ITU-T Kaleidoscope 2009
Innovations for Digital Inclusion

Session 1

Invited Paper:
Is digital inclusion a good thing? / Richard M Stallman

Open Source, Free Software and Digital Inclusion
Session Chair: Mostafa Hashem Sherif
AT&T, USA·

Highlights from The Paper "Is digital inclusion a good thing?"

- This is a position paper to defend freedoms in the digital age against:
  - Surveillance and control using proprietary software
  - Software as a service
  - Censorship (excused by terrorism, obscenity, etc.)
  - War on sharing
- Free software is different than Open Software and is not gratis

Conclusions / Recommendations

- Digital inclusion should not be at the expense of freedom
- Free software →new business models
  - Free software: capitalism & socialism & anarchism
- Personal commitment, technological level in addition to the necessary legislations
- New initiatives to support the Arts

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Session 2

Technology for losers / Erkki Sutinen
Towards Digital Blood-Banking / Vasileios Spyropoulos
Quality of Service Management for ISP / Eva Ibarrola
Enhanced Advertising for NGN / Jose Simoes

Leveraging network-enabled services for digital inclusion

Alfredo Terzoli
Rhodes University, South Africa

Mar del Plata, Argentina, 31 Aug - 1 Sep 2009

Technology for losers / Erkki Sutinen

- Strength-based design, coupled with co-creation can stimulate innovations able to re-include the digital excluded

- Two examples:
  - Tumaini University, Iringa University College: new way of teaching Computer Science
  - Kids' Club and special needs children: new technologies for and with special needs

Towards Digital Blood-Banking

Vasileios Spyropoulos

- Universal Information System for blood banking is essential and feasible, but not yet complete.
- The network, with its services, such as suitable web services, is essential to the success of this important enterprise (as is the work of Vasileios group).

Quality of Service Management for ISP

Eva Ibarrola

- QoS management models and implementation methodologie are more and more important for ISPs.

- Based on ITU Rec. E.802, *Framework and methodologies for the determination and application of QoS parameters,* a complete QoS model is proposed and validated.

Enhanced Advertising for NGN

Jose Simoes

- Advertising across different technologies and platforms is becoming more and more important and requires appropriate architectures.
- Because of its focus on providing context to content selectors in the content manager component, the paper goes beyond the important but relatively narrow area of advertising, taking on the problem of automatic information filtering.

Conclusions / Recommendations

- Common thread across the papers: **the 'human element' is important** and all design must **explicitly** accommodate this.

- **Digital exclusion can take many forms**, depending on the environment and the unit of measure used: they all need to be catered for.

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Session 3

Interplay and implications of intellectual property and academic – Industry collaboration to foster digital inclusion / Louis Masi
Model and system architecture for USN businesses / Masugi Inoue
Discrimination in NGN service markets: Opportunity or barrier to digital inclusion? / Lina Gomez
Global effort on Bridging the Digital Divide and the role of ICT standardization / Mario Canazza
Universal Digital Inclusion: Beyond Connectivity, Affordability and Capability / Alfredo Terzoli

Bridging the Digital Divide for the individual
Kai Jakobs,
RWTH Aachen University, Germany

Highlights from

Interplay and implications of intellectual property and academic – Industry collaboration to foster digital inclusion

- Progress is not a proprietary concept!
- Different types of collaboration need to be encouraged.
- We must work together to make a difference.
- Open standards, open architectures, open source software and open innovation, accelerate economic development for all.

Highlights from

A model and system architecture for ubiquitous sensor network businesses

- Ubiquitous sensor networks (USNs) can be beneficially employed by communities.
- 'All' it takes is a platform that can support multiple services and applications.
- Such platforms will be beneficial for a variety of communities (of interest).
- They will also create new jobs (in the ICT industry).
- For such platforms, internationally agreed standards are crucial.

Highlights from

Discrimination in NGN service markets: Opportunity or barrier to digital inclusion?

- In the Internet, unfair discrimination by service providers (largely against applications) is not unheard of.
- Differentiation may be a good thing as
  - an enabler of innovations,
  - a tool for digital inclusion.
- Today, wide access to cellular technology keeps many away from (wired) broadband services.

Highlights from

Global effort on Bridging the Digital Divide and the role of ICT standardization

- Positive correlation between a country's development and the utilisation of ICTs.
- Governments need to facilitate development of a competitive telco market, with full geographical coverage, at reasonable costs.
- Standards are crucial to bridge the digital divide.

Highlights from

Universal Digital Inclusion: Beyond Connectivity, Affordability and Capability

- Three widely accepted reasons for a widening digital divide: Connectivity, Affordability, Capability.
- Beyond that: indigenous knowledge.
- ICT may help preserve indigenous knowledge.
- To do so, ICT must not be culture-agnostic.
- The interface has to be adaptable to community characteristics.

Conclusions

- One size does not fit all. This holds for:
  - Forms of co-operation,
  - Implementation of ICT.
- Look at both sides. This holds for:
  - Discrimination/differentiation
- In any case, international standards are a sine-qua-non.

Recommendations

- When designing standards, also think about their
  - implementation,
  - adaptability,
  - application,
  - costs.
- Consider extended educational activities.

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Session 4

RoFSA: A universal platform for convergence of fiber and free-space optical communication networks / Kamugisha Kazaura
An ID/Locator Split Architecture of Future Networks / Ved Kafle
Mobile-NGN Architecture based on REST concept / Yoshitoshi Murata
Reliability and scalability analysis of low cost long distance IP-based wireless networks / Daniele Trinchero

Network architectures today and tomorrow

Helmut Schink
Nokia Siemens Networks, VC SG 15

Highlights from Paper 1 "RoFSA: A universal platform for convergence of fiber and free-space optical communication networks"

- innovative broadband wireless communication system based on RoFSO links
- convergence of fiber and free-space optical communication networks
- extending broadband connectivity to underserved areas.
- experiments have shown feasibility in absence of severe weather conditions
- compatibility with existing widely deployed optical fiber infrastructure
- early initiatives by the ITU-T and ITU-R and other bodies on further studying standardization of RoFSO technology will greatly support in the rapid maturity and adaptation of the technology

Highlights from Paper 2 "An ID/Locator Split Architecture of Future Networks"

- naming system, called Host Name and Identifier System (HNIS)
- efficient name resolution in future dynamic networks
- ID/locator split architecture demonstrated, better mobility, multihoming, and routing features
- Implementation of the proposed architecture demonstrated
- evaluate of the capability of the proposed architecture in handlingfrequent changes in host information in mapping systems.

Highlights from Paper 3 "Mobile-NGN Architecture based on REST concept "

- new Mobile-NGN architecture based on the REST *(representational state transfer)* concept
- no dominant players who control the mobile communication market. Users can freely select some access network.
- application providers will easily be able to provide new applications without paying attention to terminal hardware.
- Communication addresses will be unified among different communication services: the same address will be used permanently.

Highlights from Paper 4 "Reliability and scalability analysis of low cost long distance IP-based wireless networks"

- long distance (300km) point-to-point connections implemented by use of low cost technology
- tests for long periods, to identify transmission performance, hardware lifetime and dependency from weather conditions.
- transmission capacity is not comparable with other, more developed, either mature or forthcoming transmission systems.
- Nevertheless, thanks to their low costs, MKM networks can be implemented for the construction of backhaul networks in places where digital infrastructures do not exist yet
- implementation in the Amazonian Ecuador, to provide wideband connection to villages deployed in the Amazonian Forest started.

Conclusions / Recommendations

- Standarisation of free space optics, possibly with RoF should be investigated
- HNIS standardisation and registration/policy possibly to be developed
- low cost long distance radio as open source hardware?

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Session 5

Innovative broadband models for digital inclusion/
Supavadee Aramvith
Dynamic Resource Management for Downlink Multimedia Traffic in OFDMA Cellular Networks / Dhananjay Kumar
Optical Transport Networks: from all-optical to digital/
Virgilio Puglia

Session 5 , Broadband for everyone
Tohru Asami
University of Tokyo, Japan

Highlights from "Innovative broadband models for digital inclusion"

- Universal Service Obligation (USO) project
  - Good-balance: suitable technologies, required applications, investment, time-to-service, and end-user affordability.
- Compares IPSTAR , WiMAX & CDMA 470
  - IPSTAR (IP broadband satellite): community internet governmental network, educational network, rural telephony(69k user terminals 2008, backhaul)
  - WiMAX: UL/DL= 15 Mbps /5.5 Mbps
  - CDMA 470: Cost-effective (Rather expensive CPE)

Highlights from "Dynamic Resource Management for Downlink Multimedia Traffic in OFDMA Cellular Networks"

- Proposed Two Stage Rate Adaptive (TSRA) algorithm to meet dynamic bandwidth requirement in downlink, maximizing spectral efficiency.
- TSRA with BWA supports mobile multimedia applications
  - Mixed multimedia traffic: CBR, rt-VBR, nrt-VBR, and ABR.
- Gap between analytical and simulated average capacity gets smaller as number of user increases

Highlights from "Optical Transport Networks: from all-optical to digital"

- Traditional DWDM as an OTN=>IPoDWDM(lack of interoperability)=>ODN (Optical Digital Network)
- IPoDWDM=Router+DWDM+MPLS
  - IP router with optical colored interfaces can also serve as IP-OXC & understand QoS
  - Switching between working and protection paths before data lost occurs
- ODN = vendor-implementation
  - BMS: λ inverse multiplex
  - Digital ODN layered structure = digital path layer networks (ODU) + digital section layer networks (OTU)

Conclusions / Recommendations

- Universal Service
  - IPSTAR, WiMAX & CDMA 470: Good-balance of suitable technologies, required applications, investment, time-to-service, and end-user affordability
- Wireless Network
  - Two Stage Rate Adaptive for Downlink for Multimedia Traffic in OFDMA Cellular Networks
- Optical Network
  - Trend from DWDM as an OTN to ODN (Optical Digital Network) via IPoDWDM

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Session 6

iCanSee: A SIM Based Application for Digital Inclusion of the Visually Impaired Community / Hannah Thinyane
An Asterisk-based framework for e-learning using open protocols and open source software / Alfredo Terzoli,
Innovations for Digital Inclusion: Leveraging Next Generation Networks for Human Development from the Bottom of the Pyramid / Hannah Thinyane

Session 6, Open and accessible services for digital inclusion

Mitsuji Matsumoto,
Waseda University, Japan.

Highlights from Paper 1 "iCanSee: A SIM Based Application for Digital Inclusion of the Visually Impaired Community"

- A SIM based application built on SCWS called iCanSee to help the visually impaired used text based communication tools on mobile phones has been proposed and implemented.
- iCanSee is a software based solution, residing in the SIM card making it easily usable in whichever phone the user selects but only if the phone browser supports CSS.
- This works highlights and addresses a key accessibility issue of accommodating users who have low vision enjoy the benefits and advantages associated with mobile phones.

Highlights from Paper 2 "An Asterisk-based framework for e-learning using open protocols and open source software"

- The paper presents a conceptual design of an e-learning system based on open protocols and open source software.
- E-learning can be used as a method of addressing inequalities between education institutions.
- The authors outlined an e-learning model and its proposed implementation using open source and public available tools and technologies.
- Challenges in the implementation e.g resources limitations, cost, compatibility etc have been addressed and an effective solution of how to integrate the various tools has been given.

Highlights from Paper 3 "Innovations for Digital Inclusion: Leveraging Next Generation Networks for Human Development from the Bottom of the Pyramid"

- The paper examines the possibility of leveraging South Africa's migration to NGN for development of unique ICT support networks and services for human development at the base of the country's development pyramid (BOP).
- Proposed research and strategy focuses on increased knowledge and information which is highly significant in complex multicultural societies like SA which can lead to social and cultural changes to address all kinds of inequalities.
- The authors point out clear technological innovations are necessary and must be made within clearly understood social and economic contexts in the migration to NGNs.
- Promoting BOP participation in the evolving NGNs would be more effective if approached from the BOP itself, and would be a more effective means of bridging SA racial divide.

Conclusions / Recommendations

- In today's session 6, the discussion concerning the accessibility of various communities was done. Accessibility for the visually impaired iCanSee, academia in e-Learning framework, Open Protocol, Open Software, and Human Development from the Bottom of the Society in South Africa were discussed. I got the following key points from this session 6.

(1) Accessibility is experienced in the various level of communities/Society in the wide sense. In current ITU-T, the standardization activities is mainly considering new advanced technology proposed by business (companies, providers) in the developed communities.

(2) New technology has produced new challenges in addressing the digital divide as well as New accessibility issues.

(3) In the standardization of accessibility, the accessibility should address all level of society e.g., disabled person or BOP, etc..

(4) ITU-T can provide an environment to make it possible to bridge and harmonize between low-end and high-end community.

(5) The first two papers were requested to submit to ITU-T SG16.

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Session 7

Government Role in Information and Communications Technology Innovations / Dongback Seo
New Model for Cost of Equity Evaluation in Emerging Markets: The Telecommunication Sector in Brazil / Tullio Carné Bertini
ICT Standardization in China, the EU and the US / Kai Jacobs

Session 7, Public policies, standards and digital inclusion

Lic. María Victoria Sukenik,
Secretaría de Comunicaciones (Argentina)

Mar del Plata, Argentina, 31 Aug - 1 Sep 2009

Government Role in Information and Communications Technology Innovations

- **The government intervention in ICT should depend on the type of innovation and time of intervention to stimulate the ICT sector.**

- **4 types for innovation: incremental, architectural, platform and radical, based on 2 aspects:**
  - the technology life cycle, and
  - changes in the value chain of the implementation.

- **A successful public policy should be able to vary according to the kind of innovation.**

New Model for Cost of Equity Evaluation in Emerging Markets: The Telecommunication Sector in Brazil

- This new model rest on the importance of an appropiate cost of equity capital model to be used in the WACC (Weighted average cost of capital) estimation process.

- Propose a new modified CAMP model and creates the "Pod" index, responsible for balancing the country risk premium, considering only a portion of this risk according to the characteristics of each asset (Brazilian telecommunications sector).

- An appropriate WACC, also helps for the investment and to foster competition.

ICT Standardisation in China, the EU and the US

- **US: virtually exclusively market-based approach to standardisation.**
- **China: is strictly government-led.**
- **EU: applies an element of regulation, co-funding the European Standards Organisations.**
- **Compares a centrally governed system (China), that lacks the flexibility to quickly adapt to a new situation or to upcoming new requirements, to a highly de-centralised one (US), with the EU system somewhere in between, both leading the standard settings in the ICT sector.**

Conclusions / Recommendations

- **The ICT sector is characterised by an extremely high rate of innovation, and accordingly by comparably short product life cycles.**
- **There is a time gap between the implementation of an ICT equipment and the commercialization of a service.**
- **That's why public authorities should consider not only a short-term possibility of technology development and implementation, but also the commercialization of future services.**

Conclusions / Recommendations

- **Since the high rate innovation generates risk, it's necessary toi have an appropiate model in order to evalauate that risk.**
- **For standard settings in ICT sector, there should be considered:**
  - **Flexible approach to standardization;**
  - **Participacion and consensus from different actors in standard setting (legitimacy/reputation);**
  - **R&D related to standard setting;**
  - **Links with international bodies;**
  - **Financing.**