

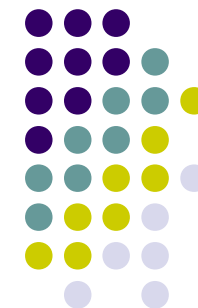
# KENET

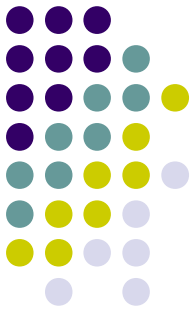
Kenya Education Network

**National Research and Education Network for Kenya**

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# KENYA EDUCATION NETWORK INSTITUTIONAL COVERAGE MAP



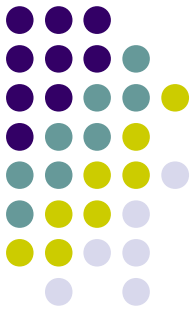


# Governance and Operations

- Kenya Education Network Trust (KENET)
  - Trustees - 5 VCs, MD of Telkom Kenya, DG of CCK, PS, Education institutions
  - 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
- 42 member institutions; 130,000 students + 17,000 staff members

# KENET Secretariat

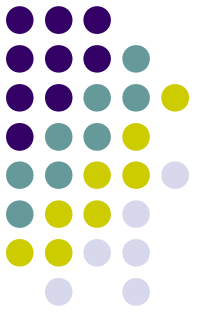
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- 8 IT professionals permanent staff
  - 2 to 3 IT Interns at any one time from member universities
- One accountant and one administrator
- One CEO
- Physically hosted by the University of Nairobi in the Jomo Kenyatta Memorial Library
- Moving to USIU

# What KENET offers to members

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- Bandwidth services
  - At negotiated prices
- 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



# Current KENET NoC

- One NoC in Nairobi
- All services running on open source
- Cisco routers used for routing, BGP sessions with both uplink providers
- Colocates some elearning servers





# KENET NoC cont'd

- Hosting the mirror.ac.ke which contains FOSS software available for free download
- Recognised by OpenOffice.org as the mirror for Kenya
- Provides link to KIXP to improve access to local sites (18 Mb/s)
- This link to KIXP also provides access to Google Apps Gmail accounts for Universities
- Web hosting and Email hosting for several Universities and institutions



# KENET Early Network

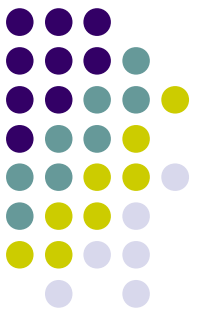




# Old Infrastructure

- 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 used local leased lines
  - No control – network owned by the Telcom and they offer no SLA
- KIXP and some campuses connected using wireless links
  - Not viable for far away institutions
- 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

# Previous Bandwidth capacity at KENET



- Uplink - 1Mb via Intelsat and 3Mb via Jambonet (Local Telco)
- Downlink – 3Mb via Jambonet and 1.8Mb via Intelsat burstible to 2.4Mb
- Larger Universities have their own VSAT downlinks via Intelsat
- 7Mb downlink shared from Intelsat to different geographic locations – Nairobi, Eldoret, Nakuru
- Those outside Nairobi uplink via Jambonet
- The dedicated Intelsat bandwidth is 5.7Mb and the rest is a shared burst

# Old Bandwidth Costs at KENET

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- VSAT – Intelsat Bandwidth costs about \$1 for 2.3Kbps or \$2,330 for 1Mb/s
- Commercial rate for that would be \$3,000 for 1Mb/s
- Lease line via Jambonet– Approximately \$6 per kilobit or \$1 for 170bits
- Negotiated from commercial rate of \$12
- Not 1:1 !
- Bandwidth savings all gained by member institutions

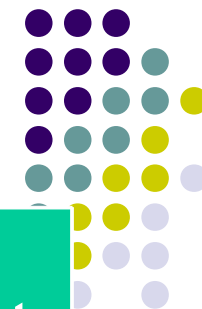


# Early problems at KENET

- 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 technical staff at several member institutions
- High cost of bandwidth and bandwidth mis-management
- As a result of lack of trained staff some networks were/are poorly set up eg no proxy server for 20+ machines and IP addresses sometimes get black listed for spamming, viruses
- 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
- Check out case study solutions at: <http://wiki.bwmo.net>

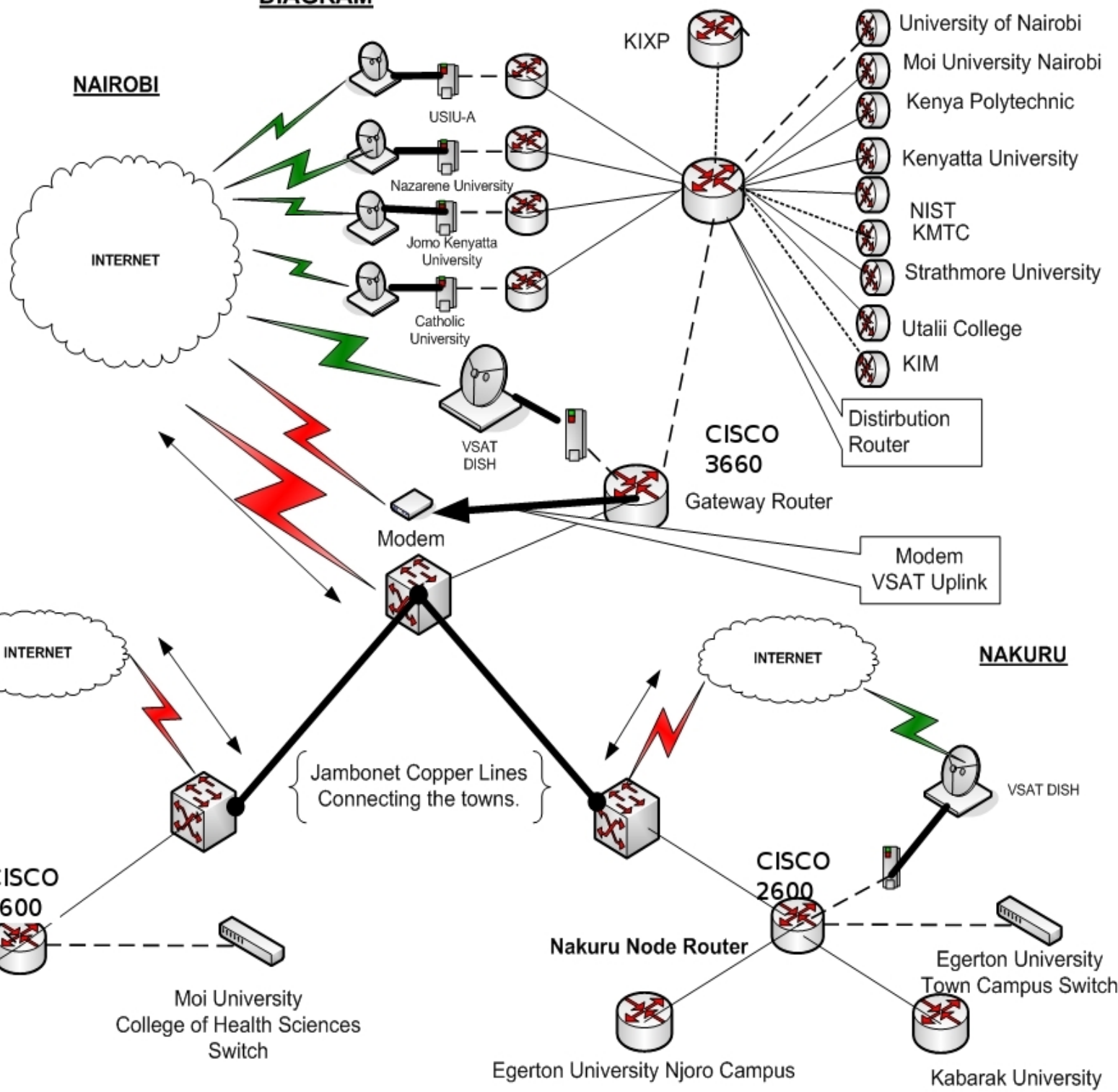
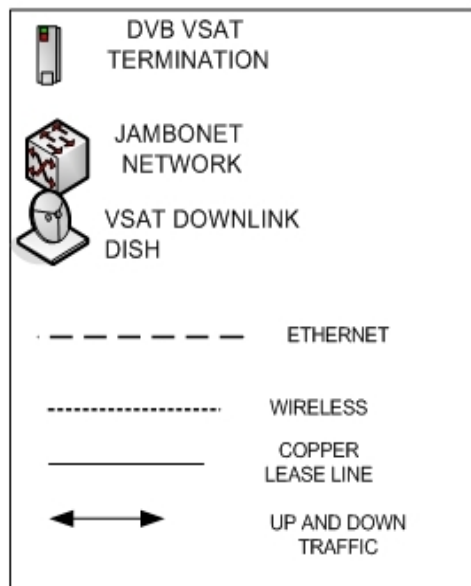
# KENET Membership

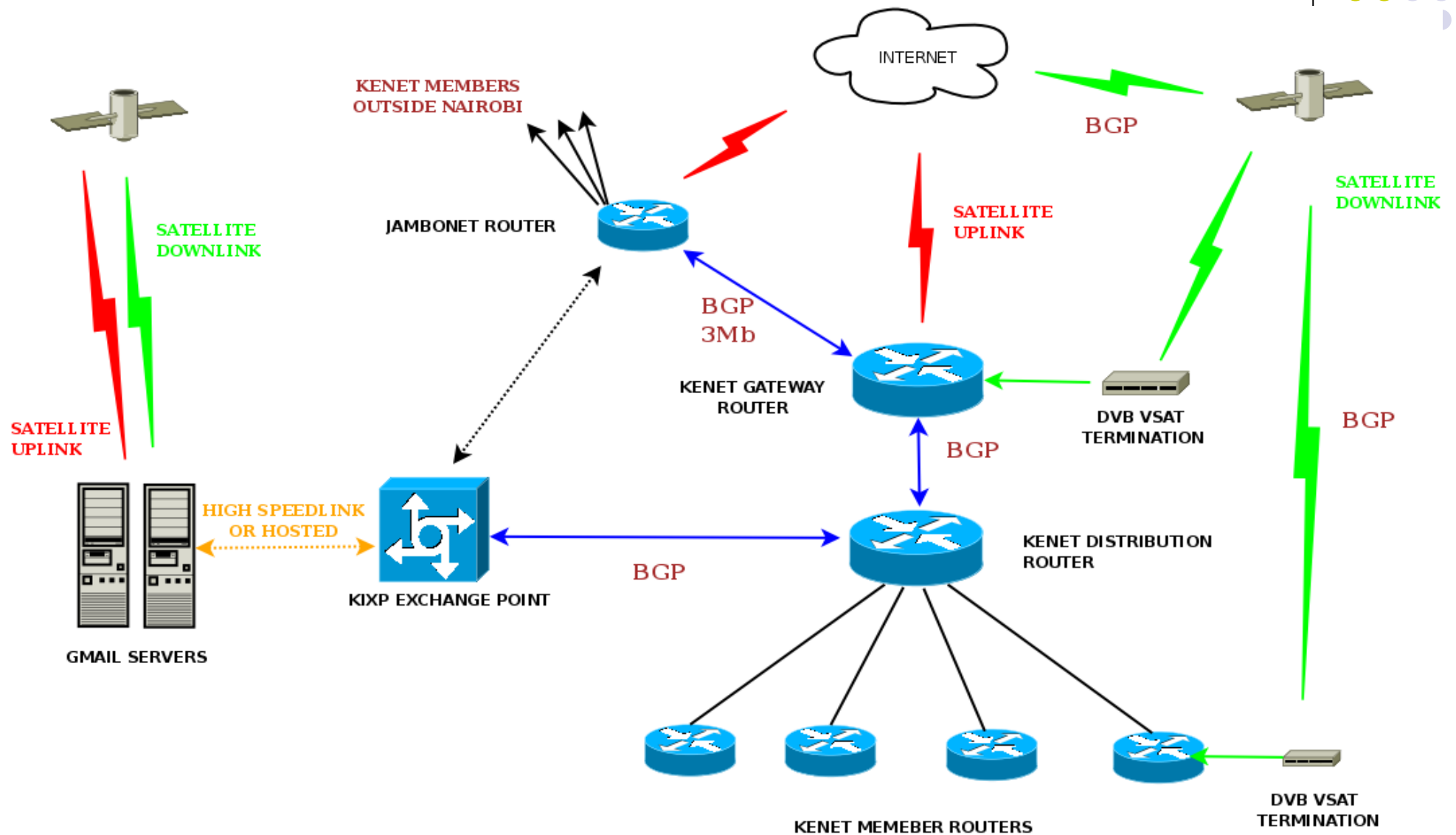
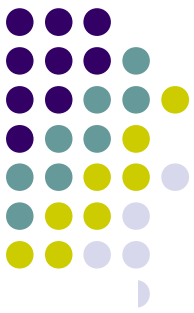
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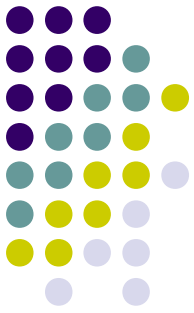


Institution type	No.	Membership status	Student enrollment
Public Universities	7	Full members and active	110,000
Private Universities	10	Full and active members	20,000
Polytechnic University Colleges	2	Full and active members	15,000
Non-Degree Tertiary Colleges	6	Full and active members	15,000
National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

# KENET NETWORK DIAGRAM





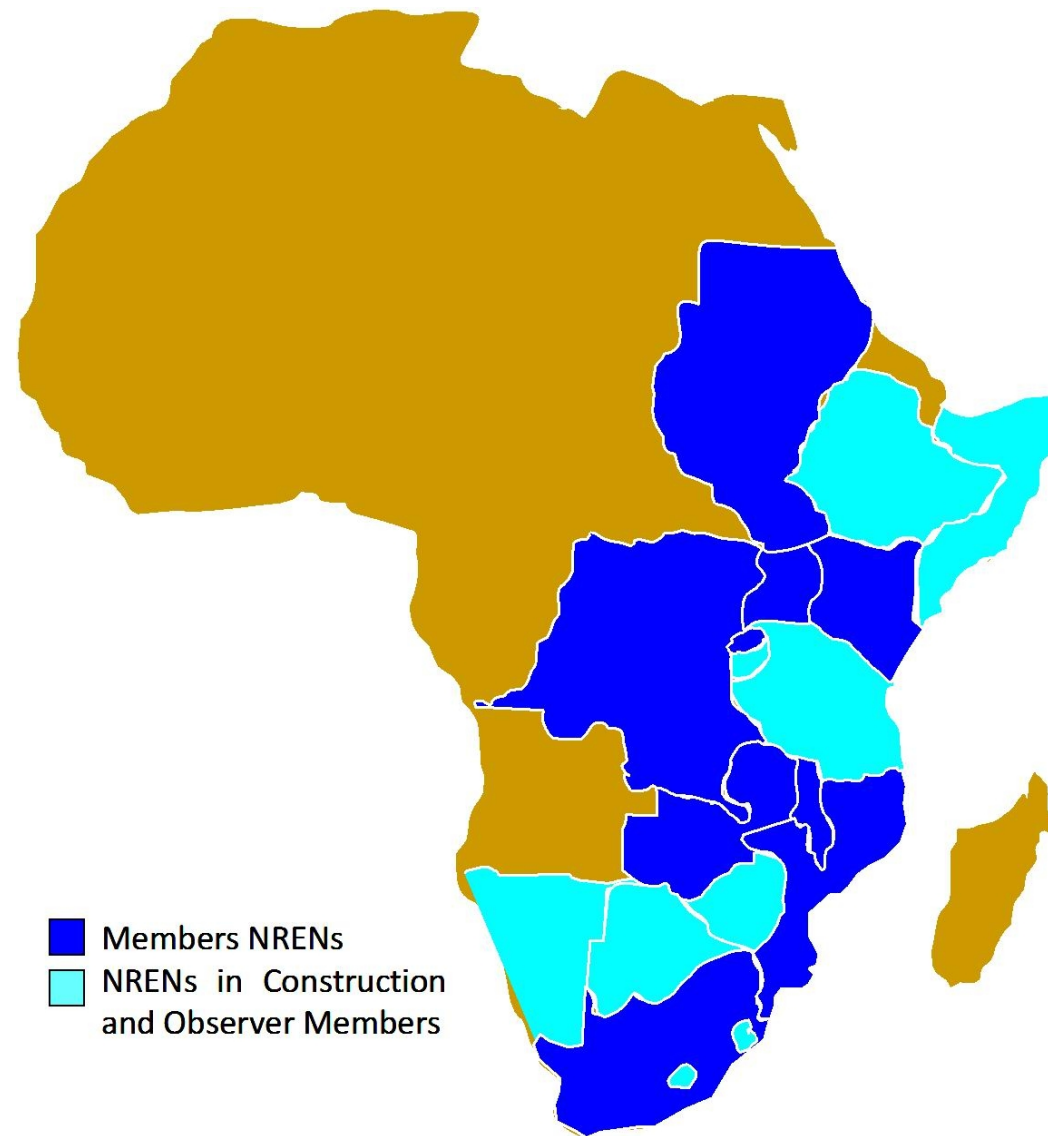
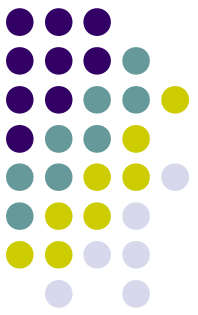


# Value Proposition of KENET

- Cheap Bandwidth and leased lines?
  - 1:1 ratio, best price
  - Consortium power in bandwidth and computer purchases?
- Provide gateways and connections to other RENs and partnerships
  - Autonomous System Number as an NREN, IP address block, routing and layer 3 services ; Google partnership, Ubuntunet Alliance etc

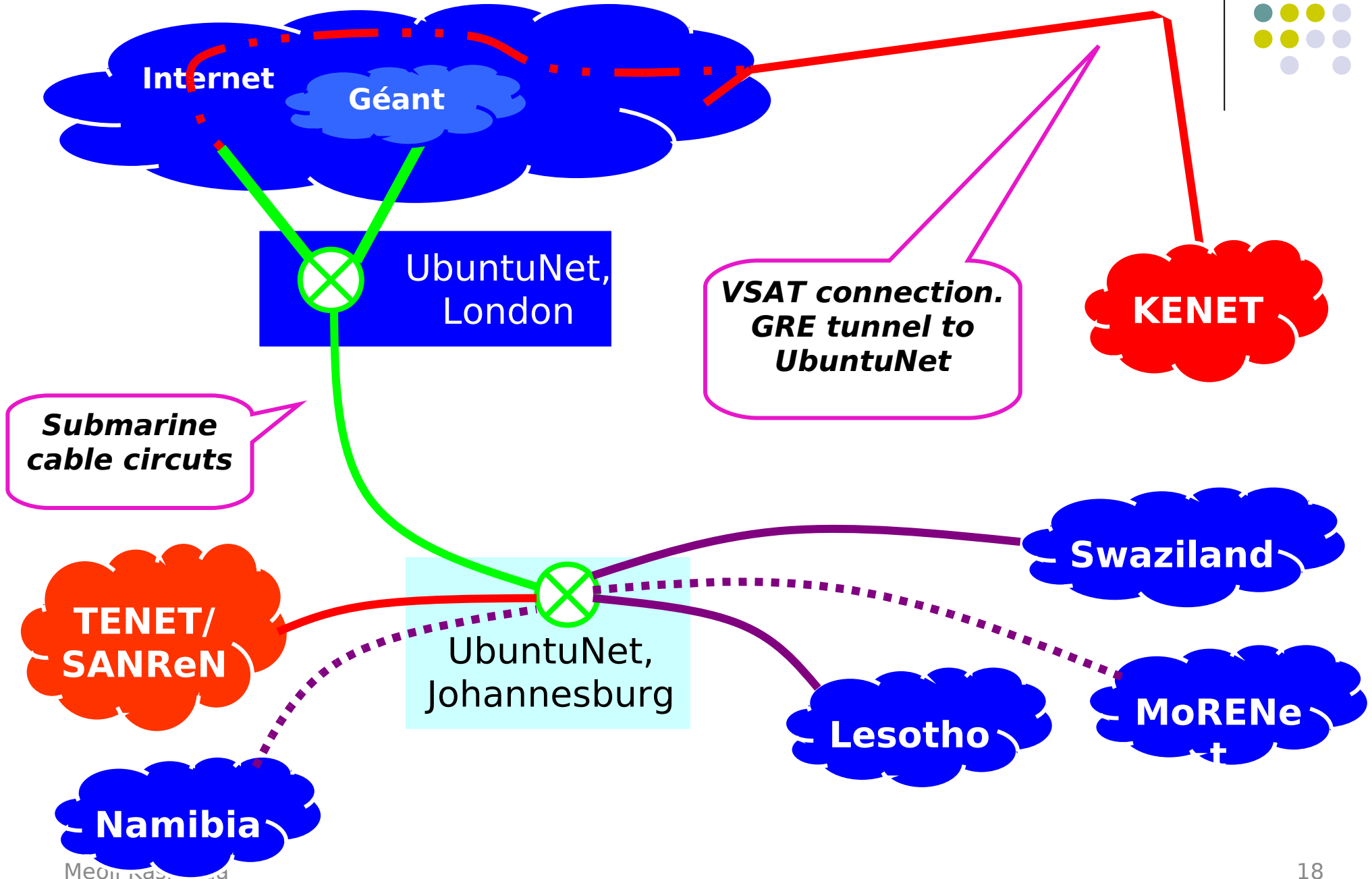
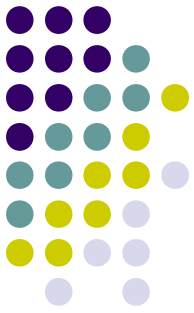


# UbuntuNet Alliance – A regional REN



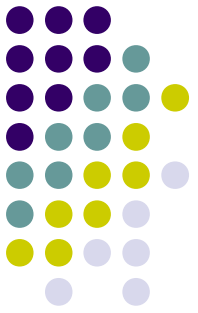
# Example: UbuntuNet today

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# KTCIP Project

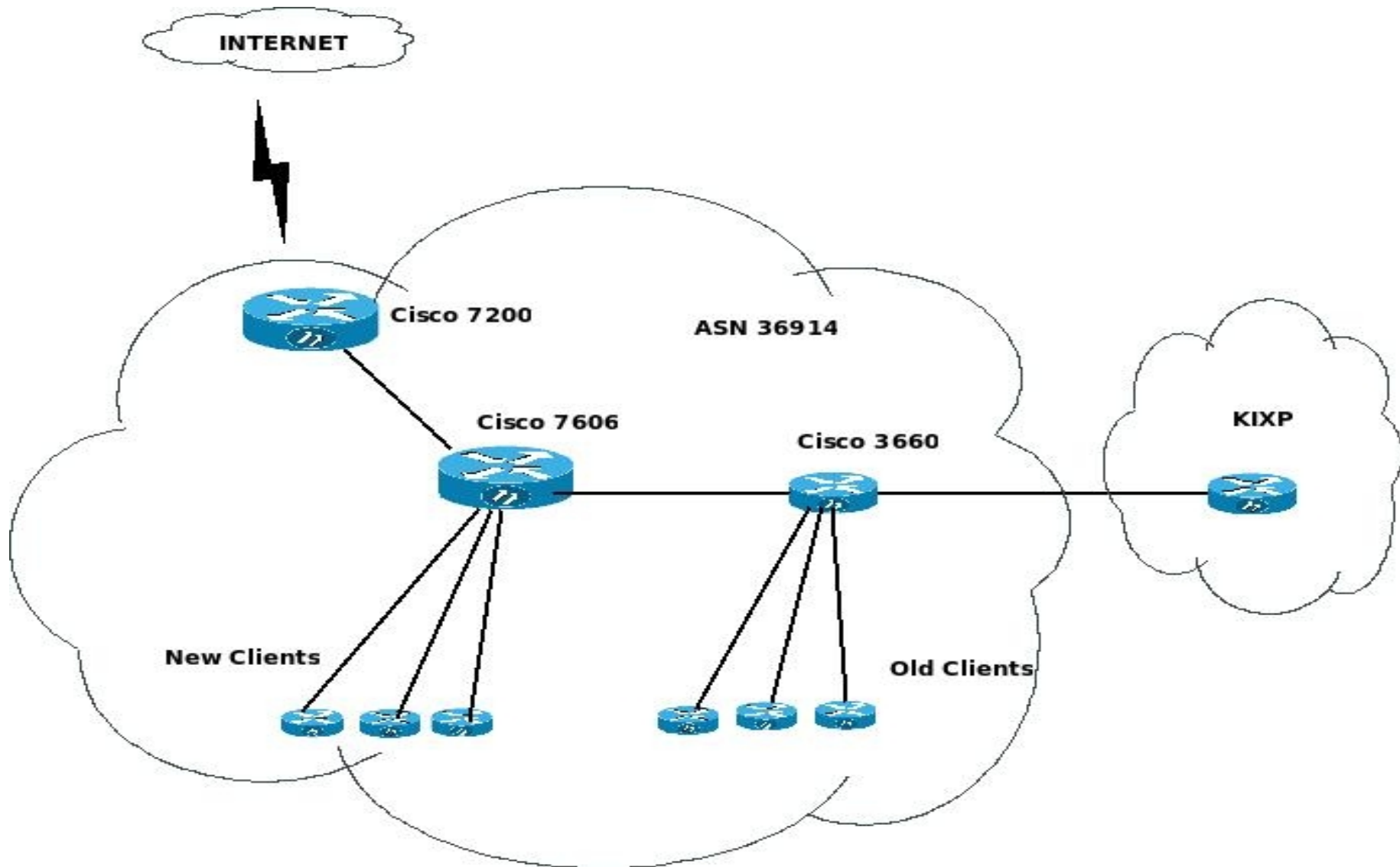
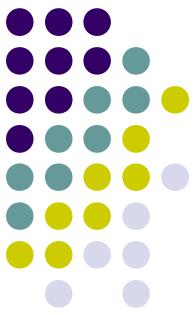
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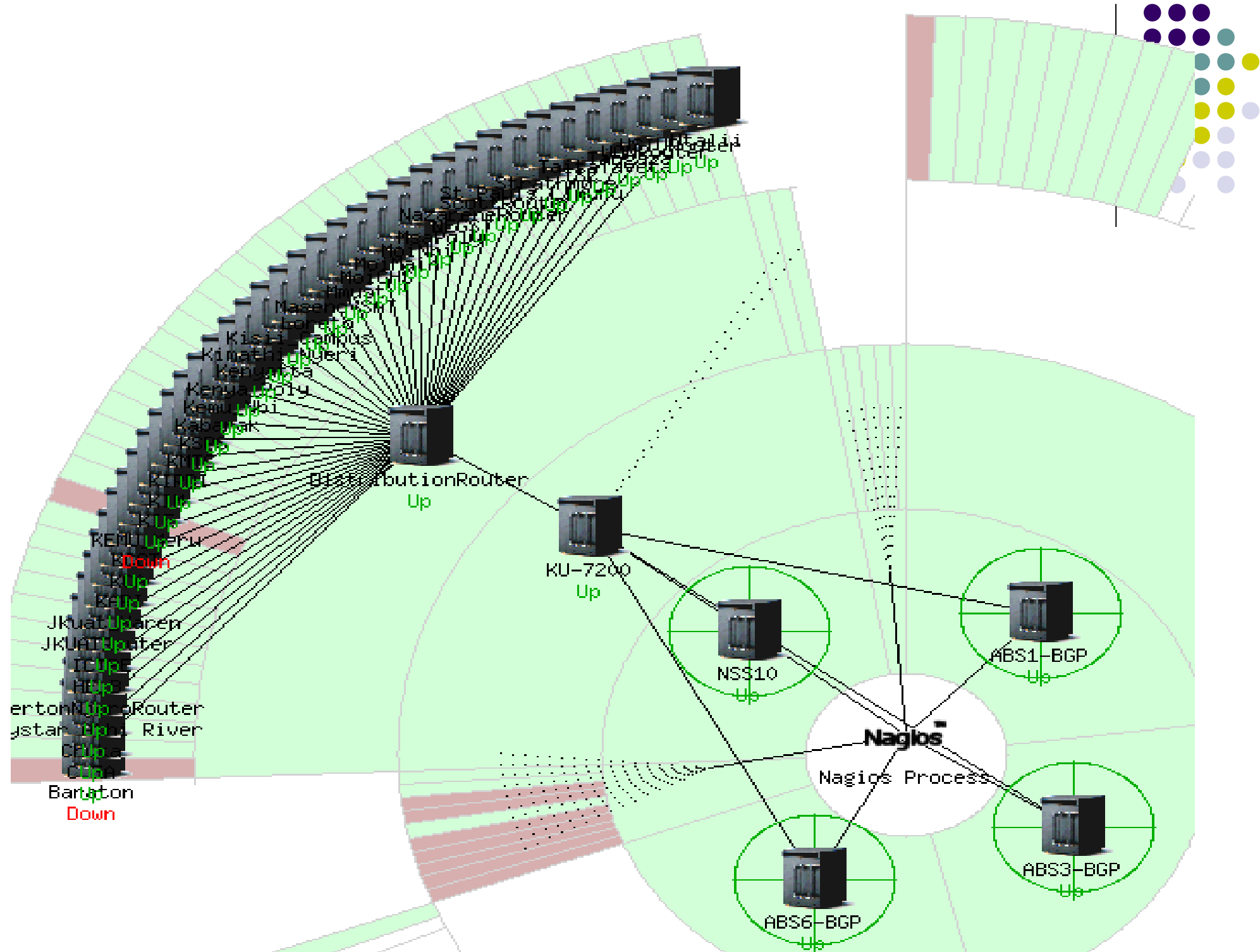


- Project to improve bandwidth access for Higher Education Institutions in Kenya
- Will upgrade Number of POPs to six across Kenya
- Increase total bandwidth to 200Mbps
- Improve local infrastructure to leased fiber to at least half of 62 participating institutions
- Improve all POPs to high standards
- 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

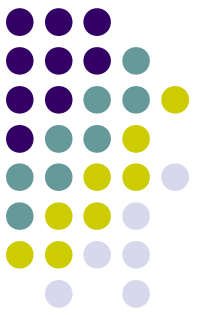
# The project so far.....

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# Changes?



- Need to change the IGP and improve the BGP
- Talk to the Universities and get help them organise their networks, some still have daisy chains
- Talk to the Layer 1 provider, current fiber is dropping packets, jitter. Might not be well done
- Get STP running on the switches



# Thank you!

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

## Questions, Comments...