITU-T Y.4702 "**C**
- ITU-T Y.4805 "**interoperabili**

9 New Supplements agreed

- ITU-T Y.Supp.42 to ITU-T Y.4100 series **"Use cases of User-Centric work Space (UCS) Service**
- ITU-T Y.Supp.34 to ITU-T Y.4000 series **"Smart Sustainable Cities - Setting the stage for stakeholders' engagement"**
- ITU-T Y.Supp.33 to ITU-T Y.4000 series **art Sustainable Cities - Master plan"**
- Y.Supp.32 to ITU-T Y.4000 series **rt sustainable cities - a guide for city leaders"**
- Y.Supp.31 to ITU-T Y.4550 series **art Sustainable Cities - Intelligent sustainable ings"**
- Y.Supp.28 to ITU-T Y.4550 series **grated management for smart sustainable cities";**
- Y.Supp.29 to ITU-T Y.4250 series **i-service infrastructure for smart sustainable cities w-development areas";**
- Y.Supp.30 to ITU-T Y.4250 series **view of smart sustainable cities infrastructure";**
- Y.Supp.27 to ITU-T Y.4400 series **ng the framework for an ICT architecture of a sustainable city".**

IOT Example: Technical Overview of Smart Metering



Source: Recommendation ITU-T Y.4251/F.747.1 (06/2012)

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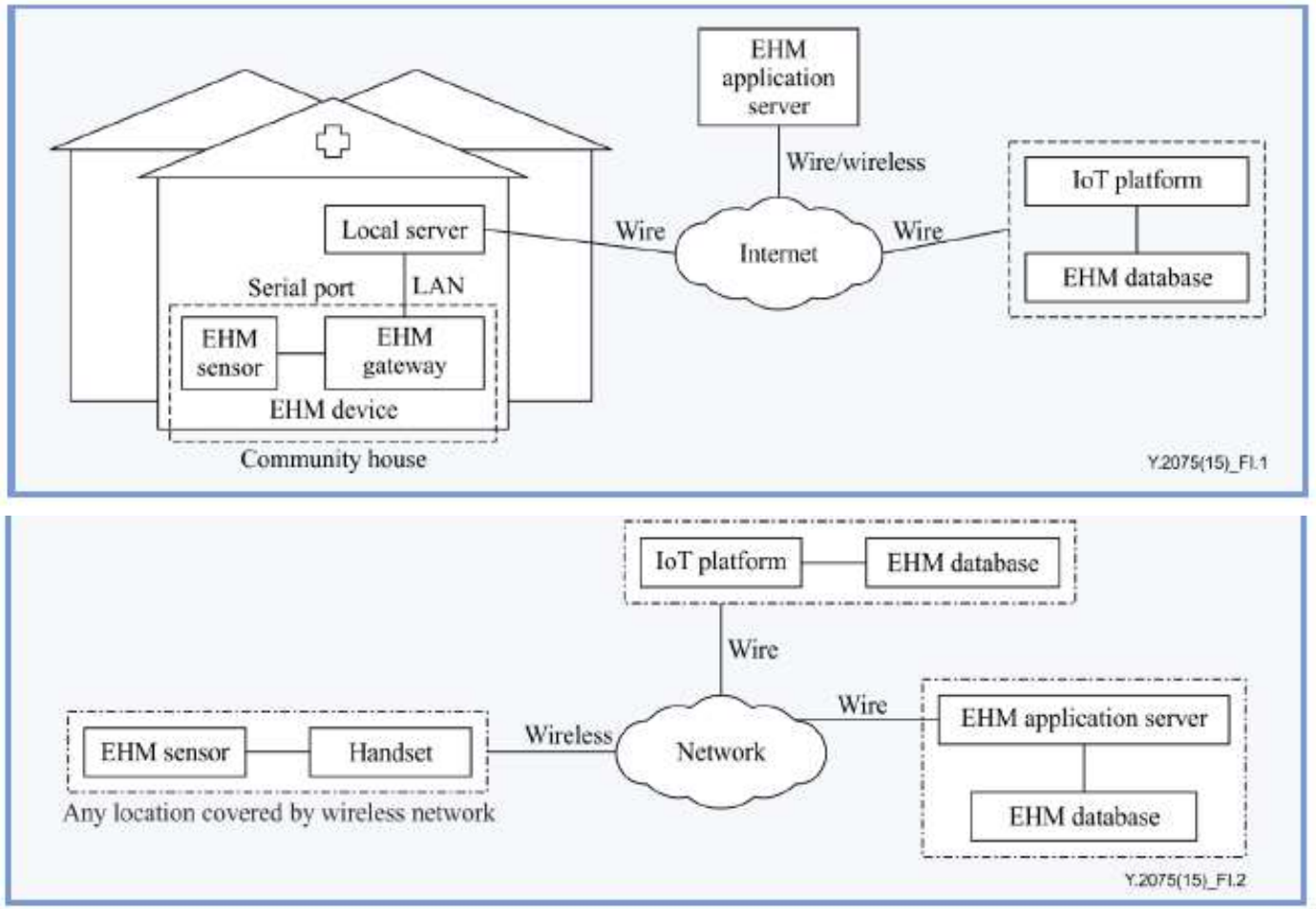
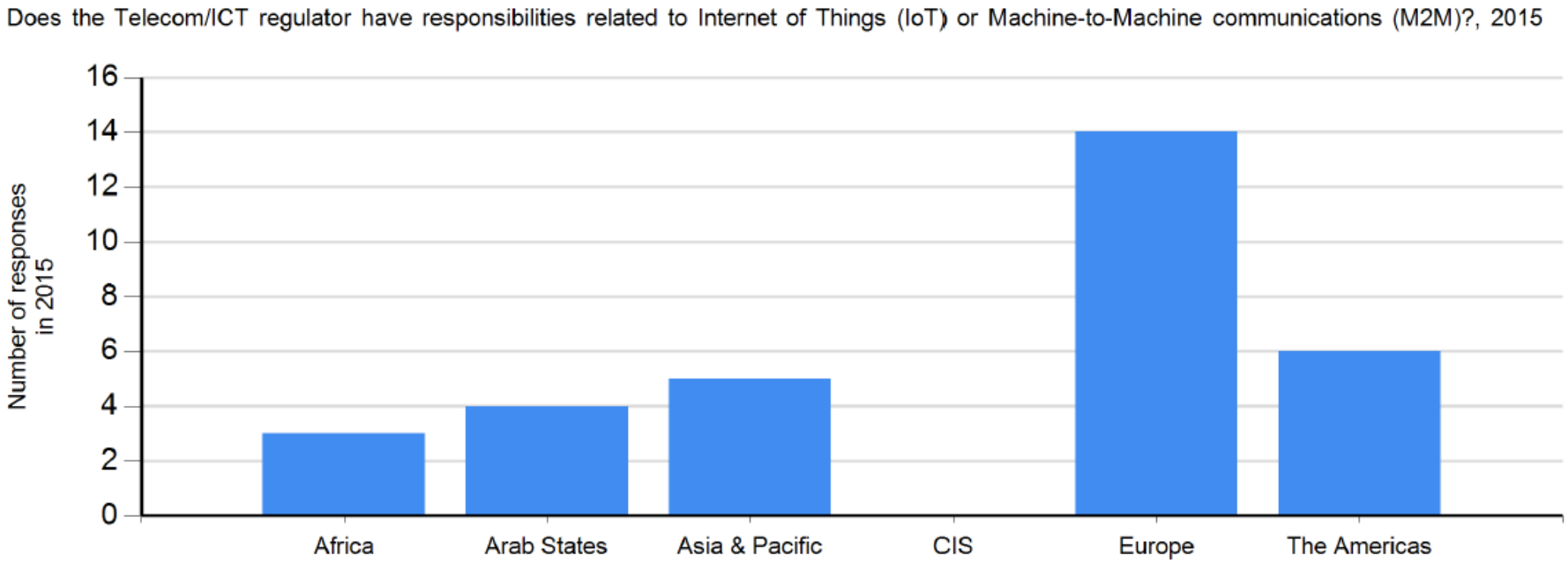
IOT Example: E-Health Monitoring (EHM) Service Deployment Technical Scenarios



Source: Recommendation ITU-T **Y.4408/Y.2075 (09/2015))**

IOT and Regulatory Authority



Source: ITU World Telecommunication Regulatory Database

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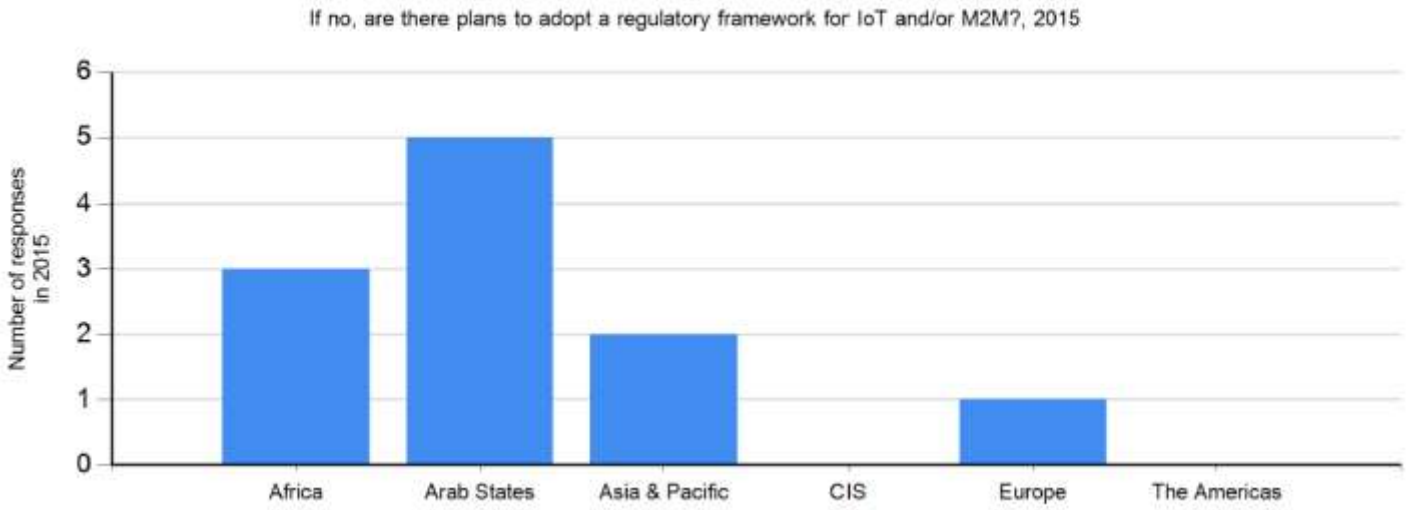
IOT Policy and Legislation



Source: ITU World Telecommunication Regulatory Database

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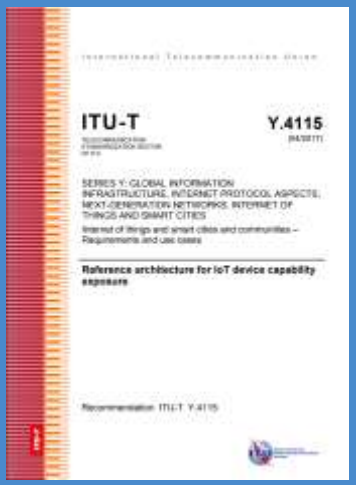
Most recent approved ITU-T Recommendations

Recommendation ITU-T Y.4114 "Specific requirements and capabilities of the IoT for Big Data".

This Recommendation complements the developments on common requirements of the IoT [ITU-T Y.2066] and functional framework of the IoT [ITU-T Y.2068] in terms of the specific requirements and capabilities that the IoT is expected to support in order to address the challenges related to Big Data.

Recommendation ITU-T Y.4115 "Reference architecture for IoT device capability exposure"

This Recommendation specifies reference architecture of IoT device capability exposure (IoT DCE) which supports IoT applications in DCE devices (e.g., smart phones, tablets and home gateways) to access device capabilities exposed by IoT devices connected to the DCE device.



Recommendation ITU-T Y.4805 “Identifier service requirements for the interoperability of Smart City applications”.

This Recommendation explores the set of requirements for identifier services used in Smart City. An identifier service for Smart City must be scalable and secure, and not only promote interoperability among different Smart City applications, but also compatible with any existing practices in the application domain.

Some ongoing work items under study

- Y.Accessibility-IoT - Accessibility requirements for the Internet of things applications and services
- Y.del-fw - Framework of delegation service for the IoT devices
- Y.IoT-DA-Counterfeit - Information Management Digital Architecture to combat counterfeiting in IoT
- Y.IoT-Interop - An Interoperability framework for IoT
- Y.IoT-IoD-PT - Identity of IoT devices based on secure procedures and ensures privacy and trust of IoT systems
- Y.ODI - Open Data Indicator in smart cities
- Y.smartport – Requirement of smart managements of supply services in smart port
- Y.frame-scc - Framework and high-level requirements of smart cities and communities
- Y.fsn - Framework and Service scenarios for Smartwork

I Thank U (ITU)