

Digital Inclusion: Uganda

*Thin Computing Accompanies
Introduction of Connectivity and Services*

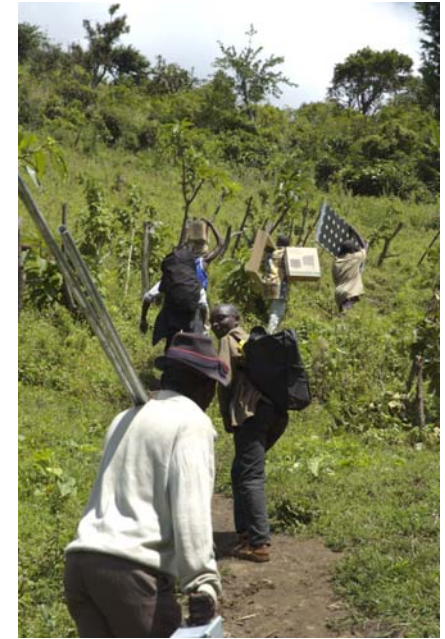


ActionAid (NGO) Provides Local Services

- ActionAid is an international development agency whose aim is to fight poverty worldwide
 - Formed in 1972, ActionAid has helped over 13 million of the world's poorest and most disadvantaged people in 42 countries worldwide through a staff of over 1700 (89% from developing countries)
 - Has operated successful programs with villages in remote areas of Western Uganda for over 6 years
 - Programs focus on education, HIV/AIDS-related issues, local empowerment/awareness and income-generating activities
 - Lack of communication infrastructure among villages limits the impact of the programs as well as the ability of villagers to pool their resources

The Local Challenge

- Rural Uganda (Rwenzori Mountains area)
- Remote, hostile hill country
 - Distance precludes market access
 - Rain prevents access to hillside villages and more
- No – or limited – power throughout villages
- No phones – no communication at a distance
- No computers – no access to information outside the village
- No access = limitation to services access; inefficiency and inability to participate in economy beyond the village
- Primary research in local villages yielded needs for:
 - Internet access
 - Phone service, principally village-to-village within a relatively small radius



Project Requirements and Opportunity

- Solution must address power void in all but one main village
 - Inconsistencies and outages prevalent
- Connectivity can be provided via one existing wireless connection in main village
 - Cannot be assumed to be constant
- Therefore, phone service between villages cannot be dependent on main wireless link or grid power

The Inveneo Solution

- Inveneo (www.inveneo.org) teams with ActionAid local staff to understand local needs and conditions and deploy the system
- Five initial village systems deployed
 - One in the Community Knowledge Center (Nyamiryango, main village) acts as the hub station
 - Hub station connects the stations in the villages to the local phone network (since no landlines are available in this part of Uganda, an interconnect to the GSM network was established using GSM terminal units) and the Internet (utilizing the existing Internet connection at the Community Knowledge Center)
 - Remaining four communications stations installed in those villages with no access to electricity or phone lines
 - All stations connected with 802.11 wireless network links ranging from 2 to 6 km distance

Technical Solution

- Wireless network solution comprising:
 - Wyse S50 units (Linux, AMD processors)
 - Open-source software (KDE, OpenOffice) for Internet access and productivity tools
 - Phone connections established using SIP VoIP signaling protocol and the Asterisk Open-source PBX system
 - Each village has own extension and voice-mail box
 - PBX system allows free calling between connected villages
 - Any phone in the world can call the stations in the villages and calls to any phone in Uganda are possible from the village stations
 - Solar panels installed in conjunction with systems in each village to power systems



Local Services are Critical Element

- Thin-computing model mitigates need for local support and services, but a certain degree of maintenance is inevitable
- Need strong participation and support of the local communities and ActionsAid's local staff
 - Inveneo has trained ActionsAid's IT Officer as well as other staff members in installation, maintenance, and troubleshooting of the system
 - ActionAid will train the local villagers in the use of the stations and how to apply the system to improve their situation

Thin Computing At Work

- Solution architecture enables village-to-village phone connections even when Internet connection is unavailable
- Thin-computing model enables:
 - Highly reliable systems
 - Low technology education and maintenance burden
 - Low power consumption of devices
 - Affordable cost proposition
- Villagers can now connect with each other to facilitate local and super-local interactions
- Rural, developing world citizens can now access global information and participate in the global economy

Expected Outcomes of the Solution

- Increased village income (as much as 100%) through improved access to market prices for crops
- Ability to cooperate between villages to pool resources
 - Increased buying power
 - Coordinated truck hiring to transport goods and crops
- Improved access to local database of traditional medicines for treatment of AIDS-related opportunistic diseases
- Increased ability of villagers to research government and NGO grants and programs, and apply for grants online