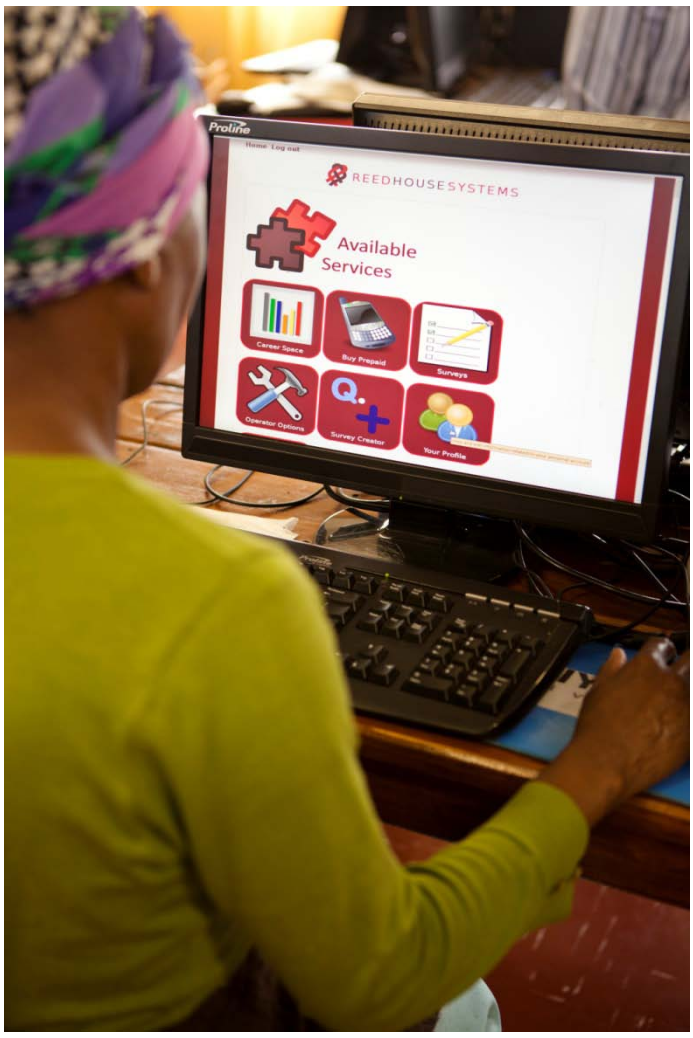
The Siyakhula Living Lab & Reed House Systems - A brief overview



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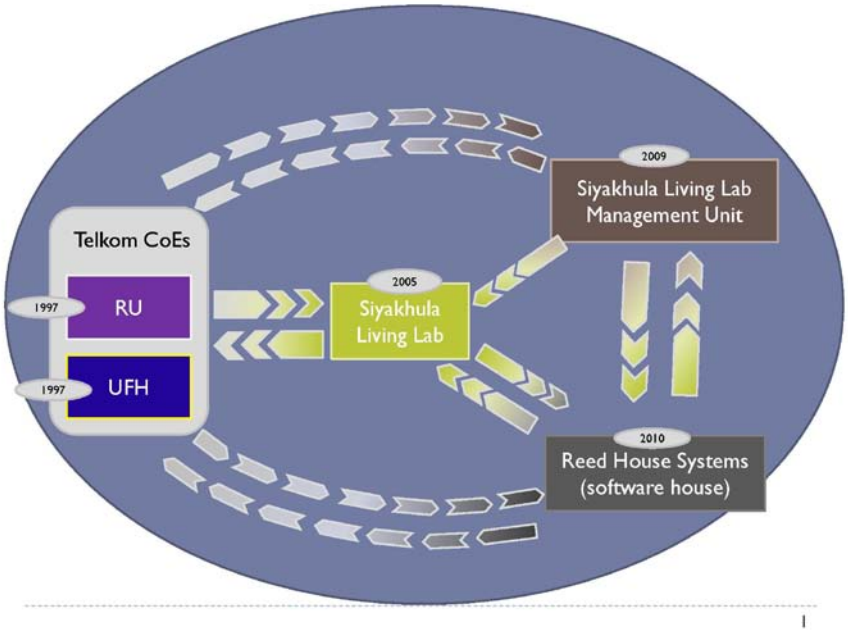
1. BACKGROUND

Rhodes and Fort Hare Universities have been active in ICT for Development for many years, through the two Telkom Centres of Excellence in Telecommunication hosted in their Computer Science departments (www.coe.ru.ac.za; www.coe.ufh.ac.za). In 2006, this activity has given rise to a field test site, in the Mbashe municipality in the vicinity of the Dwesa-Cwebe Nature Reserve, in the rural Eastern Cape Province. This initiative, now called the Siyakhula Living Lab (SLL, www.siyakhulall.org) is organised along the lines of the emerging RDI *living lab* methodology whose main underlying principle is *co-creation of solutions with empowered users.* SLL shows in a practical fashion how marginalised rural communities that are difficult to reach, may in future be joined with the greater South African and African communities to the economic, social and cultural benefit of all. Other departments at the two institutions (Anthropology, Communication, Education, African Languages, Information Systems, Journalism and Media Studies, Sociology) have joined the project, giving it a strong, and necessary, multi-disciplinary flavour.

The original objective of the project was to develop and field-test the prototype of a simple, cost-effective and robust e-business/telecommunication platform, to deploy in marginalized and semi-marginalized communities where a large number (over 40%) of the South African population live. The project has evolved to include a generic service integration platform to support services for rural and peri-urban areas in South Africa. The need to transform into robust industrial products the experimentation in the Siyakhula Living Lab has given origin to a software house, Reed House Systems (RHS, www.reedhousesystems.com), which started its operations in 2010. RHS is at the moment hosted in the campus of Rhodes University, and offers internships to Rhodes and Fort Hare students. The service integration platform is called TeleWeaver and its 'business model' and its capacity of being a game changer in the way of introducing ICT infrastructure in marginalized areas are described in Appendix 1 of this document.

SLL, RHS and the two Telkom Centres of Excellence constitute an innovation eco-system whose main focus is the introduction of meaningful ICTs in marginalized areas. The eco-system and the relations between its components are represented in the diagram in the next page.



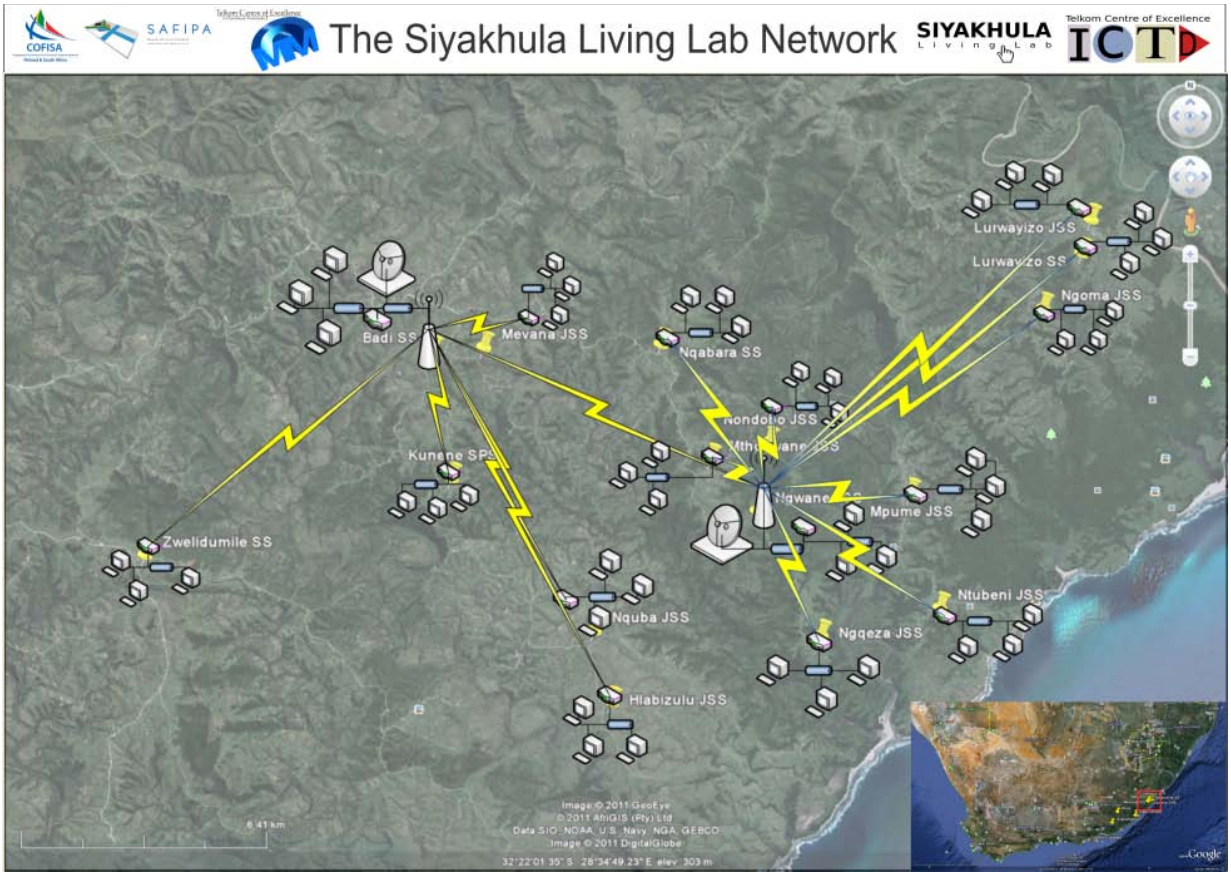
2. TECHNOLOGY OPTIONS USED TO PROMOTE ACCESS

We use a technology mix, which we adapt to the circumstances. (This is important, given the rather dynamic field.) At the moment, the blue-print we have is as follow:

CONNECTIVITY

The starting point is the creation of a 'broadband island', i.e. the provision of points-of-presence, typically located in schools, which are connected wirelessly to each other at reasonable high speed. For this connection we use fixed and mobile WiMax, which we find very good and cost effective, but wifi can be an option, as well as other technologies, depending on geography and licensing. Then, one or two of these point-of-presences (which we call DANs, Digital Access Centres) have a connection to the Internet, to serve the whole broadband island. The nature of the connection to the internet depends on where the broadband island is located. In SLL we use a satellite connection, but GPRS / 3G can be considered, or even fixed lines, for peri-urban deployments. This architecture is the result of an evaluation of bandwidth needs and costs, and not surprisingly reflects the rather standard LAN / WAN structure, which still makes sense in our context, but will evolve if the costs or needs change.

The following picture illustrates the network as it is. While the network infrastructure is completed (base stations, satellites links, configurations), only 6 points have their Customer Premise Equipment (CPE) installed right now. The CPE rollout and the attached hardware should be completed by the end of the first semester 2012.



STRUCTURE OF EACH DAN

Each point-of-presence contains a variable number of terminals, realized as thin clients. Depending on the circumstances, the central server is a single machine or a cluster of a few, less powerful machines. All elements in the DANs can be either new or refurbished. (Cluster for the central server allows the use refurbished machines there as well.) Edubuntu, of the Linux OS family, is used throughout the deployment. Here below is a picture of the DAN in Ngwane, during a computer literacy session for the pupils in the school.

3. SIYAKHULA LIVING LAB CURRENT STUDY AREAS

Current study areas in the SLL are:

- Broadband telecommunications network models for rural and peri-urban communities
- eService provisioning for rural and peri-urban communities
- Financial, technical and cultural models for rural and peri-urban ICT initiatives
- Monitoring and evaluation of rural and peri-urban ICT initiatives
- Rural and peri-urban user requirement elicitation
- ICT in Education

More detailed info on each of these points, together with some of the literature published on them, can be found at http://www.siyakhulall.org/?q=activities. Goals and objectives of the Siyakhula Living Lab can be found in the Appendix 2 of this document.

4. REED HOUSE SYSTEMS CURRENT OPERATIONS

Reed House Systems is currently housed in the Strueben Building on Rhodes Campus, in proximity of the Computer Science building.

At the moment RHS is running in 'keep alive mode', working at finalizing a complete version of the middleware platform (the core and TeleWeaver), with supporting documentation. The platform will be released into the open source community in the second semester of 2012, hoping to generate enough momentum in the ICT4D community so that ICT4D practitioners will start prototyping their own applications in it. The application layer, containing the end users application (see Appendix 1) has to start in earnest now. It will be driven through direct contact with entities in government, non government and private space which have a strong interest (institutional or commercial) to be wanting to access the communities targeted by TeleWeaver and will be happy to pay for it.

The software house can count on five staff members (4 part-time and 1 full time), of which 3 are senior software developers and 3 are full-time postgraduate student in the CS department. They are supported in their work by people who are part of other components of the eco-system sketched above. A snapshot of the people who were active in RHS in the mid 2011 can be found at http://www.reedhousesystems.com/?q=people.

RHS has been active for over two years now and has developed a good set of rules and procedures to govern software development (done in Java and using open source components and tools) and staff member interaction.

5. FUNDING AND PARTNERS

The SLL and RHS systems are embedded in the following regional, national and international innovation systems, through which funding has been obtained:

- Telkom Centres of Excellence (CoE) at the Universities of Fort Hare and Rhodes. The private sector funders include Telkom, Saab Grintek, Tellabs, Easttel, Khula Technologies, StorTech and GENBAND
- Technology and Human Resources for Industry Programme (THRIP) of the Department of Trade and Industry of South Africa
- The Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA) and the South African-Finland Knowledge Partnership on ICT (SAFIPA) both programmes of the South African and Finnish governments, run through the Department of Trade and Industry

Numerous attempts have been made to further integrate both the Siyakhula Living Lab and Reed House Systems into the provincial and national government system of innovation, for funding or as model for replication. So far, various entities have expressed their interest and commended the work done, but firm commitment to the initiative has not been given.

6. LESSONS LEARNT

- Successful rural and peri-urban ICT initiatives requires partnership with communities as equal stakeholders, as opposed to a top-down approach, which affects the uptake, adoption and ownership of any initiatives
- ICT initiatives in the targeted areas require long term commitment from all stakeholders
- If done properly, the response of the communities can be enthusiastic
- ICT deployment need to eventually sustain itself. Therefore, they it is best coupled with money-generating, custom-built applications relevant to the people using the ICTs. This view is implemented in TeleWeaver, whose nature and business model is explained in Appendix 1
- Locating community ICT hubs in schools seem to work well in rural areas
- Installations need to be robust and it must be possible to monitor them remotely
- First line troubleshooting should be done through appropriate training of local champions, something that will have more than one good side-effect
- It is difficult to raise the finances needed to move ICT4D initiatives onto a commercial footing

Appendix 1

TeleWeaver, a middleware platform to host applicatons (e-services) for marginalized areas

Teleweaver is the core product of Reed House Systems, and is a middleware platform on top of which various applications (services) are deployed. Services in the platform can be accessed either via fixed end-points such as PCs in Digital Access Centres (an evolution of the old 'telecenters') or in homes, of via mobile handsets, of whatever technology and generation (from 2G to 4G). Applications can range from e-commerce support to sell local products and services (from beading to micro-tourism), to support for generating a Curriculum Vitae in response to a job advertisement found through another service in Teleweaver - the Career application, to support of interaction with governmental entities at various level (ID requests and tracking or child grants from home affairs, for example), to support for surveys in the community, to support for on-the-go hitch-hiking, to support for pre-paid services etc (The applications listed are just a small subset: the idea is to have tens and then hundreds of services over time.)

Each application running in Teleweaver will be in general a source of revenue, either from the local users (for example, preparation of a CV) or, more importantly at first, from an entity outside the community (for example a buyer of online goods and services from the community; or a department such as home affairs, which might want to pay to reduce the presence of physical offices for the operations made possible by Teleweaver). The revenue per single application will not be large: but the sum of the revenues have the potential to be substantial. This, by the way, is the reason for the name, TeleWeaver: revenue streams are 'woven' together until they become important and are able to support the ICT infrastructure, exactly as reeds are woven together to make artifacts much stronger than any single reed.

The system will be offered to various levels of government, such as municipalities, provincial or national departments. These clients will pick up the costs upfront and then will activate the attached revenue streams that will first allow them to eliminate the running costs of the installation and, later, if successful, recoup the initial outlay. The system on offer will be either just the software product (Teleweaver) or, better, the full turn-key solution, including hardware for the Digital Access Centers (DANs), connectivity and training.

The reason for government to buy the product (especially the turn-key solution) is the realization, now well documented, that appropriate and working access to ICTs is essential for any economic activity and quality of life improvement. It should also be stressed that normal ICT providers target a complete different market and do not have, by and large, appropriate and localized solutions for the market targeted

by Reed House Systems. Signs abound that governments are now aware of this and the next few years will see this specific market open up. Reed House Systems is positioning itself for that moment.

Appendix 2

Goals and objectives of the Siyakhula Living Lab

SHORT-TERM : BUILD DIRECT BENEFITS

- Development of a effective, low maintenance service-oriented network infrastructure
- Learner and adult training in computer use, promoting the emergence of local training champions
- Offer new services to the community that can directly save costs and support local economic activity, both on fixed and mobile terminals. SLL supports local businesses (art and craft production, Bed and Breakfast and other micro-tourism activities etc.) through a platform, that is being expanded to encompass a variety of other e-services (e-learning, e-health, e-governance etc.)
- Involve researchers in real life research work, reflected by the research output

MEDIUM-TERM: NETWORK THE COMMUNITY AND BUILD A BRIDGE TO THE KNOWLEDGE SOCIETY

- Bringing the telecommunications network into community homes – demonstrate benefits and speed up adoption, including M-Commerce
- Start a software production centre, Reed House Systems (www.reedhousesystems.com), that could industrialize the software prototypes developed in the Siyakhula Living Lab
- Offer effective entry into a networked and 'research-primed' marginalized community to government department, companies (large or small) and NGOs wanting to develop new process or products for marginalized communities
- Developing a scalable, standardized model for similar areas in Africa and other developing countries

LONG-TERM: ACTIVATE FULL PARTICIPATION IN THE KNOWLEDGE SOCIETY

- Most community households networked and active in the knowledge society
- The involvement of the community as innovators reaches maturity
- The model is replicated on a large scale in other marginalized areas in Southern Africa