

Broadband for All: Connecting people from the ground up – one last mile at a time

4th Biennial Conference



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Date: 9 October 2012

Overview

- South African broadband context
- The need for broadband in rural areas
- ICT as an enabler (of socio-economic development)
- The Broadband for All Project
- Research and Development outcomes
- Impact of the Village Operator Model
- Next Steps and Future Research



What Happens in an Internet Minute?

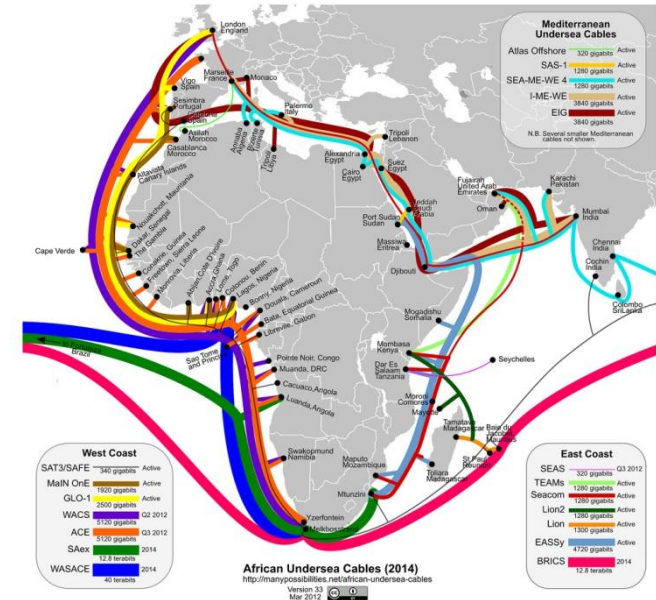


And Future Growth is Staggering



South Africa: Broadband context

- Broadband technologies in SA:
 - ADSL
 - 3G / LTE
 - Wireless ISPs
 - Fibre
- Various undersea cable systems
- SA Broadband penetration is low
 - 8.5 million Internet users (end of 2011)
 - 2.48 million access Internet only from cellphones (end of 2011)
 - 17% Internet penetration
- But, most of these connections are in urban areas



Broadband means an always-on, high-speed Internet connection

Source: World Wide Worx, 2012

Rural South Africa – The need for broadband

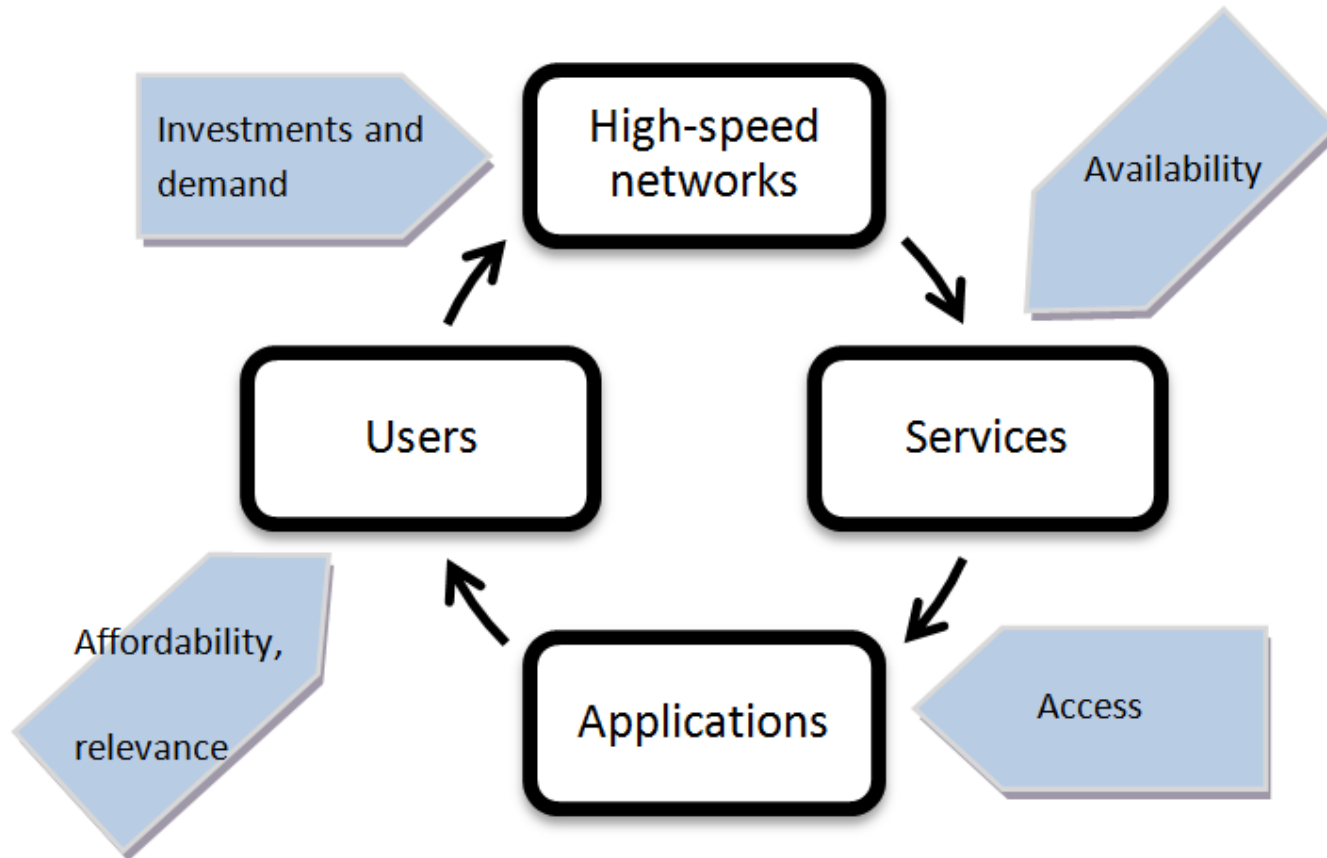
- SA has large rural areas where lack of development and job opportunities contribute to poverty
- Broadband is not available in many of the rural areas as it is not economical to roll-out traditional broadband infrastructure
- Many schools, clinics, businesses and citizens cannot access broadband Internet
- Hence, the market is failing to meet the broadband needs of the people in rural South Africa
- Government intervention is required



Information and Communication Technology as an enabler

- Broadband is recognised as a strategic tool in building a **knowledge economy**.
- The **World Bank** found that increasing **broadband penetration** by **10 percent** generates an additional **1.38 percent** growth in the **Gross Domestic Product (GDP)** for developing countries.
- Broadband could provide better access to
 - healthcare,
 - education,
 - other government services and
 - job opportunities.
- The anticipated National ICT Policy Framework, developed by the Department of Communications (DoC), is expected by 2013.

Broadband as an ecosystem

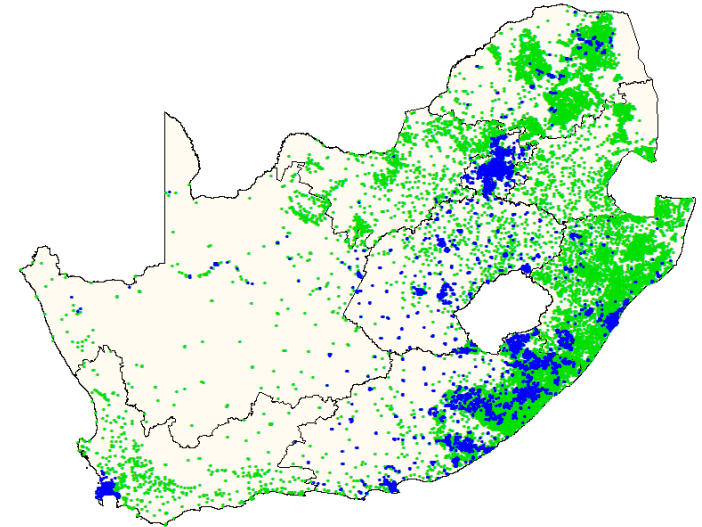


Viewing broadband as an ecosystem helps define the likely roles that governments will need to play in using broadband as a tool in ICT for development (ICT4D).

Source: World Bank, 2010

South African Schools Connectivity Challenge

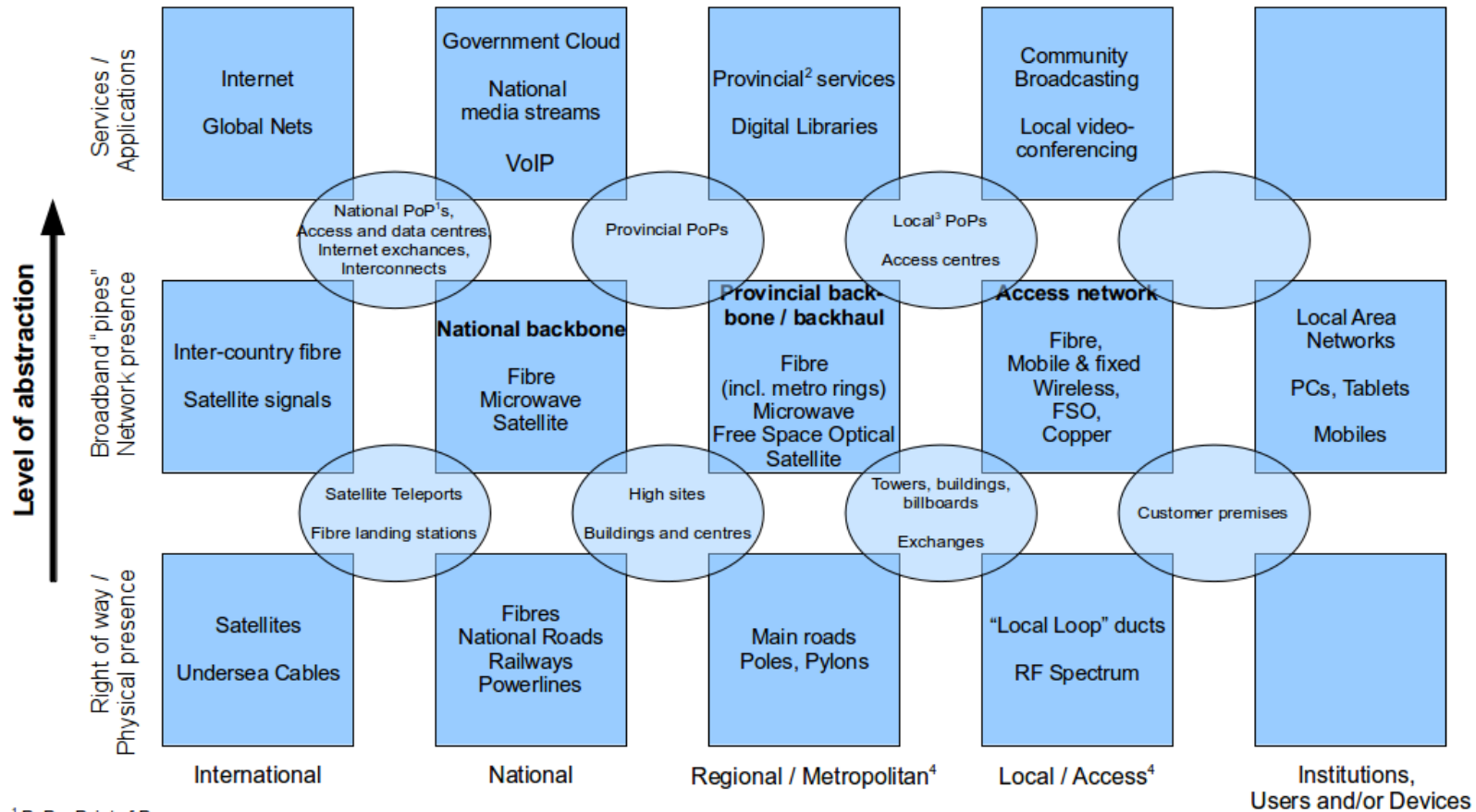
- Estimated 17 000 of total of 26 500 public schools are RURAL and outside any foreseen 3G/LTE/ADSL/fibre or other broadband plans...
- In some cases, schools and Provincial Departments of Education are still using couriers to deliver official messages!
- Learners and teachers need access to educational resources
- School administrators need access to national school administration systems
- Need local technical support



- Urban Schools
- Rural Schools

Framework for broadband infrastructure assessment

Broadband Infrastructure Landscape Model “Examples”



¹ PoP = Point of Presence

² "Provincial" can be other forms of sub-regions

³ "Local" can be district, town, or even suburb

⁴ More stages can exist between "backbone", "backhaul" and "access"

Geographical scope / Jurisdiction

Broadband for All Project

- Aim of the project

Affordable broadband connectivity in areas that are currently not connected utilising low-cost, locally-owned and locally-supported infrastructure to create socio-economic and commercial opportunities.

- Objectives of the project
 - Establish a large scale demonstrator of the **wireless mesh networks** R&D at the CSIR,
 - and evaluate the **community based approach** to local economic development, infrastructure establishment and service delivery.
- This project is supported by the Department of Science and Technology with sector budget support from the European Union.



science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



BB4ALL: CSIR research, development and implementation

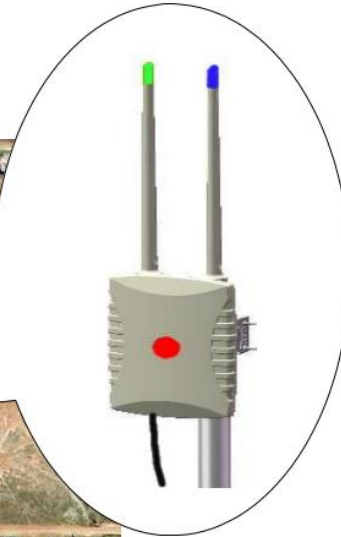
- Established a working **wireless backbone network** with high-sites to connect rural facilities to the Internet in
 - Nkangala District, Mpumalanga and
 - Sekhukhune District, Limpopo
- Established **mesh clusters** to connect rural schools to each other and the wireless backbone
- Developed **Wireless Mesh Equipment** (High-Performance Node)
- Created **Village Operator business model** and trained and support Village Operators providing **local support**
- **Monitoring and Evaluation** of project continues



The project benefits from the CSIR's multi-disciplinary approach to research and development and collaboration with external experts and service providers.

BB4ALL: Wireless Mesh Cluster

Wireless Mesh Network Infrastructure



BB4ALL: Wireless Mesh Equipment – Map View

GW-Kwamh1-KwaMhlangaHigh

Network Help

firmware: img-i386-9-yab-20120530 , uptime: 22 days 19:41:58 , date: 2012-07-06 05:39:14

Streetmap view

route (perfect) route (acceptable) route (borderline) route (poor)

streetmap view / floating map view

refresh now

pause automatic refresh

refresh interval: 5 minutes

unlock nodes

Show all device information

Close all device information

Gateway

- GW-Kwamh1-KwaMhlangaHigh

Devices

- Kwamh1-DOECircuit
- Kwamh1-Kgantsho
- Kwamh1-KwaMhlangaHigh
- Kwamh1-Langalibalele
- Kwamh1-Mkhanyo
- Kwamh1-Musi
- Kwamh1-Rorobhani
- Kwamh1-Tjhidelani
- Kwamh1-VOOffice
- Kwamh1-Zakheni

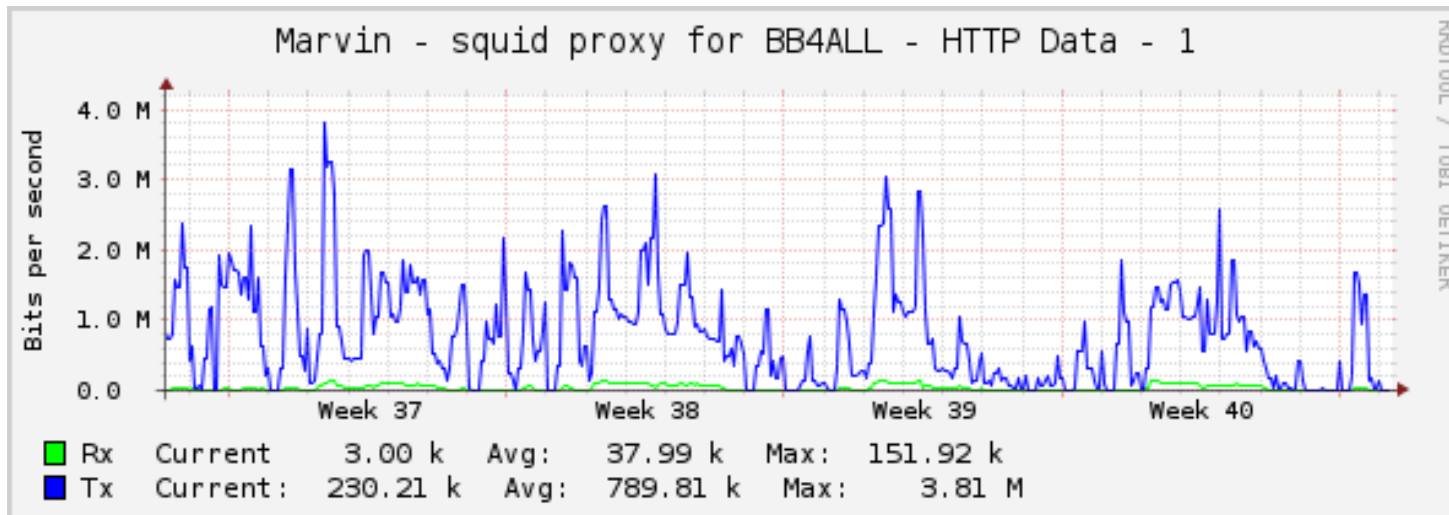
BB4ALL: Village Operators



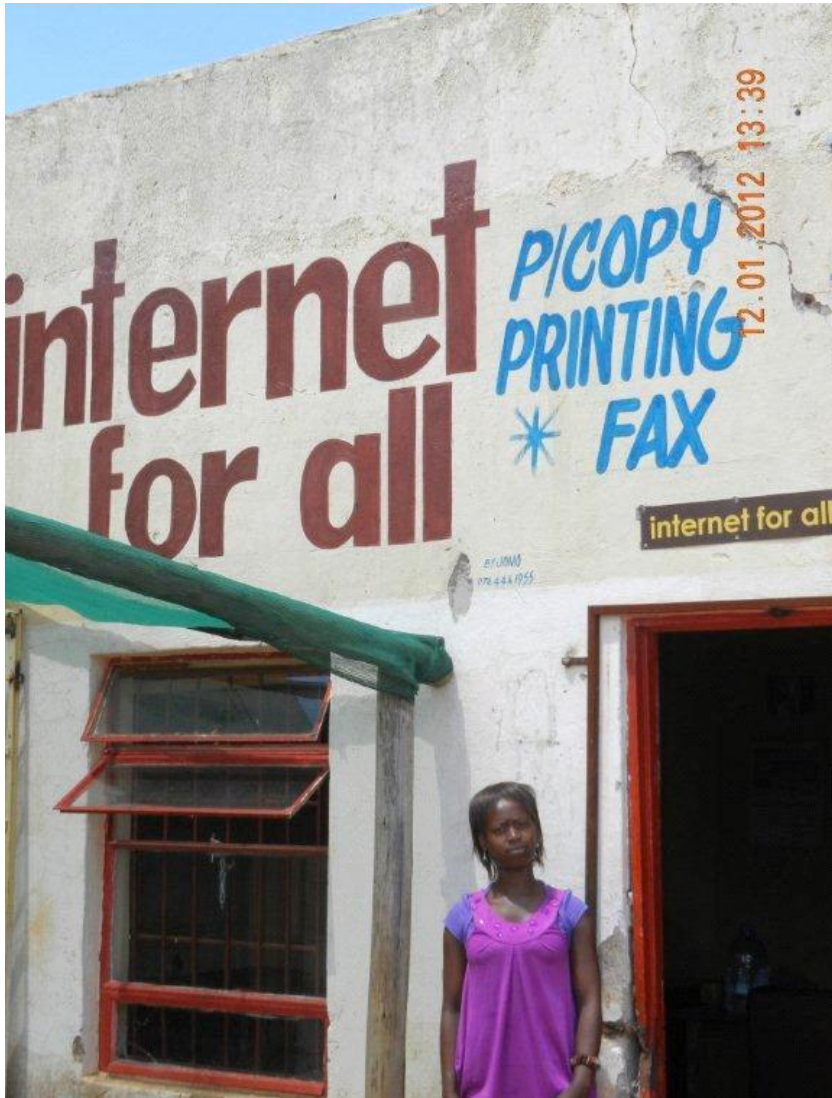
- Village Operators (VOs) – young entrepreneurs from the communities around the schools.
- Training includes business skills, technical skills, customer service skills.
- VOs become very marketable
- 15 of the original 19 VOs operating the network.

BB4ALL: Impact – The Numbers

- Number of schools and offices connected – 207
- Number of learners with access – 97 500
- Number of direct jobs created – 16
- Number of indirect jobs created – Several (office staff, technical support)
- Services offered - Fax, e-mail, government forms, list of vacancies, submitting CVs, etc.
- Traffic graph:



BB4ALL: Impact – Local economic development



- Village Operators (VOs) have found sustainable employment and became proud change agents in their communities stimulating development enabled through ICTs.
- VOs are helping other small businesses
 - Internet training
 - Local business catalogue
- VOs are supporting each other:
 - Abel and Timothy provide DVD production service.
 - Collaborative procurement.
 - Share business lessons.

BB4ALL: Impact – Schools and community



- Schools, and the greater community, benefit from the broadband Internet connection.
- The project has made a noticeable and catalytic difference.
- CSIR is now using the lessons learnt to advise national government on rural broadband, economic development and schools connectivity.

Next Steps and Future Research

- Commercialise the wireless mesh network technology – make it available to new projects
- Seek new projects that could use this alternative approach to broadband infrastructure development (Scale up the roll-out)
- Use the existing wireless mesh networks for continued research and development – focusing on applications
- Participate in the National Task Team for Schools Connectivity – share lessons learnt in the BB4ALL Project
- Do active research into TV White space technology to provide long-range, backhaul connectivity in rural areas (and elsewhere)

Acknowledgements

- The Village Operators and their communities
- Department of Science and Technology (DST) for sponsoring the project
- European Union for funding
- A great team at the CSIR

Thank you

