ITU-T
STUDY GROUP 11

Signalling requirements, protocols and test specifications

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on behalf of

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SG11 in a nutshell

SG11 is home to **SS7** and holds expertise in:

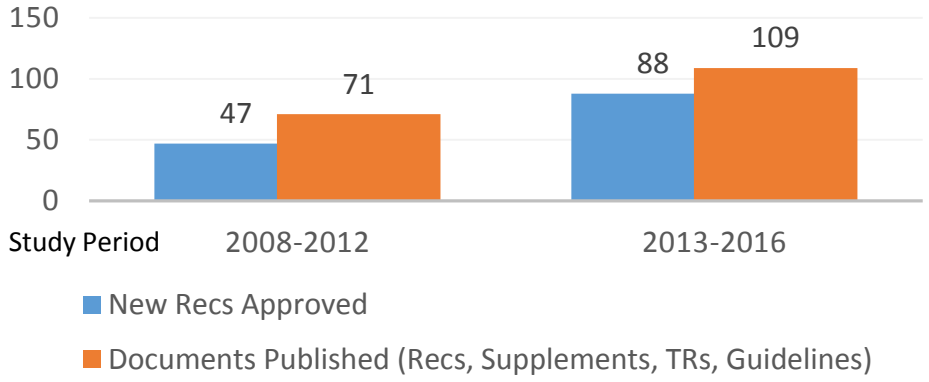
- **Combating counterfeiting**
- **Internet performance measurements**
- **Signalling architectures, requirement and protocols for legacy and future networks**
- **Conformance & Interoperability**
- **Test methodologies and specifications**

Our Mission

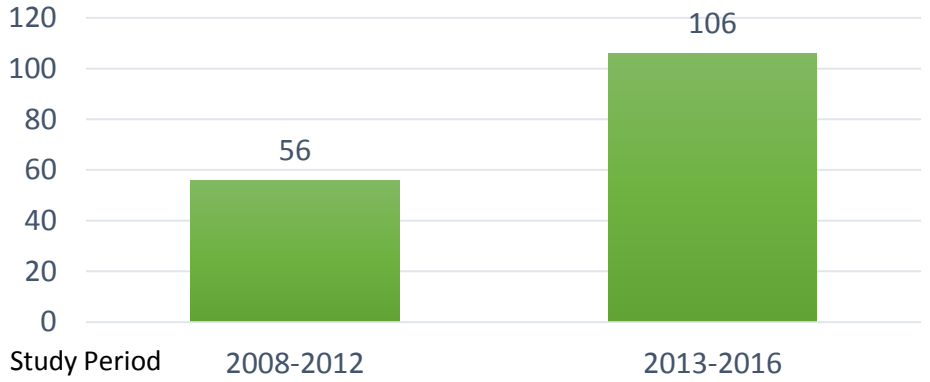
To develop protocols and test specifications to achieve consistent end-to-end interoperability of systems and networks

SG11 in numbers, positive trend

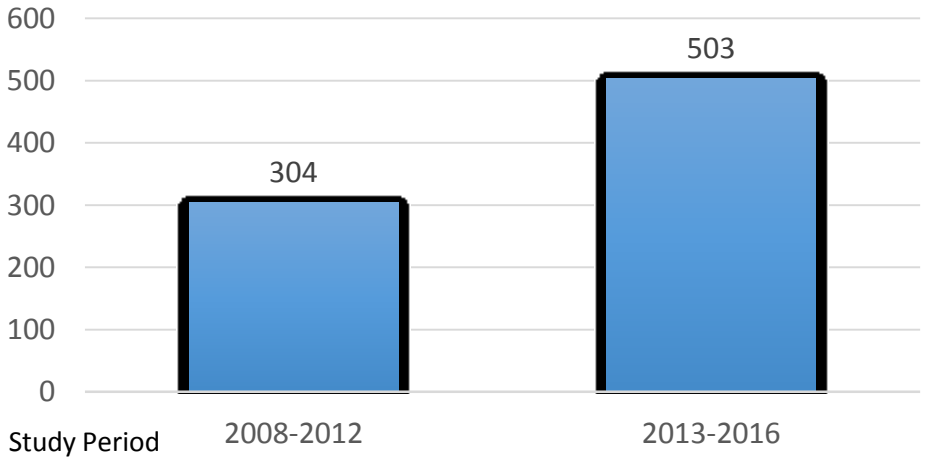
Total publications and new Recs. approved



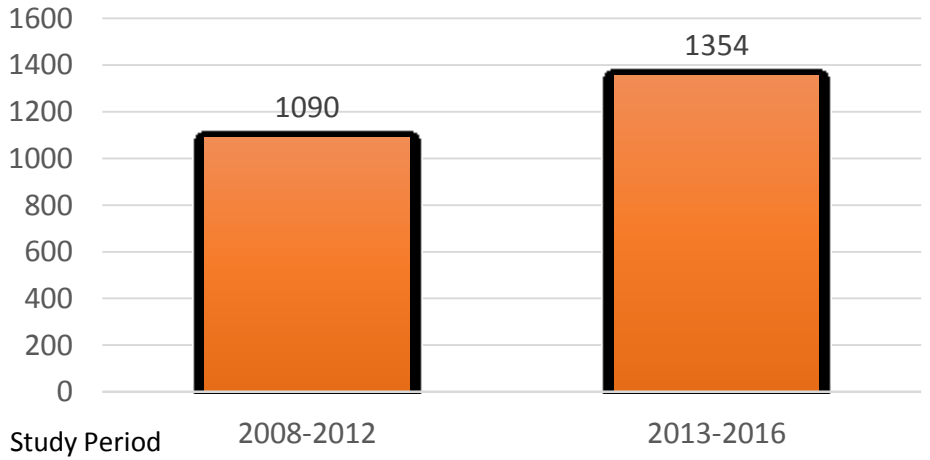
Average number of participants per SG11 meeting



Contributions Submitted



Number of TDs (PLEN + GEN)



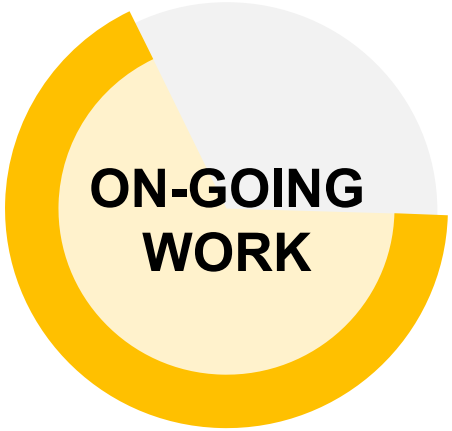
Achievements

SDN (software-defined networking) Signalling and Protocols

Supplement 67 (2015/04) to Q-series *"Framework of signalling for SDN"*

Q.3711 (2016/08) *"Signalling requirements for software-defined broadband access network"*

Q.3712 (2016/08) *"Scenarios & signalling requirements of unified intelligent programmable interface for IPv6"*



Five ongoing draft Recommendations on SDN signaling requirements

Broadband Network Gateway (Q.BNG-DBoD, Q.BNG-IAP)

Mapping physical/virtual networks (Q.PVMapping)

Metro orchestration (Q.SMO)

Central office (Q.SCO)

Other Signaling and Protocols

IPv6

2 Completed
ITU-T Q.3404, Q.3712
1 On-going
Draft ITU-T
Q.IPv6ProBB

Network attachment

4 Completed
ITU-T Q.3228, Q.3229, Q.3231, Q.3232
2 On-going
Draft ITU-T
Q. NEA-REQ,
Q.SAN-MIM

Peer2Peer communication, multimedia streaming

3 Completed
ITU-T X.609, X.609.1, X.609.2
(joint texts with ISO/IEC)
4 On-going
Draft ITU-T Q.rrp, X.mp2p-msomp, X.mp2p-mspp, X.mp2p-mssr

Control plane of Distributed Service Networking

1 Completed
ITU-T Q.3051

IP-based SMS over NGN

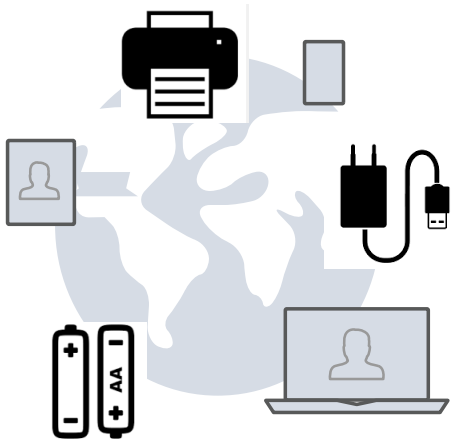
1 On-going
Draft ITU-T
Q.Arc-IPSMS

Emergency Telecommunications

Four Supplements to Q-series approved
ITU-T Sup. 49, 62, 63, 68


FAKE
GENUINE

Combating Counterfeiting ICT Equipment



The Problem

PP-14 Resolution 188 *(BUSAN, 2014)*
"Combating counterfeit telecommunication/information and communication technology devices"

- International trade in counterfeit: hundreds of billion USD
- Growing problem particularly in developing countries
- Economic impacts on manufacturers and Governments
- Affects operators networks
- Dangers to the health

Past Events

- Workshop on Combating counterfeit and substandard ICT devices *(November 2014)*
- DEMO — Demo on a solution to combat Counterfeiting of ICT products based on the Digital Object Architecture *(April 2015)*
- Workshop on Combating counterfeit using conformance and interoperability solutions *(June 2016)*

COMPLETED WORK

Technical Report on "Counterfeit ICT Equipment" *(2014, rev. 2015)*

ON-GOING WORK

Draft Rec. Q.FW_CCF "Framework for solution to combat counterfeit ICT Device"

Two technical reports ongoing

Internet performance measurements

Internet performance measurements

Vision: Unified methodology of Internet speed measurement usable by end-users on the fixed and mobile networks

Two types of measurements:

- Network Internet access speed
- Internet resources access speed

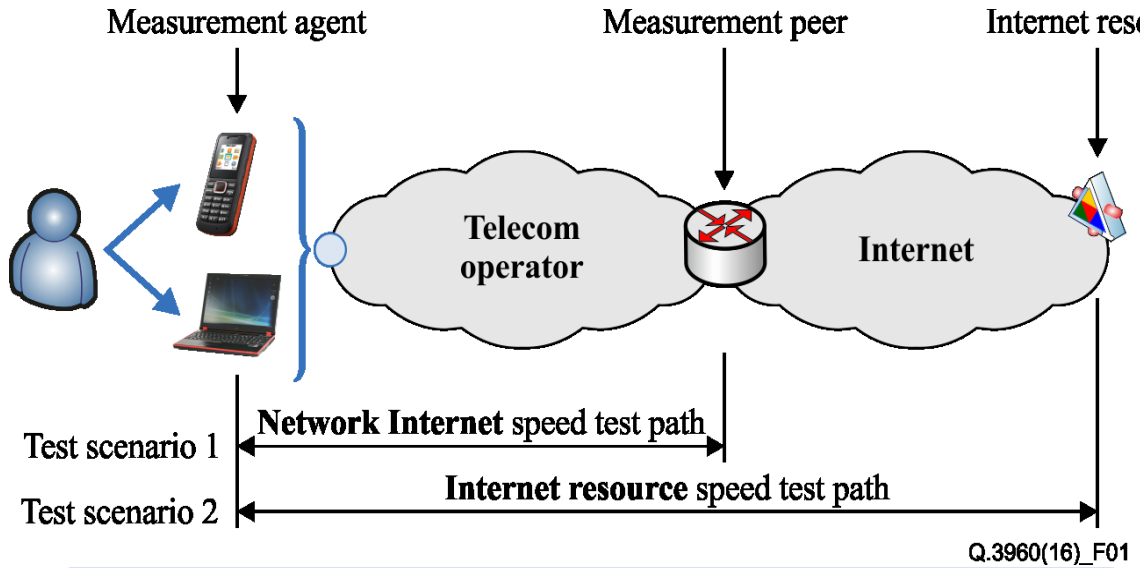


Fig.1 - Global scenario and test definition [REF. ITU-T Q.3960]

Approved

ITU-T Q.3960

Framework of Internet related performance measurements

Ongoing work:

Q.TM_Int_sp_test (Q.3961)

Testing methodologies of internet speed measurement system to be used on the fixed and mobile networks

http://itu.int/en/ITU-T/C-I/Pages/IM/Internet-speed.aspx

Framework for VoLTE Interconnection

Current issues of interconnection of VoLTE-based networks

- Roaming issues and scenarios
- Roaming charges
- Numbering/addressing
- Emergency services

Operators Challenges

- different VoLTE interconnection/roaming solutions available
- these solutions are not always interoperable.
- VoLTE roaming procedures are not agreed and therefore may not be implemented

SG11 Related Activities

- Workshop on Voice and Video Services Interoperability Over Fixed-Mobile Hybrid Environments, Including IMT-Advanced (LTE) (Geneva, 1 December 2015)
- New draft Recommendation: “Framework of interconnection of VoLTE/ViLTE-based networks”
- Stakeholders involved:
  SG11, SG2, ETSI TC INT, GSMA

Conformance & Interoperability

Conformity Assessment Steering Committee (CASC)

- Working on a test laboratory recognition procedure in ITU-T
- Collaboration with IECEE
- Three guidelines ongoing

Recommendations

- SIP-IMS conformity assessment work plan (**57** new Recs)
- Benchmarking of IMS platform work plan (**10** new Recs)
- Conformance test plan for Number Portability requirements in Q Sup.4 (Q.3905)
- Cloud computing test specifications (Q.4040, Q-Sup.65)

Tools

- Living list of key technologies suitable for C&I testing
- Reference table of ITU-T Recs and test specifications
- Pilot projects among SGs


The Future

Future Developments

SG11 aims to:

- **LEAD** protocol development for 5G/IMT-2020
- **COMBAT** the proliferation of counterfeit ICT equipment
- **ESTABLISH** ITU Test Lab recognition procedure
- **STANDARDIZE** Internet performance measurements
- **ACHIEVE** VoLTE interconnection
- **DEVELOP** test specifications for IoT, Cloud, SDN, 5G
- **ENHANCE** SS7 security

SG11 contacts

www.itu.int/itu-t/go/sg11

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Additional Slides

Relevant URLs

- Combat counterfeiting
- Internet speed measurements
- Conformity and Interoperability Portal
- Conformity Assessment Steering Committee (CASC)
- SIP-IMS Conformity assessment
- Software-defined networking (SDN)

www.itu.int/itu-t/go/sg11

SG11 mandate

SG11 developed Signalling System N.7 (Q.700-series Recommendations) which allowed international telecom connectivity

Signalling architectures, requirements and protocols, including those for IP-based network technologies, NGN, M2M, IoT, FNs, Cloud Computing, SDN, mobility, some multimedia related signalling aspects, ad hoc networks (sensor networks, RFID, etc.), QoS, and signalling to inter-network with legacy networks ATM, N-ISDN and PSTN networks.

In addition, studies relating to reference signalling architectures and test specifications for NGN and emerging network technologies

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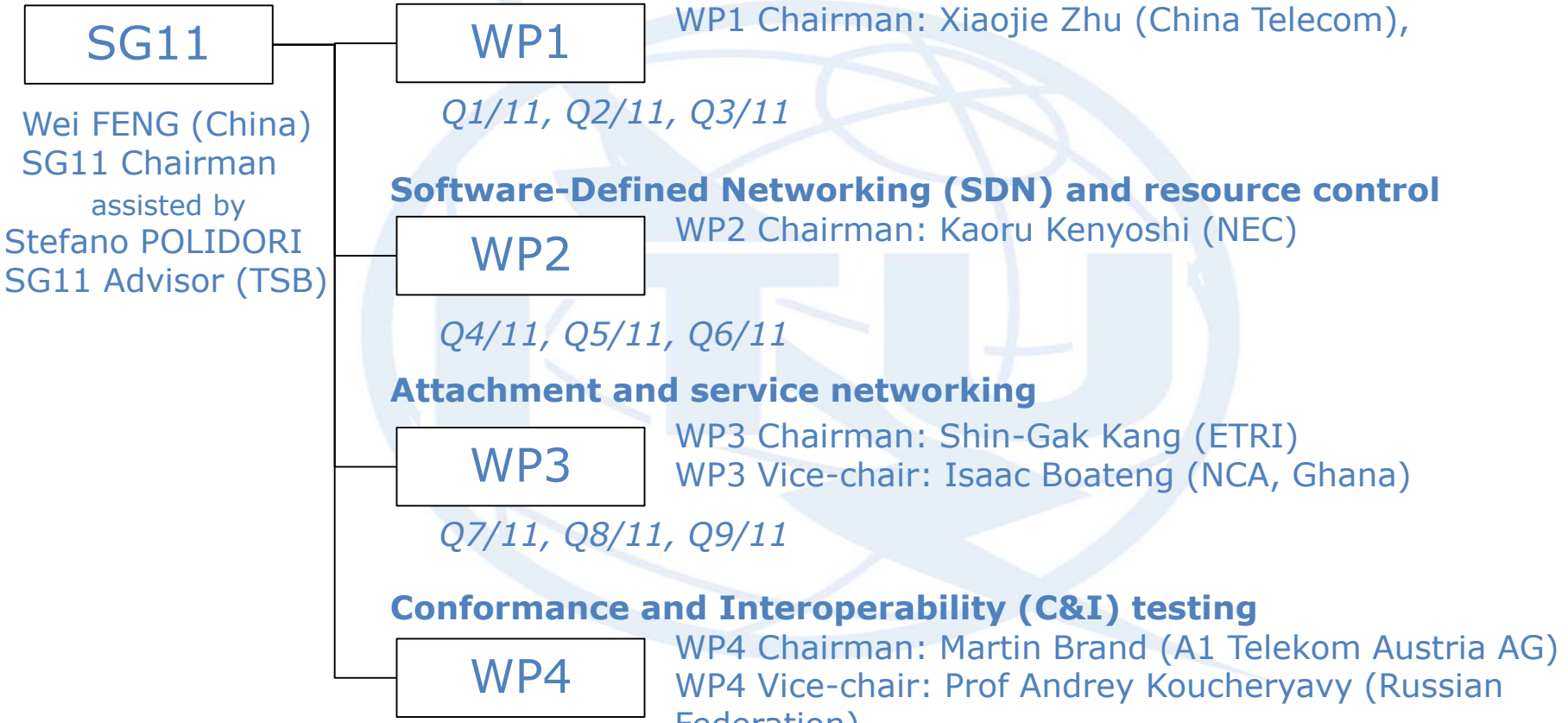
Working Party Structure



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List of Questions

QUESTIONS	TITLE
Q1/11	Signalling and protocol architectures in emerging telecommunication environments
Q2/11	Signalling requirements and protocols for service and application in emerging telecommunication environments
Q3/11	Signalling Requirements and Protocol for Emergency Telecommunications
Q4/11	Signalling requirements and protocols for Bearer and Resource control in emerging telecommunication environments
Q5/11	Protocol procedures relating to services provided by Broadband Network Gateways
Q6/11	Protocol procedures relating to specific services over IPv6
Q7/11	Signalling and control requirements and protocols for network attachment supporting multi-screen service, future networks, and M2M
Q8/11	Guidelines for implementations of signalling and protocols, and for addressing counterfeited ICT devices
Q9/11	Protocols supporting distributed, smart service networking and end-to-end multicast
Q10/11	Service and networks benchmarking measurements
Q11/11	Protocols and Networks Test Specifications; frameworks and methodologies
Q12/11	Internet of things test specifications
Q13/11	Monitoring parameters for protocols and emerging networks
Q14/11	Cloud interoperability testing
Q15/11	Testing as a service (TAAS)

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SIP-IMS conformance testing

Vision: provide a conformity assessment framework to worldwide telecom operators to test equipment against SIP-IMS profiles based on ITU-T Recommendations, and create a list of TEs based on SIP-IMS profile which comply with ITU-T Recommendations.

- Collaboration with ETSI TC INT to
  - endorse existing European regional standards as international ITU-T Recommendations on SIP-IMS profiles
  - complement those with missing standards (e.g. requirements, test specifications, use cases, etc.)

Outcomes:

- 57 new ITU-T Recommendations on requirements and relevant test specifications for basic call and some supplementary services for SIP-IMS were finalized, according to the established standardization work plan
  - Q.3617-Q.3639: Service and session control protocols – supplementary services based on SIP-IMS
  - Q.4000-Q.4039: Testing specifications for SIP-IMS

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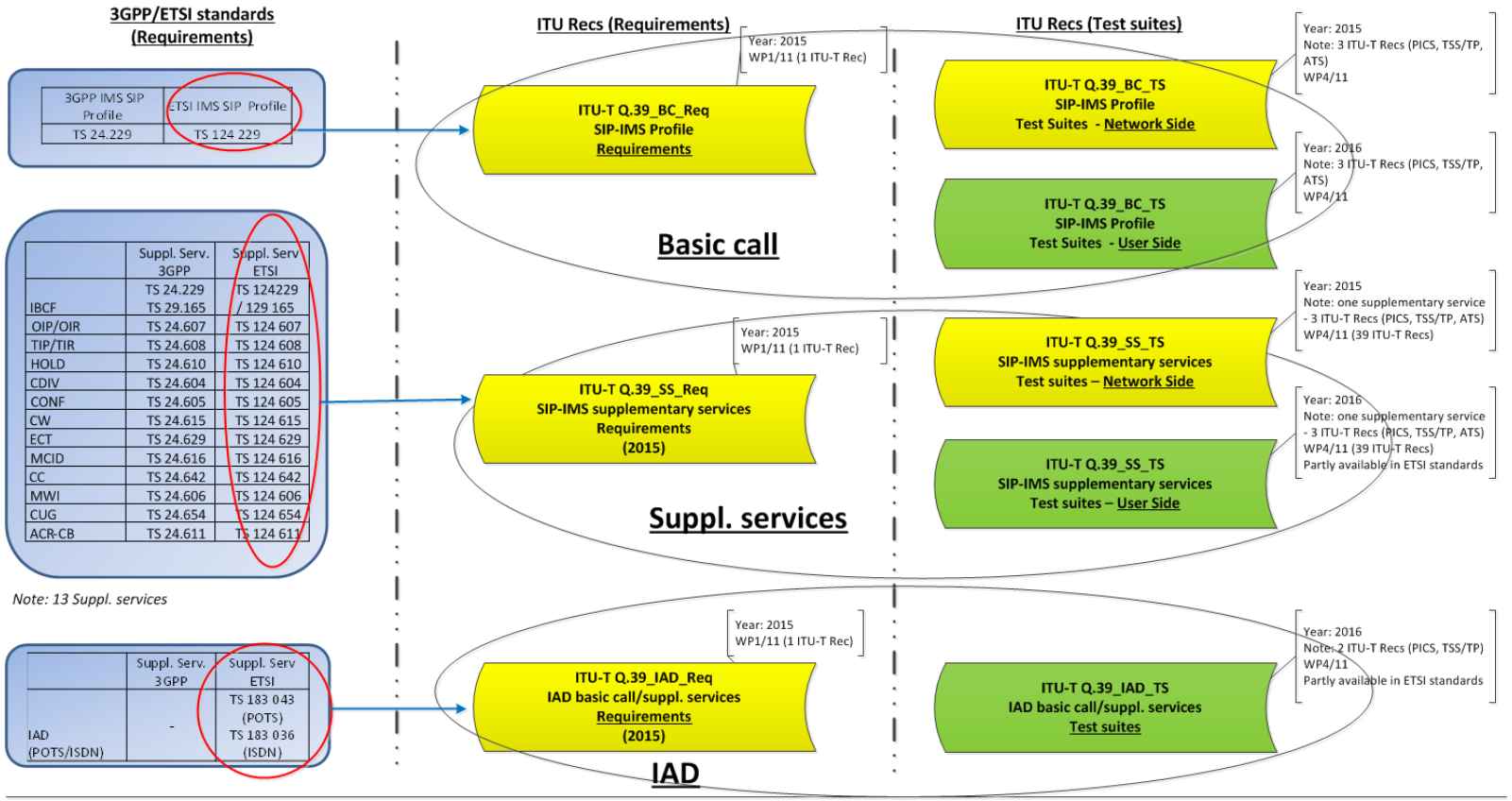
WORK PLAN ON SIP-IMS STANDARDIZATION



Legend

ETSI standard which will be endorsed by ITU-T

New ITU-T Rec. which should be developed

Current ETSI standard

Statistics

Endorsed ETSI standards – 54
New ITU-T Recs. – 44

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Benchmarking standardization

Vision: provide a framework to worldwide telecom operators to test the performance of the IMS/NGN/PES and VoLTE network equipment according to ITU-T Recommendations.

10 Recommendation were approved as follows:

- Basic concept of benchmark testing
  - Q.3930
- Benchmark testing for PSTN/ISDN emulation
  - Q.3931.1, Q.3931.2, Q.3931.3, Q.3931.4
- Benchmark testing of IMS/NGN/PES and VoLTE
  - Q.3932.1, Q.3932.2, Q.3932.3, Q.3932.4
- Reference benchmarking for VoIP and Fax over IP
  - Q.3933

ITU Workshop on "Voice and Video Services Interoperability (over LTE)"

- The 7th ITU CTO meeting agreed to organize a workshop on Voice and Video service interoperability in the fix and mobile environment in order to identify the current status and issues.
- The workshop on "Voice and Video Services Interoperability" was held on 1st December in Geneva. 14 presentations were introduced from operators, SDOs, vendors and institutes. After the presentations, the panel discussion identified the items which should be studied in SG11.
- SG11 meeting from 2nd December reviewed the report of the workshop and created the following two new work
  1) Framework of interconnection of VoLTE/ViLTE-based networks (Q2/11)
  2) Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks. Protocol specification (Q2/11)

ITU Workshop on "Voice and Video Services Interoperability Over Fixed-Mobile Hybrid Environments, Including IMT-Advanced (LTE)" Geneva, Switzerland, 1 December 2015
http://www.itu.int/en/ITU-T/Workshops-and-Seminars/conformity-interoperability/20150112/Pages/Programme.aspx

SG11 organized two Workshops during SG11 meeting (June 2016)

- **ITU Workshop on "Combating Counterfeit Using Conformance and Interoperability Solutions“**
  Geneva, Switzerland, 28 June 2016
  http://itu.int/en/ITU-T/Workshops-and-Seminars/20160628/Pages/default.aspx

- **ITU Workshop on “Signalling System N.7 (SS7) Security“**
  Geneva, Switzerland, 29 June 2016
  http://itu.int/en/ITU-T/Workshops-and-Seminars/201606/Pages/default.aspx

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Joint Coordination activity Conformance and Interoperability Testing (JCA-CIT)

General statistic

- 8 meetings
- Was concluded by SG11 in July 2016

Main focus

- Addressing C&I coordination issues within ITU and with other SDOs

Key outcomes

- Discussed key ITU-T activities on C&I (CASC, SIP-IMS profile, Internet speed measurements etc.)
- Coordinated collaboration works in ITU and with other SDOs on C&I.
- Assisted SG11 to maintain living lists on C&I (key technologies, reference table, pilot projects)
- Informed participants about the planned ITU testing events and outcomes of the conducted events (e.g. APT/ITU C&I events, etc.)

http://www.itu.int/en/ITU-T/jca/cit/Pages/default.aspx

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ITU-T recognition procedure of testing laboratories (1/2)

Background:

- Russian Contribution to SG11 meeting (November 2013) and corresponding group was created
- The corresponding group concluded in July 2014 and the work transferred to Q11/11

SG11 achievements:

- New guideline *"Testing laboratories recognition procedure"* (Q.TL-rec-pro) was approved in April 2015
- ITU-T Conformity Assessment Steering Committee (CASC) was established under SG11 in April 2015
- Mr Isaac Boateng (NCA, Ghana) was appointed Chair of CASC
- CASC will adopt the working methods of a Working Party
- First meeting of CASC held in December 2015 and second meeting in June 2016
- All ITU-T SGs are invited to appoint a representative to the CASC
  [see TD 245 (TSAG)]

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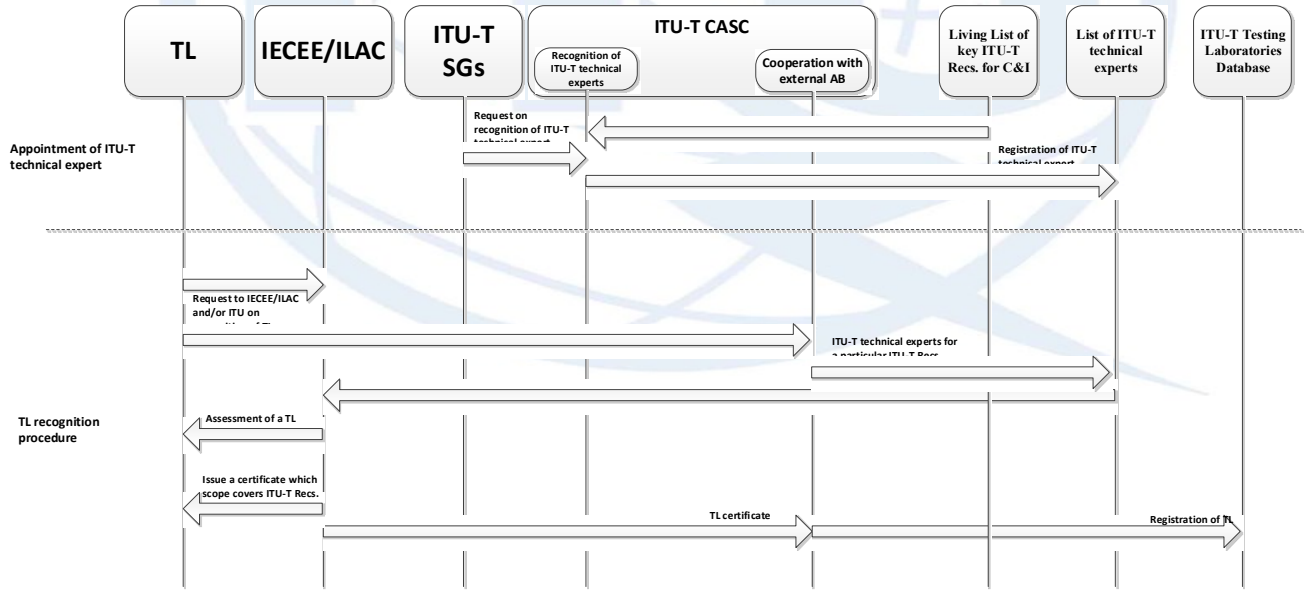
ITU-T recognition procedure of testing laboratories (2/2)

Detailed procedures will be developed by ITU-T CASC.

The general work flow will be as follows:

- The candidate TL shall submit to the ITU-T CASC an application for recognition
- The ITU-T CASC will provide to the relevant committee of IEC and ILAC the necessary documentation and the list of ITU-T technical experts
- Based on the decisions of IEC and ILAC, ITU-T CASC will recognize a TL
- The TL is notified and added to the list of ITU-T recognized TL



TL recognition procedure work flow

FG on M2M service layer

- The Focus Group on the M2M service layer (FG M2M) studied activities currently undertaken by various standards developing organizations (SDOs) in the field of M2M service layer specifications to identify key requirements for a common M2M service layer.
- This focus group concluded in December 2013 and these deliverables are transferred to relevant SGs in order to initiate developing recommendations based on them.

	Working group	Leadership
WG1	Use cases and service models	M. Morrow (Cisco) R. Istepanian (Kingston University) M. Berrebi (eDevice)
WG2	Requirements and architectural framework of the M2M Service Layer	M. Carugi (ZTE) H.J. Kim (ETRI)
WG3	API and protocols	Guodong Xue (Huawei Technology) Hideo Himeno (NEC Corporation) Ali Amer (Saudi Telecom Company)

Deliverables	TITLE
D0.1	M2M standardization activities and gap analysis: e-health (SG16 and SG13)
D0.2	M2M enabled ecosystems: e-health (SG16 and SG13)
D1.1	M2M use cases: e-health (SG16 and SG13)
D2.1	M2M service layer: requirements and architectural framework (SG16 and SG13)
D3.1	M2M service layer: APIs and protocols guideline (Q1/11 developed Rec. ITU-T Q.3052)