Bandwidth Connectivity and Management

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Why Connectivity?

- Internet Connectivity critical for African Universities to enable them to participate effectively in the global knowledge society
- Connectivity is essential for:
  - Communication
  - Research and Collaboration
  - Course and content delivery
  - Academic management of courses
  - Access to educational resources
Connectivity Challenges

- Unreliable and Expensive
- The limited connectivity available is poorly managed
  - Few African Universities have a policy for managing limited bandwidth effectively
- Few satellite ‘footprints’ cover the whole of Africa
- Limited fiber access (currently)
- Typical University has 64 Kbps leased line at average of $1,000 per month or $15 per kbps per month
- Almost never dedicated
- Average cost for African Universities - about $10 per kbps
Connectivity Solutions

- With World Bank support AVU started ATICS initiative
- Survey of 83 universities across Africa (to date)
- Database of African Universities and ICT and connectivity information www.atics.info

- Partnership for Higher Education in Africa contracted the AVU to figure out how to acquire and benefit from lower bandwidth costs
- AVU given mandate by participating universities to negotiate for and obtain lower pricing
In search of Connectivity Solutions

- **African Virtual University** commissioned independent consultants (2002 and 2003) to:
  - Determine feasibility of KU-band or C-Band VSAT systems and low cost VSAT installations
  - Review satellite coverage over Africa
  - Review technology options
  - Determine feasibility of AVU developing its own hub, location and cost
  - Undertake bandwidth and hardware cost survey
  - Undertake licensing regime survey
  - Design and optimize VSAT network
Key Findings

- VSAT was only viable solution short to medium term
- C-Band more feasible than Ku Band
  - Higher availability, larger single beam coverage, less affected by ‘rain shadow’
- C-Band capacity is limited
  - Upfront reservation/ commitment may be required
- Significant costs reduction realized only when full transponder loading achieved
  - Under $3 per kbps for ~100 MBPS
  - Longer commitment terms (over 5 years) can reduce costs
Key Findings

- African Universities (and institutions generally) have poor reputations for payment
  - Providers likely to demand large guarantees
- Fiber very expensive
  - Costs over $4 per kbps without landing fees
- VSAT licensing can be an impediment due to regulatory issues in some countries
  - Lobby governments
- Issues of sustainability critical
  - Develop clear business plans, bandwidth management policies and practices
Bandwidth Consortium

- Consolidating (aggregating) bandwidth needs can achieve economies of scale
- greater bargaining leverage
- command volume discounts
### Bandwidth Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>1997-2001</td>
<td>$20 Kbps</td>
</tr>
<tr>
<td>2002</td>
<td>$13 Kbps</td>
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<tr>
<td>2003</td>
<td>$8.90 Kbps</td>
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<tr>
<td>2004</td>
<td>$5.0 Kbps</td>
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<tr>
<td>2004</td>
<td>$4.2 Kbps</td>
</tr>
<tr>
<td>2005</td>
<td>$2.33 Kbps</td>
</tr>
<tr>
<td>Future</td>
<td>$1.00 Kbps or less</td>
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Challenges of the VSAT network

- Cost of the service & Non-Payment of recurring charges by universities
- VSAT Licensing regimes
- Setup of the Local Area Networks (LAN)
- Equipment costs
- Lack of technical expertise (installation and maintenance)
- Poor bandwidth management and optimisation
Bandwidth Management: some suggestions from INASP for University Managers

- Effective Bandwidth Management requires:
  - Leadership and Strategic Direction
  - Supportive policy environment
  - Accountability

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Bandwidth Management requires Leadership and Strategic Direction

- How does bandwidth connectivity help the university to achieve strategic aims and objectives?
- What implications are there for policy, resources and priorities within the university?
- How can the strategy be developed and implemented?
- How can consensus be achieved and resources mobilised?
- Acknowledging that changing working patterns may be unpopular

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Bandwidth Management requires a supportive Policy Environment

- Policy is an enabling element of higher education management
- Some things are denied in order to make other things possible
- Without policy it is impossible to manage key aspects of bandwidth use
- Policies will need to restrict how bandwidth is used (and such restrictions are unlikely to be popular if managed badly)
- Policy development must be consultative, supported and led from the top

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Bandwidth Management requires Accountability

- Successful implementation of bandwidth strategy can only be achieved by ensuring accountability:
  - Within the IT department
  - Within the user community
  - Within the executive management

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INASP recommendations for senior management

- Make bandwidth management a priority
- Ensure safe Internet access
- Respond to demands
- Encourage positive behaviour from users
- Monitor the IT team
- Give everyone an identity (user monitoring)
- Evaluate connection options regularly
- Join forces (collaboration with other institutions)

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Bandwidth Management: some suggestions from INASP for ICT staff

- effective monitoring of network traffic and usage
- network control, firewalls, good security and anti-virus practices
- institutional Email services to remove the use of bandwidth-hungry free webmail services
- content caching and filtering
- authentication of users and usage to provide a policy enactment environment
- network traffic shaping and optimisation
- efficient scheduling of downloads
- network design and re-design to maximise bandwidth management and optimisation

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Xamul aay na, laajtewul ko raw

Not to know is bad. Not to wish to know is worse

Igbo Proverb
Thank You

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