

**Consultation answers from Basic Internet Foundation to
*Consultation Note on
Model for Nation-wide Interoperable and
Scalable Public Wi-Fi Networks***

Sudhir Dixit, PhD, IEEE Life Fellow

Fellow and Evangelist at Basic
Internet Foundation, (UNIK),
Oslo, Norway

US Office:

645 Woodside Drive
Woodside, CA 94062

sudhir.dixit@basicinternet.org

Sudhir.dixit@ieee.org

Josef Noll, PhD, IARIA Fellow

Co-Founder and Secretary General at
Basic Internet Foundation

Professor at University Graduate Studies
(UNIK), University of Oslo (UiO)

Head of Research at Movation AS

Oslo, Norway

josef@jnoll.net

November 23, 2016



www.basicinternet.org

Answers to Issues for Consultation

This document provides aspects for the consultation note on model for nation-wide interoperable and scalable public Wi-Fi networks, provided by the Telecom Regulatory Authority of India on 15th November 2016.

Before providing specific comments to the consultation note, we would like to propose a slight extension of the suggested public Wi-Fi Networks. Our suggestion is to divide the Public Wi-Fi in (i) free access to basic information for essential services, such as cashless transactions and other government services touching every citizen and (ii) paid access to bandwidth demanding content.

The novel concept is to define basic Information as text and pictures essential for every citizen, and obligatory information which anybody can access being fully compliant with net neutrality rules. It should be noted that the essential basic information typically uses negligible bandwidth (<2.5% of available bandwidth) but with significant impact on the user's quality of life and overall national economy. The above extension is very pertinent to the vision of Digital India and will accelerate the goal of cashless economy as envisioned by the recent currency demonetization. Furthermore, there are now cheap smartphones available with Wi-Fi access, which are fast replacing the entry-level phones by an order of magnitude. As described in the TRAI webpage, enabling broadband access through Wi-Fi is an excellent approach because of stationary and/or low mobility requirements of the target users and low TCO (Capex and Opex). It should be noted that while the goal of USO have been laudable, it has been less than successful to provide broadband coverage to rural and smaller communities (tier 4, 5 and so on). Requirement of providing free basic internet, as envisaged, in our whitepaper, could be an alternative to and or an adjunct to the current USO funding based model to truly mandate access to every citizen.

For more information on our proposal, please visit the website www.basicinternet.org and/or an executive summary of a white paper we have published, which is attached in annex 1.

Comments to Issues for Consultation

Q1: is the architecture suggested in the consultation not for creating unified authentication and payment infrastructure will enable nationwide standard for authentication and payment interoperability?

Yes, the architecture looks sufficient to combine authentication and payment, and is reasonably simple to implement. However, the different flows in the architecture would need to be tested by certified software running on the client device and the server supporting the relevant service. The authentication and security solutions must be thoroughly tested to maintain the credibility of the Wi-Fi service. Furthermore, it is recommended that a selected number of industry agreed sign-on and payment apps be allowed for

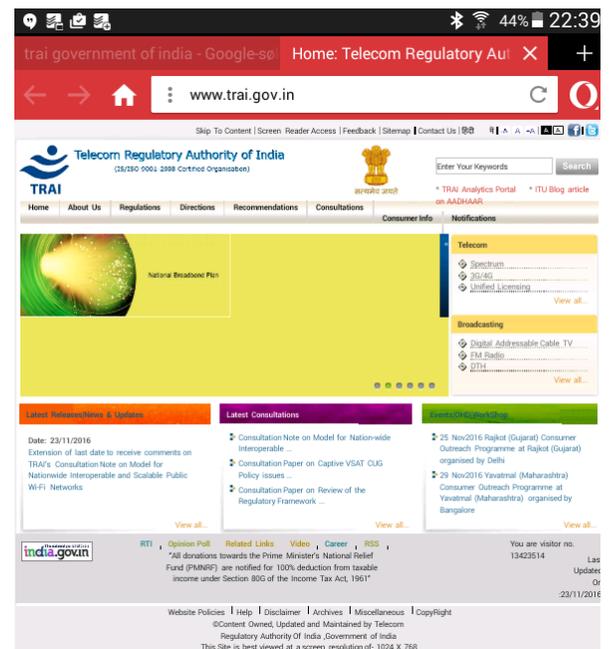


Figure 1 - InfoInternet presentation of TRAI, using the Opera Software proxy

faster uptake and to avoid confusion, and exploitation of the people who are not tech savvy. Imagine, hundreds of these client apps being provided by thousands of Wi-Fi service providers across India. Unless managed and regulated this could be major problem.

Q2: Would you like to suggest any alternate model?

We would like to suggest an extension of the model, through providing (i) free access to basic content and services (aka InfoInternet), and (ii) introduce authentication and payment for access to full functionality, bandwidth-rich applications and payment options.

The extension will keep the business opportunities for the providers of the hot-spot, and will provide an easy way to access the information by users (who are not tech savvy and/or not yet ready to pay but must use Internet services for essential needs such as access to government and utility services), without complex authentication mechanisms (rather implement bio authentication) that hinder the uptake. Furthermore, the InfoInternet solution will provide a secure Internet experience, as all dynamic elements, such as malicious code, are filtered out.

Q3: Can Public Wi-Fi access providers resell capacity and bandwidth to retail users? Is “light touch regulation” using methods such as “registration” instead of “licensing” preferred for them?

Technically speaking, apportioning capacity and bandwidth from the same access point (or in the backhaul) on a customer basis is not straightforward and if implemented would increase the cost of equipment and service. However, equipment roadmaps show that these functionality is coming even in budget-type of access points. Until then, approaches of virtual Wi-Fi AP or VLAN may be better suited to attain the proposed objectives, and these should be considered.

Q4: What should be the regulatory guidelines on “unbundling” Wi-Fi at access and backhaul level?

It is suggested that a client app selects the type of backhaul on-demand as a user logs into a Wi-Fi access point similar to the approach adopted in mobile cellular networks where a user can search the available mobile operators and select one of choice, or simply make it an automated process based on user profile and settings, Another first could be to also make the backhaul tariffs and network performance available in real-time to help the user and/or the Wi-Fi service provider to make the optimum selection

Q5: Whether reselling of bandwidth should be allowed to venue owners such as shop keepers through Wi-Fi at premise? In such a scenario please suggest the mechanism for security compliance.

The suggested InfoInternet standard will allow venue owners to provide information around the event, and even allow access to local information. In such a way shop keepers and organizers can provide all the information necessary for the event and all functionality to get the event in place. An example of information is the program of the event, including the presentation of the artists. Functionality might include the check of tickets, e.g. bar code, against a local database.

Figure 2 presents results from an InfoInternet installation at Universities in Kinshasa, Congo (DRC). Students were first provided with access to local content (phase I-III), and in a later stage with both free access to Information (InfoInternet) and the whole web. The

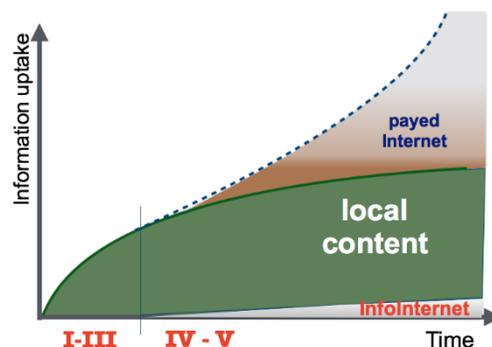


Figure 2 - Example of InfoInternet from Kinshasa (Congo)

operation demonstrates the functionality of providing local content, as well as the low bandwidth requirements of the provision of InfoInternet, being typical less than 25% of the available bandwidth.

Q6: What should be the guidelines regarding sharing of costs and revenue across all entities in the public Wi-Fi value chain? Is regulatory intervention required or it should be left to the forbearance and individual contracting?

From our experiences in providing the InfoInternet, we suggest that the government should regulate that any provider connecting to the governmental fibre backbone shall (i) provide free access to the InfoInternet. In addition, we suggest (ii) to introduce a cost sharing model for the amount of traffic in the backbone.

By providing (i) free access to information the regulator can ensure that everyone will have access to information, regardless of the capabilities to handle authorization and payments.

The (ii) cost-sharing model will ensure that the government has enough funds to maintain and extend the back-bone network, or can buy capacity from commercial suppliers.

The InfoInternet standard is suggested by the non-profit Basic Internet Foundation from Norway. We have established collaboration with companies, research institutes and academia in India. Though most collaboration partners support the idea of free access to Information as a driver for digital inclusion, concern was raised by some partners that digital literacy requires video-type of education.

Providing free access to local information in addition to the free access to just text and pictures ("InfoInternet standard") might address digital literacy appropriately. Though the InfoInternet standard might be extended to a national "gold standard", including video with limited length and resolution to increase literacy.

We are looking forward to further consultations and experience exchange, promoting digital inclusion and digital literacy.

Annex 1

Summary of White Paper ¹of the Basic Internet Foundation

Rarely does an opportunity arise to make a huge impact on the lives of billions of people around the world, and Free Basic Internet service squarely falls in this category. It is a win-win for all the stake holders: the service providers, users, national governments, content providers and equipment manufactures.

Today, around 46% of the world's households have access to Internet through either fixed or mobile subscriptions. However, the gap between developed and developing countries is still wide. According to studies conducted by ITU, by the end of 2015, 34% of households in developing countries had Internet access, compared with more than 80% in developed countries. In the least developed countries, only 7% of households have Internet access. Thus, on average, out of the total world population of about 7.5B, about 4B still do not have access to Internet or do not use Internet. There are multiple reasons: lack of access, economic, illiteracy, lack of perceived value, or simply the fear of using technology. As saturation reaches in the developed markets and the urban areas around the world, it is well accepted that growth for the operators must come from these 4B users. Baring illiteracy, the other reasons can be easily addressed by offering service for free, making useful content available that adds value to people's lives, and making interaction with the devices easy and intuitive. It is natural that once a user experiences the value, he or she would become a paid subscriber, thus motivating the service providers to offer Basic Internet for free.

For the users, access to free Basic Internet will improve their quality of life and empower them with information to generate new or additional income, become more productive, and have access to healthcare, financial, educational, hospitality, transportation related content and services. For the national economies, providing services through the traditional "brick and mortar" infrastructure is extremely expensive and time-consuming; thus, digital inclusion through internet is the only viable way to bridge the digital divide and to meet people's aspirations and improve their quality of life. At the global level the United Nations' Human Rights Council unanimously ratified that access to internet has become a basic human right. The United Nations General Assembly adopted 17 sustainable development goals in September 2015 [12], with the Internet being an enabler to achieving them.

To achieve the above goals, the Basic Internet Foundation started its activities back in 2010 for developing Internet access in Africa (with a focus on the need for basic internet rather than on complex technology development) with research into how to provide access to basic information for free and non-basic information (such as entertainment and non-impacting content) for a fee, such that the developed solution was least-cost, financially sustainable and attractive for all the stakeholders. This ended up being called *Basic Internet*. The Foundation developed a hybrid business model, where service providers could still generate income from the consumption of the non-basic information through a voucher or prepaid system from users who could pay and who transitioned to consuming full internet. Preliminary estimates suggested a \$45 billion opportunity for the service providers at an average cost of ½ a dollar per user per month after five years of deployment of the service. The Basic Internet network contains in its complete form: a local core network with local information, a local network, a centralized core, and the backhaul network/network termination. In areas where no Internet connection is available, the network

¹ The white paper: "The InfoInternet: Providing free access to information to everybody" can be downloaded from: <http://BasicInternet.org/whitepaper>

termination can be achieved through either a radio link or a satellite connection. The solution provides high capacity access to local content, paid access for Internet services, and free access to Basic Information, and complies with all the telecom regulatory requirements, such as net-neutrality. Facebook and Mozilla have rolled out Free Basics and Free Access Paid by Ads, respectively, but fail to meet regulatory requirements of countries well versed with the drawbacks of restrictive business environment.

The Foundation has successfully piloted its solution at the University of Lisala and 4 other universities in Kinshasa, Democratic Republic of Congo, and is now working with the local ISP to commercializing the service in a financially sustainable manner. In addition, the Foundation is aiming to deploy its solution in other countries, such as Mali and India, and the discussions with the relevant people and organizations are ongoing. It is also exploring the possibility of launching a Global Alliance for Digital Inclusion.

In summary, it is the view and vision of the Basic Internet Foundation that access to free basic internet is a human necessity and transformational for the billions of citizens of the world. It is both technically and commercially feasible at a fraction of a dollar cost per user per month with a path to transitioning them over to paid full internet service with significant revenue opportunities.