



**ITU Workshop on “Future Trust and Knowledge
Infrastructure”, Phase 2
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**Key Trust issues related to NNAI and
Services**

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“Key Trust issues related to NNAI (Numbering, Naming, Addressing and Identification) and Services”

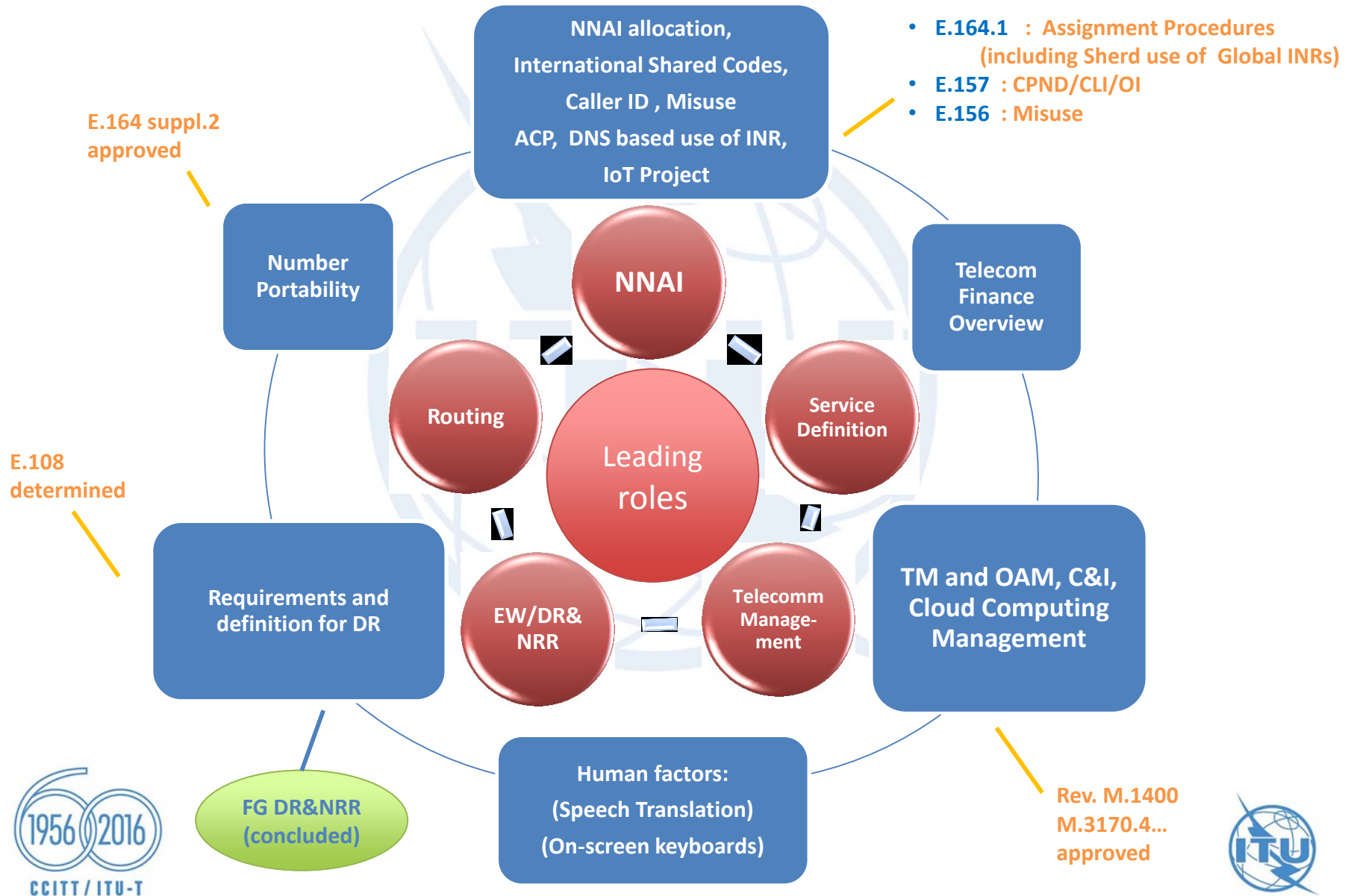
Contents*

- SG2 at a glance
- NNAI trust related issues.
- Routing vulnerabilities (SS7).
- Global services.
- Towards All IP networking.
- Telecom Management in SG2.

ITU-T SG2

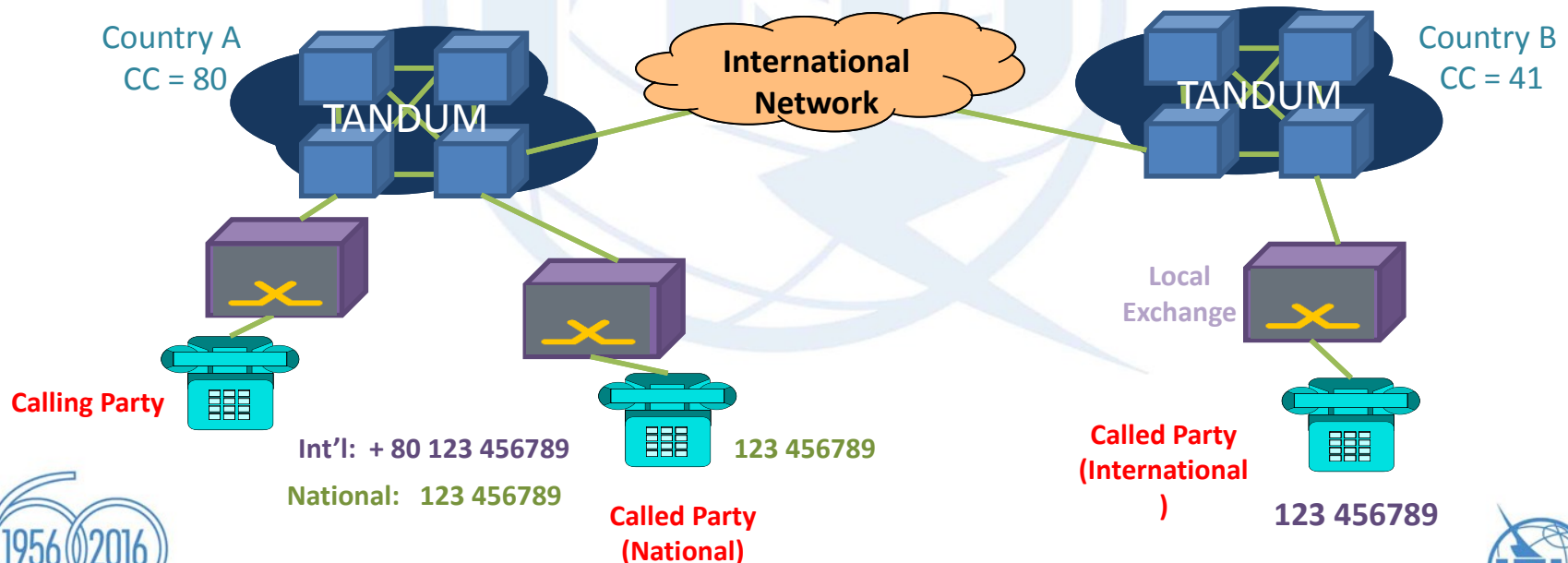
WP1/2	Numbering, Naming, Addressing, Routing and Service Provision.
<u>Q1/2</u>	Application of numbering, naming, addressing and identification plans for fixed and mobile telecommunication services.
<u>Q2/2</u>	Routing and interworking plan for fixed and mobile networks.
<u>Q3/2</u>	Service and operational aspects of telecommunications, including service definition.
<u>Q4/2</u>	Human factors related issues for improvement of the quality of life through international telecommunications.
WP2/2	Telecommunication Management and Network and Service Operations
<u>Q5/2</u>	Requirements, priorities and planning for telecommunication management and OAM Recommendations.
<u>SNO</u> <u>Q6/2</u>	Service and Network Operations group (SNO). Management architecture and security.
<u>Q7/2</u>	Interface specifications and specification methodology.
<u>SG2RG-ARB</u>	Regional Group for the Arab Region.
<u>SG2RG-EA</u>	Regional Group for East Africa.
<u>SG2RG-AMR</u>	Regional Group for the Americas.

ITU-T SG2 at a glance



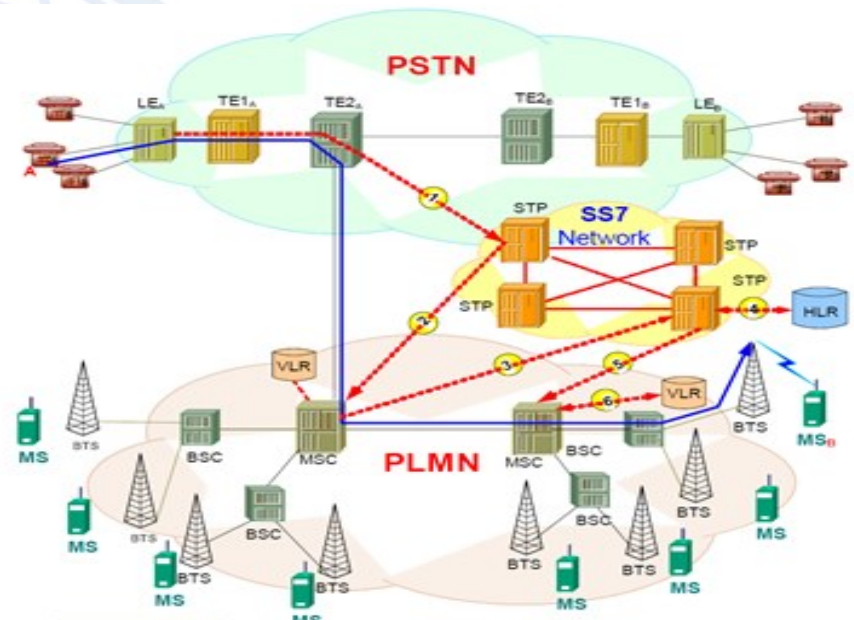
Numbering in Legacy Networks

- **E.157** ITU-T Recommendation for CPND.
- **UPTN** (Universal Personal Telecom Service/Number) [OLD F.850 and E.168, *Fixed Network oriented*] freed this association.
- Evolution of mobile systems introduced challenges. **UPT** currently is under revision.



SS7 cloud handles the routing of calls based on the numbering information: Vulnerabilities.

- SS7 developed 20 years ago in SG11. Still very much of importance and use public telecom interconnection (both fixed and mobile).
- **SS7 Vulnerabilities** has been publically reported.
- Recent SG11 [workshop](#) on SS7 Security.

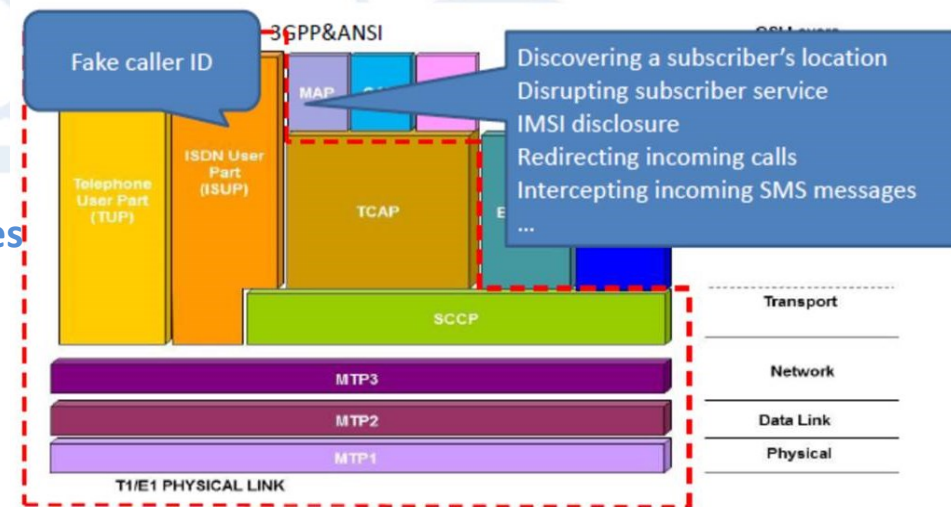


The Washington Post
For sale: Systems that can secretly track where cellphone users go around the globe

Operational Consequence due to SS7 Vulnerabilities : “Numbering Misuse”

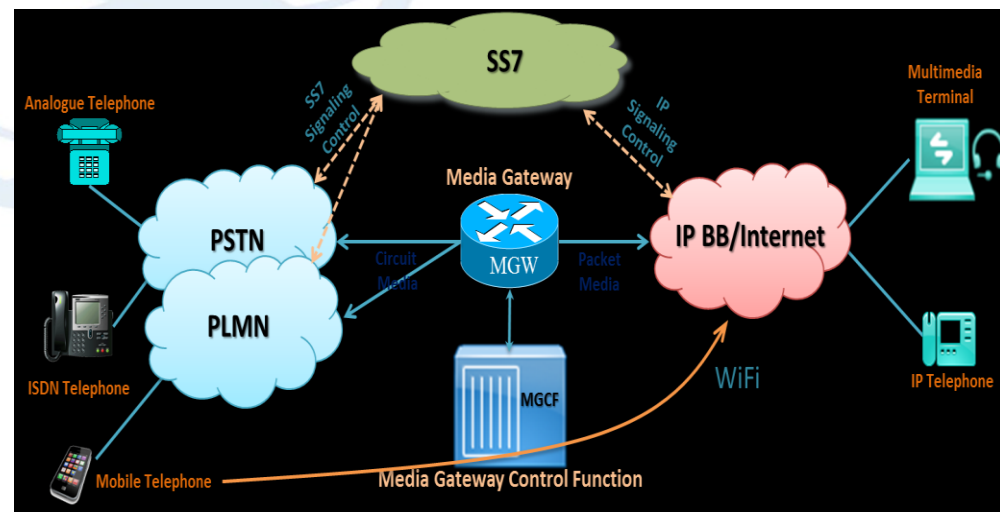
- A caller can send FAKE Caller ID (any number without authentication or authorization; no caller ID verification mechanisms verification is possible in the SS7 stack)*.
- The carrier of the terminating network can only simply accept and forward the claimed caller IDs due to *complexity of network infrastructure and services*.
- **Abuses#:**
 - Tracking the location
 - Intercepting the calls
 - Manipulating the subscribers profile
 - Camping subscribers in **Denial of Services**
 - Popular **Spamming** for fraud revenues

• GSMA Reported 2012 > 100 cases/Mo.



Increasing complexity of infrastructures

- Integration of legacy and IP infrastructures introduced increased complexity.
- Currently many of the requests to SG2 for the assignment of INR resources, are to provide messaging, real-time voice and video services based on integrated Legacy and IP infrastructures.
- ITU-T ENUM interim procedure for delegation of “country-code.e164.arpa” to the national ENUM registry, which manages and operates the DNS infrastructure and related systems for the CC.e164.arpa.
- Alternative *ENUM-like* registries are some times in use, which can create confusion and complexity.



Growing Demand for INRs

“Shared Country Codes and Identification Code to provide Global Services”

Increasing demand to provide cross border innovative services (e.g. real-time voice and video services, M2M, Messaging, OTT telecom application ... etc).



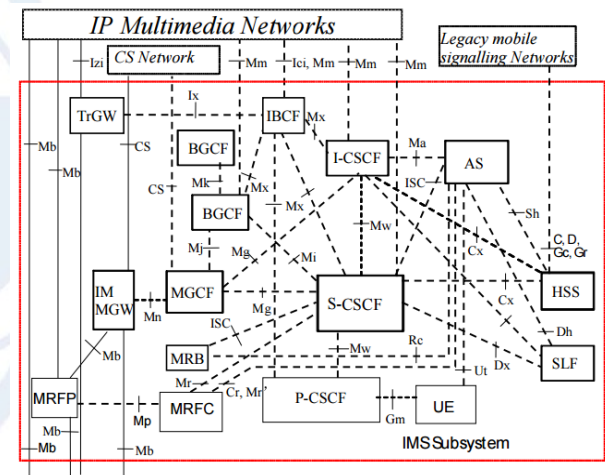
Globalization of Networks
And Services.

- TRUST in origin of a call is becoming more complex; add to that:
 - Lawful interception
 - Data retention
 - Charging
 - Emergency services
- How to build TRUST in such global services? Revise National and International Regulations? Develop Technical Standards/Solutions?

The shared E.164 as other global service is not attached for a geographical location, enabling “an ROA of a given Country X” to provide the service to ‘less friendly – to X countries originated subscribers.’”

More Increasing Complexity: towards All IP networking

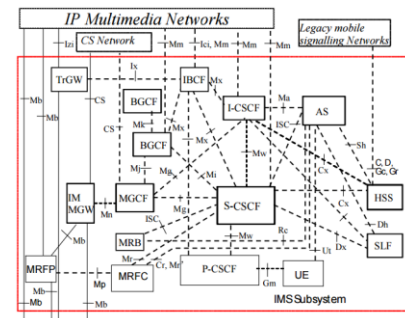
- Many of current solutions for real time real-time voice and video services uses **IMS platforms** in mixed IP-Legacy or in an all IP environment.
- Prior to LTE and IMS interconnection between operators relied on legacy CS networks, But IMS session will lose some key characteristics like video call, high fidelity codec,
- No current standard solution for international IMS interworking yet.



More Increasing Complexity: towards All IP networking

- VoLTE/ViLTE will come true in the near future to most mainstream operators, (later IMT2020(5G)).
- Work on Solutions (Standardization) for international IMS interworking is in progress in the ITU-T (SG2 (Q2), SG11, ..) as well as other entities (e.g. GSMA, TTC,).
- Solutions under study are based on Carrier ENUM.

TRUST in service delivery.
Exposure of operators' internal information is a TRUST issue?



Telecom Management in SG2

- M.3400 TMN management Function, (Section 9) security management.
- M.3410 Guidelines and requirements for security management systems to support telecommunications management.
- M.3016.x security for the management plane.
- For Future Networks: Requires management of the network itself (Network entirety) for trustworthy management.
- The management functions should include also fault, configuration, accounting, performance, management security. These works is related to SG2.

Summary of SG2 Key TRUST Issues

- **NNAI:**
 - **Origin Identification:** E.157 under revision (TRUST on Identity):
 - Consideration for all IP and IP/Legacy environment.
 - Reconsideration of National Legislations/Regulations.
 - **Misuse:** E.156 under revision (TRUST in the use and veracity of NNAI Resources):
 - Consideration of SS7 vulnerabilities.
 - Classification and Characterization of Services to help analyze misuse.
 - Enhancing Misuse Resolution Mechanisms.
 - **Routing:** Alternative Calling Procedure, Trust in Routing.

New Project in SG2 on IoT Identification.

Summary of SG2 Key TRUST Issues

- **Services: (TRUST in service delivery):**
 - IMS Interworking challenges of VoLTE/ViLTE (+5G), TRUST in Carrier ENUM solutions.
 - UPT re-evolution and impact on TRUST in services (e.g. Digital Financial Services)
 - Global Services Classification, analysis of TRUST vulnerabilities.
 - DR&NRR TRUST in service delivery and robustness.
- **Management:**
 - New consideration for management of network entirety.

