



Deliverable Title:

D 3.1 Workshops Report

November 2010

## Document Information

Project  
Project Title: *Exploiting Research INfrastructures potentiAl for boosting Research and Innovation in Africa (ERINA4Africa)*

Project Start: 1<sup>st</sup> October 2009  
Project Duration (months): 16  
Call: FP7-INFRASTRUCTURES-2009-5  
Contract Number: 246663

Document  
Deliverable Number: D3.1  
Deliverable Title: Workshops Report

Deliverable Identifier:  
Contractual Date of Delivery: 2010-11-30  
Actual Date of Delivery: 2010-11-30  
Editor(s): Bjorn Pehrson  
Author(s): Simon J E Taylor, Margaret Ngwira, Björn Pehrson, Isabel Matranga

Reviewer(s): Mohsen Jahangrian  
Workpackage No.: WP3  
Workpackage Title: Dissemination and Networking  
Workpackage Leader: Simon J E Taylor  
Workpackage Participants: ALL  
Est. Person-months: 12  
Distribution: PU-Public Use  
Nature: R-Report  
Version.Revision:  
Draft/Final: FINAL  
Total Number of Pages: 33  
(including cover)  
File name: D3.1-FINAL.doc  
File folder link  
Keywords: *Knowledge society, ICT for development, e-Infrastructures, Euro-Africa collaboration, e-Health, e-Learning, e-Government, AfricaConnect, ERINA*

Distribution: CO **C**Onfidential, only for members of the consortium (including the Commission Service)  
PP Restricted to other **P**rogramme **P**articipants (including the Commission Service)  
PU **P**ublic use  
RE **R**Estricted to a group specified by the consortium (including the Commission Service)

Nature: D **D**emonstrator  
O **O**ther  
P **P**rototype  
R **R**eport

## Disclaimer

This document contains a description of the ERINA4Africa project findings, work and products. Certain parts of it might be under partner Intellectual Property Right (IPR) rules so, prior to using its content please contact the consortium head for approval.

In case you believe that this document harms in any way IPR held by you as a person or as a representative of an entity, please do notify us immediately.

The authors of this document have taken any available measure in order for its content to be accurate, consistent and lawful. However, neither the project consortium as a whole nor the individual partners that implicitly or explicitly participated in the creation and publication of this document hold any sort of responsibility that might occur as a result of using its content.

This publication has been produced with the assistance of the European Union. The content of this publication is the sole responsibility of the ERINA4Africa consortium and can in no way be taken to reflect the views of the European Union.

The European Union is established in accordance with the Treaty on European Union (Maastricht). There are currently 25 Member States of the Union. It is based on the European Communities and the member states cooperation in the fields of Common Foreign and Security Policy and Justice and Home Affairs. The five main institutions of the European Union are the European Parliament, the Council of Ministers, the European Commission, the Court of Justice and the Court of Auditors. (<http://europa.eu.int/>)



**ERINA4Africa is a project funded partially by the European Union**

## Log of Changes

<b>Deliverable N° &amp; Version N°</b>	<b>Date (dd/mm/yyyy)</b>	<b>Changes</b>
<b>D3.1-vFINAL</b>	30/11/2010	Final report delivered

## Table of contents

Document Information .....	2
Disclaimer .....	3
Log of Changes .....	4
Table of contents .....	5
Executive Summary .....	6
1. Introduction .....	7
2. 1 <sup>st</sup> ERINA4Africa Workshop .....	8
2.1. Overview .....	8
2.2. Summary of Presentations .....	10
2.3. Key Results .....	11
2.4. Workshop Attendee Information .....	12
2.5. Workshop Summary .....	13
3. 2 <sup>nd</sup> ERINA4Africa Workshop .....	14
3.1. Overview .....	14
3.2. Summary of Presentations .....	21
3.3. Key Results .....	21
3.4. Workshop Attendee Information .....	25
3.5. Feedback Results .....	25
3.6. Workshop Summary .....	29
4. Workshops Report Summary .....	30
Annex 1: Attendee Lists .....	31
A1.1 1 <sup>st</sup> ERINA4Africa Workshop Attendees .....	31
A1.1 2 <sup>nd</sup> ERINA4Africa Workshop Attendees .....	31

## Executive Summary

The *Exploiting Research Infrastructures potential for boosting Research and Innovation in Africa* (ERINA4Africa) project aims to foster cooperation between Europe and Africa by studying the potential of e-Infrastructures in Africa. As part of this initiative two workshops were run. The 1<sup>st</sup> ERINA4Africa Workshop *Investigating Best Practices for e-Infrastructure Application Development* took place in Kigali, Rwanda on the 21st April 2010. The 2<sup>nd</sup> ERINA4Africa Workshop *Investigating African e-Infrastructure Applications of the Future* took place in Lilongwe, Malawi on the 6<sup>th</sup> and 7<sup>th</sup> October 2010. This report presents the results of these workshops.

Through a combination of presentations from key influential figures in e-Health, e-Learning, e-Government and e-Science, e-Infrastructure demonstrations and brainstorming sessions that included over 100 attendees the ERINA4Africa Workshops have demonstrated a clear need for African e-Infrastructures and an emerging energised community that can pave the way for the development of these. Europe is playing a fundamental role of the realisation of these and with sustainable strategic partnerships a *human infrastructure* can be created that will lead the way in new mutual beneficial scientific collaborations. e-Infrastructure Lighthouse Demonstrators need to be urgently specified to act as focal points around which these new European-African research communities can be forged. Human factors work on these could begin immediately to ensure the right technology is delivered in the right way to the right people.

# 1. Introduction

This report presents the results from the two ERINA4Africa workshops:

- The 1<sup>st</sup> ERINA4Africa Workshop *Investigating Best Practices for e-Infrastructure Application Development*, Aberdeen House Hotel, Kigali, Rwanda, 21st April 2010, and
- The 2<sup>nd</sup> ERINA4Africa Workshop *Investigating African e-Infrastructure Applications of the Future*, Lilongwe, Malawi, Kumbali Lodge & Kamuzu College of Nursing (University of Malawi) 6<sup>th</sup>-7<sup>th</sup> October 2010.

The results from each workshop will be presented in turn and then summarised at the end of the report. For each workshop an overview will be given followed by the agenda. Summaries of each presentation will then be given. Key results will then be presented with an analysis of workshop attendees and feedback forms..

The sequence of the workshops reflected issues within the ERINA4Africa project. The first workshop was aimed at investigating opportunities and problems of e-Infrastructure Development and the second was aimed at identifying the key e-Infrastructure Applications that could receive priority attention.

## 2. 1<sup>st</sup> ERINA4Africa Workshop

### 2.1. Overview

The aim of the workshop was introduced as follows:

The use of advanced distributed computing techniques and technologies are revolutionising many different fields such as e-Health, e-Learning and e-Government. The e-Infrastructures are enabling the realisation of truly global virtual research communities and have led to significant advances across the world. The Exploiting Research Infrastructures Potential for Boosting Research and Innovation in Africa (ERINA4Africa) initiative aims to identify existing and planned exemplars of such advances in an Africa context. Building on results of the ERINA and FEAST studies, ERINA4Africa is investigating key best practices and barriers to realisation of contemporary and future e-Infrastructure-based applications. This workshop gives attendees the opportunity to brainstorm interim results and observations from the project.

The workshop was held in at the Aberdeen House Hotel held in Kigali, Rwanda on 21 April 2010 and had an exciting programme of events. The day was officially opened by the Honourable Minister of Education Dr Charles Murigande. The Minister, who came with his Principal Secretary, took a lively interest in the event. After a succinct introduction on the purpose of the workshop by ERINA4Africa coordinator, Dr Simon Taylor via ISABEL, presentations were made around the three broad areas of ERINA4Africa: e-Health, e-Governance and e-Learning. The Workshop concluded with in depth discussion in three groups and concluded with a roundup brainstorming session .

Unfortunately the European consortium members were prevented from attending by the Icelandic volcanic ash cloud that sporadically interrupted air travel across Europe at that time.. However, the use of the EUFP7 Global ISABEL interactive video conferencing system assisted in uniting the Rwanda and European participants until the submarine cable was severed around midday in mid ocean. This took several weeks to be reconnected, bringing much of east and southern Africa connectivity to a grinding halt. Despite this ISABEL did however give an excellent illustration of how e-Infrastructures could support global virtual communities between Europe and Africa in practice.

Use of the ISABEL system permitted an interactive start to the meeting and Dr Taylor's introduction and the first two presentations were videostreamed and accessible at [www.globalproject.org](http://www.globalproject.org) All presentations are available at [www.erina4africa.eu](http://www.erina4africa.eu) and at <http://globalplaza.org/spaces/global/events/kigali-meeting>. There were approximately 37 local participants from 12 African countries and 6 European participants were virtually present during the period that the GLOBAL link was functioning. While functioning the ISABEL system demonstrated how a global virtual research community between Europe and Africa could work in practice.



The Minister of Education, Honorable Dr Charles Muligande, the Chair of UbuntuNet Alliance, Professor Z D Kadzamira and participants of the 1<sup>st</sup> ERINA4Africa Workshop

The agenda of the workshop was:

08:30	Registration
09:00	Introductions and welcome remarks Director of Ceremonies <i>Mr Albert Nsengiyumva</i> , RwEdNet Coordinator and DG of Rwanda Workforce Development Authority
09:15	Introduction to the ERINA4Africa Workshop: Aims and objectives <i>Mr Tiwonge Banda</i> UbuntuNet ERINA Partner and <i>Dr Simon Taylor</i> , ERINA4Africa Coordinator, Brunel University (via GLOBALPLAZA)
09:30	Background to the Day and the following events and introduction of Guest of Honour <i>Dr Francis Tsubira</i> , CEO of UbuntuNet Alliance
09:45	Address by the Guest of Honour and Official Opening <i>The Honourable Minister of ICT Dr Ignace Gatara</i>
10:10	<i>Group photo and networking coffee break</i>
10:40	Overview of e-Infrastructure Case Studies <i>Dr Simon Taylor</i> , Erina4Africa Coordinator, Brunel University(via GLOBALPLAZA)
10:50	Digital Education Revolution in Rwanda the Case of Rwanda Education Common <i>Ms Louise Karamage</i> , Rwanda Education Commons

11:20	What can IT solutions contribute to quality health delivery. <i>Prof. Emile Rwamasirabo</i> former rector of NUR, Rwanda ambassador to Japan
11:50	DATAD case study <i>Dr Pascal Hoba</i> , Association of African Universities
12:20	<i>Networking lunch</i>
13:30	ERINA4Africa Interim Results <i>Prof. Bjorn Pehrson</i> , KTH (via GLOBALPLAZA)
14:30	Brainstorming session <i>Ms Margaret Ngwira</i> , UbuntuNet ERINA4 Partner
16:00	Presentation of key results and summary of key themes
16:30	Plenary discussion and summing up of main issues <i>Dr Iman el Maaly Abdelrahman</i> , CEO, SUIN, Director of ICT, University of Khartoum and d Board Member, UbuntuNet Alliance
17:15	Completion of evaluation questionnaires
17:30	Close of Workshop and farewell to remote participants
18:00 - 20:00	<i>Networking Cocktail hosted by Professor Zimani D Kadzamira</i> , Chair of UbuntuNet Alliance

## 2.2. Summary of Presentations

There were several presentations focusing on the promise of e-Infrastructures. *Ms Louise Karamage* of Rwanda Education Commons discussed the Digital Education Revolution in Rwanda and the Case of Rwanda Education Common (REC). This presented the role of REC in Vision 2020 and the five focus areas in the Education Strategic Plan. The Rwanda Education Commons (REC) was announced by USAID during the last Africa Regional Higher Education Summit held in October 2008 and is a four-year program funded by USAID and implemented by the Global Learning Portal (GLP) @ AED with MINEDUC. Its objectives are to expand access to quality education through the effective use of ICTs in Education, to develop communities of learners and educators, and to replicate, scale, and integrate REC activities throughout Africa towards building an Africa Education Commons. *Prof. Emile Rwamasirabo* discussed what can IT solutions contribute to quality health delivery. Focusing on capacity building for health professionals and IT for health care quality improvement he focused on health HR challenges and the current state of e-Health in Rwanda. IT support to formal health education, IT support to a continuing professional development programme and quality healthcare & IT medicine were also discussed. Concerning e-Learning, *Dr Pascal Hoba* outlined work on the Database of African Theses and Dissertations (DATAD). This gave orientation on DATA and its objectives. The current state of implementation was reported on as well as requirements for success and key challenges.

## 2.3. Key Results

The key results of the workshop were developed during the brainstorming session. Four groups were formed and led facilitators taken from the attendees including Professor Patrick Mangheni, CEO of RENU and Mr Solomon Dindi, CEO of MAREN.

Groups were asked to discuss:

- Key areas for e-infrastructure applications
- Challenges to full utilisation of e-infrastructures
- Opportunities and benefits of e-Infrastructures.

The results of the brainstorming were as follows:

### **Key areas for e-infrastructure applications**

#### 1. e-Health:

- Resource utilization
- Drug tracking (including counterfeit drug monitoring, fleet management, monitoring and health statistics)
- Telemedicine (e-diagnostics)
- Community and health practitioners training
- Patient management records,
- Continual Professional Development for Health workers

#### 2. e-Government:

- Government financial systems (revenue, expenditure, taxation, transparency, M&E, e-procurement)
- Land and property management
- Civil related applications (citizen database, e-voting, passports, ID)
- e-commerce
- GovNet
- Good governance (criminal justice system)

#### 3. e-Learning:

- Content development
- Platforms
- Digital repositories

### **Challenges to full utilisation of e-infrastructures**

#### 1. Human and policy

- Human Resources (Capacity Building, e-readiness, change management, leadership, appropriate business skills);
- Lack of coordination among stakeholders
- Availability of High level advisory committee as in Rwanda

- Stable National security situation
- Conducive Government Policy environment

## 2. Technical

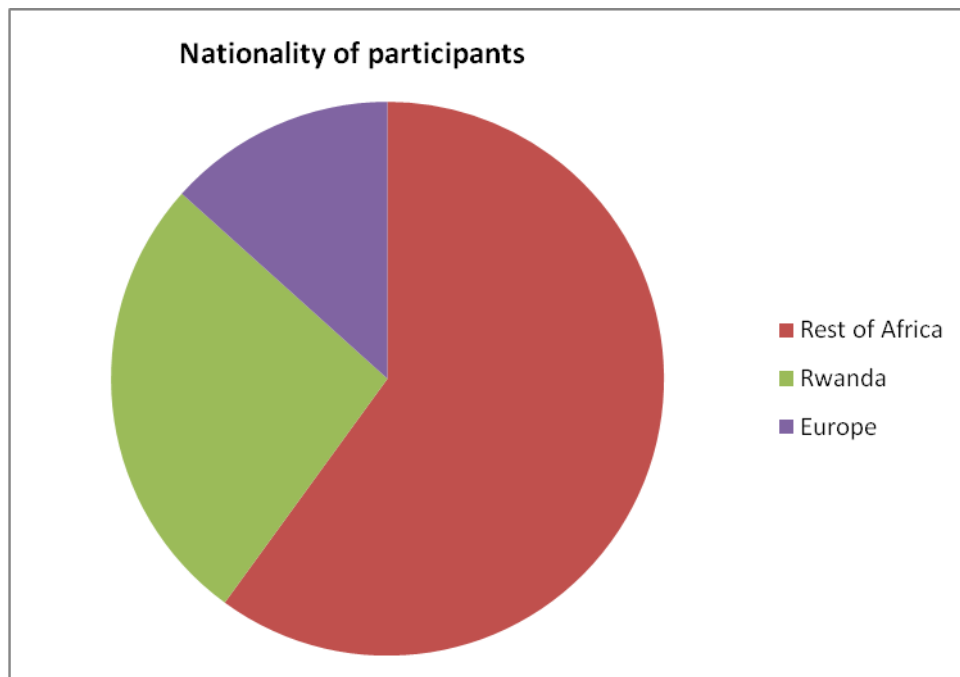
- Infrastructure (power, connectivity, backbone, equipment, end user support);
- Costs;
- Disaster Recovery facilities;

### Opportunities and benefits of e-Infrastructures.

- Competitive and Knowledge Based economies
- Employment creation with Increased local application developers
- Green IT opportunities
- Improved services : health, education, governance,
- Transparency,

## 2.4. Workshop Attendee Information

As shown below, the workshop was attended by 8 participants from Rwanda, 18 from the rest of Africa and 4 from Europe. Professional backgrounds included NREN CEOs, Researchers, ICT Professionals, University Lecturers, Medical specialists, E- Learning specialists, and Civil Servants.



Rwanda Workshop Attendee Breakdown by Region

## **2.5. Workshop Summary**

Discussions during the brainstorming were extremely lively and positive evaluation was received from participants. Discussions on the potential for e-Infrastructures demonstrated clear excitement about the potential. Progress is being made rapidly and the promise of increased bandwidth is help people to conceptualise a bright new future where ICT applications are not defined by network constraints. Overall the emphasis appeared to be on building social collaborations to begin the process of realising e-Infrastructures. Key to these were identifying ‘template’ applications that implementers of e-Infrastructures could use to save time in developing their systems.

### 3. 2<sup>nd</sup> ERINA4Africa Workshop

#### 3.1. Overview

The aim of the workshop was introduced as follows:

e-Infrastructures enable research environments in which researchers globally collaborate and have shared access to scientific facilities (data, communications, computing and instruments). The coming of the first fibre cables to East Africa in 2009 presented enhanced opportunities for enhanced harnessing of e-Infrastructures in sub-Saharan African region in a way that was not possible when VSAT was the main means of connectivity. The AfricaConnect initiative will enhance the development of these e-Infrastructures in the countries where it is implemented and also more broadly through their interconnection to the Global REN community. Once AfricaConnect is fully realised, what will be the major scientific applications that will use the network? The “Exploiting Research Infrastructures potential for boosting research and iNnovation in Africa” (ERINA4Africa) project is investigating these applications. This workshop presents the opportunity to discuss this question and to outline the high priority applications of the future that urgently need to be developed.

The 2nd ERINA4Africa Workshop ‘Investigating African e-Infrastructure Applications of the Future’ was held in Lilongwe, Malawi on the 6th and 7th October 2010. Day one was held at Kumbali Lodge and Day two at Kamuzu Nursing College, University of Malawi. *Facilitated by a pioneering three-party high-definition video-conference session, medical experts at university hospitals in Malawi, Rwanda and Sweden discussed regional differences in treatment of portal hypertension and shared documents in real-time across continents,* This clearly demonstrated the potential of what advanced ICT support called e-Infrastructures can deliver to Africa. The future of these technologies was also discussed in the workshop and addressed issues including digitization of research data, malaria research, secure drug distribution, e-Health, e-Learning, e-Government and other advanced e-Applications.

The connectivity during the workshop in Malawi to support the e-Infrastructure video-conference was provided by courtesy of the incumbent Malawi telecom operator (MTL) via a temporary terrestrial microwave link to Dar es Salaam and a not yet commissioned link in the EASSy cable. The connectivity in Rwanda was provided by the Rwanda REN, Rwednet, connected via the SEACOM cable. The connectivity in Europe was provided by CARENET, a research network for e-health applications connected to the European REN backbone, GÉANT that is also connected to the emerging regional REN backbone in Southern and Eastern Africa, UbuntuNet.

The workshop was an opportunity to discover e-Infrastructures and their applications, to network with those interested in application development and to outline the high priority e-applications of the future that urgently need to be effectively designed and developed. The theme of the first day centred around brainstorming these issues and took place at Kumbali Lodge with the guest of honour James Kalilangwe, Principal Secretary in the Ministry of Information and Civic Education. A second day gave attendees the opportunity to see demonstrations and presentations of potential e-Infrastructure applications. This was held at the University of Malawi, Kamuzu College of Nursing and was kindly opened by the Principal of KCN, Dr. Address Malata.



Participants of the 2<sup>nd</sup> ERINA4Africa Workshop, Day 1, Kumbali Lodge

Presentations were given during the two days by representatives from the University of Malawi, the Malawi Commission for Science and Technology, SANREN, South Africa, Brunel University, MAREN, MACRA, Malawi College of Medicine, all of which are available on the [conference website](#). Over 65 people attended the workshop from a wide variety of sectors including the local European Commission. The workshop was made possible by sponsorship from the European Union under the EU FP7 project ERINA4Africa. Funding from MACRA (Malawi Communications and Regulatory Authority) and bandwidth from MTL were vital in extending activities for the extra day and facilitating the multi country video conference.



Participants of the 2<sup>nd</sup> ERINA4Africa Workshop, Day Two, Kamuzu College of Nursing



Pioneering three-party high-definition video-conference session, medical experts at university hospitals in Malawi, Rwanda and Sweden discuss regional differences in treatment of portal hypertension and shared documents in real-time across continents



Participants watching the videoconference

The agenda of the workshop was:

**Day 1 - 6th October 2010**

**Venue: Kumbali Lodge, Lilongwe**

- 08:30 Registration  
Morning Chair: *Mr Tiwonge Banda*, ERINA4Africa Consortium member and Head, Finance and Admin (A), UbuntuNet Alliance
- 09:00 **Introductions and welcome remarks**  
*Mr Tiwonge Banda*
- 09:10 **Introduction to the ERINA4Africa Workshop: Aims and objectives**  
*Dr Simon JE Taylor*, ERINA4Africa Coordinator, Brunel University
- Collaboration without borders: the UbuntuNet Alliance vision**  
*Prof. Zimani Kadzamira*, Chair, UbuntuNet Alliance for Research and Education
- 09:30 Networking  
***Introduction of the guest of Honour Mr James Kalirangwe, Principal Secretary Minister of Information and Civic Education***
- 09:50 Address by the Guest of Honour and Official Opening
- 10:10 *Group photo and networking coffee break*
- 10:40 **Introducing MAREN, the Malawi Research and Education Network**  
*Mr Solomon Dindi*, CEO, MAREN
- Role of MACRA in facilitating Utilisation of Advanced Network Resources for Research and Education**  
*Mr Edward Kauka*, Technical Audit Manager, (Universal Access), MACRA
- Scientific Challenges facing the Southern Africa Region** - paper  
11:10 *Ms Gift Kadzamira*, Head of Documentation, Malawi National Commission for Science and Technology
- e-Infrastructure applications at Malawi College of Medicine**  
11:40 *Mr Anthony Muyepa*, Malawi College of Medicine
- 12:10 Questions and discussion
- 12:30 *Networking lunch*  
Afternoon Session Chair *Mr Solomon Dindi*, CEO MAREN and Lecturer, Chancellor College
- 14:00 **Report on ERINA4Africa Results**  
*Dr Simon Taylor*, ERINA4Africa Coordinator and Prof. Bjorn Pehrson ERINA4Africa Consortium member, KTH
- Brainstorming on e-Infrastructure Applications and Opportunities with facilitated groups**  
14:30 *Dr Simon Taylor*, ERINA4Africa Coordinator
- Presentations from Groups**  
16:15 *Dr Simon Taylor*, ERINA4Africa Coordinator
- 16:45 Completion of evaluation questionnaires  
*Mr Memory Afonso*, UbuntuNet Alliance
- 17:00 Close of 1st Day of Workshop
- 17:30 - Dinner at Kumbali Cultural Village for all participants
- 20:00

## Day Two - 7th October 2010

### e-Infrastructure : applications and potential in health research and service delivery

Venue: University of Malawi, Kamuzu College of Nursing, Lilongwe

- 07:45 Registration opening,  
*Ms Beatrice Ng'ambi*, UbuntuNet Alliance
- 08:30 Morning Session Chair: *Mr Pelani Malange*, MALSWITCH Applications and Projects Manager
- 08:35 **Bridging session: ERINA4Africa, UbuntuNet Alliance and MAREN**  
*Mr Tiwonge Banda*, UbuntuNet Alliance, ERINA4Africa Consortium Member
- 08:45 **Welcome Remarks**  
*Dr Address Malata*, Principal of University of Malawi Kamuzu College of Nursing
- 09:00 *Health Challenges and KCN International Research Initiatives*  
*Dr Chrissie Kaponda*, Associate Professor, Kamuzu College of Nursing
- 09:30 *Simulations in Health Service Decision Support*  
*Dr Simon Taylor*, ERINA4Africa Coordinator and Reader, Information Systems and Computing, Brunel University, Uk
- 10:00 *Content: e-Learning, Open Access and Digital Repository Initiatives in Malawi*  
*Mr Kondwani Wella*, College Librarian, Kamuzu College of Nursing
- 10:30 *Group Photo and Coffee break*
- 11:00 *Grid Computing Applications in Health Services Delivery and introduction to SANReN*  
*Mr Christiaan Kuun*, SAGrid, Meraka Institute, Pretoria South Africa
- 11:30 Questions and discussion
- 12:00 *MTL Today and Tomorrow*  
*Mr Elias Imaan*, MTL Chief Commercial Officer
- 12:15 *MALSWITCH National e-Infrastructure*  
*Mr Pelani Malange*, Applications and Projects Manager, MALSWITCH
- 12:20 *Networking lunch*
- 13:45 Afternoon Session Chair: *Mr Anthony Muyepa*, Director of ICT, Malawi College of Medicine,
- 13:45 ***Development of possible concept notes for new e-Infrastructure FP7 projects***  
*Facilitated by Mr Anthony Muyepa*
- 14:45 Roundup by *Dr Simon Taylor*
- 15:00 *Coffee break*
- 15:15 *High Definition Video Conferencing with Karolinska Hospital in Sweden and King Faisal Hospital in Rwanda and Lilongwe to share Gastric and Urological surgical expertise*  
*Dr Johan Permert* (Stockholm), *Dr Emile Rwamasirabo* (Kigali) and *Professor Andren-Sandberg* (Lilongwe) coordinated by *Professor Bjorn Pehrson*, KTH, Sweden, *Dr. Emmanuel Kayibanda*, GIT surgeon, Kigali and others will join the discussions  
Bandwidth provided by MTL - Malawi Telecommunications Limited
- 16:55 Vote of thanks, *Ms Margaret Ngwira* UbuntuNet Alliance
- 17:00 Completion of evaluation questionnaires and end of Day 2, *Mr Memory Afonso* UbuntuNet Alliance
- 17:30 - Optional Recreational Visit to Linga Country Winery, Lilongwe
- 18:30

### 3.2. Summary of Presentations

On the first day, the workshop began with overviews of ERINA4Africa and Ubuntunet. *Mr Solomon Dindi* and *Mr Edward Kauka* gave updates on the state of MAREN and MACRA respectively. *Ms Gift Kadzamira* discussed scientific challenges facing the Southern Africa region. *Mr Anthony Muyepathe* presented e-Infrastructure applications at the Malawi College of Medicine, their challenges, opportunities and state of the art. This was followed by a brainstorming session (results presented below). The second day began with a presentation by *Dr Chrissie Kaponda* on current Health Challenges and KCN International Research Initiatives. *Dr Simon Taylor* then gave an overview of work done by the MATCH research institute at Brunel University on Simulations in Health Service Decision Support and these tools might support the creation and monitoring e-Health systems. *Mr Kondwani Wella* then discussed Content: e-Learning, Open Access and Digital Repository Initiatives in Malawi, their development and possible future. *Mr Christiaan Kuun* gave an update from South Africa on Grid Computing Applications in Health Services Delivery and an introduction to SANReN. Finally *Mr Elias Imaan* and *Mr Peleni Malange* gave overviews and updates of MTL and MALSWITCH. Overall the impression was given of e-Infrastructure systems and applications rapidly coming together.

This was followed by a pioneering three-party high-definition video-conference session. Here, for the very first time, medical experts at university hospitals in Malawi, Rwanda and Sweden discussed regional differences in treatment of portal hypertension and shared documents in real-time across continent. This gave a true demonstration of the potential of e-Infrastructures and, after two days of fascinating presentations and discussions, brought the workshop to a close.

### 3.3. Key Results

The key results of the workshop were developed during the brainstorming session. Four groups were formed and led by the following facilitators taken from the attendees. The results are presented below as answers to brainstorming questions.

1. What do you consider to be the e-Infrastructure applications that need to be developed urgently?
  - Realtime climate monitoring systems
  - Supply chain and procurement systems
  - Geographic information systems
  - Bioinformatics health systems
  - Human language technologies
  - Digitisation of local resources and distribution to local and international researchers
  - Enhancing distribution and access to lectures and learning material
  - Digitisation of personal in various fields (crime, health, insurance, etc.) and associated access to such information.
  - Climate modelling and simulations
  - Climate change applications.
  - Enhancing access to tertiary education,
  - Remote medication consultation,
  - Remote sensing,
  - Develop models and simulations,

- Health (remote consultation by medical doctors),
- Remote sensing applications to monitor environment.
- Realtime climate monitoring systems early warning/forecasting,
- Bionformation (bioinformatics),
- Web-based data collection for health.
- e-Learning (technology enhanced learning),
- e-Health (advanced technology to improve health),
- e-DRM (access to ICT for environmental disaster risk management),
- e-Inclusion & e-Accessibility (independent living, social inclusion, youth & women and the information society, etc.),
- e-Governance (Secure services to citizens & business),
- e-Agriculture.
- Central electronic medical record system,
- Digital library.

2. In your opinion what will these applications make possible? Please give up to 5 benefits that the above applications will bring to Africa.

- preparedness to disasters; better response to these natural disasters,
- economics of social empowerment,
- fundamental layer to policy making and planning,
- proactive disease control and patient management,
- seamless information communication
- if local resources are made available online it enables researchers to improve the quality of life for citizens,
- education for all can be better achieved by better dissemination,
- making more personal information available allows applications to be developed that improve our lives. Less privacy = more services, though a balance should be sought.
- improved research,
- improved sharing of information,
- improved availability of climate information that improves in decision making at different levels,
- management of weather related disasters that leads to improved social security,
- improved food security, especially in Africa that rely too much on rain-fed agriculture.
- education for all,
- easy and cheap access to health facilities,
- minimisation of time wastage,
- prevention of environment/management of resources,
- businesses will flourish
- education for all,
- access to qualified health personnel (that is cheap and affordable health services),
- better management of natural resources.
- planning/policy/decision making,
- governance,
- economic/social development,
- empowerment,
- R&D/enhance innovation.

- empowerment
- improved quality of teaching,
- informed decision making with access to real time data
- data management capabilities (e-Health),
- ICT to offer stakeholders reliable, comprehensive information to anticipate risks and to respond to emergencies (e-DRM),
- Deploy ICT solutions to be used for the monitoring, prediction, and warning of disaster in Africa (e-DRM),
- creating a comfortable, transparent and cheap interaction between governments and citizens (e-Gov),
- transfer of skills and knowledge in remote areas (e-learning).
- allow ubiquitous access of patient records,
- improve health delivery service,
- flexibility in learning,
- assist in sharing knowledge and expertise,
- improve the health of a nation hence economy growth.

3 What do you consider to be the best approaches to the realisation of the applications that you have indicated. Please give up to 5.

- strong collaboration amongst stakeholders,
- capacity building – not limited to human,
- support innovation & creativity,
- awareness creativity & sensitisation for the public (awareness -> transfer -> adoption)
- easy to use interfaces applied to all technological components,
- policy should be created that allows these resources to be made available,
- mandate to be given to institutions to go ahead with these applications. Gvt pressure to make it happen.
- good planning and management system,
- the accessibility of the platform at different levels,
- collaboration with stakeholders in order to come up with tailor-made information
- user friendly system interface,
- policy: appropriate policy to ensure equal access to education,
- making sure that each patient has equal access to medical personnel,
- political will and government support,
- demonstrate feasibility and sustainability of applications.
- user friendly system interface,
- there must be a policy that stipulates all students must have equal access to same tutorials regardless where they are.
- support from the government should be there.
- strong collaboration among various stakeholder and clear definition of requirements/output,
- foster innovation/creativity,
- empowerment,
- awareness/transfer/adoption
- stakeholder analysis,
- needs assessment,

- technical support strategy development in consultation with stakeholders and other key informants
- capacity building,
- transitional phase with a clear exit strategy if external T.A. is utilised
- stakeholders engagement from inception,
- standardised data collection and policies,
- open technology,
- political will
- capacity building - technical expertise,
- equipment,
- bandwidth,
- distributed computing,
- e-IR (institutional repository)

4. What do consider to be the most significant barriers to the realisation of the applications that you have indicated? Please give up to 5.

- lack of political and bureaucratic will; non-conducive environment,
- funding,
- lack of creativity and innovation,
- dependency on foreign technology,
- lack of first class facilities and resources (r&d centres; equipment; education)
- limited technology e.g. supercomputers and software,
- technical knowhow.
- resistance to change,
- resource development may be expensive,
- funding,
- facilities.
- ignorance on how to use the facilities of \ICT (lacking technical knowhow),
- resource electronic development costs/constraints
- dependency,
- non-conducive environments (policy/regulation),
- facilities/infrastructure,
- capacity/skills/knowledge
- availability of competent human resource for trouble shooting, training, programming, systems development,
- access to Internet, computers,
- power - ESCOM/Solar power,
- A vision/strategic direction of supportive policy environment
- political will,
- national ID not currently in use
- bandwidth,
- technical expertise,
- appropriate infrastructure

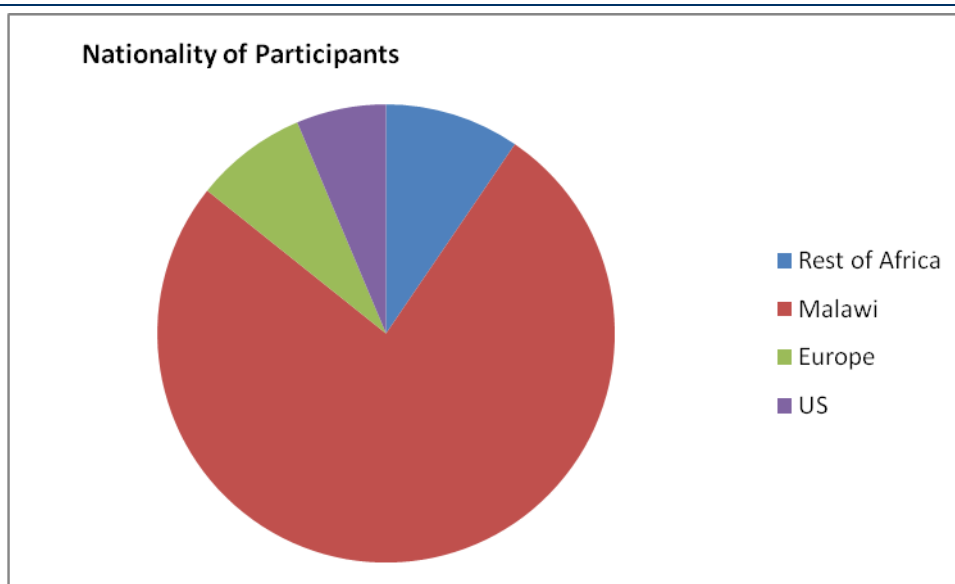
### 3.4. Workshop Attendee Information

As shown below, the workshop was attended by 48 participants from Malawi, 6 from the rest of Africa, 5 from Europe and 4 from the USA.. Professional backgrounds included Researchers, ICT Professionals, ICT Entrepreneurs, Medical specialists and health Service Deliverers, Educators, Project Managers, Civil Servants

### 3.5. Feedback Results

Overall feedback was obtained from 29 people (around a third of the attendees). 1 from Europe, 2 South Africa, 24 Sub-Saharan Africa and 2 USA. Of these 15 were Academia & Research, 6 Government & Public Administration, 4 Non-Governmental Organisation (NGO), 2 Private Commercial Organisation - Large Enterprise and 1 other (UNDP) The following table gives the overall feedback for the sessions over the two days. As can be seen, the feedback clearly indicates that attendees were highly satisfied with the workshop.

	Not interesting	Marginally interesting	No comments	Interesting	Very interesting
<i>Day 1</i>					



**Malawi Workshop Attendee Breakdown by Region**

Topic	Not interesting	Marginally interesting	No comments	Interesting	Very interesting
Introducing MAREN, the Malawi Research and Education Network	0	0	1	11	8
Role of MACRA in facilitating Utilisation of Advanced Network Resources for Research and Education	0	0	3	8	7
Scientific Challenges facing the Southern Africa Region	0	0	1	6	7

e-Infrastructure applications at Malawi College of Medicine	0	0	0	5	9
Report on ERINA4Africa Results	0	0	2	7	5
Brainstorming on e-Infrastructure Applications and Opportunities with facilitated groups	0	0	0	5	10
<b>Day 2</b>					
Health Challenges and KCN International Research Initiatives	0	0	1	8	12
Simulations in Health Service Decision Support	0	0	4	7	11
Content: e-learning, Open Access and Digital Repository Initiatives in Malawi	0	1	4	9	7
Grid Computing Applications in Health Services Delivery	0	0	2	14	5
MTL Today and Tomorrow,	0	1	0	9	12
MALSWITCH National e-Infrastructure	0	1	4	11	6
Development of possible concept notes for new e-Infrastructure FP7 projects	0	0	2	9	5
High Definition Video Conferencing with Karolinska Hospital in Sweden and King Faisal Hospital in Rwanda and Lilongwe	0	1	1	7	17
Content: e-learning, Open Access and Digital Repository Initiatives in Malawi	0	0	3	7	2

Additionally, the following comments were made on which themes of the workshop were most valuable and why.

- Report on what is practically applicable
- Group work: lots of good ideas and discussions
- Tele conferencing
- Video conferencing- sharing of knowledge
- The motivation of people towards e-infrastructure development in Malawi
- MTL today and tomorrow was quite interesting to know where MTL is now
- Internal ICT stakeholder meeting
- Video conferencing
- Brainstorming on priority applications provided different views and participation
- The emerging e-infrastructures in Malawi
- All areas were valuable
- Simulations in Health Service: decision making support
- E-infrastructure applications
- Health challenges at KCN and international collaborations paper exposed our weakness in Nursing research
- E-health simulations: good technology for Africa especially Humanlooking at the lack of resources in Africa
- Brainstorming session: gave participants opportunity to explore their potential and solutions in relation to e-infrastructures
- Simulation in health service: helps in decision making

Participants would have liked to have seen the following extra elements at the workshop.

- See a lot of participation from the policy makers in government and also movers and shakers in the ICT sector and also our partners in development
- Private-public partnerships
- Demonstrating of other live presentations just like HD video conferencing
- Stakeholder analysis
- Getting a lot of public awareness on the activities like this. Broad scope of participants
- More private sector participation
- Human language technologies as potential e-infrastructure for bridging the language barrier in Africa
- More of e-learning

When asked “Do you feel you now have a better understanding of the e-Infrastructure developments, potentials and collaboration opportunities, thanks to your participation at the workshop?” 11 responded Definitely Yes, 14 Yes, 1 No and 0 Definitely No. Similarly a strong positive reaction was given when asked “Has your participation at the workshop brought any new and relevant contacts you may wish to pursue in the future?” 10 responded Definitely Yes, 14 Yes, 1 No and 0 Definitely No.

In terms of interaction, participants interacted with others from the following sectors:

- SME 2
- Research 15
- Academic 19
- Public Administration 4
- Association - Non profit Organisation 7
- Large Enterprise 5
- European Commission 5
- Government 9
- Press and Media 0

Attendees were asked about the follow-up activities that they would pursue after the workshop. :

- Signed NDAs (Non Disclosure Agreements) 1
- Signed MoUs (Memorandum of Understanding) 7
- Joint RTD (Research & Technological Development) Projects 15
- Future joint RTD (Research & Technological Development) 14
- Proposals under FP7 (European Commission's Framework Programme 7) 8

Participants were asked about how they found out about the workshop.

- Press and Media 0
- Email invitation 10
- Erina4Africa web site 2
- Ubuntunet web site 6
- Other web site (please specify) 0
- Colleague 13
- Other (please specify) 2 Personnal Contact with Margaret

### 3.6. Workshop Summary

The recent arrivals of the submarine fibre cables SEACOM, TEAMS and EASSy to East Africa provide opportunities for enhanced harnessing of e-Infrastructure in the Sub-Saharan Africa region in a way that was not possible when VSAT was the main means of connectivity. National backbone networks and back-haul links from the landing points to landlocked countries like Malawi and Rwanda are being deployed. Last mile links to end-users are still a bottleneck but are emerging. On top of this fibre infrastructure, National Research and Education Networks (RENs) are being implemented interconnecting African Research and Higher Education Institutions to each other, to the Global Research and Education Network community, and to the Internet. The AfricaConnect initiative will contribute to the development of the RENs and associated e-Infrastructures.

The brainstorming, presentations and demonstrations of e-Infrastructures gave a clear indication of the prospects of these technologies, their impact in Africa and the exciting potential of African-European collaboration. This workshop identified a clear need for African e-Infrastructures and an emerging energised community that can pave the way for the development of these. In some ways more importantly than technology, the workshop identified that a *human infrastructure* should be developed to identify new mutual beneficial scientific collaborations. Additionally, it was identified that e-Infrastructure Lighthouse Demonstrators need to be urgently specified to act as focal points around which these new European-African research communities can be forged. Human factors work on these could begin immediately to ensure the right technology is delivered in the right way to the right people.

## 4. Workshops Report Summary

Through a combination of presentations from key influential figures in e-Health, e-Learning, e-Government and e-Science, e-Infrastructure demonstrations and brainstorming sessions that included over 100 attendees the ERINA4Africa Workshops have demonstrated a clear need for African e-Infrastructures and an emerging energised community that can pave the way for the development of these. Europe is playing a fundamental role of the realisation of these and with sustainable strategic partnerships a *human infrastructure* can be created that will led the way in new mutual beneficial scientific collaborations. e-Infrastructure Lighthouse Demonstrators need to be urgently specified to act as focal points around which these new European-African research communities can be forged. Human factors work on these could begin immediately to ensure the right technology is delivered in the right way to the right people.

## Annex 1: Attendee Lists

### A1.1 1<sup>st</sup> ERINA4Africa Workshop Attendees

Name of participant	Designation	Organisation
Michael G. Debretsion		Ethiopian ICT Development Agency
Zelalem Assefa Azene	CEO, Ethernet	Ministry of Education /EtherNet
Dr Pascal Hoba	DATAD Coordinator, AAU	Association of African Universities
Isabel Matraga		Engineering
Dr Gerald Chege	ICT Specialist, KENET	United States International University
Beatrice L.B. Ng'ambi	Accountant, UbuntuNet	UbuntuNet Alliance
Margaret E. Ngwira	Board Member	UbuntuNet Alliance
Prof. Zimani D. Kadzamira	Chair, UbuntuNet	UbuntuNet Alliance
Solomon Dindi	CEo, MAREN	MAREN
Tiwonge Msulira Banda	Member	UbuntuNet Alliance
Ludmila Maguni	CEO, MoreNet	Ministry of Science and Technology
Dr Jameson Mbale	Head, Computer Science	University of Namibia
Albert Nsengiyumva	Director	Rwanda Workforce Development Authority
Louise Karamage		Rwanda Education Commons
Dr Emile Rwamasirabo	Urological Surgeon	King Faisal Hospital
Etienne Ntagwirumugara	CEO	RwEdNet
Dr. Charles Murigande.	Minister of Education	Govt of Rwanda
Prof. Suleiman Gulaid	CTO, SomaliRen	Amoud University, Borama, Somalia
Dr Iman Abdelrahman	CEO, SUIN	IT and Networks Administration
Prof. Bjorn Pehrson	Professor	KTH Royal Institute of Technology
Dr Jabiri Kuwe Bakari	CEO, TERNET	Open University of Tanzania
Prof. John Kondoro	Chair, TERNET	Dar es Salaam Institute of Technology
Dr Francis Tusubira	CEO	UbuntuNet Alliance
Dr Nora Mulira	Head of ICT	DICTS, Makerere University
Prof. Patrick Mangheni	CEO RENU	Research and Education Network for Uganda
Simon Taylor	Reader	Brunel University
Bonny Khunga	CEO, ZAMREN	Copperbelt University

### A1.1 2<sup>nd</sup> ERINA4Africa Workshop Attendees

Name of Participant	Designation	Organisation
Mr James D Kalilangwe	Principal Secretary	Ministry of Information
Prof Zimani Kadzamira	Chair	UbuntuNet Alliance
Prof Bjorn Pehrson	Professor	KTH, Sweden
Simon Taylor	Reader	Brunel University, UK
Karine Valine	Managing Director	Sigma Orionis, eIAfrica-France
Christiaan Kuun	Project Manager	SCIR-Meraka Institute - SANREN, South Africa
Margaret E Ngwira	F&AM (Project Leader)	UbuntuNet Alliance
Tiwonge Msulira-Banda	Project Officer	UbuntuNet Alliance
Memory Afonso	ICT Intern	UbuntuNet Alliance

Beatrice Ng'ambi	Accountant	UbuntuNet Alliance
Walusungu Gondwe	Assistant Systems Engineer	Chancellor College
Dave Phiri	Senior Software Developer	Baobab
Edmond Kachale	Software Developer	Baobab
Grace Hiwa	Chief Systems Analyst	Dept of Information, Systems & Technology Mgt Services
V L F Jakobsson	Press and Information Officer	European Commission
Gift A Kadzamira	Head of Documentation & Information Services	National Commission for Science & Technology
Tupochere Mbilizi	IT Business Analyst	MALSWITCH
Pelani Malange	Applications & Projects Manager	MALSWITCH
Lucy Mtilatila	Principal Meteorologist	MET Services
Anthony Muyepa	ICT Director	College of Medicine
Isaac George Kotokwa	Acting Principal	National College in Information and Technology
Paul Lungu	Acting Executive Director	Lilongwe University for Science & Technology
Solomon Dindi	Chief Executive Officer	Malawi Research and Education Network
Mary Waswa	Facilitator	Malawi National Library Services (ELDIS)
Maxwell Phiri	President	ICT Association of Malawi
Andrew Ijambo	Project Manager	Techno Brain Ltd
Samuel Kamanga	ICT Manager	University of North Carolina Project
Edward Kauka	Technical Audit Manager	Malawi Communication Regulatory Authority
Richard Chisala	Chief Technical Officer	UltiNets
Thomas Zgambo	Managing Director	UltiNets
Demster Ngauma	Network Engineer	Sustainable Development Networking Programme
Chimwemwe Matemba	Project Manager	Privatisation Commission (RCIP)
Noel Jambo	ICT Expert	Bunda College
Dr Alice Maida	Country Director	I-TECH Malawi
Charlie Maere	IT Manager	Kamuzu College of Nursing
Uddochukwu Akunna	Master of Science student	KTH - Sweden
Sheena Jacob	Interim Nursing Director	I-TECH
Elias Iman	Chief Commercial Officer	Malawi Telecommunication Ltd
Dr Chrissie Kaponda	Associate Professor	Kamuzu College of Nursing
Dr Address Malata	College Principal	Kamuzu College of Nursing
Mike Mwambakulu	Systems Analyst	Lilongwe University for Science and Technology

Harry Chavinda	Computer Technician	Kamuzu College of Nursing
Kondwani Wella	College Librarian	Kamuzu College of Nursing
Mary Wasili	College Registrar	Kamuzu College of Nursing
Dr Alfred Maluwa	Director of Research Centre	Kamuzu College of Nursing
Thomas Bello	Assistant Librarian	Kamuzu College of Nursing
Prof Andren Sandberg	Professor of Surgery	Karolinska Hospital & KCH
Dr Rahim Ibrahim	Resident Surgeon	Kamuzu Central Hospital
Dr Perry A Jansen	Director	Partners in Hope
Dr Chifundo Kajombo	General Surgical Resident	Kamuzu Central Hospital
Dr Judith Mkwaila	General Surgical Resident	Kamuzu Central Hospital
Dr Enock K Ludzu	Resident Surgeon (Intern)	Kamuzu Central Hospital
Dr G Mulima	Surgical Resident	Kamuzu Central Hospital
Javeria Qureshi, M D	Resident Surgeon	UNC Project
Pempho Sinkanda	IT Intern	Kamuzu College of Nursing
Mr Gomegzeka Chisala	Intern Teach Project Manager	UltiNets
Annie N Msosa	Lecturer, Clinical	Kamuzu College of Nursing
Idesi Chilinda	Assistant Lecturer	Kamuzu College of Nursing
Ebony Msikawanthu	Chief ICT Officer	National Commission for Science and Technology
Manuel Zintambira	Enginner ICT Solutions	Malawi Telecommunication Ltd
Dr. Clifford Wokocho	Medical Doctor	Kamuzu Central Hospital
Hawa Ndilowe	Principal Secretary	Malawi Government