

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

# The Internet of Things has the power to revolutionize everything



**Our Homes...**



**Our Businesses...**



**Our Cities...**

# 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)**



**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.*



Open platform for knowledge sharing & Forward looking research

United for Smart Sustainable Cities (U4SSC)



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

## Lead study group on

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

Internet of things (IoT) and its applications

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

Smart Cities and Communities (SC&C), including its e-services and smart services

IoT identification



Last meeting: 4-15 September 2017

# ITU-T SG20 Structure

<b>WP1/20</b>	<b>Questions</b>
<a href="#"><u>Q1/20</u></a>	End to end connectivity, networks, interoperability, infrastructures and Big Data aspects related to IoT and SC&C
<a href="#"><u>Q2/20</u></a>	Requirements, capabilities, and use cases across verticals
<a href="#"><u>Q3/20</u></a>	Architectures, management, protocols and Quality of Service
<a href="#"><u>Q4/20</u></a>	e/Smart services, applications and supporting platforms
<b>WP2/20</b>	
<a href="#"><u>Q5/20</u></a>	Research and emerging technologies, terminology and definitions
<a href="#"><u>Q6/20</u></a>	Security, privacy, trust and identification
<a href="#"><u>Q7/20</u></a>	Evaluation and assessment of Smart Sustainable Cities and Communities

# Key issues addressed include:

- Research and emerging technologies, terminology, and definitions
- Evaluation and assessment of Smart Sustainable Cities and Communities
- Requirements, capabilities, and use cases across verticals
- Architectures, management, protocols, and Quality of Service
- e/Smart services, applications and supporting platforms
- Security, privacy, trust and identification
- End to end connectivity, networks, interoperability, infrastructures and Big Data aspects related to IoT and SC&C



# 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 **“Requirements for networked intelligent objects”**
- ITU-T Y.4452 **“Requirements for networked intelligent objects”**
- ITU-T Y.4453 **“Architecture for networked intelligent devices”**
- ITU-T Y.4553 **“Requirements for networked intelligent node for IoT applications”**
- ITU-T Y.4702 **“Requirements for networked intelligent objects”**
- ITU-T Y.4805 **“Requirements for networked intelligent objects interoperability”**

## 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 **“Smart Sustainable Cities - Master plan”**
- ITU-T Y.Supp.32 to ITU-T Y.4000 series **“Smart sustainable cities - a guide for city leaders”**
- ITU-T Y.Supp.31 to ITU-T Y.4550 series **“Smart Sustainable Cities - Intelligent sustainable cities”**
- ITU-T Y.Supp.28 to ITU-T Y.4550 series **“Smart sustainable cities - Integrated management for smart sustainable cities”**
- ITU-T Y.Supp.29 to ITU-T Y.4250 series **“Smart sustainable cities - Multi-service infrastructure for smart sustainable cities in new-development areas”**
- ITU-T Y.Supp.30 to ITU-T Y.4250 series **“Smart sustainable cities - Review of smart sustainable cities infrastructure”**
- ITU-T Y.Supp.27 to ITU-T Y.4400 series **“Smart sustainable cities - Setting the framework for an ICT architecture of a smart sustainable city”**.



# 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.





# ITU-T SG20 Meeting

September 2017

## Revised Recommendations

ITU-T Rec. Number	Title
ITU-T Y.4101/ Y.2067	Common requirements and capabilities of a gateway for Internet of things applications

## New Recommendations

ITU-T Rec. Number	Work item or provisional name	Title
ITU-T Y.4201	Y.frame-SCC	High-level requirements and reference framework of smart city platform
ITU-T Y.4200	Y.SCP	Requirements for interoperability of smart city platforms
ITU-T Y.4116	Y.TPS-req	Requirements of transportation safety service including use cases and service scenarios
ITU-T Y.4117	Y.IoT-WDS-reqts	Requirements and capabilities of Internet of Things for support of wearable devices and related services
ITU-T Y.4500.1	Y.oneM2M.ARC	oneM2M- Functional Architecture
ITU-T Y.4455	Y.IoT-NCE	Reference architecture for IoT network capability exposure
ITU-T Y.4806	Y.IoT-sec-safety	Security capabilities supporting safety of the Internet of Things

## Agreed informative texts

Document	Work item or provisional name	Title
Y Suppl.45 to ITU-T Y.4000 series	ITU-T Y.SC-overview (Supplement)	An overview of smart sustainable cities and the role of information and communication technologies
YSTR- CSL - oneM2M.DG.CoAP	Draft Technical Report ITU-T Y.oneM2M.DG.CoAP	oneM2M Developer Guide of CoAP binding and long polling for temperature monitoring
YSTR- CLS- oneM2M.UCC	Draft Technical Report ITU-T Y.oneM2M.UCC	oneM2M Use Case Collection
YSTR- CLS- oneM2M.Ind.DE	Draft Technical Report ITU-T Y.oneM2M.Ind.DE	oneM2M Industrial Domain Enablement
YSTR-CLS- oneM2M.DG.SEM	Draft Technical Report ITU-T Y.oneM2M.DG.SEM	oneM2M-Developer Guide of Implementing semantics
YSTR-CLS- oneM2M.DG.AppDev	Draft Technical Report ITU-T Y.oneM2M.DG.AppDev	oneM2M- Application developer guide: Light control example using HTTP binding
YSTR-CLS- oneM2M.DG.DM	Draft Technical Report ITU-T Y.oneM2M.DG.DM	oneM2M- Developer guide of device management

Working title	Title
ITU-T Y.SCC-Reqts	Common requirements and capabilities of smart cities and communities from IoT and ICT perspectives
Y.UCS-Reqts	Requirements and capabilities of user-centric work space service
Y.IoT-UAS-Reqts	Use cases, requirements and capabilities of unmanned aircraft systems for Internet of Things
Y.oneM2M.IWK.LwM2M	oneM2M- LwM2M Interworking
Y.oneM2M.PB.WebSocket	oneM2M- WebSocket Protocol Binding
Y.oneM2M.MAF.MEF	oneM2M- MAF and MEF Interface Specification
Y.oneM2M.DG.DM	oneM2M- Developer guide of device management
Y.oneM2M.DG.AppDev	oneM2M- Application developer guide: Light control example using HTTP binding
Y.oneM2M.DG.CoAP	oneM2M- Developer Guide of CoAP binding and long polling for temperature monitoring
Y.oneM2M.InteropTest	oneM2M- Interoperability Testing
Y.oneM2M.CT	oneM2M- Common Terminology
Y.oneM2M.PB.MQTT	oneM2M- MQTT Protocol Binding
Y.oneM2M.PB.HTTP	oneM2M- HTTP Protocol Binding
Y.oneM2M.SLCP	oneM2M- Service Layer Core Protocol Specification
Y.oneM2M.SEC.SOL	oneM2M- Security Solutions
Y.oneM2M.DG.SEM	oneM2M- Developer Guide of Implementing semantics
Y.oneM2M.ARC	oneM2M-Functional Architecture
Y.oneM2M.DM.OMA	oneM2M- Management Enablement (OMA)
Y.oneM2M.PB.CoAP	oneM2M- CoAP Protocol Binding
Y.oneM2M.TF	oneM2M- Testing framework
Y.oneM2M.FDC	oneM2M- Field Device Configuration
Y.oneM2M.HAIM	oneM2M- Home Appliances Information Model and Mapping
Y.oneM2M.Ind.DE	oneM2M- Industrial Domain Enablement
Y.oneM2M.BO	oneM2M Base Ontology
Y.oneM2M.DM.BBF	oneM2M- Management enablement (BBF)" (New)
Y.UIS-IoT	Unified Identity/Identifier/Locator Split (UIS) Services and Architecture in IoT Environment
Y.oneM2M.UCC	oneM2M- Use Case Collection
Y.oneM2M.REQ	oneM2M- Requirements
Y.disaster_notification	Framework of the disaster notification of the population in Smart Cities and Communities
Y.MEDT	Methodology for Building Sustainable Capabilities during Enterprises' Digital Transformation
Y.API4IOT	API for IoT Open Data in Smart Cities
Y.LPWA	Security, interoperability and identification aspects for Low Power Wide Area (LPWA) systems
Y.FW-IC-MDSC	Framework of identification and connectivity of Moving Devices in Smart City
Y.SSC-IA	Smart Sustainable City Impact Assessment
Y.SSC-MM	Smart Sustainable City Maturity Model
Y.AFDTS	Assessment Framework for Digital Transformation of Sectors in Smart Cities

# 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

# ITU-T SG20 Regional Groups

A world map with a light blue background and white outlines of continents. Four semi-transparent blue callout boxes are overlaid on the map, each containing text and connected to a specific region by a thin white line. The callouts are: 1. Latin America (left side), 2. Arab Region (Africa/Middle East), 3. Africa Region (Africa), and 4. Eastern Europe, Central Asia, and Transcaucasia (Europe/Asia).

**SG20 RG-LATAM - ITU-T SG20 Regional Group for the Latin American Region**

**SG20 RG-EECAT - ITU-T SG20 Regional Group for Eastern Europe, Central Asia and Transcaucasia**

**SG20 RG-ARB - ITU-T SG20 Regional Group for the Arab Region**

**SG20 RG-AFR - ITU-T SG20 Regional Group for the Africa Region**





# Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities (FG-DPM)

## 5 Working Groups

WG1 - Use Cases, Requirements and Applications/ Services

WG2 - DPM Framework, Architectures and Core Components

WG3 - Data sharing, Interoperability and Blockchain

WG4 - Security, Privacy and Trust including Governance

WG5 - Data Economy, commercialization and monetization

## Key priorities:

To propose mechanisms , frameworks and guidelines for supporting the security, privacy and interoperability of datasets and data-management systems within the IoT and smart city domain.

**Second meeting:**  
Geneva, 20-25 October 2017



# United for Smart Sustainable Cities – (U4SSC)



U4SSC is a global platform for smart city stakeholders which advocates for public policy to encourage the use of ICTs to facilitate the transition to smart sustainable cities.

**JOIN us for the work on :**

- 🌱 Guidelines on tools and mechanisms to finance SSC projects
- 🌱 Guidelines on strategies for circular cities
- 🌱 City science application framework
- 🌱 Blockchain 4 cities
- 🌱 Guiding principles for artificial intelligence in cities





# United for Smart Sustainable Cities – (U4SSC)

## 4 New publications!



Collection Methodology for Key Performance Indicators for Smart Sustainable Cities

Enhancing innovation and Participation in Smart Sustainable Cities

Connecting cities and communities with the Sustainable Development Goals

Implementing SDG11 by connecting sustainability policies and urban-planning practices through ICTs



**Available for FREE at:**



<http://itu.int/go/U4SSC>



# Implementing KPIs for Smart Sustainable Cities Worldwide



The U4SSC welcome all cities that would like to start their SSC journey!

Measure your city's progress

# KPIs structure

54 Core Indicators + 37 advanced Indicators

20 Smart + 32 Structural + 39 Sustainable

Dimension

Economy

Environment

Society and culture

Category

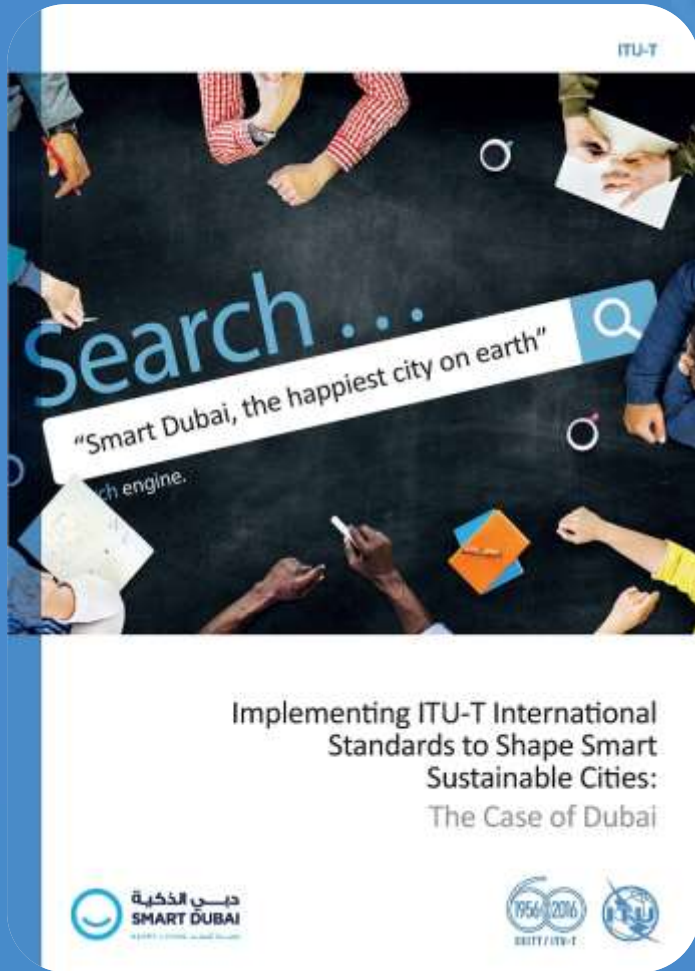
- ICT Infrastructure
- Water and sanitation
- Drainage
- Electricity supply
- Transport
- Public sector
- Employment
- Innovation
- Urban Planning
- Buildings

- Air quality
- Energy
- Environmental quality
- Infrastructure
- Public space and nature
- Waste
- Water and sanitation

- Culture
- Education
- Health
- Housing
- Safety
- Social inclusion
- Food security



# Report: The case of Dubai



The case study **“Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The Case of Dubai”** details Dubai’s ambitious and trailblazing journey towards becoming a smart city, a venture worthy of emulation by other aspiring smart cities around the world.

**Available for FREE at:**

<http://www.itu.int/en/ITU-T/ssc/Pages/default.aspx>



# Publications on IoT and Smart Sustainable Cities



## Flipbook on Unleashing the potential of the Internet of Things

This flipbook presents a compendium of the first set of ITU international standards for IoT, providing a resource of great value to standards experts interested in contributing to the work of ITU-T Study Group 20.



## Flipbook on Shaping smarter and more sustainable cities: Striving for Sustainable Development Goals

This compendium of Technical Reports and Specifications details policy and technical considerations relevant to the development of SSC, providing policymakers and engineers with valuable reference material to guide their pursuit of happier, safer life in our cities.

**Available on ITU website for free!**



**Thank you**

**ITU-T, IoT and smart  
cities & communities**

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