ITU Kaleidoscope 2014

Living in a converged world - impossible without standards?

Wrap up Session

Summary of the sixth Kaleidoscope conference
Panel with Session Chairs

Session Chair:
Christoph Dosch (ITU-R Study Group 6 Chairman; IRT GmbH, Germany)

Saint Petersburg, Russian Federation
3-5 June 2014

SESSION 1

The future of convergence

S1.1 Invited paper: A Software Defined Approach to Unified IPv6 Transition
Kevin Hu (Huawei Technologies, China)

S1.2 Global Convergence in Digital Identity and Attribute Management: Emerging Needs for Standardization
Daniela Merella (Fondazione Inuit Tor Vergata University of Rome, Italy)

S1.3 Distributed Demand-Side Management with Load Uncertainty.*
Emmanuel Chifuel Manasseh (Hiroshima University, Japan)

S1.4 Proposal of "Cyber Parallel Traffic World" Cloud Service.
Yoshitoshi Murata (Iwate Prefectural University, Japan)

Session Chair
Eva Ibarrola (University of the Basque Country, Spain)

Saint Petersburg, Russian Federation
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Highlights from Paper 1 "A software defined approach to unified IPv6 transition"

- A novel software to address the challenges of transitioning from IPv4 to IPv6 was presented aiming to unify the variety of IPv6 transition mechanisms in a cost-effective flexible manner.
- A proof-of-concept prototype built and deployed on an enterprise campus to provide IPv6 internet access based on this proposal was described.
- Results of experiments were presented demonstrating significant benefits of this approach, including low complexity, high flexibility and low cost.
- Kevin Hu explained that the proposal was nearly transparent to network subscribers since they don´t have to upgrade their software or hardware for transition.

- Comments related to latency

Highlights from Paper 2 "Global Convergence in Digital Identity and Attribute Management: Emerging Needs for Standardization"

- Several areas within digital identity management where standardization is urgently needed to achieve further international convergence were highlighted in this paper.
- Attribute management was argued to be of central importance to make continued progress in this area.
- Other areas that should also be addressed for standardization, such as application of process mining for online authentications and authorization and related security relevant processes were also highlighted.

- Some comments related to personal & digital identity management

Highlights from Paper 3***
"Distributed Demand-Side Management with Load Uncertainty"

- A proposal of a game theoretic based distributed Demand-side management (DSM) scheme, where end-users utilize energy consumption scheduling (ECS) and storage devices to minimize their consumption costs.
- The authors verified that, difference in pricing mechanisms employed by utility companies gives incentive for users to trade the energy.
- The proposal makes it possible that end-users with storage devices may schedule their storage devices to be charged during low-price off-peak hours and discharge the stored energy during peak hours to minimize their energy consumption cost.

Comments related with the cost of storage devices

Highlights from Paper 4
"Proposal of "Cyber Parallel Traffic World" Cloud Service"

- In this presentation a cyber parallel traffic world (CPTW) cloud service, roads, sidewalks, and traffic facilities such as traffic signals (the same as they are in the real world) were presented.
- In the proposed cyber environment, vehicles, pedestrians, and temporary obstacles move in synchronization with their real-world movements.
- The authors claim for the participation of many people creating a CPTW representing their area for completing the development of CPTW scheme.
- They also envision the foundation of an organization for managing the development of CPTW and providing its services.

- Comments about covering all the traffic country signals.

Conclusions/Recommendations

- This session was dedicated to the future of convergence and the four presented papers are good examples of the long way we still have to go through to achieve that convergence.
- Cooperation between researchers can help a lot in this long way towards convergence.
- These interesting proposals should be addressed to the standardization bodies so the way to convergence can be shortened.

SESSION 2 PART I

3G, 4G, 5G and beyond – the impact on spectrum

S2.1 Towards Converged 5G Mobile Networks - Challenges and Current Trends.*
Anna Zakrzewska (Technical University of Denmark, Denmark)

S2.2 Comparison of WiBro and TD-LTE through the Social Network Analysis.
Dong-hyu Kim (Yonsei University, Korea)

S2.3 Modelling and performance analysis of pre-emption based radio admission control scheme for video conferencing over LTE.
Ekaterina V. Markova (Peoples' Friendship University of Russia, Russia)

Session Chair
Christoph Dosch (ITU-R Study Group 6 Chairman; IRT GmbH, Germany)

Saint Petersburg, Russian Federation
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Highlights from Paper 1
S2.1 "Towards Converged 5G Mobile Networks - Challenges and Current Trends" *

- Clear demonstration that for future mobile services only a combination of measures might lead to meet the demand for more capacity and higher performance as a result of the dramatic increase in traffic for 5G and stricter performance requirements, such as drastically reduced latency and energy consumption.
- The to cope with the capacity crunch, the proposals are:
  - Additional spectrum
  - Network densification
  - Higher spectral efficiency
- Exemplification for six important Challenges areas / enabling technologies:
  - M2M
  - Capacity crunch
  - Enhanced local area access
  - New radio access architecture such as proposed by EU project "BuNGee"
  - Network management (self-organisation self-configuration, self-healing)
  - Core Network virtualization (decoupling of H/W and S/W)
- → Standard conversion leads to unified agnostic solutions

* nominated for best paper award

Highlights from Paper 2
S2.2 "Comparison of WIBRO and TD-LTE through the social network analysis"

- The authors investigate factors that contribute to the overtaking of one standardized system by one that comes a bit later to the market
- The authors exemplify the specific case of Mobile WiMAX vs. TD-LTE, where TD-LTE now seems to make the race although WIBRO (i.e. Mobile WiMAX) had already been well established in the world market
- Decisive factors are
  - Critical role of China in TD-LTE
  - Active participation of the world's top telecoms gear vendors in the development of TD-LTE
- Based on this social network analysis, firms and governments could act/react accordingly

Highlights from Paper 3
S2.3 "Modelling and performance analysis of pre-emption based radio admission control scheme for video conferencing over LTE"

- High occupation of IP networks may lead to reductions in data-rate available for a given data stream
- The paper investigates this effect of service degradation (or even service interruption) with respect to the Quality of Service requirements as defined in various ITU-T Recommendations
- Two cases are distinguished:
  - Time-critical streams that require some Guaranteed Bit-Rate (GBR)
  - Time-uncritical streams that do not need GBR
- The authors propose a pre-emption based radio admission control (RAC) model for VoD (Video-on-Demand) and VC (Video Conferencing) and request according updating of the cited ITU-T Recs
- A recursive algorithm is presented that allow the calculation of performance measures such as blocking probability, pre-emption probability and mean bit-rate

Conclusions/Recommendations

- Paper S2.1 should be considered for input to ITU-R WP 5D (Mobile Service). It seems very useful with respect to discussions on the future use of IMT and its follow-up system(s).
- Paper S2.2 could also be of interest to WP 5D as it deals with the market penetration of IMT systems Mobile WiMAX and TD-LTE
- The authors of Paper S2.3 are advised to make pertinent contributions to ITU-T if they wish the Recs. on QoS to be updated to take into account variable or pre-empted data-rates in IP networks.

SESSION 2 Part II

3G, 4G, 5G and beyond – the impact on spectrum

S2.4 IMT Standardisation and Spectrum Identification: Regulatory and Technology Implications.
Mohamed El-Moghazi (University of Strathclyde, United Kingdom)

S2.5 Spectrum occupation and perspectives millimeter band utilization for 5G networks.
Valery Tikhvinskiy (Moscow Technical University of Communication and Informatisation (MTUCI), Russia)

S2.6 A Non-cooperative TV White Space Broadband Market Model for Rural Entrepreneurs.
Sindiso Mpenyu Nleya (Computer Science Department, South Africa)

Session Chair: Ved P. Kafle (NICT, Japan)

Saint Petersburg, Russian Federation
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Highlights from Paper 1 "IMT Standardisation and Spectrum Identification: Regulatory and Technology Implications"

- The ITU's involvement in mobile communication development
  - IMT Standards (IMT-2000: 3G (6 Standards e.g. WCDMA) & IMT-Advanced: 4G (2 Standards e.g. LTE-Advanced))
  - IMT Spectrum Identification (e.g. 2 GHz, 2.5 GHz)

- The IMT standardization influenced decisions on spectrum
  - Indirect link between the spectrum and the IMT standards
  - The ITU has encouraged spectrum re-farming between the different generations of mobile communication

- The IMT standardization influenced mobile technology
  - Harmonising different 3G standards.
  - Accelerating the competition between the different technologies

Conclusions/Recommendations

- The dominance of LTE-Advanced put question marks on the future role of the ITU on the 5G standards development
- Important to follow the discussions in the coming WRC-15 regarding additional IMT spectrum identification (e.g. 400 MHz, 1.4 GHz, 3.8 GHz)
- Important to consider whether the ITU should involve in the standardization process of other wireless technologies

Highlights from Paper 2 "Spectrum occupation and perspectives millimeter band utilization for 5G"

- New services request new radio access to transmit signals beyond 4G
  - The needs of 5G – channels with bandwidth 500 MHz (UL)/ 1000 MHz (DL)
- Search of new spectrum bands shifts into millimeter band (MMB)
- Priorities in new spectrum investigations have became spectrum "seamless" and belonging of spectrum band to MOBILE or FIXED services
- Spectrum release and redeployment of MMB – The necessity of 5G development
- Costs on "clean" spectrum for 5G development will be substantial and can surpass expectations of national administrations

Conclusions/Recommendations

- Investigation of spectrum occupation in millimeter band demonstrate its high current utilization
- Future implementation of 5G mobile networks in Russia may require the release of the millimeter band from RES, the number of which currently estimated at more than 1000 RESs of BFWA and over 11000 RESs of RRL.
- Millimeter band release activity by 2020 requires planning the costs in the state budget, which can reach 100 million USD annually, that significantly exceeds the previous annual budget spending.

Highlights from Paper 3 "A Non-cooperative TV White Space Broadband Market Model for Rural Entrepreneurs"

- Proposed a dynamic spectrum sharing model based on optimization of throughput and delay
  - Finding an equilibrium pricing scheme for a smart mesh network in which multiple primary services users are willing to share allocated spectrum with a secondary service user.
- Showed analytical results of demand, revenue, cost and profit relationships

Conclusions/Recommendations

- Throughput model looks better compared to delay model in terms of optimizing overall revenue.
- The study aims at increasing access to broadband networks in rural and remote areas at reduced cost
- In future work, the authors plan to include traffic engineering in the model

SESSION 3

Multimedia applications for all?!

S3.1 Invited Paper: Conversion of Broadcasting and Broadband Internet - A benefit for people with disabilities (and for us all).
Christoph Dosch (ITU-R Study Group 6 Chairman; IRT GmbH, Germany)

S3.2 SQUALES: A QT-based Application for Full-Reference Objective Stereoscopic Video Quality Measurement.*
Marcelo S. Alencar (Federal University of Campina Grande, Brazil)

S3.3 Design and Specifications of a Repository for Real-Time Open Data.
Patrick Hosein (University of the West Indies, Trinidad and Tobago)

S3.4 A Cross-Country Comparison on User Acceptance of Multimedia Cloud Services - Germany and Japan.
Yasuhiro Tanaka (Senshu University, Japan)

Session Chair
Dhananjay Kumar (Anna University, India)

Saint Petersburg, Russian Federation
3-5 June 2014

Paper1: Invited Paper: "Conversion of Broadcasting and Broadband Internet - A benefit for people with disabilities (and for us all)"

- The aim is to provide access services (such as subtitles, audio-description, clean audio or sign language videos) via the broadband Internet to people with disability.
- The author presented the work of ITU within the field of IBB (Integrated Broadcast-Broadband) systems.
- There are some advantages of combining broadcasting and Broadband Internet.
- The synchronization issue may need further investigation considering the constraints of popular multimedia codec (H.264/MPEG-4).

Paper 2 : "SQUALES: A QT-based Application for Full-Reference Objective Stereoscopic Video Quality Measurement"

- A Quality-based C++ application for full reference stereoscopic video quality assessment is implemented and analyzed.
- Authors aim to contribute, as an open-source tool to be used by academia and industry.
- PSNR, SSIM, PW-SSIM, and technique for stereoscopic video quality assessment: disparity weighting (DW), DPSNR, DSSIM and DPW-SSIM is presented.
- Authors may need to validate/cross-check the numerical experimental observation.

Paper 3 : "Design and Specifications of a Repository for Real-Time Open Data"

- A design frame work to integrate real-time open data from multiple sources in multiple formats and make the data accessible in a standard format.
- Authors presented a platform comparison of existing techniques of data integration.
- An architectural view of the proposed platform was outlined.
- A simplified mathematical model of integrating samples of data was formulated which may need to be generalized for further analysis.

Paper 4 : "A Cross-Country Comparison on User Acceptance of Multimedia Cloud Services - Germany and Japan"

- A study on acceptance of multimedia cloud services focusing on the influence of user's privacy awareness.
- The framework of analysis is based on the Technology Acceptance Model (TAM).
- A t-test on available data set for Germany and Japan was carried out and perceived value was observed.
- Authors also presented sample data from hypothetical testing.

Conclusions/Recommendations

- The work presented in first paper can be submitted to the ITU-internal Intersector Rapporteur Group on Audiovisual Media Accessibility (IRG AVA).
- The stereoscopic video quality assessment tool developed and presented in Paper 2 can be used by academia and industries and may be evaluated for standardization.
- The design framework of a repository for real-time open data in Paper 3 can submitted to the concerned study group in ITU-T.
- A study on user acceptance of multimedia cloud services in Germany and Japan in Paper 4 could be used by study group of cloud computing in ITU-T.

SESSION 4

E-Health and standards

S4.1 Combining ICT-Standards Essential-Patents and Medical-managerial Guidelines towards sustainable Assisted-living and home-care.*
Vasileios P. Spyropoulos (Technological Education Institute of Athens, Greece)

S4.2 E-HEALTH Standardization Challenges in Emerging Economies: The case of Mexico.
Veronica Rojas Mendizabal (CICESE Research Center, Mexico)

S4.3 Reverse Standardization from Public E-health Service.
Masahiro Kuroda (National Institute of Information and Communications Technology, Japan)

S4.4 Global standards, the key enablers for deploying next generation emergency communications networks.
Fidel Liberal (University of the Basque Country, Spain)

Session Chair
Martin Adolph (ITU-T, Switzerland)

Saint Petersburg, Russian Federation
3-5 June 2014

Highlights from Paper 1
Combining ICT-Standards Essential-Patents and Medical-managerial Guidelines towards sustainable Assisted-living and home-care

- ICT-enabled home-care and assisted living solutions are becoming increasingly wide-spread, and considered by many as an affordable alternative to expensive hospitalization
- Complex standardization ecosystem involving stakeholders from different industries (healthcare, ICT)
- Determining standard-essential patents (SEPs) becomes an increasingly challenging task

- Standard-setting organizations, patent offices and industry need to collaborate to ensure SEPs are disclosed according to the IPR policy of the respective SSO

Highlights from Paper 2
E-HEALTH Standardization Challenges in Emerging Economies: The case of Mexico

- Importance of standards as a means to ensure the quality of health service delivery
- Importance of standardization as means to increase competitiveness
- Standardization/standards should play an important role in any comprehensive e-health policy framework
- Framework should also address legal, ethical aspects; consider capacity building

Highlights from Paper 3
Reverse Standardization from Public E-health Service

- Portable health clinic – exploiting ICTs to deliver affordable, sustainable healthcare services to people without access to healthcare in Bangladesh
- Body area network (BAN) technology: lightweight, low-power, small size, low-cost
- Medical BAN (MBAN): to address specific e-health requirements
- International MBAN standards have been adopted / are under development
- Importance of a sustainable business system

Highlights from Paper 4
Global standards, the key enablers for deploying next generation emergency communications networks

- Public safety networks are being upgraded worldwide to provide broadband and rich media features
- Interoperability, technical, operational, organizational challenges
- An emergency inter-networking system capable of connecting existing first responder communication systems and enabling the integration of next generation mobile networks is proposed
- IMS-based and leverages the over the top (OTT) approach

Conclusions/Recommendations

- ICTs in support of health and health-related fields: Remote patient monitoring and ambient assisted living increasingly wide-spread, and considered by many as an affordable alternative to expensive hospitalization
- ICTs to support public safety communications

- Importance of standards as a means to ensure the quality of (health) service delivery
- Importance of non-technical aspects: legal, regulatory, ethical, cost, business models

- Growing focus on IPR policies

SESSION 5

Sensor networks

S5.1 Dynamic Mobile Sensor Network Platform for ID-based Communication.*
Ved P. Kafle (NICT, Japan)

S5.2 An Experimental Test-Bed for the Evaluation of the Hidden Terminal Problems on the IEEE 802.15.5 Standard.
Antonio-Javier Garcia-Sanchez (Technical University of Cartagena, Spain)

S5.3 On Software Standards for Smart Cities: API or DPI.
Dmitry Namiot (Moscow State University, Russia)

Session Chair
Mitsuji Matsumoto (Waseda University, Japan)

Saint Petersburg, Russian Federation
3-5 June 2014

Highlights from Paper 1 (S5.1) Dynamic Mobile Sensor Network Platform for ID-based Communication Ved P. Kafle (NICT, Japan)

Abstract:
Presented the design and implementation of the ID-based communication supporting dynamic mobile sensor network

New features:
- Remotely reconfigurable sensor network
- Reliable connectivity through mobility and multi-homing
- General-purpose open API in sensor nodes

Future work, Potential new topics for standardization:
- Standardization, optimization, application development

1. Interfaces between sensing, computation and communication units
2. Light-weight authentication and access control methods for mobile sensors
3. Methods for ID-based communication in heterogeneous network protocols, e.g., extension to ITU-T Y.FN-heteronet (WP3/13)

Highlights from Paper 2 (S5.2) An Experimental Test-Bed for the Evaluation of the Hidden Terminal Problems on the IEEE 802.15.5 Standard: Antonio-Javier Garcia-Sanchez (Technical University of Cartagena, Spain)

Motivation:

Widespread use of wireless sensor networks:

By 2016, 39% applications and services will be uniquely enabled by Low-Rate Wireless Personal Area Mesh Networks.

There is a standard IEEE802.15.5 and lots of usage examples have been reported. However, very few experimental work accessing the performance

Lack of an open-source implementation available to the scientific, development communities

Implemented IEEE802.15.5 and evaluate the effect of Hidden Terminal(HT) issue.

Highlights from Paper 3 (S5.3)
On Software Standards for Smart Cities: API or DPI.
Dmitry Namiot (Moscow State University, Russia)

- This paper discusses the global unified standards for software products and existing approaches (de-facto standards)
- Can a unified approach to the creation of services to cover all the possible use cases and scenarios for new services?
- Prevailing trends in the design to create a standard
- Time to market for new applications/services as a key factor
- The need to address the prevailing trends in the design to create a standard
- The limits of acceptability for universal global standard
- Time-to-market as a key factor for software development tools

Conclusions/Recommendations

- Most of the participants interested in sensor network field. There are many questions. Usage area is short and close to human behavior.
- Most of the questions were related to realization of the system, standardizations. In particular, the possibility of physical realization.
- IEEE802.15.5 was discussed, extension of current standard due to change of the environment.

Session 6

Standardization, Education, Innovation

S6.1 Invited Paper: Standardization: A primer.
Ken Krechmer (University of Colorado, USA)

S6.2 Standards as enablers for innovation in education - the breakdown of European pre-standardisation.
Tore Hoel (Oslo and Akershus University College of Applied Sciences, Norway)

S6.3 Syllabuses Crawling and Knowledge Extraction of Courses for Global Standardization Education.
Hiroshi Nakanishi (Osaka University, Japan)

S6.4 Standards: Inhospitable Terrain for Innovation?*
Megi Medzmariashvili (Lund University, Sweden)

Session Chair
Elena Bogdanova (Institute of International Business and Law NRU ITMO, Russian Federation)

Saint Petersburg, Russian Federation
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Ken Krechmer
(University of Colorado)
"Standardization: A primer"

In his Invited paper Mr. Krechmer discusses the main general questions on standardization and gives obvious answers.

Q: Are standards necessary? A:Absolutely
Q: Is standardization desirable? A:Increasingly
Q: Is academic education in standards desirable? A:Increases awareness but a common core is lacking.

He also identified an emerging succession of standards: adaptability standards.

Hiroshi Nakanishi
(Osaka University, Japan)
"Syllabuses Crawling and Knowledge Extraction of Courses for Global Standardization Education"

In his paper, Mr. Nakanishi proposed a new crawling technology to collect and analyze syllabuses published on the websites of universities. Using the technology proposed, syllabuses of 132 Japanese universities including all the 88 national universities have been crawled. As a result of the extraction of the global standardization courses, it has been made clear that 45 courses of the global standardization education are being offered by 24 Japanese universities , and various kinds of knowledge are offered by each of the courses.

Tore Hoel
(Oslo and Akershus University College of Applied Sciences, Norway)
"Standards as enablers for innovation in education - the breakdown of European pre-standardisation"

Mr. Hoel in his presentation tells about the history of standardization organizations and explains main trends in such organizations on the way the standards are created and implemented.

The main point is that pre-standardisation is part of innovation. Innovation is impossible without real openness. Formal standards bodies cling to a closed business model. They need to open up their processes and outputs. Or become irrelevant.

Megi Medzmariashvili (Lund University, Sweden) "STANDARDS: INHOSPITABLE TERRAIN FOR INNOVATION?"

- Standardization's positive link with innovation is not absolute;
- Effective standardization must relate to larger EU policy goals, i.e. European Competitiveness;
- There must be a supportive and complimentary legal framework to support these goals and facilitate participation in standard setting activities;
- There is need for a regulatory/legal catch on SSO's to monitor and ensure standardization processes are transparent, inclusive and free from abusive influence.