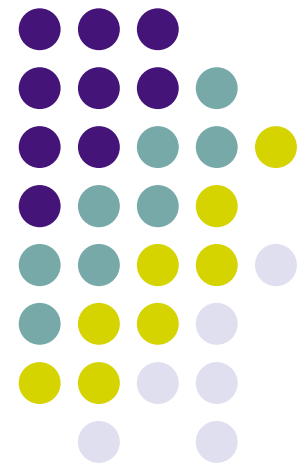


KENET

Kenya Education Network

Kenya's National Research
and Education Network



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<http://www.kenet.or.ke>

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What is KENET?

- Not for profit organisation currently providing Internet services to 42 higher education institutions
- Education Network to inter connect educational institutions and research centres in Kenya
- Has evolved to provide technical support to the member institutions
- Provides Internet services to member institutions
- Provides trainings to improve capacity levels of member institutions so that they can make more effective use of ICT in teaching, learning, research and management

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How KENET was formed...

KENET USAID Grant and Govt Support

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- \$1.1 million USAID grant in 1999
 - Invested in Telkom Kenya (now Orange) digital leased line network to interconnect universities
 - Last mile digital radios for six strategic Universities:
(Daystar, JKUAT, Moi, Baraton, ANU, Maseno)
- Equipment was transferred to Telkom Kenya to pay for bandwidth services
 - Most of it used to operate KENET up to 2006
- CCK support of Ksh 3 million (Approx \$38,000) per year from 2002-2005.
- All licenses granted free of charge

KENET Financial Support by Founder Institutions

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- University of Nairobi hosts KENET secretariat and data center at the Jomo Kenyatta Memorial Library
 - Donated services of CEO V. Kyalo from 2001-2007
- Moi University (Eldoret), Egerton (Nakuru) host the VSAT equipment
- USIU has donated CEO from 2007 to present.
- Founder institutions can contribute finances in case of need e.g.,
 - Moi University committed to pay salary of administrator
 - JKUAT committed to pay salary of accountant
- Other grants by RockeFeller and Ford Foundation to purchase equipment in later years



Governance and Operations

- Kenya Education Network Trust (KENET)
 - Trustees -
5
V
Cs, MD of Orange, DG of CCK (regulator), PS, Education
 - Management Board representing Trustee VCs and research institutions
(ICT directors or senior ICT faculty)
 - Secretariat with a CEO “donated” by a member university (USIU)
- Licensed as Alternative Networks Operator by CCK
 - All license fees waived by the regulator since inception
 - International gateway license
- Provides Internet services in partnership with commercial operators
- 4

KENET Secretariat and NoC

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- Five IT professionals permanent staff
 - 2 to 3 IT Interns at any one time from member universities
- One accountant and one administrator
- One CEO
donated by USIU, one of the founding members (IT faculty member)
- Physically hosted by the University of Nairobi in the Jomo Kenyatta Memorial Library
- Will be growing to number at least 7 full time technical staff by end of 2009
- One NoC in Nairobi
- All services running on open source
- Cisco

What KENET offers to members

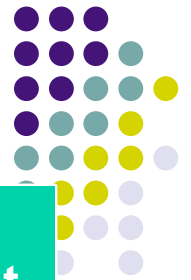
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- Bandwidth services
 - Access to Telkom Internet services at 50% of commercial rates
 - Intelsat bandwidth through the Bandwidth Consortium that was originally part of African Virtual University (contract ends on October 31, 2008)
 - Now KTCIP Bandwidth Negotiated price
- Services – mail hosting, backup, web hosting, setting up of custom servers, DNS Record hosting, monitoring for all connected hosts
- Server co-location
- Technical training of member technical staff
 - Bandwidth management training
- Network support and design

KENET Membership

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Institution type	No.	Membership status	Student enrollment
Public Universities	7	Full members and active	110,000
Private Universities	10	Full and active members	20,000
Polytechnic University Colleges	2	Full and active members	15,000
Non-Degree Tertiary Colleges	6	Full and active members	15,000
National and International research institutions	4	Full and active members	-
Inactive full members	10	Full members but inactive	
Potential members	16	Friends of KENET	
Total	55	KENET consortium Members	About 200,000

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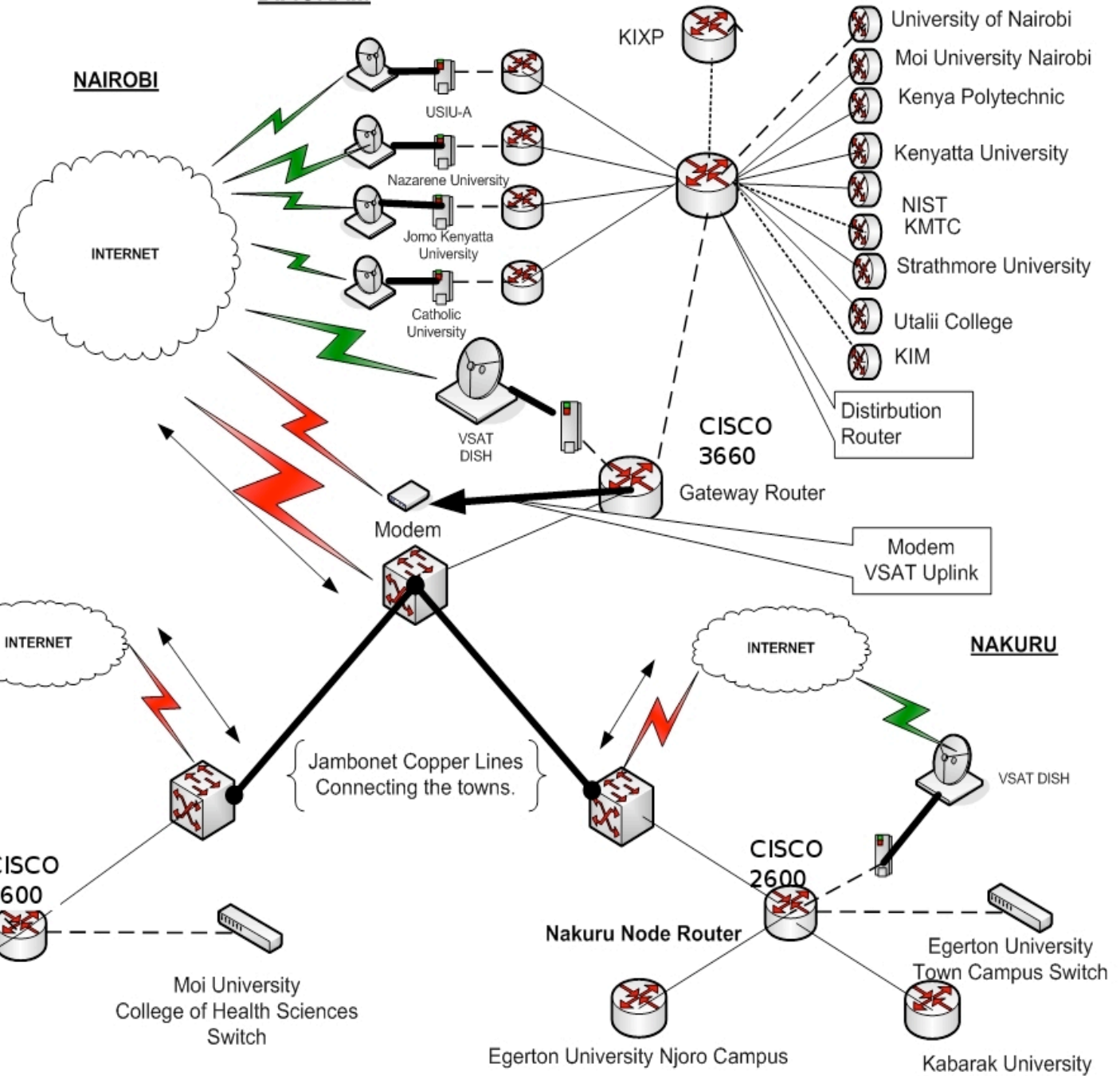
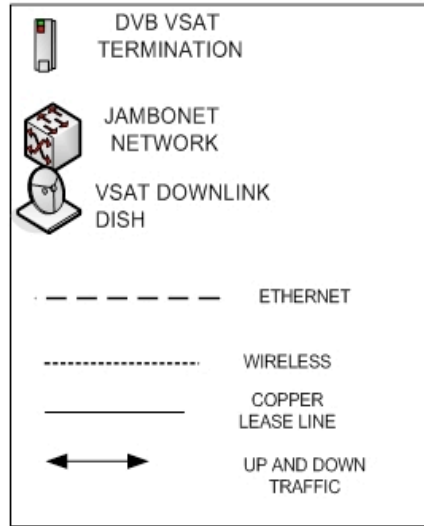
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Old Infrastructure

- International Satellite bandwidth
 - Access via local leased lines connected directly to Jambonet (Internet services operator)
 - In some case DVB satellite with uplink via KENET POPs or Jambonet POPs
- Distribution Infrastructure uses local leased lines
 - No control – network is owned by the Telkom and they offer no SLA
- Wireline access link to Kenya Internet Exchange Point (KIXP) at 18Mbps
- Last mile for 4 member institutions via digital microwave radio installed in Telkom network in year 2002
 - Moi, JKUAT, ANU, Baraton,
- Three PoPs with VSAT nodes in Nairobi, Nakuru, Eldoret

KENET NETWORK DIAGRAM



New infrastructure - KTCIP Project

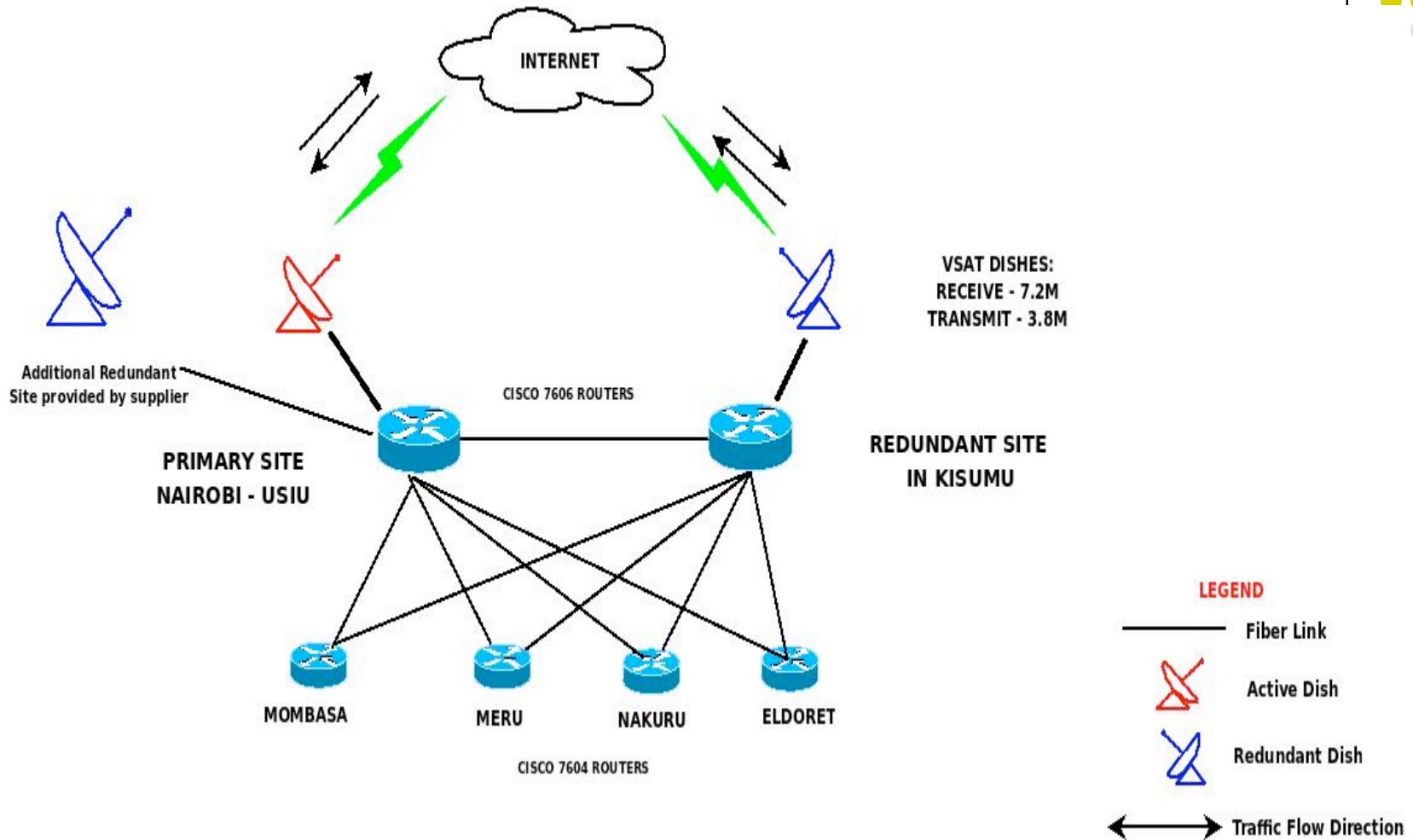
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- Kenya Transparency & Communications Infrastructure Project
- Project to improve bandwidth access for Higher Education Institutions in Kenya
- Will upgrade Number of POPs to six across Kenya
- Increase total bandwidth to 214.552 Mbps
- Install a main Data Center in Nairobi to provide top IT services
- All POPs will be ready to receive Fiber when Kenya's fiber network will be complete
- Lines will be leased but provider will be tied to hard SLA
- Currently ongoing with 15 of 61 institutions connected and 119Mbps of of the 214Mbps allocated



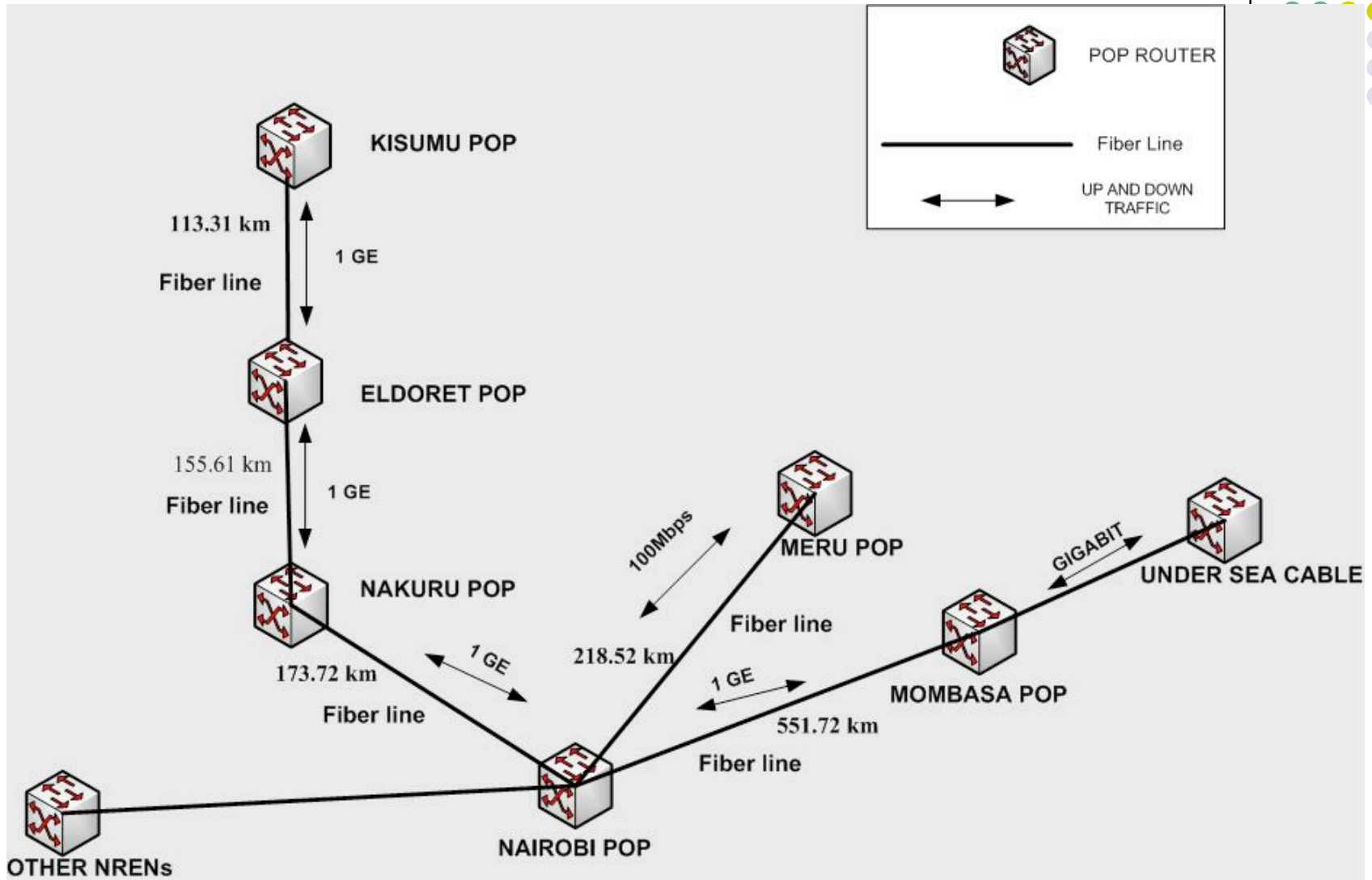
New network design



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What about Undersea Fiber?



What is the Internet used for mainly?

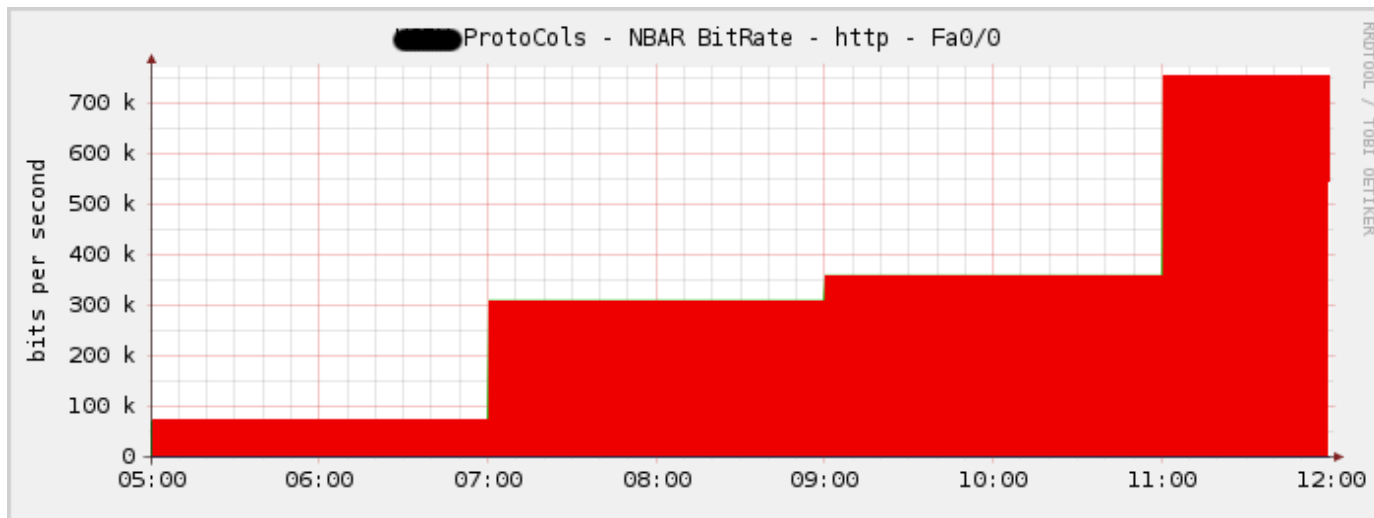
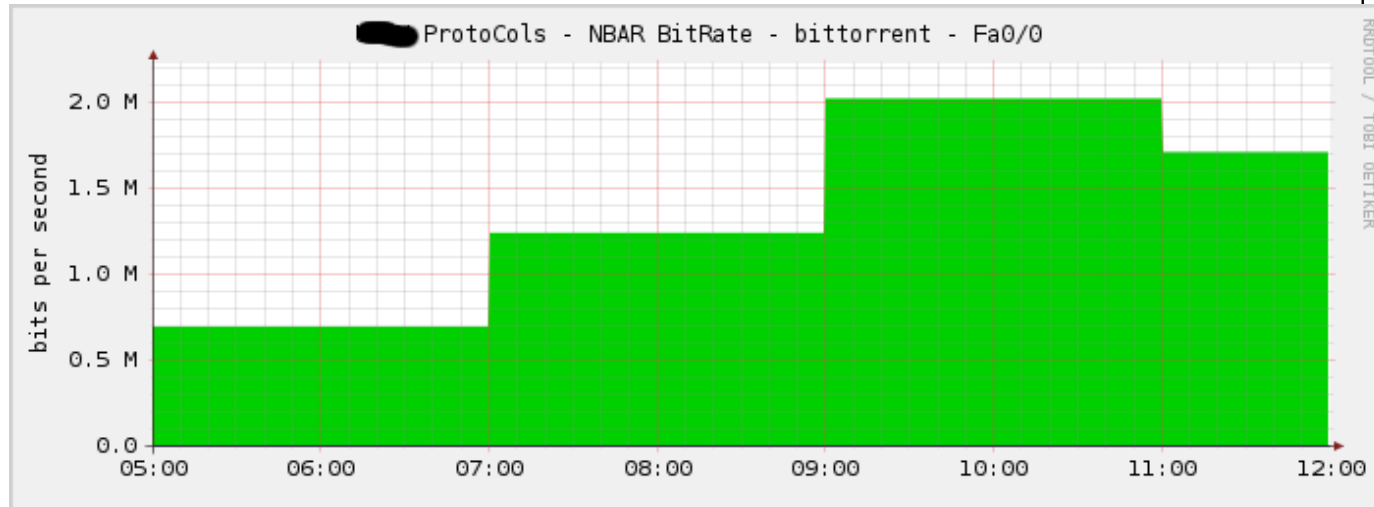
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- Most of the time for browsing purposes - over 90% of the traffic is HTTP
- Most networks are not well designed eg – a network of over 400PCs may not have a download server for their antivirus so all PCs get the downloads together meaning number 1 website will be an anti-virus vendor. We are in the process of doing a training and developing a Bandwidth Management and Optimisation Box with help of – Aptivate, INASP, ISOC and others to alleviate this
- P2P also a factor – Bittorrent, Edonkey etc are used by students/staff to get media sometimes resulting in clogged network.
- Social sites – Facebook and others rank very high
- Google also one of the top sites
- More accurate info will be collected as the new project roles out

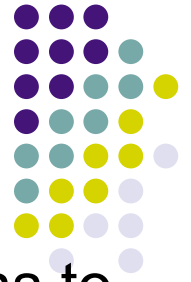
Bandwidth Management sometimes a big challenge!

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Challenges faced over the years?

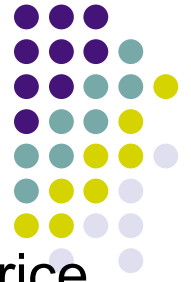
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- Lack of policy both at KENET and at member institutions to govern ICT
- Lack of own infrastructure hence relying on other providers
- Lack of qualified/skilled technical staff at several member institutions
- High cost of bandwidth and bandwidth mis-management
- In 2005-2006, complaints were made to KENET concerning poor service. The already low capacity bandwidth were unusable for most institutions due to clogged networks (case studies at <http://bwmo.net>)
- Poor penetration in terms of reach to the students, poor PC to student ratios
- ICT budgets at some Universities are constrained hence not able to purchase servers, wireless equipment etc

Challenges as KENET evolves...

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- Stiff competition from ISPs – some ISPs now know the price of the Undersea fiber bandwidth and are making offers
- Fiber infrastructure in the country is not as far reaching yet and we will not be able to reach all our Universities
- Abuse of bandwidth still occurs
- Most institutions not up to scratch in terms of network management and security resulting in blacklisting of IPs, viruses, spam, clogged links. Deploying IPv6 may be a challenge due to lack of skills in Network Management
- Sustainability in the evolving market – KENET will need to venture into offering more solutions like VOIP, Video Conferencing etc made possible by Undersea fiber in order to generate income. We do not have experience/skill in this yet.

Challenges as KENET evolves cont'd



- High level routing, peering still a grey area as well as managing a fiber infrastructure serving more than 60 institutions which is part of the future plans of KENET
- Developing local content – enabling lecturers to be fully web based eg hosting lectures/lessons online. Allowing students freedom to develop and test applications
- Deploying large scale services like Mail Scrubbing, Caching, Co-location to KENET Members
- Collaborating with Universities and NRENs abroad with research data and know how to improve access to information. (example: <http://tusk.kenet.or.ke/>)



Possible solutions?

- Trainings – from experienced NRENs and Universities will help bring up the level of competency in the institutions. Fiber commissioning in June 2009 might move KENET from 215Mbps to 1Gpbs. Most members are not ready for the dangers that come with high speed Internet connections. Also, most members including KENET itself not fully prepared for IPv6 as yet
- Policy formulation – most members do not have AUPs and are not knowledgeable on how to formulate them. Formulation of policies could help alleviate problems in the Universities
- Local content development – most students research what is available from abroad as there is very little local content. KENET is assisting in deploying some E-Learning platforms like Moodle to improve local content

KENET in 5 years?

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- Looking to own the last mile fiber to the Universities and managing it.
- Provide top level Internet services: Caching, Web hosting, Mail scrubbing etc
- Peering with neighboring NRENs and those abroad
- Assisting the developing NRENs in the region
- Improved reach of Internet and ICT to students
- Hosting relevant local content and research information
- Hosting carrier class NoCs

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Thank you!

<http://www.kenet.or.ke>

Questions?