

An Intuitive Billing System for a Tradition Wifi and Mesh WLAN Network

A. Kayode Adesemowo, and Bill. Tucker

Department of Computer Science

University of the Western Cape, Modderdam road, Bellville, Cape Town 9535

Tel: +27 21 959 3010, Fax: +27 21 959 3006

email: kadesemowo@iee.org, btucker@uwc.ac.za

Abstract- South Africa “dual economy” as acknowledged in the 2003 State of the Nation address, has persisted and is evident in the “digital divide” with plethora of ICT4D projects. A number of ICT4D projects have not adequately noted the dynamics of the “dual economy” in the rural areas where majority of such projects focuses and the “dual economy” challenges in the cities: CBD, suburban and slums.

The intuitive billing system being explored in this paper hopes to contextualise one of such socio-economic challenge. Billing solutions have been proffered for traditional wireless networks, however these solutions have failed to explored the hybrid of wireless network and wireless mesh network. More so in the context of a deployable, reusable solution for young entrepreneurs in the informal sector of the dual economy

Intuitive billing systems therefore provide insight and a way forward for a solution that could be used to address network access and billing for an hybrid wireless infrastructure and mesh network. Also, a solution that has low start up initial costing outlay, is well documented, and easy to use. The billing solution will also integrate billing for both data (in time and megabyte) and voice (VoIP)

Index Terms— billing, wireless, mesh, captive portal

I. INTRODUCTION

In his state of the 2003 Nation Address, President Mbeki formally acknowledge the South Africa “dual economy” [7],[5]. This dual economy was depicted by the picture of the First and the Second Economies as a double storey house. It does co-exist. The existence is evident both at co-existing within the cities or in city and rural areas. A lot has changed though from the 2003 era, yet the dual economy persists.

This dual economy apparent in the “digital divide” within the co-existing dual economy in the cities and the digital divide between the cities and rural areas in South Africa need to be considered and put into context when exploring ICT for Development – ICT4D projects [11]. A plethora of ICT4D projects exist: e-commerce test bed [6], tele-health [12], Meraka WISP-in-a-box (http://wirelessafrica.meraka.org.za/wiki/index.php/The_WISP-in-a-box_project). These ICT4D projects notably the Meraka WISP-in-a-Box and Dwesa based e-commerce test bed has not contextualised the “dual-economy” factor. The Dwesa project noted though the need for ICT4D projects to be self-sustaining. Beyond this self-sustenance, there exists

a need for ICT4D projects to have the appealing of ready-to-use solutions or subscribed services. A number of subscribed services that exists in South Africa do not offer solutions that meet the unique need of the informal economy within the dual economy: skyrove (www.skyrove.com), alwayson (www.alwayson.co.za), iSpot (www.ispot.co.za). The dynamics of the “dual economy” in the rural areas where majority of such projects focuses and the “dual economy” challenges in the cities: CBD, suburban and slums are lacking in ICT4D projects.

The intuitive billing system being explored in this paper hopes to contextualise one of such socio-economic challenge. A test bed would be built to understudy the challenges and proffer a model to address the evolving issues. The test bed would incorporate traditional infrastructure mode wireless network and evolving self-forming wireless mesh network – WMN [4]. It is noted that billing solutions have been proffered for traditional wireless networks, however these solutions have failed to explored the hybrid of wireless network and wireless mesh network. More so in the context of a deployable, reusable solution for young entrepreneurs in the informal sector of the dual economy

The proposed intuitive billing systems therefore provide insight and a way forward for a solution that could be used to address network access and billing for an hybrid wireless infrastructure and mesh network. Also, it would be a solution that has low start up initial costing outlay that is well documented, and easy to use. The billing solution will also integrate billing for both data (in time and megabyte) and voice (VoIP).

II. INTUITIVE BILLING SYSTEM

A. Background

A large amount of study and ICT4D projects in areas relating to bridging the digital divide. Due to the fact that a number of these projects do not address financial sustainability, or ease of charging and account, there seems to be a dearth of literature around the subject of revenue generation, cost recovery/sharing systems [9] and the entrepreneurial product and services offering in ICT4D projects.

The Dwesa project [8],[10],[9] has conceptualised and tried an adaptive billing dubbed the Network Revenue Management System – NRMS. The billing rating engine provides a platform to extend or re-use to take note of the socio-economic parameters of the informal economy.

The Meraka WISP-in-a-box provides a springboard to integrate billing of data and voice. Yet, this was not intuitively integrated together.

The intuitive billing system would therefore extend and integrate both the NRMS and WISP-in-a-box architecture.

As investigated in the Swiss National Science Foundation project Charging and Accounting Technology for the Internet (CATI), [2] shows the economic dimension at variance to tariff component. The economic efficiency of the economic dimension need not be orthogonal to tariff flexibility and network technology.

Pricing model requires integration of temporal pricing aspects, dynamic pricing, pricing transparent to the user, adaptive technical network, traffic classification, and suitable granularity of dynamically charged services in terms of technical service parameters (Data) as well as timing information (e.g., duration) [2].

B. Proposed Solution

An infusion of the NRMS and WISP-in-a-box architecture would be extended and integrated in the proposed intuitive billing system. The intuitive billing system would followed an iterative approach [1] for user requirement, architecture and solution refinement.

A wireless mesh network currently exists at the department of Computer Science at the University of the Western Cape – UWC. One Access point has been installed with a CoovaAP firmware for captive portal capability. Hotcake based billing system exists on Ubuntu Linux system being used for network authentication and provisioning: Apache, MySQL, Perl, PHP, and FreeRadius (an implementation of RADIUS protocol [3]).

In the second iteration, the hotcake billing will be replaced with the Drupal hotspot module. Drupal offers a powerful and highly customizable content management system which could be extended more easily. Radius would be replaced by a more extensible DIAMETER protocol [RFC 3588]. To assure service availability and continuity, Inter domain accounting, high packet loss ratio and processing delay constraints typical of WMN would be addressed [4].

III. CONCLUSION & FUTURE WORK

This paper has outlined an intuitive billing system that takes cognisance of the reality and need of the informal economy within the South Africa's dual economy. The need of small entrepreneurs in this second economy could be met by a solution as these. It offers them an entrepreneurial product and services they can explored to improve their socio-economic need.

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A. Kayode Adesemowo received his Masters degree in 2007 from the University of the Western Cape and is presently studying towards his PhD degree at the same institution. He is a chartered Engineer with keen interest in Information Assurance and audio-visual.

William D. Tucker is a senior lecturer in the Department of Computer Science at the University of the Western Cape (UWC), South Africa. He hold a PhD from UCT and teaches Computer Science at UWC and supervises students at post graduate level.