ITU-T Study Group 20: Internet of Things (IoT) and smart cities and communities

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

Last meeting: 4-15 September 2017

4 Regional Groups

SG20 RG-AFR

SG20 RG-EECAT

SG20 RG-LATAM

SG20 RG-ARB

JCA – IoT and SC&C

Visible contact point on IoT and SC&C activities

Coordination across ITU-T SGs, ITU-R and ITU-D

Cooperation with external bodies working in the field of IoT & SCC

ITU-T SG20 Structure

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

Approved new standards (ITU-T Recommendations)

- ITU-T Y.4113 **"Requirements of the network for the Internet of Things"**

- ITU-T Y.4451 **"Framework of constrained device networking in the IoT environments"**

- ITU-T Y.4452 **"Functional framework of Web of Objects"**

- ITU-T Y.4453 **"Adaptive software framework for IoT devices"**

- ITU-T Y.4455 **"Reference architecture for IoT network service capability exposure"**

- ITU-T Y.4553 **"Requirements of smartphone as sink node for IoT applications and services"**

- ITU-T Y.4702 **"Common requirements and capabilities of device management in IoT"**

- ITU-T Y.4101/Y.2067 **"Common requirements and capabilities of a gateway for Internet of Things applications"**

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

- ITU-T Y.4115 **"Reference architecture for IoT device capabilities exposure"**

- ITU-T Y.4116 **"Requirements of transportation safety service including use cases and service scenarios"**

- ITU-T Y.4117 **"Requirements and capabilities of Internet of Things for support of wearable devices and related services"**

- ITU-T Y.4805 **"Identifier service requirements for the interoperability of Smart City applications"**

Draft new standards under approval

- ITU-T Y.4454 **"Platforms interoperability for smart cities"**

- ITU-T Y.4200 **"Requirements for interoperability of smart city platforms"**

- ITU-T Y.4201 **"High-level requirements and reference framework of smart city platform"**

- ITU-T Y.4500.1 **"oneM2M- Functional Architecture"**

- ITU-T T.4806 **"Security capabilities supporting safety of the Internet of Things"**

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Agreed new Supplements

- 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 buildings"

- ITU-T Y.Supp.28 to ITU-T Y.4550 series
"Integrated management for smart sustainable cities"

- ITU-T Y.Supp.29 to ITU-T Y.4250 series
"Multi-service infrastructure for smart sustainable cities in new-development areas"

- ITU-T Y.Supp.30 to ITU-T Y.4250 series
"Overview of smart sustainable cities infrastructure"

- ITU-T Y.Supp.27 to ITU-T Y.4400 series
"Setting the framework for an ICT architecture of a smart sustainable city"

- ITU-T Y.Supp.45 to ITU-T Y.4000 series
"An overview of smart cities and communities and the role of information and communication technologies"

Agreed new technical papers and tutorials

- **oneM2M- Application developer guide: Light control example using HTTP binding**

- **oneM2M Developer Guide of CoAP binding and long polling for temperature monitoring**

- **oneM2M- Developer guide of device management**

- **oneM2M-Developer Guide of Implementing semantics**

- **oneM2M Industrial Domain Enablement**

- **oneM2M Use Case Collection**

Supplementary slides

Internet of Things Landscape 2016

Applications (Verticals)

Personal

Wearables
WATCH, Samsung Gear2, pebble, moto g, LG, HUAWEI, WE:X, CAEDEN, MOTIV, textronics, D3O, ORION, Jewelbots, nymi, Ringly, Tory Burch

Fitness
JAWBONE, fitbit, TomTom, GARMIN, NIKE, UNDER ARMOUR, MISFIT, BASIS, Xiaomi, huami, Microsoft Band, ATLAS, mapmy fitness, RunKeeper, LUMO, amiigo, LifeBEAM, ATHOS, lark, senSoria, WHOOP, striiv

Health
Samsung, Withings, kinsa, TELCARE, NeuroSky, hale, Thync, beam, GREAT LAKES NEUROTECHNOLOGIES, QUANTTUS, proteus, Ginger.io, iHealth, EarlySense, XETHRU, nanowear, vessyl, beddit, sano, hello, CHRONO, eyeSmart, GLOBAL KINETICS, AdhereTech, AliveCor, PROPELLER HEALTH, Sensor

Entertainment
SONOS, Razer, doppler labs, ROLI, Narrative, soundhawk, OWLET, peel, Electric Objects, meural, normal

Family
nucleus, ily, HALO, Glow, Good Night Lamp, FiLIP, bellabeat, mombaby, ovuline, livescribe, LULLY

Sports
STRAVA, WILSON X, Babolat, PELOTON, X2, ZEPP, ARCCOS, INFOMOTION, recon, swingbyte, GAME GOLF, ZEN FENCING, COMMON SENSORS

Toys
Hasbro, MATTEL, sphero, anki, sifteo, MAKIES, wonder, UBOOLY

Elderly
Healthsense, INDEPENDA, Live!y

Home

Automation
nest, LIFX, Honeywell, SAMSUNG, hue, CHAMBERLAIN, iDevices, belkin, wemo, icontrol, SAVANT, ecovent, ecobee, KISTRO, LIGHT SENTRY, Lumen, view, LUTRON, ORVIBO, LEVITON, somfy, bluesmart, CLEAN, CUBE, roost, tado°, KEEN

Hubs
nest, amazon alexa, INSTEON, iris, BOSCH, SmartThings, connect, iRule, Control4, ivee, wink, Vera, prodea, NINJABLOCKS, Fluent, NEXIA, zonoff

Security
august, SCHLAGE, Kwikset, ALARM.COM, dropcam, canary, vivint, SimpliSafe, ring, KIWI, KeyMe, evercam.io, Lockitron, BeON, camiocam, UNIKEY, LATCH, cocoon, seek, scout

Kitchen
JUNE, nomiku, drop, SUPERMECHANICAL, pantry, MOMENTUM MACHINES, Sereneti, BREWBOT, innit

Sensing
netatmo, leeo, ambient, birdi, AWAIR, CUBE SENSORS, wally HOME, sense, TRANSFORM AIR

Consumer Robotics
ALDEBARAN, jibo, iRobot, RobotsLAB

Pets
Whistle, Petnet, HACHIKO, Petcube, FitBark

Garden
EDYN, plantlink, BITPONICS, rachio

Trackers
tile, iotera, AthenTek, TrackR

Vehicles

Automobiles
INRIX, waze, AUTOMATIC, STREETLINE, dash, Zubie, navdy, Automile, vinli, Airbiquity, censio, OpenXC, CobraWireless

Autonomous
Google Self-Driving Car Project, Audi, GM, TESLA, DAIMLER, UBER, cruise, Ford, QUANERGY, DELPHI, NOVARIANT, nuTonomy, Peloton, MobilEye, Valeo

UAVs
DJI, 3DR, Parrot, Airware, LILY, CyPhy, SKYCATCH, SKYDIO, YUNEEC, DRONE BASE, DroneDeploy, HEXO+, DRL, SKY FUTURES

Space
BOEING, Lockheed Martin, AIRBUS, SpaceX, BLUE ORIGIN, spire, PLANET, Orbital ATK, NANORACKS, GALACTIC, XCOR

Bicycles / Motorbikes
SoBi, HAMMERHEAD, superpedestrian, unu, gogoro, SKULLY, SKYLOCK

Enterprise

Healthcare
STANLEY Healthcare, AUGMEDIX, VERSUS, mc10, vitalconnect, NovaSom, Qmim, Senseonics, PEERBRIDGE, vivify, AIRSTRIP, Sotera, Rhythm, Monica, INFOBIONIC, TeleTracking, PneumaCore, PRISTINE, VitalMetrics, OrthoSensor

Retail
RETAILNEXT, euclid, Theatro, PRISM SKYLABS, hiku, cloudtags, GIMBAL, PHUNWARE, NOMI, VARIABLE

Payments / Loyalty
PayPal, shopify, Square, Verifone, payleven, belly, coin, cantaloupe, acs, SHOPKEEP, ciright, LevelUp, DUALi

Smart Office
LogMeIn, CRESTRON, kisi, Robin, BUILDING ROBOTICS, CLEAN CUBE, XORA, eventboard

Agriculture
John Deere, adapt-N, Ag Leader, ONFARM, PYCNO, ARGUS, DACOM, Smartfield, afimilk, ZedX, ClimateMinder, SPENSA, i-Linc

Infrastructure
WORLD SENSING, TACHYUS, mPrest, ELTAV, Smart Cloud, M2M, INCON, SMARTSTRUCTURES, LumaSense Technologies, SensorLogic, GroundMetrics

Industrial Internet

Machines
CATERPILLAR, SIEMENS, BOSCH, GE, SIGHT MACHINE

Energy
Schneider Electric, Itron, enlighted, SolarCity, GE, BAKER HUGHES, Trilliant, enevo, ENERNOC, bigbelly, SMART GRID CLUSTER, OSIsoft, OutSmart, enbala, e-on, lucid, SilverSpring, ENERGYSAVVY, HydroPoint, sensity, Blue Pillar, AutoGrid, Panoramic, PETRA SYSTEMS, Fat Spaniel

Supply Chain
Fleetmatics, Impinj, VILOC, OmniID, SkyBitz, SMARTDRIVE, Telogis, assetpulse, WEFT, HID Tek, TEGO, AZBEA, ASAP, PRECYSETECH, RF CONTROLS

Robotics
amazon robotics, ABB, CLEARPATH, HARVEST, rethink robotics, Boston Dynamics, KUKA, ROBOTEX, EMPIRE, LIQUID ROBOTICS, tempo automation, OPENROV

Industrial Wearables
GLASS, DAQRI, parsable, humanlocation, BITSTEW, GUARDHAT, XOEYE, UPSKILL, wavelink, AUGMATE, APX

Platforms & Enablement (Horizontals)

Platforms

Software
xively, GE, Axeda, Jasper, lemetry, Ayla Networks, ThingWorx, IFTTT, Numerex, seeeo, M2M SPECTRUM NETWORKS, Evrythng, wot.io, davra networks, ZATAR, covisint, AUTODESK SEECONTROL, PubNub, thingsquare, BSQUARE, greenwave systems, M2M SPECTRUM NETWORKS, WiSilica, innoPath, peoplepower, machineshop, IoT, arrayent

Full Stack
samsara, EUROTECH, Predix, HELIUM, Telit

Developer
electric imp, TESSEL, resin.io, TEMBOO, estimote, Particle, theThings.iO, KONEKT, Wovyn, SensorCloud, NewAer

Analytics
splunk, sumologic, STRATOSCALE, lobeam, KAAZING, TempoIQ, UPTAKE, glassbeam

Sensor Networks
placemeter, SAFECAST, SST, MotionLoft

Connectivity
SIGFOX, SIERRA WIRELESS, neul, FILAMENT, aeris, INGENU, VENIAM, KORE, intamac, skyroam, ARKESSA, senet, actility

Security
Symantec, gemalto, Bastille, inside secure, MOCANA, NEURA, SHODAN, escrypt, SecuriThings, CyberFlow ANALYTICS, OWASP

Open Source
KAA, ThingSpeak, IoT, webinos, openHAB, nimbits

Interfaces

Virtual Reality
oculus, VIVE, PlayStation VR, Samsung Gear VR, OSVR, AVEGANT

Augmented Reality
Microsoft HoloLens, magic leap, Meta, SONY, blippar, zSpace, VUZIX, EPSON, PARACOSM

Other
amazon alexa, THALMIC, nod, EMOTIV, LEAP MOTION, SIXENSE, ivee, RYTHM, Omni, api.ai

3D

Printing / Scanning
3D SYSTEMS, Project Tango, intel REALSENSE, MakerBot, stratasys, occipital, OMC, VOLTERA, matterport, formlabs, DESKTOP METAL, VOXEL8, Carbon, BotFactory, shapeways, sculpteo, VOODOO MANUFACTURING

Content / Design
Sketchfab, Thingiverse, GRABCAD, AUTODESK, BODY LABS, FLOORED, DASSAULT SYSTEMES

Building Blocks

Hardware

Processors / Chips
intel, QUALCOMM, TOSHIBA, TEXAS INSTRUMENTS, Atmel, ARM, NVIDIA, LG, SIEMENS, NXP, INEDA SYSTEMS, SILICON LABS, Movidius

Sensors
NXP, Atmel, TEXAS INSTRUMENTS, NATIONAL INSTRUMENTS, libelium, psikick, Qualtré, MEMSIC, VALENCELL, Pete Sense, XERAFY, skyetek, mCube, CROSSBOW, ThingMagic

Parts / Kits
ARDUINO, Raspberry Pi, littleBits, Octopart, adafruit, XILINX, relayr

Charging
uBeam, WiTricity, humavox, AMPY

Software

Cloud
Google Cloud Platform, CISCO, IBM Watson IoT Platform, Microsoft Azure, amazon web services

Mobile OS
iOS, android, Brillo, HomeKit, BlackBerry

Connectivity

Protocols
WiFi Alliance, Bluetooth, ZigBee Alliance, XMPP, LoRa Alliance, MQTT, NFC, Z-WAVE, AMQP, M-Bus, OMA Open Mobile Alliance, MiWi, X10, THREAD, HART, BiTX, DDS, RFID, CoAP, RuBee, 2G 3G 4G LTE 6LoWPAN LWM2M DDS LIDAR

M2M
intel, QUALCOMM, MARVELL, BROADCOM, SIEMENS, FreeWave, TEXAS INSTRUMENTS, Atmel, Laird TECHNOLOGIES, CISCO, MOTOROLA, Fibocom, goTenna, GainSpan, enocean, altair semiconductor, Weaved

Telecom
verizon, at&t, China Mobile, NovaSom, T-Mobile, Sprint, airtel, Telefonica, China unicom, orange, américa móvil, US Cellular, Vodafone

WiFi
eero, STARRY, BRCK, Open Garden

Partners

Consultants / Services
IDEO, Dragon Innovation, MESH SYSTEMS, R/GA, PTC, pch, 3D HUBS, TOMORROW LAB, LSL, makexyz, altiux, 8

Retail
amazon, Walmart, BEST BUY, Apple, THE HOME DEPOT, Target, Lowe's

Manufacturing
foxconn, flex, SANMINA, JABIL, PEGATRON, Benchmark, Celestica

Alliances
ALLSEEN ALLIANCE, OMA, INDUSTRIAL INTERNET CONSORTIUM, AIOTI, OPEN CONNECTIVITY FOUNDATION

Incubators
techstars, Highway1, HAX, LEMNOS Labs, BOLT

Funding
KICKSTARTER, INDIEGOGO, AngelList

FIRSTMARK

ITU-T SG20 last meeting main results
4-15 September 2017

Statistics:

153 Participants

8 Draft Recommendations consented

1 Supplement agreed

6 Technical Reports agreed

36 New work items

ITU-SG20 Main outcomes
4-15 September 2017

8 draft Recommendations consented

- **ITU-T Y.4101/Y.2067 -** Common requirements and capabilities of a gateway for Internet of things applications
- **ITU-T Y.4201** - High-level requirements and reference framework of smart city platform
- **ITU-T Y.4200** - Requirements for interoperability of smart city platforms
- **ITU-T Y.4116** - Requirements of transportation safety service including use cases and service scenarios
- **ITU-T Y.4117** - Requirements and capabilities of Internet of Things for support of wearable devices and related services
- **ITU-T Y.4500.1** - oneM2M- Functional Architecture
- **ITU-T Y.4455** - Reference architecture for IoT network capability exposure
- **ITU-T Y.4806** - Security capabilities supporting safety of the Internet of Things

1 Supplement agreed

- **Y Suppl.45 to ITU-T Y.4000 series** - An overview of smart sustainable cities and the role of information and communication technologies

6 Technical Report agreed

- **YSTR- CSL - oneM2M.DG.CoAP** - oneM2M Developer Guide of CoAP binding and long polling for temperature monitoring
- **YSTR- CLS- oneM2M.UCC** - oneM2M Use Case Collection
- **YSTR- CLS- oneM2M.Ind.DE** - oneM2M Industrial Domain Enablement
- **YSTR-CLS- oneM2M.DG.SEM** - oneM2M-Developer Guide of Implementing semantics
- **YSTR-CLS- oneM2M.DG.AppDev** - oneM2M- Application developer guide: Light control example using HTTP binding
- **YSTR-CLS- oneM2M.DG.DM** - oneM2M- Developer guide of device management

Most recent approved ITU-T Recommendations (1)

Recommendation ITU-T Y.4101/Y.2067 "Common requirements and capabilities of a gateway for Internet of Things applications ".

Recommendation ITU-T Y.4101/Y.2067 provides the common requirements and capabilities of a gateway for Internet of things (IoT) applications. The provided common requirements and capabilities are intended to be generally applicable in gateway application scenarios.

Recommendation ITU-T Y.4116 "Requirements of transportation safety service including use cases and service scenarios "

This Recommendation describes requirements for providing transportation safety services. The use cases and related service scenarios which are used to extract requirements for various IoT services and applications are also described in this Recommendation.

Recommendation ITU-T Y.4117 "Requirements and capabilities of Internet of Things for support of wearable devices and related services ".

The purpose of this Recommendation is to describe characteristics, specific requirements and capabilities of the IoT for support of wearable devices and related services.

Recommendation ITU-T Y.4455 "Reference architecture for IoT network service capability exposure ".

This Recommendation introduces IoT network capability exposure (IoT NCE). The IoT NCE is a functional entity in network domain, and facilitates the Internet of things (IoT) applications and services to make full use of capabilities of their underlying networks. The IoT NCE can optimize user experience, improve network efficiency and expose network capability in order to optimize IoT applications and services.

Most recent approved ITU-T Recommendations (2)

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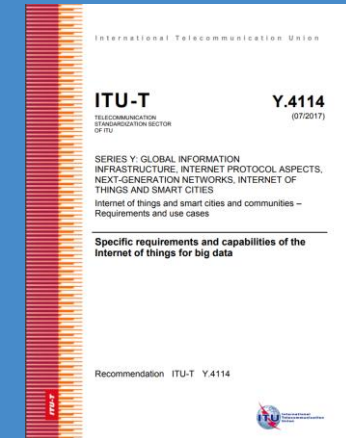
Recommendation ITU-T Y.4115 "Reference architecture for IoT device capability exposure"

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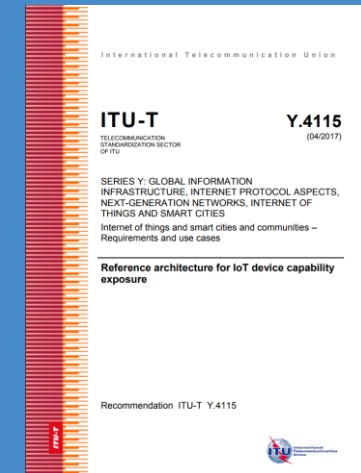
Recommendation ITU-T Y.4805 "Identifier service requirements for the interoperability of Smart City applications".

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.

New work items

Question	Working title	Title
Q2/20	ITU-T Y.SCC-Reqts	Common requirements and capabilities of smart cities and communities from IoT and ICT perspectives
Q2/20	Y.UCS-Reqts	Requirements and capabilities of user-centric work space service
Q2/20	Y.IoT-UAS-Reqts	Use cases, requirements and capabilities of unmanned aircraft systems for Internet of Things
Q3/20	Y.oneM2M.IWK.LwM2M	oneM2M- LwM2M Interworking
Q3/20	Y.oneM2M.PB.WebSocket	oneM2M- WebSocket Protocol Binding
Q3/20	Y.oneM2M.MAF.MEF	oneM2M- MAF and MEF Interface Specification
Q3/20	Y.oneM2M.DG.DM	oneM2M- Developer guide of device management
Q3/20	Y.oneM2M.DG.AppDev	oneM2M- Application developer guide: Light control example using HTTP binding
Q3/20	Y.oneM2M.DG.CoAP	oneM2M- Developer Guide of CoAP binding and long polling for temperature monitoring
Q3/20	Y.oneM2M.InteropTest	oneM2M- Interoperability Testing
Q3/20	Y.oneM2M.CT	oneM2M- Common Terminology
Q3/20	Y.oneM2M.PB.MQTT	oneM2M- MQTT Protocol Binding
Q3/20	Y.oneM2M.PB.HTTP	oneM2M- HTTP Protocol Binding
Q3/20	Y.oneM2M.SLCP	oneM2M- Service Layer Core Protocol Specification
Q3/20	Y.oneM2M.SEC.SOL	oneM2M- Security Solutions
Q3/20	Y.oneM2M.DG.SEM	oneM2M- Developer Guide of Implementing semantics
Q3/20	Y.oneM2M.ARC	oneM2M-Functional Architecture
Q3/20	Y.oneM2M.DM.OMA	oneM2M- Management Enablement (OMA)
Q3/20	Y.oneM2M.PB.CoAP	oneM2M- CoAP Protocol Binding
Q3/20	Y.oneM2M.TF	oneM2M- Testing framework
Q3/20	Y.oneM2M.FDC	oneM2M- Field Device Configuration
Q3/20	Y.oneM2M.HAIM	oneM2M- Home Appliances Information Model and Mapping
Q3/20	Y.oneM2M.Ind.DE	oneM2M- Industrial Domain Enablement
Q3/20	Y.oneM2M.BO	oneM2M Base Ontology
Q3/20	Y.oneM2M.DM.BBF	oneM2M- Management enablement (BBF)" (New)
Q3/20	Y.UIIS-IoT	Unified Identity/Identifier/Locator Split (UIIS) Services and Architecture in IoT Environment
Q3/20	Y.oneM2M.UCC	oneM2M- Use Case Collection
Q3/20	Y.oneM2M.REQ	oneM2M- Requirements
Q4/20	Y.disaster_notification	Framework of the disaster notification of the population in Smart Cities and Communities
Q5/20	Y.MEDT	Methodology for Building Sustainable Capabilities during Enterprises' Digital Transformation
Q6/20	Y.API4IOT	API for IoT Open Data in Smart Cities
Q6/20	Y.LPWA	Security, interoperability and identification aspects for Low Power Wide Area (LPWA) systems
Q6/20	Y.FW-IC-MDSC	Framework of identification and connectivity of Moving Devices in Smart City
Q7/20	Y.SSC-IA	Smart Sustainable City Impact Assessment
Q7/20	Y.SSC-MM	Smart Sustainable City Maturity Model
Q7/20	Y.AFDTS	Assessment Framework for Digital Transformation of Sectors in Smart Cities

Collaboration with oneM2M

1 Draft Recommendation consented

24 New work items

6 Technical Reports agreed

Next **oneM2M meeting** will be held in conjuntion with WP1/20 meeting from 15-19 January 2018

List of Recommendations transferred from other Study Groups

Study Group 20: IoT and its applications including smart cities and communities (SC&C) Y.4000 Series Stucture			
Y.4000 Number	**Previous Work Item**	**IoT and SC&C proposed subseries**	**From**
Y.4000-Y.4049		**General**	
Y.4000	(Y.2060)	Overview of the Internet of things	SG13
Y.4001	(F.748.2)	Overview and reference model of machine socialization	SG16
Y.4002	(F.748.3)	Relation management models and descriptions for machine socializations	SG16
Y.4050-Y.4099		**Definitions and terminologies**	
Y.4050	(Y.2069)	Terms and definitions for the IoT	SG13
Y.4100-Y.4249		**Requirements and use cases**	
Y.4100	(Y.2066)	Common requirements of the Internet of Things	SG13
Y.4101	(Y.2067)	Common requirements and capabilities of a gateway for Internet of Things applications	SG13
Y.4102	(Y.2074)	Requirements for Internet of things devices and operation of Internet of things applications during disasters	SG13
Y.4103	(F.748.0)	Common requirements for Internet of Things (IoT) applications	SG16
Y.4104	(F.744)	Service description and requirements for ubiquitous sensor network middleware	SG16
Y.4105	(Y.2221)	Requirements for support of ubiquitous sensor network (USN) applications and services in the NGN environment	SG13
Y.4106	(F.747.3)	Requirements and functional model for ubiquitous network robot platform to support USN applications and services	SG16
Y.4107	(F.747.6)	Requirements of water quality assessment services in ubiquitous sensor network (USN)	SG16
Y.4108	(Y.2213)	NGN service requirements and capabilities for network aspects of applications and services using tag-based identification	SG13
Y.4109	(Y.2061)	Requirements for the support of machine-oriented communication applications in the NGN environment	SG13
Y.4110	(Y.2065)	Service and capability requirements for e-health monitoring services	SG13
Y.4111	(Y.2076)	Semantics based requirements and framework of the Internet of Things	SG13
Y.4112	(Y.2077)	Requirements of the Plug and Play capability of the Internet of Things	SG13
Y.4250-Y.4399		**Infrastructure, connectivity and networks**	
Y.4250	(Y.2222)	Sensor control networks and related applications in a next generation network environment	SG13
Y.4251	(F.747.1)	Capabilities of ubiquitous sensor networks (USN) for supporting requirements of smart metering services	SG16
Y.4252	(Y.2064)	Energy saving using smart objects in home networks	SG13

List of Recommendations transferred from other Study Groups

	Study Group 20: IoT and its applications including smart cities and communities (SC&C) Y.4000 Series Stucture		
Y.4000 Number	**Previous Work Item**	**IoT and SC&C proposed subseries**	**From**
Y.4250-Y.4399		**Infrastructure, connectivity and networks**	
Y.4250	(Y.2222)	Sensor control networks and related applications in a next generation network environment	SG13
Y.4251	(F.747.1)	Capabilities of ubiquitous sensor networks (USN) for supporting requirements of smart metering services	SG16
Y.4252	(Y.2064)	Energy saving using smart objects in home networks	SG13
Y.4400-Y.4549		**Frameworks, architectures and protocols**	
Y.4400	(Y.2063)	Framework of the web of things	SG13
Y.4401	(Y.2068)	Functional framework and capabilities of the Internet of Things	SG13
Y.4402	(F.747.4)	Requirements and functional architecture for the open USN service platform	SG16
Y.4403	(Y.2026)	Functional requirements and architecture of the next generation network for support of ubiquitous sensor network applications and services	SG13
Y.4404	(Y.2062)	Framework of object-to-object communication for ubiquitous networking in next generation networks	SG13
Y.4405	(H.621)	Architecture of a system for multimedia information access triggered by tag-based identification	SG16
Y.4406	(Y.2016)	Functional requirements and architecture of the NGN for applications and services using tag-based identification	SG13
Y.4407	(Y.2281)	Framework of networked vehicle services and applications using NGN	SG13
Y.4408	(Y.2075)	Capability framework for e-health monitoring services	SG13
Y.4409	(Y.2070)	Requirements and architecture of the home energy management system and home network services	SG13
Y.4410	(Y.2291)	Architectural overview of next generation home networks	SG13
Y.4411	(Q.3052)	Overview of APIs and protocols for M2M service layer	SG11
Y.4412	(F.747.8)	Requirements and reference architecture for audience selectable media service framework in the IoT environment	SG16
Y.4413	(F.748.5)	Requirements and reference architecture of M2M service layer	SG16
Y.4414	(H.623)	Web of things service architecture	SG16
Y.4550-Y.4699		**Services, applications, computation and data processing**	
Y.4450	(Y.2238)	Overview of Smart Farming based on networks	SG13
Y.4551	(F.771)	Service description and requirements for multimedia information access triggered by tag-based identification	SG16
Y.4552	(Y.2078)	Application support models of the Internet of Things	SG13

List of Recommendations transferred from other Study Groups

Study Group 20: IoT and its applications including smart cities and communities (SC&C) Y.4000 Series Stucture			
Y.4000 Number	**Previous Work Item**	**IoT and SC&C proposed subseries**	**From**
Y.4700-Y.4799		**Management, control and performance**	
Y.4700	(F.747.2)	Deployment guidelines for ubiquitous sensor network (USN) applications and services for mitigating climate change	SG16
Y.4701	(H.641)	SNMP-based sensor network management framework	SG16
Y.4800-Y.4899		**Identification and security**	
Y.4800	(F.747.5)	Requirements and functional architecture of an automatic location identification system for ubiquitous sensor network (USN) applications and services	SG16
Y.4801	(F.748.1)	Requirements and common characteristics of IoT identifier for IoT service	SG16
Y.4802	(H.642.2)	Multimedia information access triggered by tag-based identification: Registration procedures for identifiers	SG16
Y.4803	(H.642.3 | ISO/IEC 29177 (common text))	Information technology - Automatic identification and data capture technique - Identifier resolution protocol for multimedia information access triggered by tag-based identification	SG16
Y.4804	(H.642.1)	Multimedia information access triggered by tag-based identification: Identification scheme	SG16
Y.4900-Y.4999		**Evaluation and assessment**	
Y.4900	L.1600	Overview of key performance indicators in smart sustainable cities	SG5
Y.4901	L.1601	Key performance indicators related to the use of information and communication technology in smart sustainable cities	SG5
Y.4902	L.1602	Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities	SG5
Supplements			
Y.Sup.37 to Y.4050-Y.4099	ITU-T L Suppl.17 to ITU-T L.1600	Definition for smart sustainable city	SG5
Y.Sup.38 to Y.4050-Y.4099	ITU-T L Suppl.18 to ITU-T L.1600	Smart sustainable cities: an analysis of definitions	SG5
Y.Sup.39 to Y.4900	ITU-T L Suppl.19 to ITU-T L.1600	Key performance indicators definitions for smart sustainable cities	SG5
Y.Sup.36 to Y.4550-Y.4699	ITU-T L Suppl.16 to ITU-T L.1500	Smart water management in cities	SG5
SG5 transferred Recommendations			
Y.4903	(L.1603)	Key performance indicators for smart sustainable cities to assess the achievement of sustainable development goals (consented) (under AAP ITU-T SG5)	SG5

JCA – IoT and SC&C

- To coordinate the activity on IoT & SCC across ITU-T Study Groups and to coordinate with ITU-R and ITU-D.
- To provide a visible contact point IoT and SC&C activities in ITU-T, to seek co-operation from external bodies working in the field of IoT & SCC and enable effective two-way communication with these bodies.
- Maintenance of a list of cross-SDO IoT & SCC standardization items and associated roadmap.

- Last meeting took place on 7 September 2017

- Next meeting will be held in with SG20 meeting

Co-Conveners:
- Hyoung Jun Kim (ETRI, Korea)
- Fabio Bigi (Italy)

Secretariat:
Contact: tsbjcaiot@itu.int

D.2r16 - IoT and SC&C standards roadmap (free download) – **Send us your inputs!**
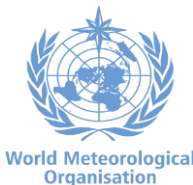
U4SSC current work

U4SSC is currently working on the following deliverables:

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

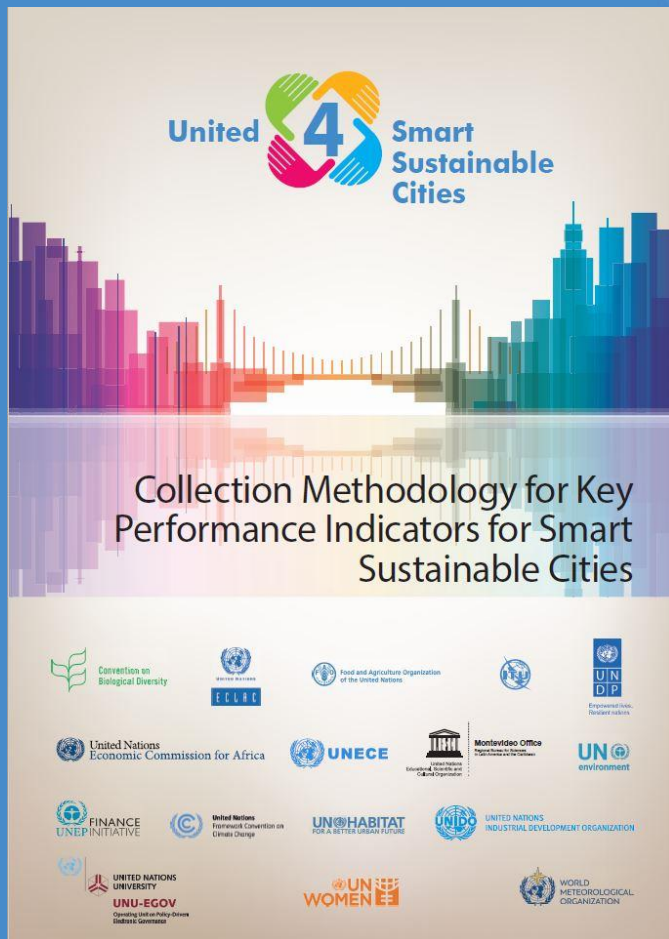Join the U4SSC now and participate in the online discussions

U4SSC publications
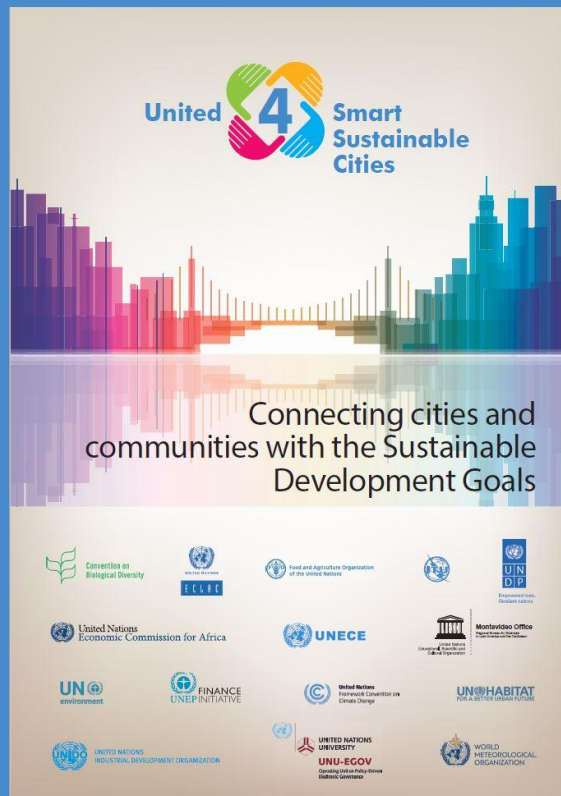
Available for free on the U4SSC website:
http://itu.int/go/U4SSC

U4SSC Key performance indicators for Smart Sustainable Cities

The U4SSC Initiative has developed a set of international **key performance indicators (KPIs) for Smart sustainable cities (SSC)** to establish the criteria to evaluate ICT´s contributions in making cities smarter and more sustainable, and to provide cities with the means for self-assessments.

Measure your city's progress

KPIs structure

54 Core Indicators + 37 advanced Indicators

20 Smart + 32 Structural + 39 Sustainable

132 Data Collection Points

| **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

Implementing Key performance indicators for Smart Sustainable Cities Worldwide

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

For more information contact: u4ssc@itu.int
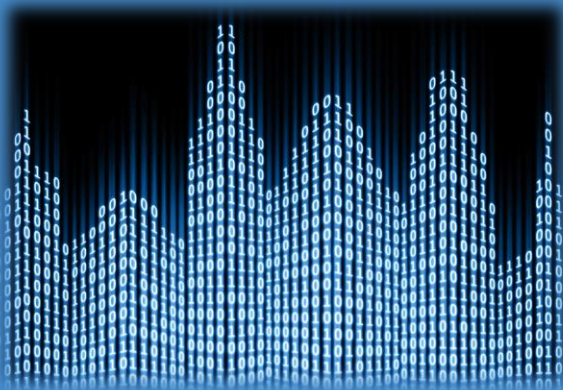
Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities (FG-DPM)

Key priorities:

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 |

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

Publication 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!

Upcoming meetings on IoT and SC&C

- Meeting of ITU-T SG20 Regional Group for the Arab Region (SG20 RG-ARB), Riyadh, Saudi Arabia, 19-22 November 2017.

- Rapporteur meetings of Q1/20; Q2/20; Q3/20 and Q4/20, Geneva 15-23 January 2018.

- Working Party 1/20 meeting will take place on 24 January 2018 in Geneva.

- The next meeting of ITU-T SG20 is planned to take place in May 2018.

Thank you

ITU-T, IoT and smart cities & communities

http://itu.int/go/tsg20

tsbsg20@itu.int