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**EVOLUTION OF NNAI AND RECENT ACTIVITIES AT ITU-T
SG2 AND SG20**

(Item on the Agenda: 4.2.2)

**(Information document submitted by American Registry for
Internet Numbers (ARIN))**

Evolution of NNAI and Recent Activities at ITU-T SG2 and SG20

Disclaimer, this is for informational purposes.

ARIN is a sector member of ITU D and ITU T.

Role in SG 2 as Chair of WP1, Vice-chair of the Adhoc on Resolution 64, and member of the NCT (Numbering Co-ordination Team per E.164.1).

ITU-T SG 2: Operational aspects of service provision and telecommunication management

Lead study group:

- for numbering, naming, addressing, identification (NNAI) and routing
- for service definition
- on telecommunications for disaster relief/early warning, network resilience and recovery
- on telecommunication management (WP2)

Evolution and management of NNAI

Telephone numbers (E.164) and International mobile subscriber identity numbers (IMSI, E.212) are some of the number resources available directly from the ITU.

Number evolution:

1. Numbers to national administrations - original purpose
2. Numbers to national administrations for mobile operators
3. Numbers to global mobile operators - ITU criteria for this and above exists
4. Numbers for national IoT/M2M and non-operators - NRAs seeing this
5. Numbers for global IoT/M2M and to non-operators <-SG2 seeing this

Hardware evolution alignment:

1. Landline phone (geographic phone number)
2. Cell phone from 1998 (national phone number)
3. Smart phone (national number and IMSI or global phone number and global IMSI)
4. Tablet (telephone number for account management and IMSI)
5. Smart meter (IMSI, probably no telephone number)

In 2015 the ITU began to receive requests for global resources (IMSIs and sometimes telephone numbers as well) for IoT/M2M devices for 5g/LTE. Examples of use include vehicle tracking systems, vehicle e-call systems, elevators, watches, tablets, smart meters, etc.

Current criteria for requesting mobile telephone numbers and IMSIs directly from the ITU:

1. Be an ITU member and an operator
2. Operate in more than one country
3. Have full control of the network
4. Abide by national regulations, and the general purpose until recently has been voice.

Some requests do not meet the criteria: SG2 is seeing requests coming from manufacturers and virtual service providers, some of whom are not global, some who will not be implementing the network and therefore do not necessarily have control end to end, national regulation may be somebody else's obligation, and voice is possible but not necessarily the primary use.

It's pretty obvious that the future will have more and more devices connecting to LTE networks, more smart phones, more tablets, more IoT/M2M devices. At a minimum, to get on the network all of these

devices must have IMSIs. Some devices also require telephone numbers. SG2 needs to have not only good and clear criteria, but this needs to be the criteria that you, your administrations, want SG2 to have.

That's the background, now there are proposed policy changes to the number allocation criteria:

1. Regarding requests for numbers for for IoT/M2M that have limited voice (closed user group) (TD 107R2 advice to NCT being used to handle some of these requests, see footnote).
2. Non-operators (eg Multefire Alliance, "Annex G" for E.212. This is LTE-based in unlicensed and shared spectrum). SG2 approved a temporary assignment. This is larger coverage than wifi. Examples include sporting arena and mining facility.
3. Trials and private use assignments.

Some new work items at SG2

1. IoT/M2M network provider portability
2. Technical Report on Overview of IoT identification schemes (SG2Q2)
3. Traffic deemed impermissible (OTT bypass and simboxes, TAP) (SG2Q3)

Finally, the US registry for IMSIs gave a presentation to SG2 about something which is new this year. The use case is very similar to the Multefire use case, but the registry came up with something unique. CBRS (Citizens Broadband Radio Service) is shared spectrum. The policy authority came up with an IMSI policy for private networks. They are planning for a limited amount of smaller requests. They took one assignment and broke it down so it could be used by up to 10k applicants, each applicant can number 100k devices.

Footnote:

This was the advice provided by SG2 to the NCT (SG2 TD 107R2)

Guidance for IoT services

Global resources can be used on a specific device both for IoT and voice service under the condition

a) it does not duplicate any existing public service in particular the public telephony service which is primarily intended for the exchange of information in the form of speech, whereby users can communicate directly and temporarily between themselves in conversational mode (taken from E.105). For example communications in a closed user group do not duplicate the public telephony service.

b) no sub-assignment of the IC is made by the assignee to a VoIP service provider to use on connected device access. For example, the calls are initiated, routed and terminated entirely on the public telecommunications networks, which includes IP-based networks and dedicated networks such as those on ships and aircrafts, and satellite networks.

Beyond this, if the assignee changes the remit of the services described in the application, this does not require an extension request but needs to be notified in the annual report.

Disclaimer on 20 activities, ARIN is a T and D sector member.

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

Lead study group:

- on Internet of things (IoT) and its applications
- on smart cities and communities, including its e-services and smart services

- for Internet of things identification

Recent activities:

Some of the topics under discussion have included IoT device interoperability, IoT device ID systems, AI (machine learning), Distributed Ledger Technology, Digital Financial Transactions, UAVs, crowd sourcing systems, aftermarket vehicle e-call systems, and IPv6.

Interoperability

Transposition project of OneM2M Technical Standards and Technical Reports

These are IP/Internet based standards

OneM2M is a Partnership, with a dozen SDOs including ATIS and ETSI, and 200 members (mobile providers, mobile manufactures, automobile manufacturers, etc.)

ITU-T Y.4500.1 (01/2018) oneM2M – Functional architecture, 452 pages. While the OneM2M standards work is of a very high quality, there have been hiccups with how these standards have been brought into the ITU.

ITU-T A.25 "Generic procedures for incorporating text between ITU-T and other organizations"

ITU-T A.2 "A contribution should not, as a rule, exceed about 2500 words (requiring no more than five printed pages to be distributed)..."

Study Group procedures are continuing to be discussed at TSAG (Telecommunication Standardization Advisory Group). The next TSAG is in December 2018 and unfortunately this overlaps the next SG20.

IP addresses are not IoT IDs

Y.4801: Requirements and common characteristics of the IoT identifier for the IoT service (initially created in SG16 and now maintained by SG20)

"IPv4/IPv6 addresses are not suitable as public identifiers because they are used as routing identifiers in the Internet. Although IPv4/IPv6 addresses are generic identifiers, there are not enough of them to accommodate numerous devices in the IoT (i.e., the exhaustion of identifiers can occur)."

IPv6

Draft Y.IPv6RefModel (IPv6 numbering for an IoT deployment)

Basics: regardless of size, split the network into 4 equal parts, first two are for traditional network purposes, 3rd part is for IoT devices, and 4th part is spare.

Presentation at RIPE meeting and operator feedback (see SG 20 LSi from RIPE)

LSi 0003: "A number of submissions stressed the point that any best practices regarding Internet addressing be developed within one of the Internet network operator communities or the IETF, as such work will necessarily emerge from the practices already being employed by operators"

ARIN position: out of scope for ITU, IP number policy is RIR matter.