# ITU-T E.164.1 for IoT.

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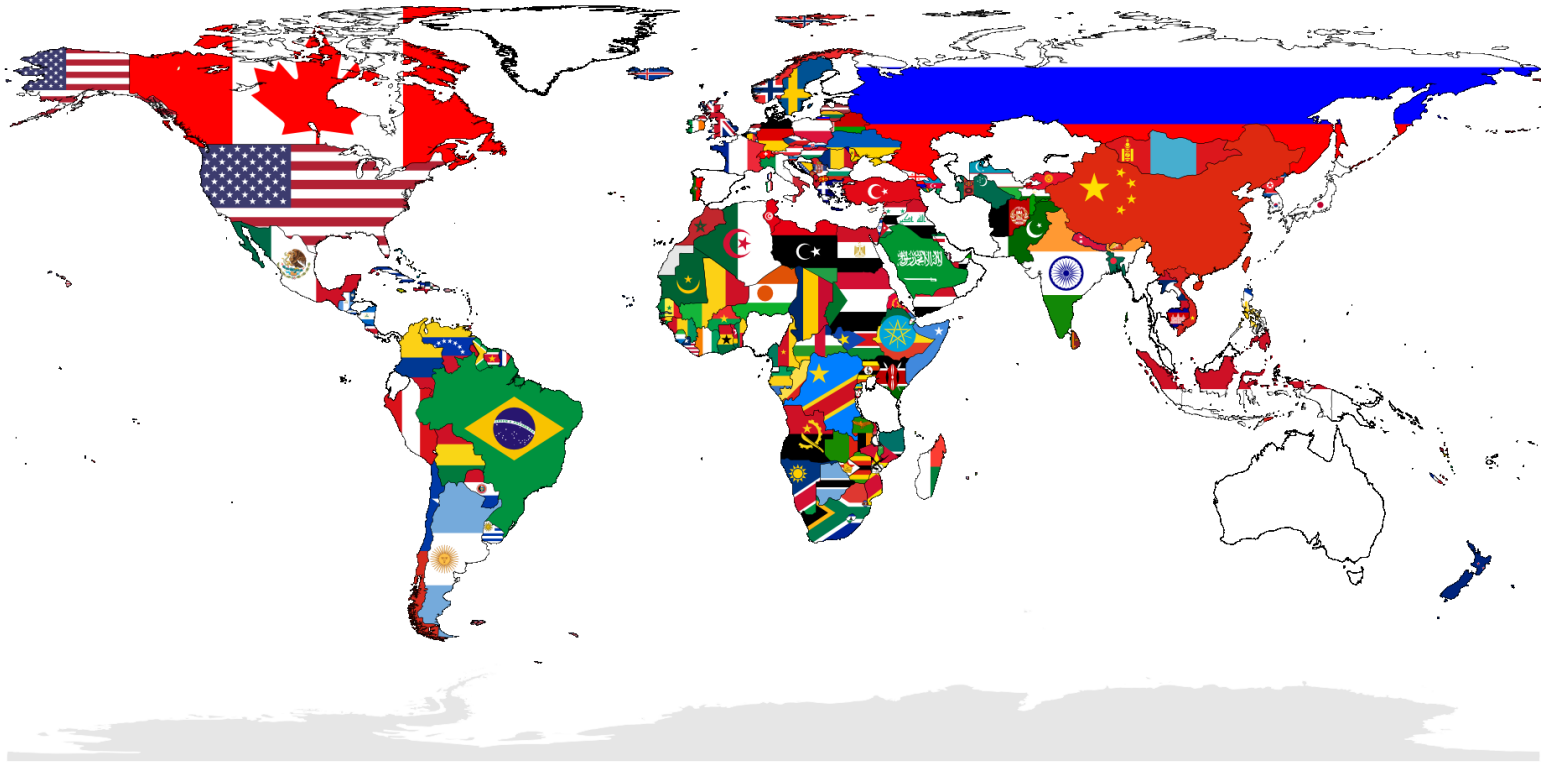
# Agenda

- Numbering assignment
- Related Recommendations: ITU-T E.164 & ITU-T E.164.1
- Reasons and works in  their evolution
- Conclusions

# Numbering assignment



ITU currently has a membership of 193 countries and almost 800 private-sector entities and academic institutions.

# Some related Recommendations:

- **E.164**=>The international public telecommunication numbering plan.
- **E.164.1**: Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)
- E.164.2:E.164 numbering resources for trials
- E.164.3: Principles, criteria and procedures for the assignment and reclamation of E.164 country codes and associated identification codes for groups of countries
- **E.190**: Principles and responsibilities for the management, assignment and reclamation of E-series international numbering resources
- **E.212**: The international identification plan for public networks and subscriptions

# Recommendations precedence in case of conflicts

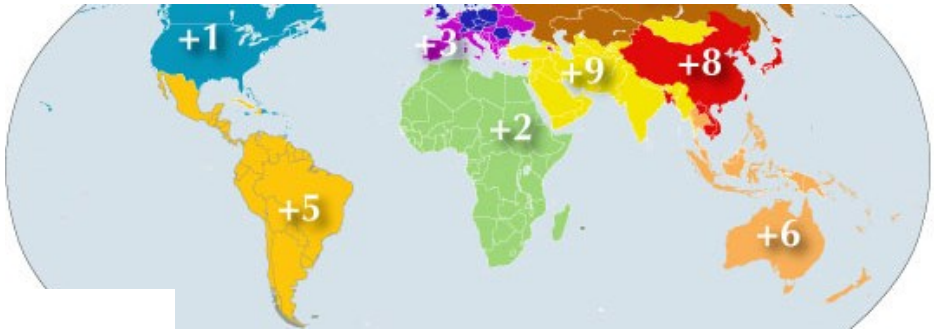
1. **E.190**: Principles and responsibilities for the management, assignment and reclamation of E-series international numbering resources
2. E**.164**=>The international public telecommunication numbering plan.
3. **E.164.1**: Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)

# ITU-T E.164 (11/2010)+Amendment 1(06/2011)

- ITU-T E.164 “The international public telecommunications numbering plan”
  - Linked to treaty obligations (specific roles and obligations defined for ITU Member States and TSB Director)
  - Defines number structure and functionality for three principal categories of numbers:
    - geographic areas (including country codes)
    - global services
    - Networks
    - groups of countries
  - International ITU-T E.164 numbering resources for Trials

The international ITU-T E.164-number is composed of a variable number of decimal digits arranged in specific code fields. The international ITU-T E.164-number code fields are the country code (CC) and remaining fields are specific to the use being made of the international ITU-T E.164 number

# Country Codes



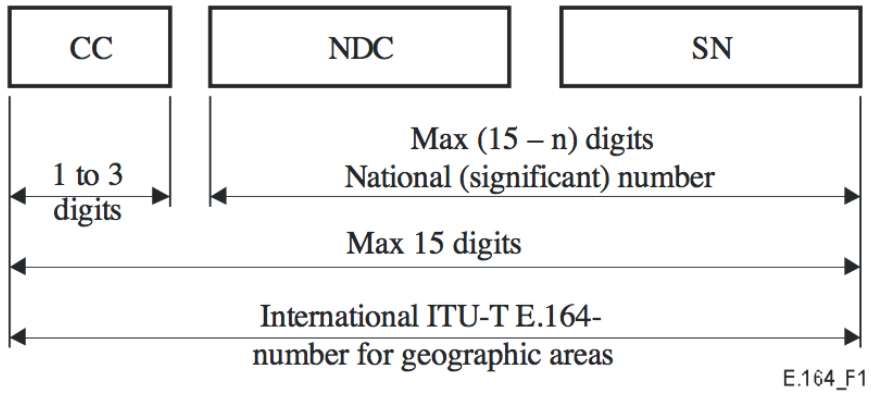

- +1 – Canada
- +1 – United States, including United States territories:
  - +1 340 – United States Virgin Islands
  - +1 670 – Northern Mariana Islands
  - +1 671 – Guam
  - +1 684 – American Samoa
  - +1 787 / 939 – Puerto Rico
- +1 Many, but not all, Caribbean nations and some Caribbean Dutch and
  - +1 242 – Bahamas
  - +1 246 – Barbados
  - +1 264 – Anguilla
  - +1 268 – Antigua and Barbuda
  - +1 284 – British Virgin Islands
  - +1 345 – Cayman Islands
  - +1 441 – Bermuda
  - +1 473 – Grenada
  - +1 649 – Turks and Caicos Islands
- +504 – Honduras
- +505 – Nicaragua
- +506 – Costa Rica
- +507 – Panama
- +508 – Saint-Pierre and Miquelon
- +509 – Haiti
- +51 – Peru
- +52 – Mexico
- +53 – Cuba
- +54 – Argentina
- +55 – Brazil
- +56 – Chile
- +57 – Colombia
- +58 – Venezuela
- +590 – Guadeloupe (including Saint Barthélemy, Saint Martin)
- +591 – Bolivia
- +592 – Guyana
- +593 – Ecuador
- +595 – Paraguay
- +596 – Martinique

List of ITU-T Rec E.164 assigned Country Codes=>Annex to ITU Operational Bulletin

# Types of ITU-T E.164 resources

## Number structure for geographic area

CC identifies a specific country, countries in an integrated Num. Plan, or a specific geographic area

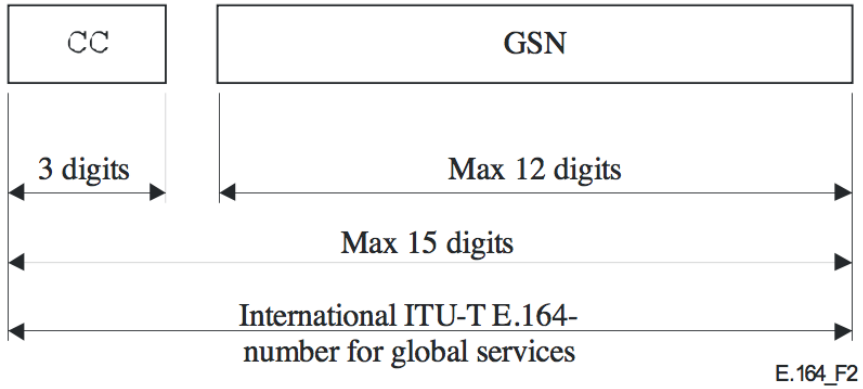



CC Country Code for geographic area
NDC National Destination Code
SN Subscriber Number
n Number of digits in the country code

NOTE – National and international prefixes are not part of the international ITU-T E.164-number for geographic areas.

## Number structure for global services

CC used to identify a global service (between 2 or more countries y/o integrated Numbering plans)=>Details in ITU-T E.169



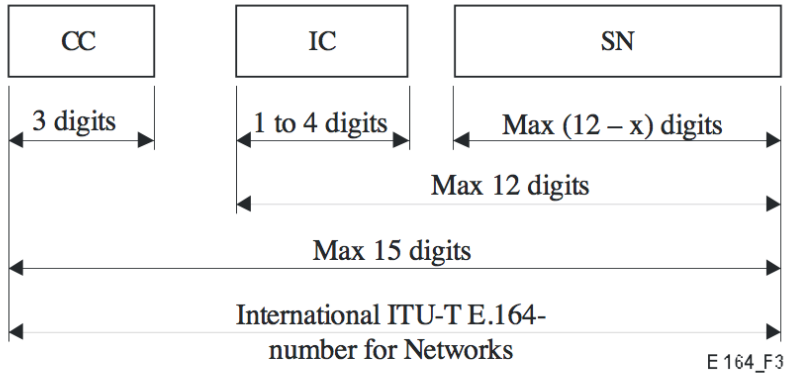

CC Country Code for global services
GSN Global Subscriber Number

NOTE – National and international prefixes are not part of the international ITU-T E.164-number for global services.

# Types of ITU-T E.164 resources

## Number structure for Networks

CC used in combination with an identification code (IC) to identify an International network

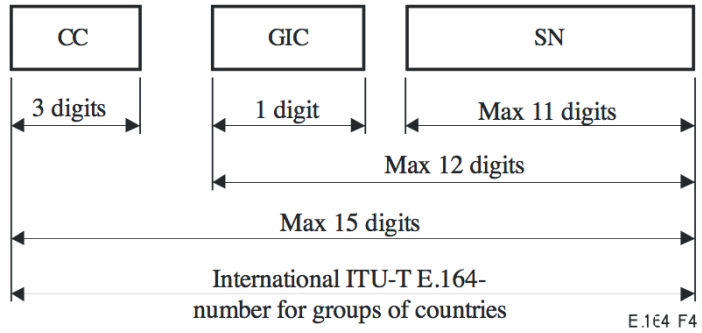



CC Country Code for Networks
IC Identification Code
SN Subscriber Number
x Number of digits in Identification Code

NOTE – National and international prefixes are not part of the international ITU-T E.164-number for Networks.

## Number structure for group of countries

CC (Shared) used in combination with a group identification code (GIC) to identify a group of countries




CC Country Code for Groups of Countries
GIC Group Identification Code
SN Subscriber Number

NOTE – National prefixes are not part of the international ITU-T E.164-number for groups of countries.

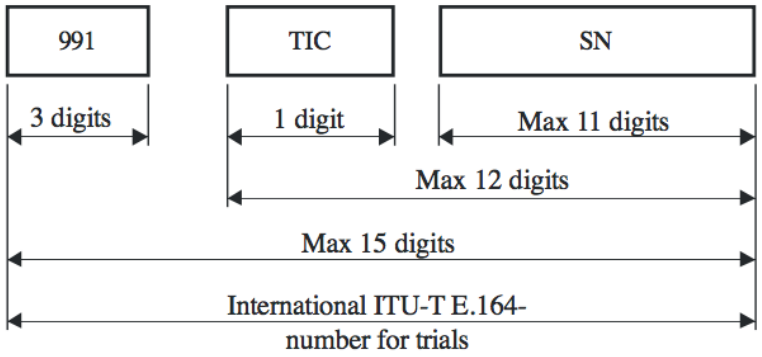
CCITT / ITU-T

ITU-T Bridging the Standardization Gap

# Types of ITU-T E.164 (09/2008) Resources

- **Number structure for Trials**

  CC (Shared) used in combination with a 3-digit trial identification code to identify a trial.




TIC Trial Identification Code
SN Subscriber Number

E.164(10)_F5

NOTE – National prefixes are not part of the international ITU-T E.164-number for Trials.

# ITU-T E.164.1 (09/2008)

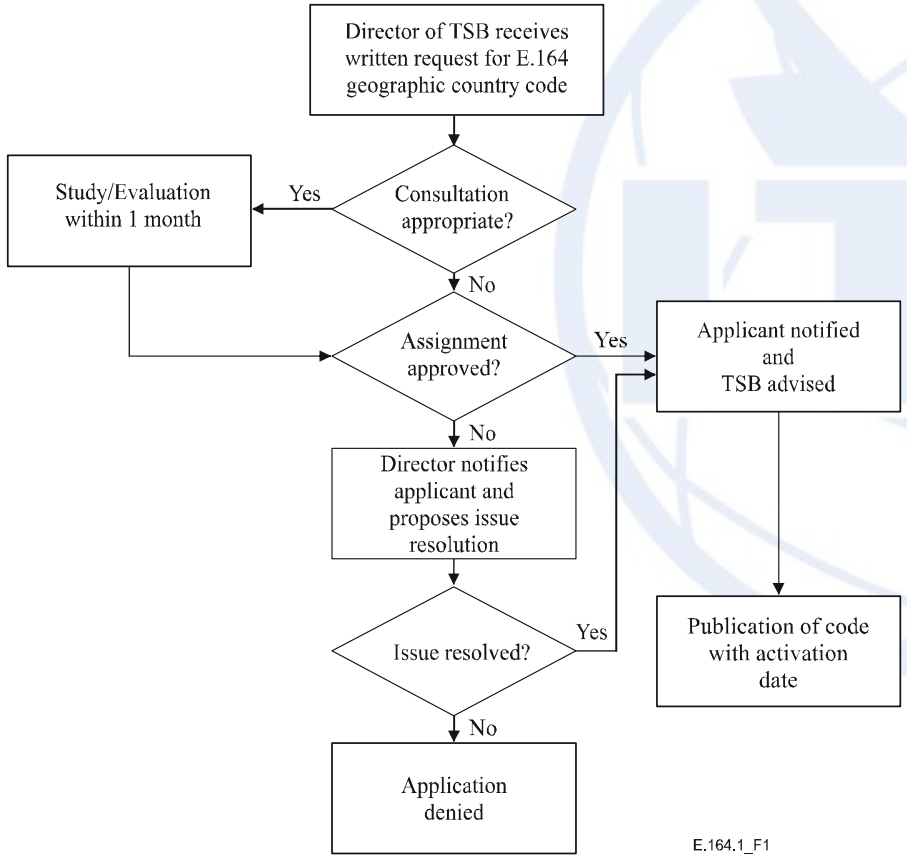
- Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)
- Provided as a basis for the effective and efficient utilization of the available E.164 numbering resources
- Such assignments require a collaborative effort between TSB and the appropriate ITU-T study group to endeavor to ensure that the assignments meet the needs of the telecommunication community

# ITU-T E.164.1 (09/2008)

- The Director of the Telecommunication Standardization Bureau (TSB) assigns and reclaims E.164 country codes for geographic areas, global services and for Networks.
- The Director is also responsible for the assignment and reclamation of identification codes (ICs) for Networks
- The assignment of subsequent digits is normally not the purview of the ITU-T, but is the purview of the assignee. However, there may be unique circumstances by which it is jointly agreed by TSB and the appropriate ITU-T study group that subsequent digits are to be administered by TSB, e.g., UIFNs. [Freephone Numbers (+800)]

# ITU-T E.164.1 (09/2008)

## Procedures for the assignment of country codes for geographic areas (reservation is not required)



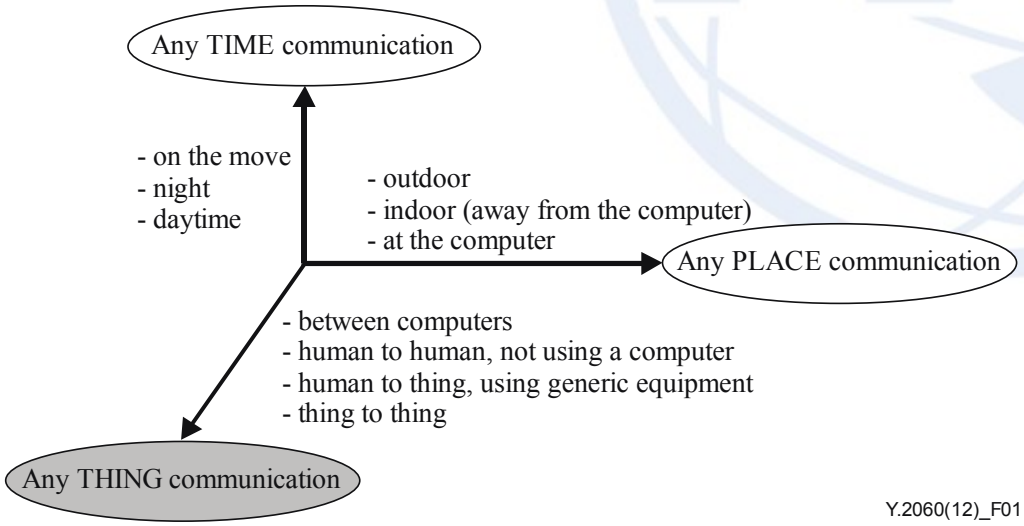
# Evolution

- The growth in M2M communications services in recent years and the advent of the internet of things (IoT) has been growing and would be more in the future. The data exchange between objects, with or without human intervention, will have profound benefits and changes for citizens and ICTs.


Source: Internet of Things: Policy and Regulatory Enablers, ITU ASP COE Training on "Developing the ICT ecosystem to harness IoT, 13-15 December, 2016. Bangkok, Thailand.

# Concept of IoT (ITU-T Y.2060)

- The Internet of things (IoT) can be perceived as a far-reaching vision with technological and societal implications.
- From the perspective of technical standardization, the IoT can be viewed as 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 (ICT).
- Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of "things" to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.




Y.2060(12)_F01

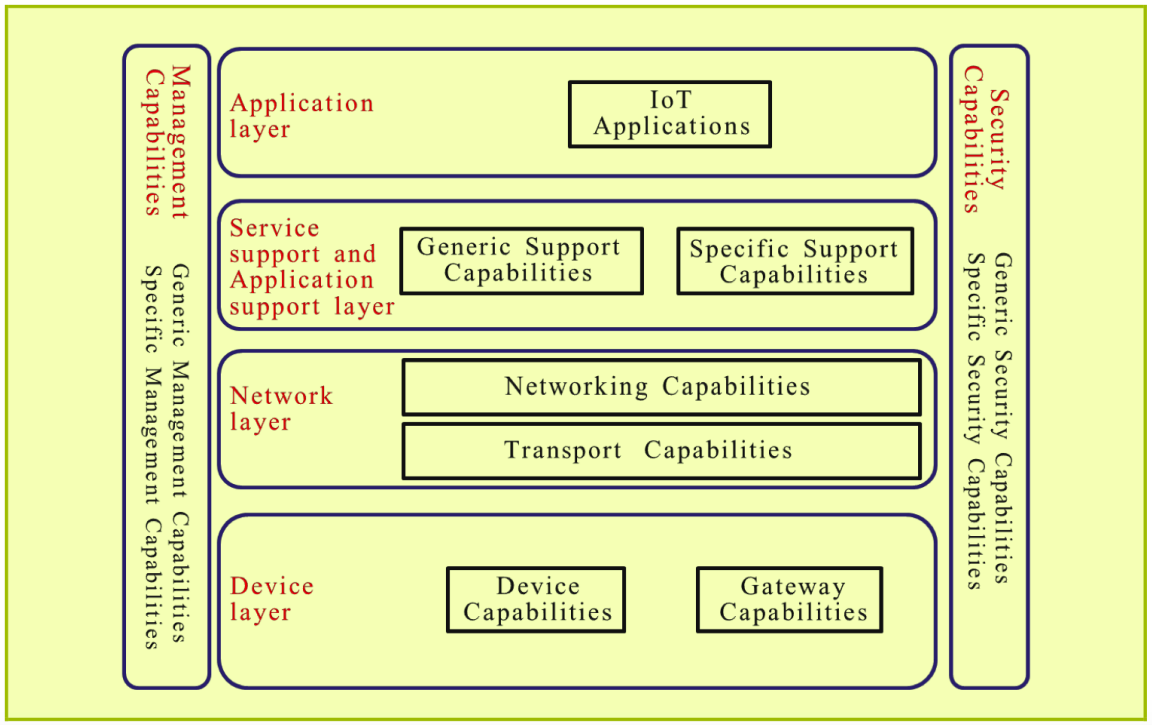
# “Definition” IoT

- *ITU-T Y.2060*: 3.2.2 Internet of things (IoT): 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.
  - NOTE 1 – Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.
  - NOTE 2 – From a broader perspective, the IoT can be perceived as a vision with technological and societal implications.
- ITU-T Y.2060: 3.2.3 thing: With regard to the Internet of things, this is an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks.

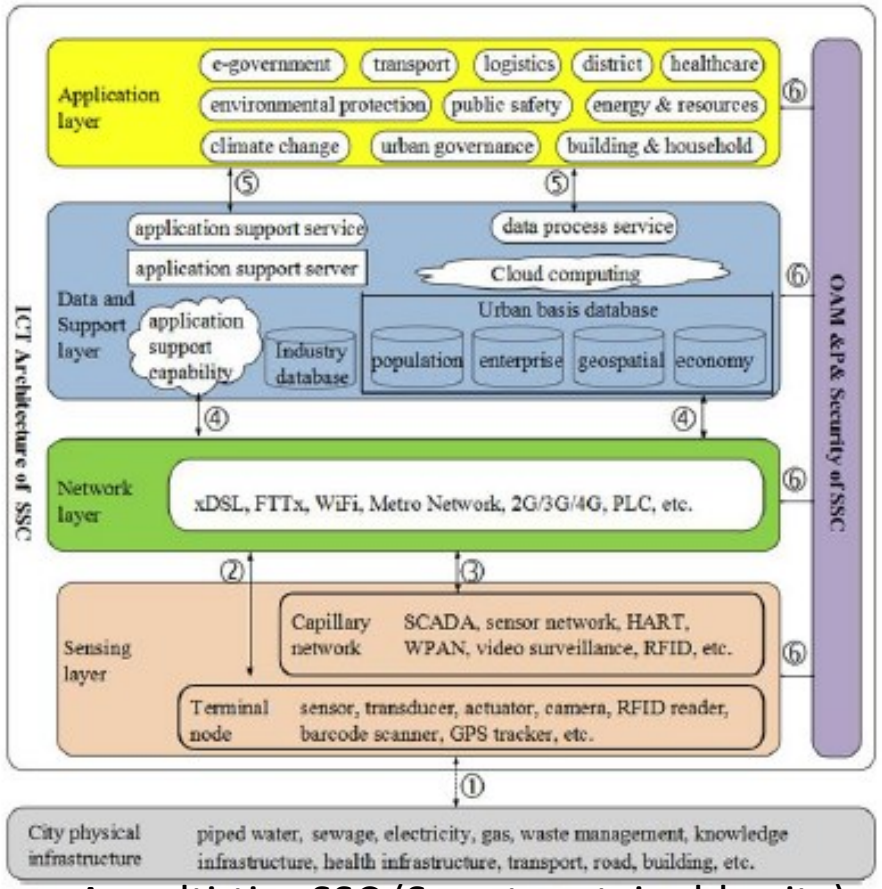
# Emerging ICT Insfrastructure

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

IoT reference model



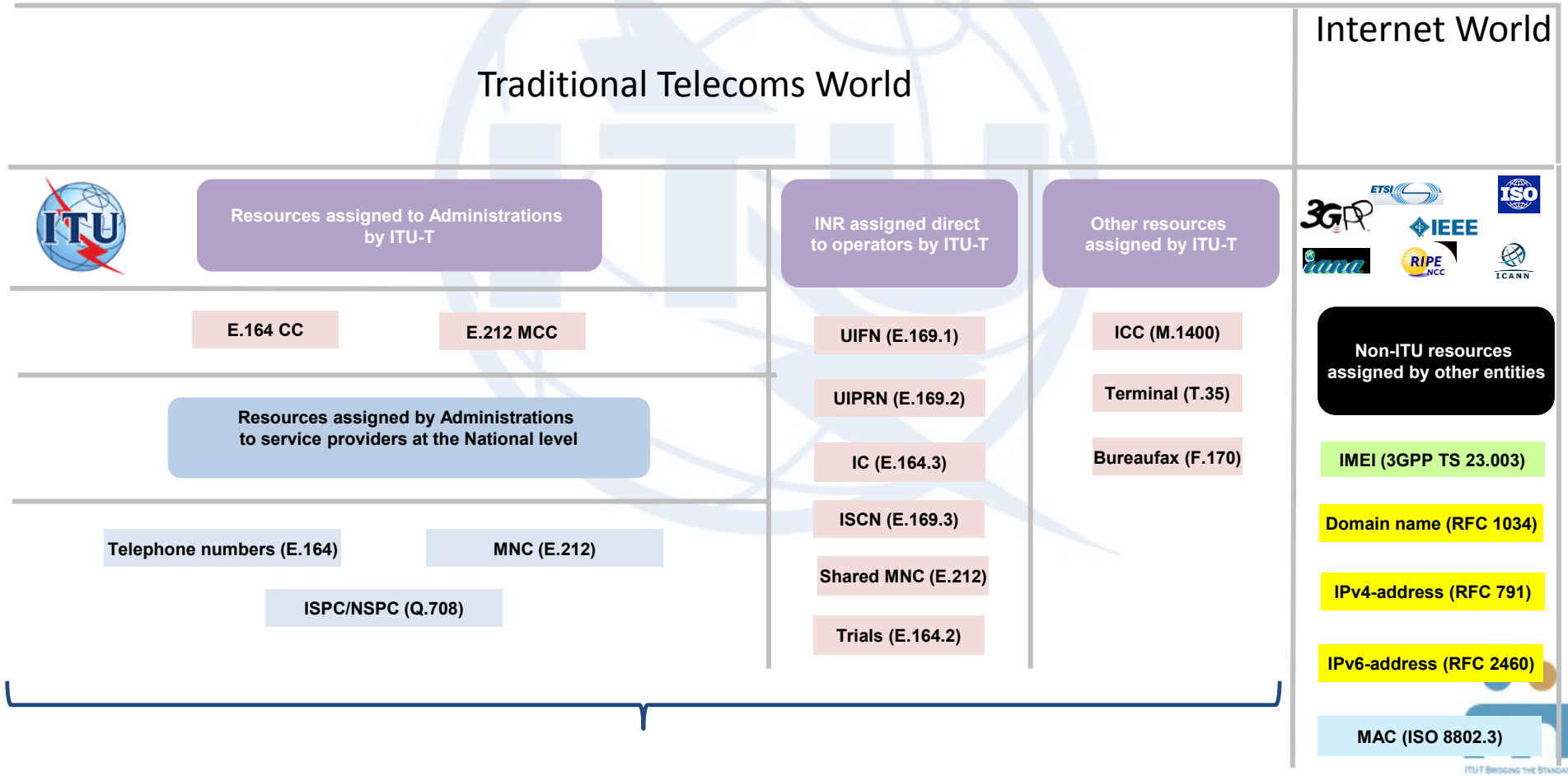

Source: Recommendation ITU-T Y.2060




A multi-tier SSC (Smart sustainable city)

Source: ITU-T Focus Group on Smart Sustainable Cities. Overview of Smart sustainable cities infrastructure

# Management of Numbering & Identification




Source: CEPT-ECO, 4th CEPT workshop on "European Spectrum Management and Numbering", 5 april, 2016

# Recommendations are dyamically updated:

- to reflect the current circumstances of the global telecommunications industry and regulatory environment taking into account NGN and IP-based network
- Because NNAI (Numbering, Naming, Addressing and Identification) requires continuous development to support the convergence of existing and future networks (fixed & mobile) and new/different services (IoT, M2M, etc.) in an interoperable world.
- To address requests for new numbering resources (geographic & non-geographic, domestically & internationally)

# Ex.: Working on Evolution:

- progress of E.IoT-NNAI=>*initial draft Recommendation for IoT-NNAI*=> The first version (January,2016) It is intended to do no more than stimulate both discussion and contributions in order that the work is developed, with the aim of advancing (Meeting Sep, 2016) The name of the new numbering resource is for further study [TBD](SG2TD953 rev.1)
- revision of recommendation E.164.1 with a view to developing new criteria for Country Code 878 (*) and for new numbering resource.
- Liasson were sent to ITU-T SG20 in line with the agreement of TSAG (March2015)
- Extension the usage of resources assigned to VISIONng on a trials basis as requested in their application (SG2-Report 20-19-23, Sep,2016)=>ex. 878 10

(*)+878=>Universal Personal Telecommunications services

# Contributions to SG2 meeting (March-April 2016)

- **sub allocation:** to apportion a share of an assigned resource to a subordinate provider. Definition proposed by editor in January 2012 (TD 102 (GEN/2)-E ) and in the last version has been changed to **sub-assignment** => Assignment process

# Contributions to Q1/2 meeting (Feb,2017)

- USA (Proposed edits to source doc.952 Rev1-Sep,2016).- Change [TBD] to NRIA (Numbering Resources for use in IoT Applications)
- Orange: The notion of "Intelligent Transport Systems (ITS)" as envisioned for country code 878 encompasses a variety of features and services that includes both human-initiated and machine-initiated communications ranging from automated emergency-type services to in-car connectivity. The contribution proposes that such an all-encompassing approach be used for revisiting the assignment criteria of E.164 country code 878 and include a definition under section 3.2 to be used for ITS extracted from ITU-R M.1797: "*The applicant must affirm that the resources must be used for ITS ie "Systems utilizing the combination of computers, communications, positioning, and automation technologies to improve the safety, management, and efficiency of terrestrial transportation"*
- Orange: some elements that requires further work for an 878 ITS CC:
  - Number portability
  - Notion of registrar
  - Remit of the service
- VISIONng
  - Portability (type of portability, type of services/applications) in a selective form=> should ask SG20
  - Expand the range without increasing the number of digits, taking into account the way E.164 numbers are coded and used in software systems (additional space using other digits than 0-9)=> impact in operators!
  - Defining criteria for CC 878.

# Contributions to SG2 meeting (March-April 2017)

VISIONng:

- 878-numbers: IoT-M2M – Individuals (VISIONng C.6)

  It is proposed that 878 numbers should continue to be made available to individuals, in addition to being used for M2M and IoT. The question of whether to allocate only specific sub-ranges of 878 to individuals should be discussed.

- 878 – Portabitity

  "We stress that, in our view, portability is an essential component of 878 numbers and that is should be an essential component of numbering ranges used for M2M/IoT."

- Voice in M2M/IoT services (VISIONng C.8)

  Voice is an integral part of M2M/IoT services:During the Q.1/2 Rapporteur meeting held on 7-8 February 2017 in Geneva, some reservations were expressed regarding the use of E.164 numbers to provide voice services in conjunction with NGN/IoT services. Any voice services that use E.164 numbers would fall within the normal national regulatory framework. Further, the provision of voice services is an essential element for certain types of NGN/IoT services, in particular emergency services. It is suggested that national regulators consider mandating the routing of specific numbering ranges that are used for emergency services 878 xx 9, or a new range 874 xx. (The code 879 is reserved for national non-commercial purposes). (VISIONng C.7)

# Conclusions

- The Recommendations are living documents that are constantly being updated in order to feedback the virtuous circle  of elements in the global ICTs infrastructure.
- ITU-T is positioning itself as a contribution-led, consensus-based approach to standards development specially in NNAI area.
- From Question 1/2 Work Programme at September,2016 meeting, the estimated completion date (SG2 approval) for the E.164.1 is 2017-2020 and for the E.IoT-NNAI (NNAI for Internet of things) appears for 2013-2016, but really is such an important work that it will be completed in 2017-2020 period. Thus there is a hard job to do in this study-period!

# Thank you!

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ITU