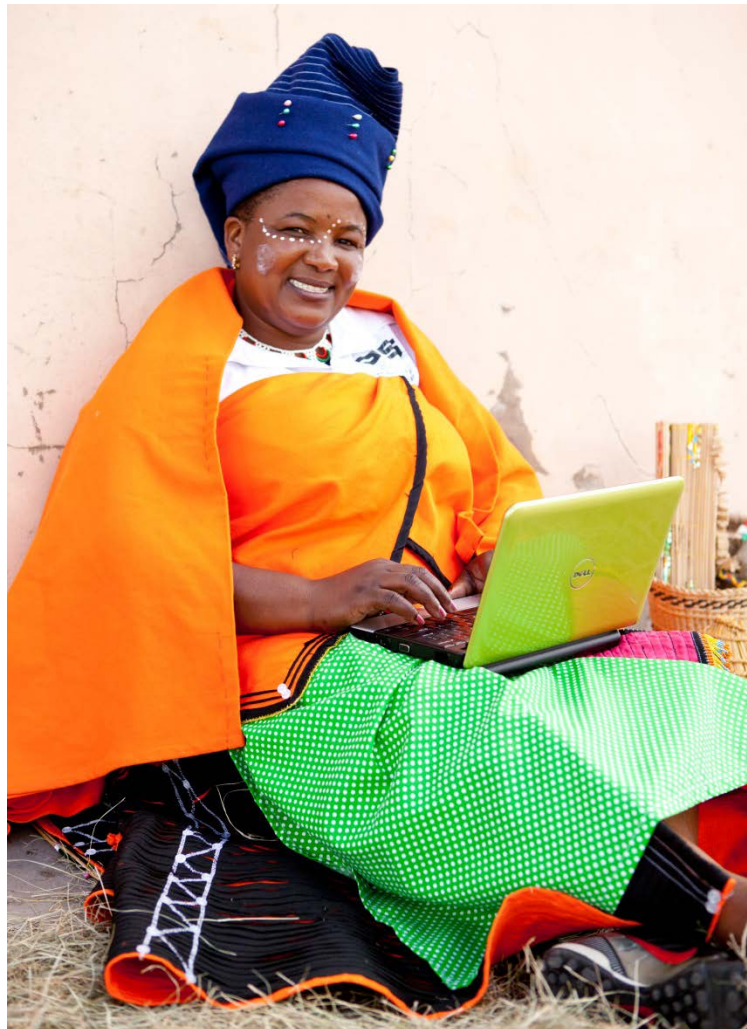


# The Siyakhula Living Lab & Reed House Systems

*A concept document for potential contributors*



July 2014

This document describes a joint initiative between Rhodes University and the University of Fort Hare, South Africa, to which you or your organization might be in a position to contribute, to help make our planet a better planet, in a small way at least.

You can contribute your time or funds to help with the operations that will diffuse Information and Communication Technology (ICT) in poor segments of society in developing countries and make them part of the emerging knowledge society. In so doing, you will help overcome an important fracture in society.

Or you can involve the organization of which you are part, convincing it to contribute in kind or financially.

If you want to join our journey, please contact us at:

*info@siyakhulaLL.org*

+27 46 603 8602

## Contents

Background .....	4
Technology options to promote access .....	5
Siyakhula Living Lab: current areas of research .....	7
Reed House Systems.....	7
Partners and national / international network.....	8
<i>TeleWeaver, a middleware platform to host e-services for poor areas.....</i>	<i>10</i>
<i>Goals and objectives of the Siyakhula Living Lab.....</i>	<i>12</i>
<i>Media on the Siyakhula Living Lab .....</i>	<i>13</i>

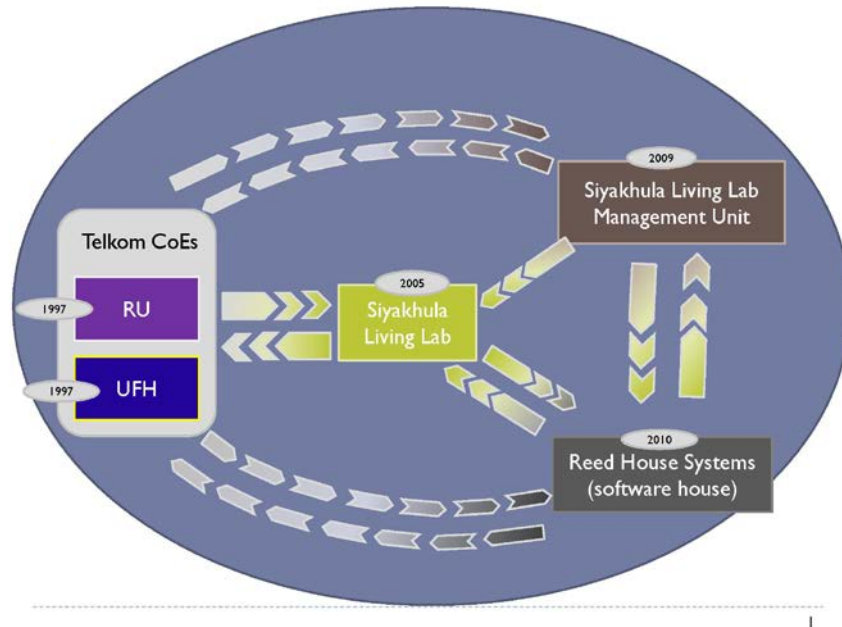
## Background

Rhodes and Fort Hare Universities have been focussing on the diffusion of ICT in poor segments of society (rural and peri-urban) for many years, through the two Telkom Centres of Excellence in Telecommunication hosted in their Computer Science departments ([www.coe.ru.ac.za](http://www.coe.ru.ac.za); [www.coe.ufh.ac.za](http://www.coe.ufh.ac.za)). The main field test site is located in the Mbhashe municipality, in the vicinity of the Dwesa-Cwebe Nature Reserve, in the rural Eastern Cape Province of South Africa. This initiative, known as the Siyakhula Living Lab (SLL, [www.siyakhulall.org](http://www.siyakhulall.org)), is organised along the lines of the emerging Research, Development and Innovation (RDI) *living lab* methodology, whose main underlying principle is *co-creation of solutions with empowered users*. 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 multi-disciplinary flavour.

While efficient and meaningful access to the Internet is paramount in our initiative, it should be understood that by 'ICT diffusion' we mean real uptake by poor communities of ICT and its transformative power. In other words, we do not want to create communities who solely *consumes* ICT artefacts produced elsewhere, but aim at promoting the birth and the growth of a culture of ICT *production*, enabling local people, especially the young and the women, to become content and software developers. They will then be able to respond to the real and evolving needs of their communities in a natural manner. This is radically different from diffusing ICT only to provide services to the communities. Naturally, this is a long term goal: but it is used as yardstick for all the decisions we are taking about our deployment. This goal underpins the choice of 'large ICT' - full computers deployments, where it is possible to generate content as opposed to mostly consume it; the use of FOSS (Free and Opens Source Software); the location of the public access centres in schools. (Note that each of these choices, luckily, also improve efficiency in terms of initial capital cost and later maintenance.)

The project has evolved to include a generic service integration platform to support services for rural and peri-urban areas in developing countries, called TeleWeaver. 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](http://www.reedhousesystems.com)), which started its operations in 2010. An important component of TeleWeaver allows billing of the organizations which want their services to be accessible to the poor communities where TeleWeaver is operational. This is an adaptation of the classical Internet model (users do not pay; organizations accessing users do pay) and represents a very promising way to make the installation sustainable. Appendix 1 of this document elaborates on this with a few examples.

SLL, RHS and the two Telkom Centres of Excellence constitute an RDI eco-system, represented in the next diagram.



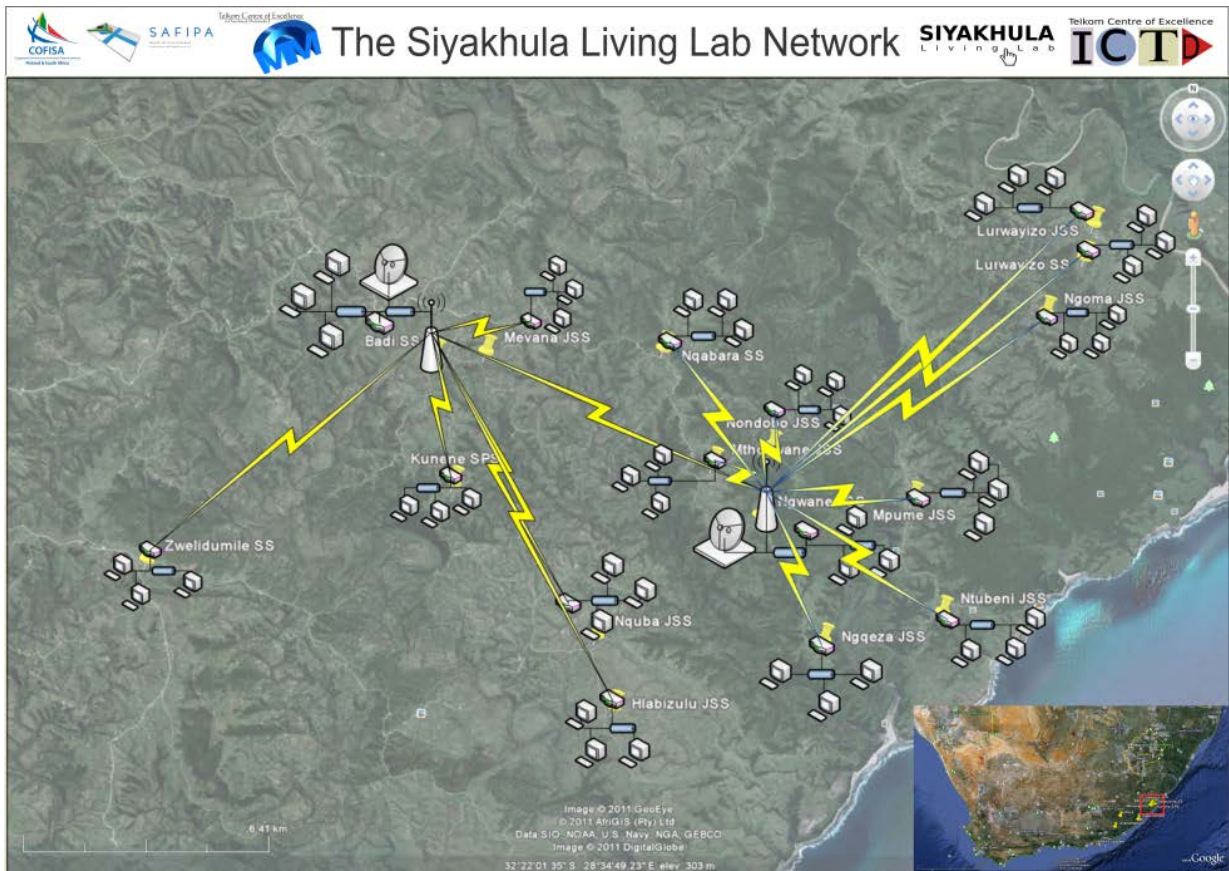
## Technology options to promote access

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 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 Nodes) 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 the main site of SLL, Dwesa, we use a satellite connection, but in Grahamstown, the peri-urban schools are connected to the Internet through the fibre link of Rhodes University. 3G /4G can be considered in other situations. 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 when the costs or needs will change.

The following picture illustrates the network as it is at the Siyakhula Living Lab main site, in the vicinity of the Dwesa/Cwebe nature reserve.



**Digital Access Nodes**

Each point-of-presence contains a variable number of user terminals, realized generally 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. The use of a cluster for the central server allows the deployment of 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.



While the DANs are located in schools, it should be understood that they are, right from the start, open to the surrounding communities. It should also be noted that the majority of the DANs are currently realized with minimal equipment, given the tight financial constraints under which the project is operating.

## **Siyakhula Living Lab: current areas of research**

Current study areas in the SLL include:

- 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 information 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.

## **Reed House Systems**

After a good start in 2010, thanks to a generous, two-year grant from the South Africa-Finland Knowledge Partnership on ICT programme (SAFIPA; [http://www.csir.co.za/enews/2007\\_dec/ic\\_04.html](http://www.csir.co.za/enews/2007_dec/ic_04.html)), Reed House Systems has been recently downsized for lack of financial support. The most natural partner, the Government, has up to now failed to provide grants or contracts towards the deployment of cost effective access points, connectivity to the Internet, and e-services to reach SA poor communities. We think that this situation is temporary

The main innovation / product is TeleWeaver, briefly illustrated in Appendix 1. A video presenting the core ideas of TeleWeaver is available on YouTube at the URL specified in Appendix 3 (item 5).

We are confident that Reed House Systems can soon restart its work fully and grow, with your contribution among others.

## Current partners and national / international network

- Telkom Centres of Excellence (CoE) at the Universities of Fort Hare and Rhodes. The private sector funders of the Centres include Telkom, Saab Grintek, Tellabs/CORIAN, Easttel, Khula Technologies, and GENBAND
- Technology and Human Resources for Industry Programme (THRIP) of the Department of Trade and Industry of South Africa
- Eastern Cape e-Skills CoLab: ICT for Rural Development (part of the Ikamva National eSkills Institute (iNeSI))
- Eastern Cape Office of the Premier
- Eastern Cape Socio Economic Consultative Council (ECSECC)
- East London Science and Technology Park
- Eastern Cape Information Technology Initiative (ECITI)
- SEDA Nelson Mandela Bay ICT Incubator
- Department of Science and Technology of South Africa
- Department of Rural Development and Land Reform of South Africa
- State Information Technology Agency of South Africa (SITA)
- Universal Service Access Agency of South Africa (USAASA)
- Department of Telecommunications and Postal Services of South Africa
- Department of Communications of South Africa
- National Treasury of South Africa
- Meraka Institute
- Living Lab of Southern Africa (LLiSA)
- University of Namibia (UNAM)
- Polytechnic of Namibia
- National University of Lesotho
- Fondazione Bruno Kessler (FBK), Trento, Italy
- Sankt Augustin's Fraunhofer FOKUS, in Germany
- Università dell'Insubria, Como, Italy
- University of Western Sydney, Australia
- Dalhousie University, Halifax, Canada
- European Network of Living Lab (ENoLL)

Over the years, the SLL has received attention from the media and important visitors. Special mention should be made of the former Minister of the Department of Science and



Technology, Mr Derek Hanekom, and the Deputy Minister of the the Department of Communications, Ms Stella Ndabeni-Abrahams, as illustrated in the following pictures.



# Appendix 1

## *TeleWeaver, a middleware platform to host e-services for poor areas*

TeleWeaver is the core product of Reed House Systems, and is a middleware platform on which various services are deployed. Services in the platform can be accessed either via fixed end-points such as PCs in Digital Access Nodes (DANs, an evolution of the old 'telecenters') or in homes, or 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, possibly found through another service in TeleWeaver - the Career service; to support of interaction with governmental entities at various level (ID requests and tracking or child grants from the Department of Home Affairs, for example); to support for surveys in the community; to support for pre-paid services. (The applications listed are just a small subset: the idea is to have tens and then hundreds of services over time.)

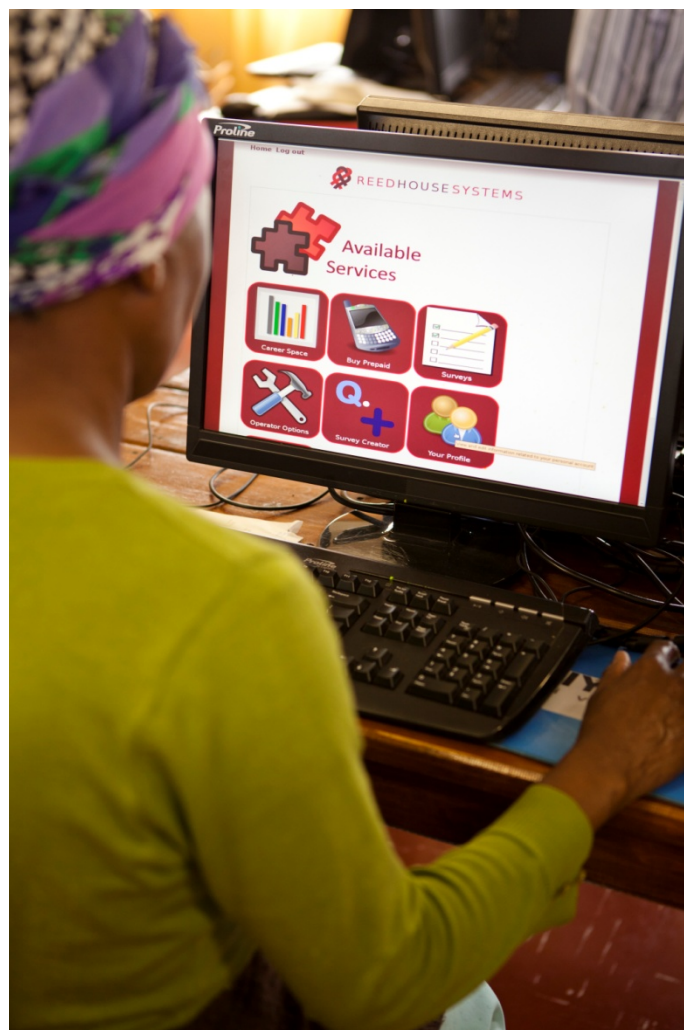
Each application running in TeleWeaver will be in general a source of revenue, either from the local users (for example, preparation of a CV) or, more importantly at first, from an entity outside the community (for example a buyer of online goods and services from the community; or a department such as Department of 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 DANs, connectivity and training.

The reason for government to buy the product (especially the turn-key solution) should be 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 solution

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 are showing that Governments are now aware of this and the next few years will see this specific market open up. TeleWeaver is being developed especially to respond in an appropriate manner to the growing awareness of the important role of ICT in development.



# Appendix 2

## *Goals and objectives of the Siyakhula Living Lab (SLL)*

### **SHORT-TERM : BUILD DIRECT BENEFITS**

- Development of an 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 an ICT solution provider, Reed House Systems ([www.reedhousesystems.com](http://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 and content generators reaches maturity
- The model is replicated on a large scale in other marginalized areas in Southern Africa, Africa and generally the developing world.

# Appendix 3

## *Media on the Siyakhula Living Lab*

### Videos

1. A short introduction to SLL, filmed at the 2012 Science Festival in Grahamstown:  
<http://www.youtube.com/watch?v=qkJrQn4pUa4>
2. Shortened version of the documentary on the SLL broadcast on SABC2 on 19 June 2014:  
<http://youtu.be/mQTMAYcnJM>
3. Documentary on an aspect of SLL broadcast on SABC2 on 8 May 2011:  
<http://youtu.be/Wv5RHc-hCvA>
4. A short SLL video on the SLL celebration held in Ngwane on 27 April 2013:  
<http://www.youtube.com/watch?v=DDLh2bQEJrM>
5. A presentation on TeleWeaver made at the 2013 Eastern Cape ICT Summit in East London:  
*(note that the name of the speaker and company is wrong; the speaker is Alfredo Terzoli and the companies are Rhodes and Fort Hare Universities)*  
[http://www.youtube.com/watch?feature=player\\_detailpage&v=0IJZnHn\\_avk#t=4555](http://www.youtube.com/watch?feature=player_detailpage&v=0IJZnHn_avk#t=4555)

### Printed Media

6. Rhodes Press:  
[http://www.siyakhulall.com/sites/default/files/SiyakhulaLL\\_Booklet\\_2012.pdf](http://www.siyakhulall.com/sites/default/files/SiyakhulaLL_Booklet_2012.pdf)
7. City press, South Africa, November 2012:  
<http://www.siyakhulall.com/sites/default/files/citypress.pdf>
8. Die Zeit, Germany, April 2011:  
<http://www.siyakhulall.org/?q=node/13>