

**Monday 17, November 2014**

**Welcome (9:00-9:15)**

**Session 1: Economics (9:15-12:15)**

**1. Henning G Schulzrinne (Columbia University - New York, US)**

Title: The Internet is a series of tubes

Abstract: 70 to 80% of the cost of deploying fiber networks is civil engineering. Thus, for most high-income countries, the challenge is to reduce the cost of fiber installation, not flying drones. I will briefly discuss the experience with universal service funding and broadband build-out in the United States, and discuss the limitations of supposedly "cheap" approaches, as well as the wired-wireless trade-offs.

**2. Falk Von Bornstaedt (Deutsche Telekom - Bonn, DE)**

Title: Monetization in the Internet.

Abstract:

what is a long term sustainable model?

How will the role of advertisement evolve in the future?

What was the conflict between Netflix and Comcast?

How do we ensure enough future investments?

**3. Irene Ng (University of Warwick, GB)**

Title: Comparing Digital Exclusion with the Bottom of Pyramid (BoP): Economic Challenges and Strategies

Abstract: "Bottom of the Pyramid" (BoP) was a phrase coined by U.S. President Franklin D. Roosevelt in 1932 when he referred to "the forgotten man at the bottom of the economic pyramid". In economics, the bottom of the pyramid is the 2.5 billion people who live on less than \$2.50 per day. "Bottom of the Pyramid" is a phrase used by those interested to develop new business and economic models that deliberately target the poorest regions. When comparing the challenges of the bottom of the pyramid with those marginalised through digital exclusion, there are surprising parallels. Multi-national companies consider targeting BoP with great scepticism when it comes to doing business profitably often due to the perception of corruption, illiteracy, currency fluctuations and inappropriate infrastructures within the BoP. These factors and also the outdated representation of the poor hide the real potential of BoP markets. Similarly, those marginalised by digital exclusion are the vulnerable people, the poor, disabled, or elderly. Increased digital skills are of benefit to consumers (saving £254 a year), to public services, bring improvements in education; bringing older and isolated people to be more effectively engaging in their communities; helping adults back into work and improving health and social services. With digital skills having the greatest impact on the lives of the marginalised in society, it is alarming to see the latest figures from the Office for National Statistics that show that 6.4 million people have never been online. To face this challenge, digital exclusion is currently seen as a challenge for the state. This paper discusses the parallels between BoP challenges and that of digital exclusion and considers the lessons learnt and how new economic and business models could be applied to face the challenges of digital exclusion as a viable option for companies to serve and therefore enable public and private sector collaboration.

#### **4. Rüdiger Zarnekow (TU Berlin, DE)**

Title: Business models for broadband rollout

Abstract:

- Should FTTH deployment be the midterm goal?
- How can business models foster broadband deployment?
- Can we enable gradual investment in rural areas?

#### **5. Adam Wolisz (TU Berlin, DE)**

Title: Technical reasons for new data transmission charging models

### **Session 2: Socio-technological (14:00-17:00)**

#### **1. Jon Crowcroft (University of Cambridge, GB)**

Title: Who you gonna call?

Abstract: As per ghostbusters, when unexpected things happen in society, it isn't obvious who to call. Indeed, BBN's report in to the events in NYC after 9/11 strongly advised against shutting off networks, based on data from emergency services that often, situational awareness was frequently based on data from citizens, as much as from specialists. This is common knowledge (see also Paradise built in hell, by Rebecca Sohit:

<http://www.amazon.co.uk/Paradise-Built-Hell-Extraordinary-Communities/dp/0143118072>

One thing increasingly exercising interest is the shift from community to government as a social group grows beyond the level where trust via peer-pressure or just personal knowledge works - this is something that needs thought (one example well documented is the self-help networks that emerge after disasters, and the very bad things that happen when the first responders arrive and try to take over without understanding the structures that have evolved - this transition applies in many arenas - even the Internet itself which didn't have very much spam or phishing or ddos till it hit a certain size - the emergence of anti-social or even byzantine behaviour is interesting and tools to combat it not well understood - think, also, Wikipedia edit wars, and non-terminating arguments in liquid democracy....

What could we learn and apply from those worlds in ours?

#### **2. Georg Carle (TU München, DE)**

Title: Towards Trustworthy Internet for All

Abstract: It should be considered a basic human right to have access to trustworthy Internet services, being compliant with personal rights and interests of individuals concerning their data and meta-data. There are a variety of threats against the trustworthiness of Internet services, including the threat of systematic espionage from intelligence agencies. Network components from commercial vendors with closed-source software may have vulnerabilities due to software weaknesses and the possibility of backdoors. Service users do not know to which extent their data and meta-data is handled in a trustworthy manner by their service provider. In the talk, measures for improved trustworthiness of Internet services are discussed.

#### **3. Saleem Bhatti (University of St. Andrews, GB)**

Title: Energy usage for ICT for developing regions

- incentivising deployment in developing regions through a key application: healthcare

#### **4. Fernando Ramos (University of Lisboa, PT)**

Title: The challenge of an Internet for all: can the grid be part of the solution?

Abstract: Around 80% of the worldwide population has access to electricity, a number that drops to 35% in the least developed countries. Nevertheless, in many developing countries the infrastructure exists, so the lines are already there. As such, in these countries power line communications (PLC) are arguably the only technology with a deployment cost comparable to wireless. This, we argue, makes it a technological solution worth exploring for Internet access.

Power grids today are being modernized through the introduction of communication networks dedicated to the management of energy transmission and distribution. Although the investment in smart grids today is concentrated in developed countries, smart grids may play an important role in the deployment of new electricity infrastructure in developing countries, by enabling more efficient operation and lower costs. For instance, in sparsely populated areas smart grids could enable a transition from one-off approaches to electrification (battery- or renewable energy-based electrification) to the development of community grids that then connect to the national grid.

In this talk I ask a question: can the grid be part of the solution for the challenge of global access to the Internet? Some opportunities seem to exist. For example, exploring the existing power lines for Internet access using PLC; or leveraging on the distributed, ad hoc nature of community smart grid networks to explore novel low-cost access solutions. But many challenges remain: is the overall cost of these solutions reasonable, when compared to the alternatives? Can the existing infrastructure in these countries really be of some use? With many open questions and several unsolved issues, there's quite a big room for discussion and debate on the topic.

#### **5. Michael Fourman (University of Edinburgh)**

Title: What rights should we have to the Internet?

Abstract: I will review some previous positions on this question, propose that there should be a fundamental right to store, process, and communicate information, sketch the consequences of such a declaration, and, I hope, leave ample time for discussion.

References:

<http://www.nytimes.com/2012/01/05/opinion/internet-access-is-not-a-human-right.html>

<http://cacm.acm.org/magazines/2013/6/164596-access-to-the-internet-is-a-human-right/fulltext>

<http://www.who.int/mediacentre/factsheets/fs323/en/>

#### **6. Arjuna Sathiaseelan (University of Cambridge, GB)**

Title: Life in the Slow Lane

The whole world is going fast - well our earth revolves at the same speed as before, I don't mean that but our lives are now in the fast lane – infact you need to be in the fast lane if you want to catch up with the others. However, there are still some who are yet to catch up and they have no lanes nor do they have any experience to know how to get into the lane! So – how would it be if we provide them an opportunity to catch up with us by opening up a slow lane?

**Tuesday 18, November 2014**

**Session 3: Socio-technological (9:00-12:00)**

**1. Renato Lo Cigno (University of Trento - DISI, IT)**

Title: Community Networks: Access to the Internet or a Different Internet Model?

Abstract:

Is a different (from the global Internet and Cellular Networks) model for urban communications and networking conceivable? Can Community Networks, now flourishing in many parts of Europe and the world, be the next "big thing" in networking, for once considering the needs of people and urban evolution as a key element, and not as a side effect of technology or business? This talk introduces some of the new trends on people-driven communication efforts, such as community networks, ad-hoc multi hop networks (existing ones), community-based GSM networks, as alternatives to the business-based organization of the networks we daily use.

**2. Roger Baig Vinas (Guifi.net - Barcelona, ES)**

Title: Guifi.net experiences

Abstract: Bottom-up initiatives have brought connectivity to places that otherwise would have been left disconnected for a long time. Community Networks, a particular case of Bottom-up, have ported the concepts of the commons and non-speculative access to telecommunication infrastructure, proposing a new model for designing, deploying and operating networks and developed the necessary tools to put in practice an entire economic ecosystem. The emergence of this telecommunication model opens the question how to integrate it in the, so far, unidimensional public-private debate, bringing new challenges in many fields such as the regulatory framework, the internet governance, the internet management, etc.

Community Networks have proved that they can contribute in great manner in reducing costs of internet expansion, thus to be able to play a significant role in achieving and affordable internet access for everyone. Nonetheless, to make this possible the model integration challenges must be addressed from a global perspective. The guifi.net members attending the Dagstuhl seminar, on behalf of the guifi.net community, would like to bring into the seminar's discussion some of these challenges, as well as share our conclusions of experiences.

**3. Leandro Navarro (Polytechnical University of Catalunya - Barcelona, ES)**

Title: Experiences and Research in Community Networking: the Community-Lab.net testbed

Abstract: Experiences, research challenges, lessons learned, from researchers working together with community network activists to understand, model, engineer and

experiment on sustainable ways to bootstrap connectivity and digital services at the scale of 7 billion people.

#### **4. Mahesh Marina (University of Edinburgh, GB)**

Title: Some Challenges for Rural Broadband: Experience from Scotland

Abstract: In this talk, I'll give a short overview of our work on the Tegola project that focused on bringing wireless Internet access to some of the remotest parts of Scotland. I'll also briefly present our recent work on analysing mobile coverage in Scotland. I'll then reflect on the experience from these projects and outline some challenges for rural (mobile) broadband.

#### **5. Marco Zennaro (ICTP - Trieste, IT)**

Title: ICT4D and TVWS

Abstract: TV White Spaces (TVWS) technology and regulation has the potential to make connectivity both technically and economically feasible in Developing Countries where affordable access remains a challenge. The superior propagation characteristics of TVWS technology make it particularly well suited to connecting remote communities. How will this new technology affect ICT4D projects? What are the research challenges in TVWS?

#### **6. Leonardo Maccari (University of Trento - DISI, IT)**

Title: Decentralized, multi-hop networks: Are They really different from the Internet?

Abstract: Community networks represent a bottom-up effort to build independent, community-owned network infrastructures. In light of the recent NSA scandal and the global trend towards centralization of networks and services, they have received large attention, since they represent a completely different approach. But are they effectively different? In this talk we will present some initial results on the study of some Wireless Community Network showing that they are indeed more centralized than they seem, both topologically and socially. How can we help the communities to build networks that are truly decentralized? Can they be used in critical situations, like repressive societies, and what are the alternatives we have now?

### **Session 4: Technological (14:00-17:30)**

#### **1. Michael Welzl (University of Oslo, NO)**

Title: Bandwidth for free?

Abstract: This talk makes the point that there is quite an arsenal of mechanisms available to give users cheap or free access to bandwidth, and asks: which ones fit GAIA's purposes?

#### **2. Gareth Tyson (Queen Mary University, London)**

Title: "Can we fit the Internet in a box?"

Abstract: What is the Internet? If you ask a network engineer they would explain the many details of TCP/IP. However, the everyday person might likely respond with "Facebook", "Twitter" or "Netflix". This talk will explore the feasibility of capturing these applications and services in a single locally usable "Internet Box". The box will operate independently of the rest of the Internet, allowing those without traditional connectivity to use the "Internet" in an simulated and disconnected manner. If this is

proven feasible, many localities that possess no connectivity could hopefully start to use Internet services immediately. The talk will argue why this is a positive first step towards global access for all.

### **3. Jörg Ott (Aalto University, FI)**

Title: The Liberouter Neighborhood Networking Platform

### **4. Panayotis Antoniadis (ETH, Zurich)**

Title: An interdisciplinary perspective on DIY networking: the case of the Internet Jukebox

Abstract: The primary role of a local DIY network, can be either the provision of cheap Internet access, as in the case of most community wireless networks, or the support of local applications, as in the case of the liberouter or the piratebox. Depending on the choice of this primary role there is a wide variety of design options at different levels that will determine the successful deployment of such a network. In this talk I will report on recent efforts to bring together researchers and practitioners from various fields around the (hybrid) design of such local networks. I will focus on a novel application, the Internet Jukebox, that aims to combine the two possible roles of DIY networking, Internet access and local interactions, by offering a flexible interface for configuring the rules for sharing an Internet connection amongst a local community of users.

### **5. Karin Anna Hummel (ETH Zurich, CH)**

Title: Providing Connectivity or Avoiding Censorship by Mobile Peer-to-Peer Communication – Fiction or Practical Solution?

Abstract: Do-it-yourself delay tolerant networks that utilize user mobility to carry data are still an appealing participatory approach to provide multi-hop peer-to-peer connectivity when there is limited access to the Internet, or the access is unsecure as under repressive political regimes. Examples of limited Internet access are rural African and Indian regions. Another example recently covered in the media is Hongkong, where the basic-democratic movement makes indeed use of an ad-hoc communication technology to circumvent blocking of communication (cf. FireChat app).

To serve these application use cases, I introduce two possible system architectures for mobile peer-to-peer networks: with and without stationary data-boxes in addition to mobile carrier devices. Then, I raise the question about the practicality of peer-to-peer communication in the envisioned scenarios.

First, I discuss whether we have already a good understanding of mobility flows and contacts and whether these flows are sufficient to provide reasonable connectivity and network capacity. I will show how the cellular network can be utilized as a ubiquitous sensor of human mobility in principle, and exemplify the approach for a developing country, namely Ivory Coast leveraging mobile phone data provided by Orange Ivory Coast. In the second part, I will target technical obstacles for the deployment of mobile peer-to-peer communication with an emphasis on energy consumption.

**Wednesday 19, November 2014**

**Break-out Session (9:00-12:15)**

**Topic:** As one of GAIA's aim (<https://irtf.org/gaia>), we have this goal:

"to document the costs of existing Internet Access, the breakdown of those costs (energy, manpower, licenses, bandwidth, infrastructure, transit, peering), and outline a path to achieve a 10x reduction in Internet Access costs especially in geographies and populations with low penetration"

The breakout session will identify where the costs are and where should the innovation be: is it technological, socio-economical or regulatory? If so, what are they?

**Afternoon: Social Event**

**Thursday 20, November 2014**

**Break-out Session (9:00-5:00) continued**

**Friday 21, November 2014**

**Wrap Up (9:00-12:00)**

Discussion of lessons learnt and road map

Conclusions