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|  | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2022-2024 | | TSAG-TD033 | | |
| TSAG | | |
| Original: English | | |
| **Question(s):** | | N/A | | Geneva, 12-16 December 2022 | |
| **TD** | | | | | |
| **Source:** | | Chairman, ITU-T Study Group 11 | | | |
| **Title:** | | ITU-T SG11 Lead Study Group Report | | | |
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| **Abstract:** | This document contains the Report of the ITU-T SG11 on lead study group activities (January-December 2022). |

1. **Background**

According to Resolution 2 of WTSA-20, ITU-T Study Group 11 is the lead study group on:

* signalling and protocols;
* establishing test specifications, conformance and interoperability testing for all types of networks, technologies and services that are the subject of study and standardization by all ITU-T study groups;
* combating counterfeiting of ICT devices;
* combating the use of stolen ICT devices.

1. **General information**

SG11 conducted its first meeting in Geneva from 6 to 15 July 2022. At the opening plenary, SG11 approved new structure and appointed leadership team. All information is made available on SG11 webpage, <https://itu.int/go/tsg11>.

The WP1/11, WP2/11 and WP3/11 preceded by RGM meetings are to be held in Geneva from 28 November to 7 December 2022.

The next SG11 meeting is planned to be held in May 2023 (dates and host to be confirmed).

1. **Report of ITU-T SG11 on lead study group activities (March-December 2022)**
   1. **Signalling and protocols**

In July 2022, SG11 consented draft new Recommendations which were finally approved following AAP LC, as follows:

* ITU-T Q.3406 (ex. Q.telemetry-VBNS) “Signalling requirements for telemetry of virtual broadband network services”;
* ITU-T Q.3721 (ex. Q.BNG-P4switch) “Procedures for Programming Protocol-Independent Packet Processors(p4) Switch-based vBNG”.

Also, in July 2022, SG11 started five new work items on signalling aspects, as follows:

* Q.BNG-CA: Signalling requirements of virtual Broadband Network Gateway for cloud access;
* Q.BNG-PUP: Signalling requirements for cloud-based control plane and pooled user plane of vBNG(Broadband Network Gateway);
* Q.PDN: Signalling and Protocol for distributed core network in future network;
* Q.IEC-SAINF: Data management interfaces for intelligent edge computing-based smart agriculture service;
* Q.IEC-EEMA: Signalling requirements and interfaces of edge-aided energy management agent at intelligent edge computing.

In total, there are 11 ongoing work items on signalling aspects.

**IMT-2020 and managed P2P communications related issues**

With regard to IMT-2020 related aspects, in July 2022 SG11 consented draft new Recommendation ITU-T Q.5025 (ex Q.PMUPF) “Protocol for managing User Plane function in IMT-2020 network” which was finally approved following AAP LC in September 2022.

Also, in July 2022 SG11 started a new work item on IMT-2020 aspects – Q.PEC “Signalling Requirements and Protocols for enhanced quality assured connections in IMT-2020 network and beyond”.

Regarding managed P2P communications, SG11 started a new work item Q.HP2P-fvsigreq “Hybrid P2P communications: signalling requirements for feature-based video services”.

Currently, there are 14 ongoing work items on IMT-2020-related issues and two ongoing work items related to P2P communications.

**Signalling of Computing Power Networks (CPN)**

SG11 has made progress on relevant ongoing work items on CPN as follows:

* Q.CPN-TP-SA: Signalling architecture of transaction platform in CPN (Q1/11);
* Q.CPN: Signalling requirements for computing power network (Q4/11);
* Q.BNG-INC: Requirements and signalling of intelligence control for the border network gateway in computing power network (Q5/11);
* Q.PCNC-FMSC: Protocol for supporting computing and network convergence in fixed, mobile and satellite convergence in IMT-2020 network and beyond (Q6/11).

SG11 started several new work items, as follows:

* Q.CSO: Signalling requirements for cross-domain service orchestration of the computing and network convergence (Q4/11);
* Q.SASO: Signalling architecture of service orchestration for computing and network convergence (Q1/11);
* Q.CNCP: Set of parameters for monitoring computing and network convergence (Q13/11).

In total, there are seven ongoing work items on CPN-related aspects.

During its meeting, SG11 noted that there are different terms such as CNC and CPN and the relationship between them is not clear. SG11 experts were encouraged to join an ad-hoc session on CPN-related terms organized by SG13. The outcomes of this discussion will be presented at the upcoming WPs/RGM meetings (28 November – 7 December 2022) and then, it might be taken for consideration during the discussion of SG11-related ongoing work items.

**Security issues of SS7 and other protocols**

SG2 and SG17 provided their replies on Q.Pro-Trust and Q.CIDA, which consent was postponed from previous SG11 meeting (December 2021) until this particular meeting. The comments were discussed and incorporated in the final baseline texts of ITU-T Q.3062 (ex. Q.Pro-Trust) “Signalling procedures and protocols for enabling interconnection between trustable network entities in support of existing and emerging networks” and ITU-T Q.3063 (ex. Q.CIDA) “Signalling procedures of calling line identification authentication” respectively. Both draft Recommendations were consented and finally approved in September 2022.

Based on past experience, SG11 organized two Webinars to provide overview of existing signalling protocols and their security, as follows:

* [Webinar on "Enhancing signalling security and privacy using globally interoperable digital signatures"](https://www.itu.int/en/ITU-T/webinars/sig-security/20220616/Pages/default.aspx) (virtual, 16 June 2022)
* [ITU Webinar Series on Signalling Security - Episode 2: on "Securing legacy telecom network services"](https://www.itu.int/en/ITU-T/webinars/sig-security/20221107/Pages/default.aspx) (virtual, 7 November 2022)

Also, TSB in close collaboration with SG11 management team developed a standalone webpage on signalling security which summarizes all SG11-related standards and events. See <https://itu.int/go/SIG-SECURITY>.

**VoNR/ViNR and IMS-related signalling and testing issues**

As a continuation of previous SG11 activities on VoLTE/ViLTE interconnection issues, SG11 started two new work items related to interconnection testing of Voice, Video over New Radio, as follows:

* Q.FW-IVV5G: Framework for interconnection testing of Voice, Video over 5G;
* Q.VoiNR-test: VoNR/ViNR interconnection testing for interworking and roaming scenarios.

It was noted that Voice over LTE (VoLTE) and Voice over New Radio (VoNR) utilize the same IMS (IP Multimedia Subsystem) as defined in 3GPP. While the IP IMS framework remains the same, technological improvements in radio, core and devices are expected to provide superior user experience in VoNR compared to VoLTE.

Also, SG11 achieved good progress on ITU-T Q.Sig\_Req\_ETS\_IMS\_roaming and Q.LiteIMS-SA. It is expected that the baseline texts will be finalized by the end of 2022.

**QKDN protocols**

SG11 has made progress on QKDN signalling requirements and protocols, including:

* Q.QKDN\_profr “Quantum key distribution networks – Protocol framework”;
* Q.QKDN\_Ak “Protocols for Ak interface for QKDN”;
* Q.QKDN\_Kx “Protocols for Kx interface for QKDN”;
* Q.QKDN\_Kq-1 “Protocols for Kq-1 interface for QKDN”;
* Q.QKDN\_Ck “Protocols for Ck interface for QKDN”.

**Deletion of UPT-related Recommendations**

Following the liaison statement that SG11 received from SG2 on deletion of ITU-T Recommendations related to Universal Personal Telecommunication (UPT) (see [SG11-TD49/GEN](https://www.itu.int/md/T22-SG11-220706-TD-GEN-0049/en)), SG11 has made observation on this issue.

At the time these Recommendations were approved, the concept of universal personal telecommunication (UPT) utilized specific technology and service concepts. In the decades since then, the technology has evolved.

From SG11 perspective, the UPT-related services specified in ITU-T Recommendations no longer exist. As such, the suite of UPT-related Recommendations is no longer relevant. Given this rationale, SG11 has advised the TSB Director to initiate the deletion procedure of the following Recommendations developed by SG11:

* ITU-T Q.1521 (2000) Requirements on underlying networks and signalling protocols to support UPT;
* ITU-T Q.1531 (2000) UPT security requirements for Service Set 1;
* ITU-T Q.1541 (1998) UPT stage 2 for Service Set 1 on IN CS-1 – Procedures for universal personal telecommunication: Functional modelling and information flows;
* ITU-T Q.1542 (2000) UPT stage 2 for Service Set 1 on IN CS-2 – Procedures for universal personal telecommunication: Functional modelling and information flows;
* ITU-T Q.1551 (1997) Application of Intelligent Network Application Protocols (INAP) CS-1 for UPT service set 1.

All SGs, including SG2, were kept informed about this decision. It was announced by [TSB Circular 30](https://www.itu.int/md/T22-TSB-CIR-0030/en) on 20 July 2022. No objection to the deletion of any of these Recommendations was received before the response deadline. Recommendations ITU-T Q.1521, Q.1531, Q.1541, Q.1542 and Q.1551 are therefore deleted on 20 October 2022. The decision was announced through [TSB Circular 47](https://www.itu.int/md/T22-TSB-CIR-0047).

Also, in July 2022, SG11 recognized the necessity to revise some Recommendations by removing the references to suppressed ITU-T Recommendation related to UPT and amending the text concerning UPT terminology accordingly. Among them are:

* ITU-T Q.76 (1995) Service procedures for Universal Personal Telecommunication - Functional modelling and information flows;
* ITU-T Q.1219 (1994) Intelligent network user's guide for Capability Set 1;
* ITU-T Q.1221 (1997) Introduction to intelligent network Capability Set 2;
* ITU-T Q.1244 (2001) Distributed functional plane for Intelligent Network Capability Set 4;
* ITU-T Q.1290 (1998) Glossary of terms used in the definition of intelligent networks;
* ITU-T Q.1711 (1999) Network functional model for IMT-2000;
* ITU-T Q.1761 (2004) Principles and requirements for convergence of fixed and existing IMT-2000 systems.
  1. **Establishing test specifications, conformance and interoperability testing for all types of networks, technologies and services that are the subject of study and standardization by all ITU‑T study groups**

**ITU-T Recommendations on conformance and interoperability testing**

SG11 consented draft new Recommendation ITU-T Q.4069 (ex.Q.GDC-IoT-test) “Testing requirements and procedures for Internet of Things based green data centres”, which was finally approved following AAP LC in September 2022.

Several new work items on testing and monitoring were started at the meeting, as follows:

* Q.RI\_PISRM: Requirements and reference model of resource integration and protocol independent method for source routing measurements;
* TR.MPLRA: Requirements and architecture for monitoring packet loss caused by network congestion;
* Q.Scvh-iopt: Interoperability testing between SDN and hypervisor based computing virtualization.

Also, SG11 discontinued one stale work item – Q.PR-MF: Methodology of performance requirements for reliable comparison of measurement results.

In total, there are 12 ongoing work items on testing aspects.

**Implementation of ITU C&I Programme**

ITU-T SG11 maintains the reference table of ITU-T Recommendations suitable for C&I testing and list of pilot projects for conformity assessment against ITU-T Recommendations ([www.itu.int/go/reference-table](https://www.itu.int/go/reference-table), [www.itu.int/go/pilot-projects](http://www.itu.int/go/pilot-projects)).

Following inputs received from several SGs, SG11 updated the reference table of ITU-T Recommendations suitable for conformance and interoperability testing ([SG11-TD155/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-220706-TD-GEN-0155)).

The [ITU C&I Portal](https://www.itu.int/en/ITU-T/C-I/Pages/default.aspx) is updated accordingly.

**Conformity Assessment Steering Committee (CASC)**

The fourteenth meeting of the ITU-T Conformity Assessment Steering Committee (CASC) was held on 8 July 2022 during the ITU-T SG11 meeting. The detailed presentation about progress on ITU Testing Laboratory (TL) recognition procedure which is based on collaboration with ILAC is available in [SG11-TD123/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-220706-TD-GEN-0123). The presentation highlights the key achievements of CASC in the last study period and describe the current TL recognition in place. The presentation also covers aspects related to recent updates made in Resolution 76 during WTSA-20.

ILAC representative gave a presentation about ILAC-ITU collaboration ([SG11-TD144/GEN](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T22-SG11-220706-TD-GEN-0144)). It was noted that ITU, ILAC and IAF finalized the updated MoU which among other activities includes a new TL recognition procedure. The updated MoU was signed among IAF, ITU and ILAC on 24 August 2022 (see [here](https://www.itu.int/en/ITU-T/extcoop/Documents/mou/MoU-ITU-T-IAF-ILAC-20220824.pdf)).

Also, it was noted that in order to support the ITU recognition procedure ILAC is developing its own assessment procedure to explain the operation of the set-up. The assessment procedure will be a separate standalone document of ILAC similar to the joint assessment procedure published the OIML CS. There is a plan to adopt a new ILAC procedure in 2022.

Based on received contribution, CASC revised its ToR. Finally, the revised ToR was approved at the SG11 closing plenary on 15 July 2022. The approved text of ToR is available on CASC webpage (<https://itu.int/go/casc>).

Also, based on received contribution, CASC revised a guideline on Testing Laboratory recognition procedure. It was aligned with Resolution 76 of WTSA-20 and recent achievements of CASC in the previous study period. The revised Guideline was approved at the SG11 closing plenary on 15 July 2022. The approved text of the Guideline is available [here](https://www.itu.int/en/ITU-T/studygroups/com11/casc/Documents/TL-RP_pub_2022-07-15.pdf).

Following the [TSB Circular 368](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSB-CIR-0368), TSB received several requests from TLs seeking ITU recognition. All of them were noted and TSB was asked to process applications according to the requirements indicated in the ITU-T Guideline “Testing Laboratories recognition procedure”.

Afterwards, first eight laboratories were recognized and successfully listed in ITU Testing Laboratories Database (<https://itu.int/go/tldb>) in September 2022. The recognized TLs are also listed in [ITU Operational Bulletin No.1253 (1.X.2022)](https://www.itu.int/pub/T-SP-OB.1253-2022). See a [newslog](https://www.itu.int/hub/2022/10/labs-gain-official-recognition-for-testing-conformance-with-itu-standards/).

TSB continues receiving applications and will proceed them accordingly.

The ITU Testing Laboratories Database is available on ITU C&I portal (<https://itu.int/go/citest>).

* 1. **Combating counterfeiting and the use of stolen ICT devices**

SG11 started two new work items:

* Q.CEIR: Technical requirement, interfaces and generic functions of CEIR;
* Q.CCF-CCSD: Consumer centric framework for combating counterfeit and stolen ICT mobile devices.

SG11 progressed well on all six ongoing work items related to combating counterfeit telecommunication/ICT devices/software and stolen ICT devices.

1. **ITU-T SG11 Workshops and Webinars**

SG11 continues organizing series of events related to SG11 activities on signalling security. Since January 2022, the following Webinars were organized:

* **Webinar on "Enhancing signalling security and privacy using globally interoperable digital signatures"** (virtual, 16 June 2022, <https://itu.int/go/WB-SSP-01>).

The webinar explored the legacy and existing signalling systems and their successors. This consisted of information on signalling architectures of telecommunication networks, overview of the key signalling exchange procedures (call/SMS/USSD flows) and an outline of the vulnerabilities of existing signalling protocols. The webinar also provided a summary of ongoing ITU standardization on securing protocols to cope with potential signalling attacks on telecom operators, which expose subscribers to fraud. The implementations of relevant ITU-T Recommendations were also highlighted at the webinar.

The presentation, recording as well as Q&A Transcript are available at: <https://itu.int/go/WB-SSP-01>.

* **ITU Webinar Series on Signalling Security - Episode 2: on "Securing legacy telecom network services"** (virtual, 7 November 2022, <https://itu.int/go/WB-SSP-02>)

Legacy telecom networks pose a major security issue for their subscribers and cannot be shut-down due to the difficulties of deploying modern telecom networks, especially in rural areas and in developing countries. Telecom operators prefer to allocate their budget to providing advanced services which generate revenue, then to securing legacy networks, which are used by lower income subscribers.

This webinar provided a summary of legacy telecom networks security approaches which do not depend on the deployment of new and expensive equipment, but rather on implementing best practices which help to secure the legacy network services still in use, to cope with potential signalling attacks on telecom operators.

All material are available at: <https://itu.int/go/WB-SSP-02>.

1. **ITU-T Focus Group on Testbeds Federations for IMT-2020 and beyond (FG-TBFxG)**

Following establishment of the ITU-T Focus Group on Testbeds Federations for IMT-2020 and beyond (FG-TBFxG) in December 2021, FG-TBFxG conducted two meetings in April and July 2022.

Among achieved results:

* FG started 11 work items ([work plan](https://extranet.itu.int/sites/itu-t/focusgroups/tbfxg/output/TBFxG-O-023.docx), as of 21 July 2022);
* Appointed 5 additional Vice-chairmen;
* Conducted 6 interim WGs e-meetings;
* Initiated a call for use cases on federated testbeds.

The third FG-TBFxG meeting is to be held fully virtually from 14 to 16 November 2022.

All interested parties are encouraged to subscribe to the Focus Group mailing list ([fgtbf@lists.itu.int](mailto:fgtbf@lists.itu.int)) [here](https://www.itu.int/myworkspace#/Mailing) (see instructions [here](https://www.itu.int/en/ITU-T/focusgroups/tbfxg/Documents/Quick_steps-subscribe_to_fgtbf_mailing_list.pdf)).

More details are available on the Focus Group webpage at: <https://itu.int/go/fgtbf>.

1. **SG11 Regional Groups**

SG11 has two Regional Groups:

* SG11RG-AFR: Study Group 11 Regional Group for Africa;
* SG11RG-EECAT: Study Group 11 Regional Group for Eastern Europe, Central Asia and Transcaucasia.

There were no Regional Group meetings since March 2022.

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