
Bandwidth management and optimization

in research and education institutions in low bandwidth environments

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The bandwidth challenge

- Available bandwidth is limited and insufficient to meet demand
- Existing capacity is usually running at maximum capacity
 - As a result it is often unusable
 - Universal flat lining during working hours
- The cost of bandwidth is extremely high
- Expanding bandwidth capacity is limited due to finances, supply, technology


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What does this mean?

- The university is not participating in the digital information revolution
 - The university is not providing its staff, researchers and students with the information they require
 - Existing digital library resources are under-utilised, further investment in digital library technology is unrewarding (high cost/low use)
 - Lack of access to up-to-date, local, regional and global research information = restricted research potential
- Low level of return on investment
 - High network costs (c.\$5000+ per month)
 - Low level of use (page downloads taking >10 minutes)
- Low incentive to invest more within the university infrastructure
 - Poor ICT investment (including staff, training, etc.)
 - More computers / same bandwidth = slower access / less research


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Detail of the challenge

- Bandwidth is a resource that is...
 - Limited, in high demand, expensive, of high value
- Existing bandwidth is often not managed
- 59% of institutions do not monitor or manage bandwidth at all
- Further examination of the data indicates that this figure is in fact much higher
 - See the ATICS Report: www.atics.info for full details of the situation in African universities


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Possible solutions?


- Do nothing !
 - often the reality but not the answer
- More bandwidth and lower cost
 - Local, national and international consortia
- Better management of the existing resource
 - Improved access, no additional bandwidth costs
- Combined approach (low cost + management)
 - Half price + double usable speed = quadruple access
 - Increased long-term sustainability

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ATICS: “Improving bandwidth management is probably the easiest way for universities to improve the quantity and quality of their bandwidth for educational purposes.”

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Bandwidth management

1. **Monitoring** and **management** of available resource
 2. **Optimisation** of the resource to ensure value for money and fitness of purpose
- Three key groups to ensure success:
 - Executive management
 - Senior implementation management
 - Technical staff involved in the day-to-day implementation

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Executive management roles in bandwidth management

- Leadership
 - Authority behind a decision or action is essential
- Supportive policy environment
 - Any developments must be sponsored and advocated
- Strategic direction
 - Bandwidth management needs to be integrated within the university policy

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Leadership and strategic direction

- How does bandwidth connectivity help to achieve strategic aims and objectives?
- What implications are there for policy, resources and priorities within the institution?
- How can the strategy be realised by actions and results?
- How can consensus be achieved and mobilised?
 - Changing working patterns may be unpopular

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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 is unlikely to be popular if managed badly)
- Policy development must be consultative, supported and led from the top

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Leadership and 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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Resourcing

- Bandwidth management is a strategic priority
 - no institution of higher education can deliver on its mission without good connectivity
- Resources need to be identified to ensure successful implementation of bandwidth management
- Consider no expansion of connectivity until current resource is well managed

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The IT department as a resource

- The IT department must be adequately equipped and managed
 - appropriate IT governance
 - appropriate alignment of IT operations with institutional objectives
 - appropriate resourcing of IT staff and operations
 - appropriate benchmarking and explanation of bandwidth use

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Recommendations for senior management

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

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Management seminars, training support and information resources to support bandwidth management capacity development

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What is available?

- Information briefing packs targeted at senior institutional managers and ICT professionals.
- Policy development workshops and training materials to support the development of supportive policy environments.
- Network traffic monitoring and analysis workshops, training materials and software tools.
- Community portal for resource distribution and online information exchange.
- Network control and network traffic shaping workshops, training materials and software tools.
- Content caching and filtering and authentication workshops, training materials and software tools.
- Standalone training and documentation resources in bandwidth-friendly Email service provision and scheduled download strategies and techniques.

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When and where?

- Seminars and training will be run at national and local level in:
 - Ethiopia, Ghana, Kenya, Malawi, South Africa, Tanzania, Uganda, Zambia, Zimbabwe
- Regional events for francophone Africa:
 - Rwanda, Senegal, Cote d'Ivoire, Congo and at least one other country
- Timetable
 - Pilot workshops October 2005, further workshops after this every 1-3 months

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Institutions and NRENs getting involved

- NRENs (where they exist) could host a regional, national or local seminar or workshop events
- Institutional representatives participating in the seminars or training workshops
- Providing additional support to extend the programme beyond the current funding boundaries
- NRENs would seem ideal holders and facilitators of this information
- Technical partners involved in software tool development

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Further information ...

- More information on the Bandwidth Management and Optimisation programme can be found in:

- *Optimising Internet Bandwidth in Developing Country Higher Education*

In print and also online: <http://www.inasp.info/pubs> in English, French or Spanish

- <http://www.inasp.info/training/bandwidth/>

More information about the entire support programme, workshops, resources and publications

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Thank you

Further information on bandwidth management and optimisation:

<http://www.inasp.info/bandwidth/>

The bandwidth management and optimisation programme is supported by:

VLLR: This programme is undertaken as the "Optimization of the use and management of bandwidth at university level" undertaken with financial support from the Flemish Interuniversity Council.

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