Agenda

• Introduction
• The membership and design of TERNET
• Future development plans for the physical network
• Human capacity development for the REN
• Challenges
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Population: 43 million

Demographics

- **gender**
  - Women: 51%
  - Men: 49%

- **age Structure**
  - 0-14 years: 42% (male 9,003,152/female 8,949,061)
  - 15-64 years: 55.1% (male 11,633,721/female 11,913,951)
  - 65 years and over: 2.9% (male 538,290/female 708,445) (2011 est.)

Official Languages

- Kiswahili and English

GDP growth: 6.5% (2010), 6.7% (2011 est.) – Source: IndexMundi

Economic Occupation:

- 70% of the pop work in agriculture and live in rural areas
- Exports (Tanzanite, gold, diamond, coffee, tea, cotton, sisal, wood, cashew nuts) just started to produce gas.
- Imports (consumer goods like foodstuffs, machinery and transportation equipments, industrial raw materials, and crude oil)
## EDUCAION SECTOR

<table>
<thead>
<tr>
<th>Level</th>
<th>Primary</th>
<th>Secondary</th>
<th>Teachers Training College</th>
<th>Public/Private Universities</th>
<th>Technical/Vocational Education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of Institution</strong></td>
<td>15,816</td>
<td>4,102</td>
<td>77</td>
<td>33</td>
<td>230</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical/Vocational Education</th>
<th>Agri &amp; Natural Resources</th>
<th>Business &amp; Mgmt</th>
<th>Engr &amp; Science</th>
<th>Health &amp; Allied Science</th>
<th>Planning &amp; Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of Institution</strong></td>
<td>26</td>
<td>25</td>
<td>40</td>
<td>101</td>
<td>38</td>
</tr>
</tbody>
</table>

**Source:** TCU & NACTE Website
Evenly distributed
Population but not for education
TERNET - Major Milestones

• 2000 - the need for a national ICT network of Universities and other Higher education and research institutions was realised

• January, 2002, 16 Higher Education Institutions (HEIs) signed a MoU to establish Tanzania Education Network however the process was stalled at later stages.
Major Milestones cont’d

- March, 2007 – TERNET, was formally constituted, as an autonomous body, and broadly representative of the Higher Learning Institutions (HEIs) and research organizations in Tanzania.
  - Interim Leadership
  - 21 Institutions signed MOU
  - Constitution was then drafted

- 11th April, 2008 – TERNET registered as a Trust

- 18th April, 2008 - TERNET become member of UBUNTUNET ALLIANCE
Major Milestones cont’d

- The IP address allocation requested from AfriNIC - assigned in February, 2010
  - IP block number 41.93.0.0 /17 or 128 of /24’s
  - Autonomous System Number 37182

- The **STM-1** submarine fibre circuit
  - live since **March 2011**
  - connecting **COSTECH NOC** with **Ubuntunet** in **London**
  - nominal bandwidth **155 Mbps**.

- 30th June, 2011 – Signed MoU with Internet 2
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Institutions Membership

TERNET runs its activities under the Supervision of TERNET Council which is made up of Head of the TERNET Members’ Institutions (Vice Chancellors and Principals, Provosts)

• Membership:
  – founding members who signed an MOU
  • subsequent members who join by filling an application form
  • Other members a category which includes Tanzania Commission for Universities (TCU) and National Council for Technical Education (NACTE).
  • All in all there 33 universities under TCU, 230 technical institutes under NACTE, and about 30 research institutes affiliated with COSTECH.

• Potential membership is 290 institutions.
# The Active Members

(Arranged in order of activeness)

<table>
<thead>
<tr>
<th>S/N</th>
<th>Institution Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open University of Tanzania (OUT)</td>
</tr>
<tr>
<td>2</td>
<td>Dar es salaam Institute of Technology (DIT)</td>
</tr>
<tr>
<td>3</td>
<td>Hubert Kairuki Memorial University (HKMU)</td>
</tr>
<tr>
<td>4</td>
<td>Mzumbe University (MU)</td>
</tr>
<tr>
<td>5</td>
<td>Weill Bugando University College of Health Sciences (WBUCHS)</td>
</tr>
<tr>
<td>6</td>
<td>Institute of Finance Management (IFM)</td>
</tr>
<tr>
<td>7</td>
<td>Moshi University College of Cooperatives and Business Studies (MUCCOBS)</td>
</tr>
<tr>
<td>8</td>
<td>Tumaini University Kilimanjaro Christian Medical Centre (KCMC)</td>
</tr>
<tr>
<td>9</td>
<td>College of Business Education (CBE)</td>
</tr>
<tr>
<td>10</td>
<td>Mwalimu Nyerere Memorial Academy (MNMA)</td>
</tr>
<tr>
<td>11</td>
<td>Aga Khan University Tanzania Institute of Higher Education (AKU-TIHE)</td>
</tr>
<tr>
<td>12</td>
<td>Institute of Social Work (ISW)</td>
</tr>
<tr>
<td>13</td>
<td>Institute of Accountancy Arusha (IAA)</td>
</tr>
<tr>
<td>14</td>
<td>University of Dodoma (UDOM)</td>
</tr>
<tr>
<td>15</td>
<td>National Institute of Transport (NIT)</td>
</tr>
<tr>
<td>16</td>
<td>Dar es Salaam University College of Education (DUCE)</td>
</tr>
<tr>
<td>17</td>
<td>Ardhi University (ARU)</td>
</tr>
<tr>
<td>18</td>
<td>State University of Zanzibar (SUZA)</td>
</tr>
<tr>
<td>19</td>
<td>Tumaini University Dar es Salaam (TUDARCO)</td>
</tr>
<tr>
<td>20</td>
<td>Mwenge University College of Education (MWUCE)</td>
</tr>
</tbody>
</table>

14 – Public and 6 are Private
Current Membership

• 47 TERNET members
• Of which 20 are active members
Connected Institutions

• Four institutions connected -
  - Tanzania Commission for Science and Technology (COSTECH)
  - College of Business Education
  - Open University of Tanzania.
  - Hubert Kairuki Memorial University
  - Ministry of Education and Vocational Training

• Several other institutions at various connecting stages to the NOC -
  - Dar es salaam Institute of Technology
  - Aga Khan University
  - National Institute of Transportation
  - Ifakara Health Institute
  - Mzumbe University (Upanga)
  - Institute of Finance Management
  - Ardhi University
TERNET Connectivity Today

BGP PEERING over STM-1(155Mbps) link

Cisco 3800 router
Tanzania Commission for Science and Technology (COSTECH)

Leased fibre link provisioned for 10Mbps

Cisco 2800 router
The Open University of Tanzania

Cisco 2800 router
The Hubert Kairuki Memorial University

Gigabit Ethernet via UTP link provisioned for 40Mbps

Leased fibre link provisioned for 10Mbps

Cisco 7609 TERNET core router

Leased Wireless link provisioned for 10Mbps

Leased Wireless link provisioned for 10Mbps

Sonicwall router
The Ministry of Education and Vocational Training

COSTECH

TERNET switch
Major challenges – last miles connectivity, awareness
Working on adding value at the NOC (-Sharing of Educational and Research Resources –
-Easy checking in Plagiarism within local Unive and later globally
Shared e-resources, e-journals etc..
Utilisation of Super computers
- Quality of research – currently journals are local to the institutions!

NATIONAL COUNCIL FOR TECHNICAL EDUCATION (NACTE)
1. DAR-ES-SALAAM INSTITUTE OF TECHNOLOGY (CENTRE FOR HIGH PERFORMANCE COMPUTING–SUPER COMPUTER)
2. COLLEGE OF BUSINESS EDUCATION

UNIVERSITIES AND COLLEGES(TCU)
1. SOKOINE UNIVERSITY OF AGRICULTURE
2. UNIVERSITY OF DAR ES SALAAM
3. OPEN UNIVERSITY OF TANZANIA
4. MZUMBE UNIVERSITY
5. HUBERT KAIRUKI MEMORIAL UNIV

MEDICINE AND PUBLIC HEALTH
1. MUHIMBILI UNIVERSITY FOR HEALTH AND ALLIED SCIENCES
2. NATIONAL INSTITUTE

AGRICULTURE AND LIVESTOCK INSTITUTIONS
1. AGRICULTURE RESEARCH INSTITUTE
2. IFAKARA MIKOCHEMI AGRICULTURE RESEARCH INSTITUTE

INDUSTRY AND ENERGY INSTITUTIONS
1. TANZANIA INDUSTRIAL RESEARCH AND DEVELOPMENT ORGANIZATION(TIRDO)
2. TANZANIA BUREAU OF STANDARDS

NATURAL RESOURCES INSTITUTIONS
1. TANZANIA FISHERIES RESEARCH INSTITUTE
2. TANZANIA FORESTRY RESEARCH INSTITUTE

TANZANIA EDUCATION AND RESEARCH NETWORK DRAWING MEMBERS FROM TCU, NACTE, AND COSTECH AFFILIATED INSTITUTIONS
Peering relationships

• A peering relationship is being setup with KENET of Kenya and Heanet the Irish NREN.

• Areas of cooperation are being identified and do include NOC operations and capacity building.
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Future development plans for the physical network

• Immediate plans –
  – connect institutions to the NOC at COSTECH
  – a mix of fibre and wireless local loops
  – Up to 1Gbps (vs 2 to 5 Mbps wireless)

• Long-term plan –
  – Utilize national ICT backbone to connect institutions – local and other regions

• Points of Presence (PoPs) -
  – Dodoma, Mwanza, and Arusha
  – linked back to the NOC at COSTECH via the NICTBB.
UbuntuNet's Current Operations:

- **20Gbps; inc. a 10Gbps POP link**
- **155Mbps**
- **760 Mbps**

UbuntuNet, London:
- **UbuntuNet, Johannesburg**
- **TENET/SANReN**
- **Géant**
- **TERNET**
- **KENET**
- **Swaziland**
- **Botswana**
- **Lesotho**
- **MoRENet**
- **Namibia**
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Capacity Development

• Through training workshops. Have attended routing workshops
  ▪ Ubuntunet 2009 conference, Kampala
  ▪ Ubuntunet 2010 Johannesburg,
  ▪ AfNOG 2011 in Dar es Salaam.
  ▪ Cisco workshop in March 2011 for IT managers of member institutions.

• Continually conduct training workshops to develop capacity within the REN secretariat and at the institution’s level.
  – Discussion with Cisco on the Second round training is ongoing
  – Discussions have started with the IBM and Google as well

• Number of ICT skills Professional Programmes is on the rise in some institutions – OUT has just started to roll out Cisco academies in its 6 centres
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• Infrastructure: High installation and recurring costs for middle and last mile loop – Some world Bank initiatives exist but have taken very long time

• HR:
  – Low level of ICT skills among the ICT staff at the institutions level – requires more training, more skilled engineers at the NOC during the take off
  – Secretariat: Is manly on volunteering – There is only one full time (one year contract) staff – Network engineer
  – Visiting staff/students from other advanced NRENs may help to address this problem

• The NOC
  – requires updated equipment: servers DNS, Mail, HTTP, monitoring workstation MRTG, and Bandwidth manager
  – Developing applications – add value of the NOC–making it a place where institutions connected can immediately benefit from

• Serious shortage of power and its backup: The battery inverter was providing 2 hours backup time. Now it is completely down.