

Supporting Resilient Off-Campus Access in a Disrupted Environment

KENET 20-year History!

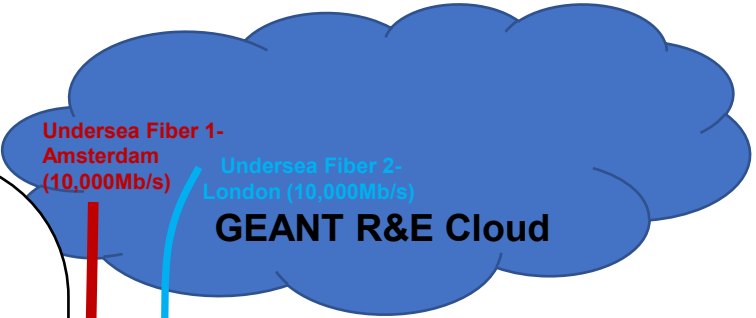
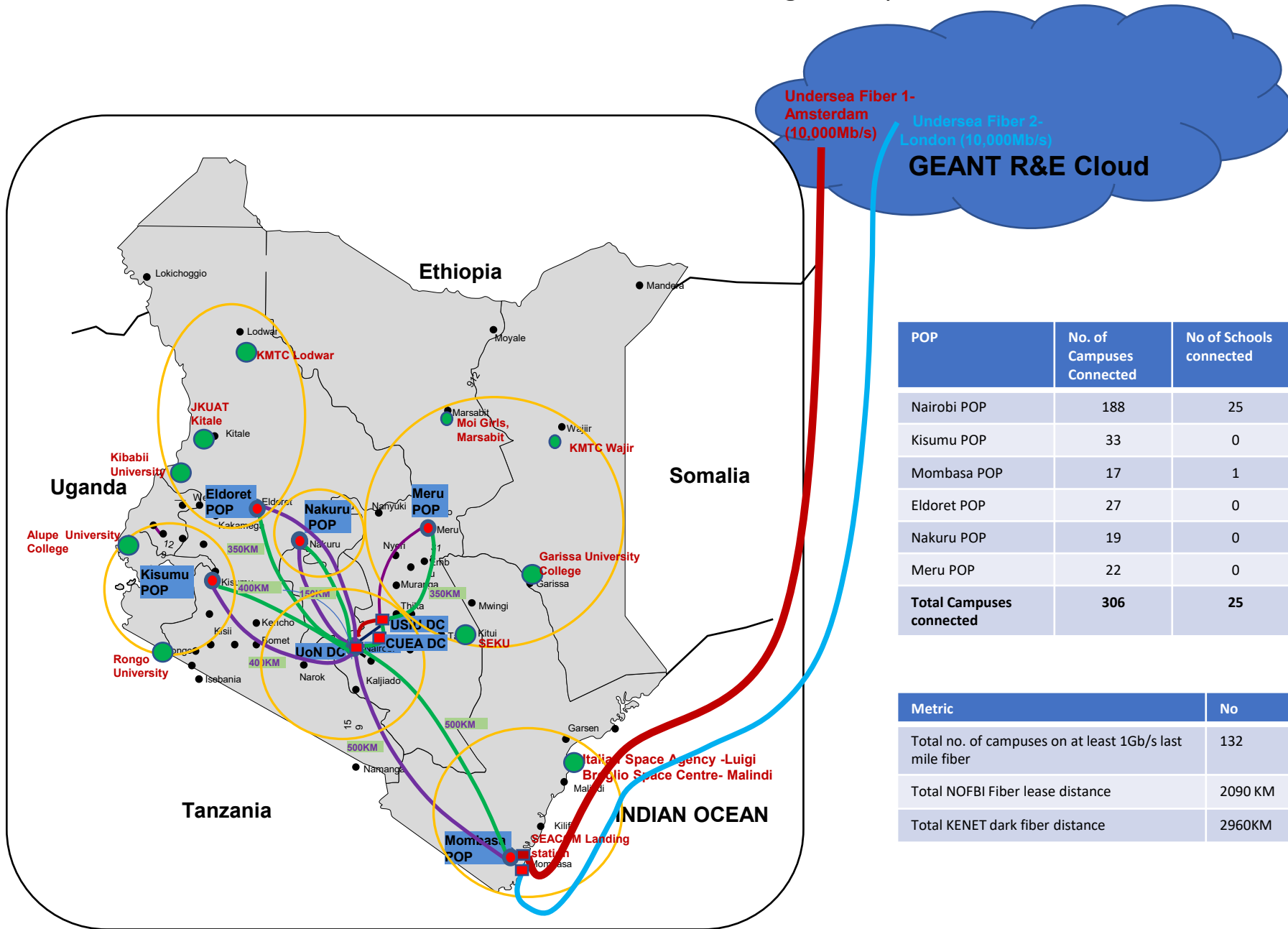
- KENET Trust constituted in November 2000 by five founder universities
 - Daystar, JKUAT, Moi, UoN and USIU
- Key objects in 2000 – **affordable high-speed** (broadband Internet) to support teaching, learning and research and administrative efficiency.
- Currently 9 Trustees – 6 VCs, CEO of KMFRI, PS TVETs, and Private sector rep
- KENET was
 - **Licensed by CA** in 2002 as operator of national broadband network operator for educational and research institution and affiliated institutions ONLY
 - Has received infrastructure and research grants from USAID (2001), Rockefeller and Ford Foundations (2005 – 2010), and GoK (2008-2013)

Motivation for Building **Broadband Network for R & E**

African / Kenyan scientists are collaborating with rest of the world

- KENET has been building a fiber-based broadband research & education of Kenya since 2008
- KENET broadband target = 1 Gb/s or more last mile connectivity to each university or research institution
- **Connected 135 of the 306 campuses with last mile fiber**
 - ***All university main campuses on 1 Gb/s or 10 Gb/s last mile fiber***
- Many university and research institutions campuses in **isolated** or rural areas of Kenya
 - Developing fiber is expensive!
- *KENET connects the Kenyan research & education community to the global R & E world through UbuntuNet and GEANT in Europe.*

KENET National Broadband Network Coverage – July 2020



POP	No. of Campuses Connected	No of Schools connected
Nairobi POP	188	25
Kisumu POP	33	0
Mombasa POP	17	1
Eldoret POP	27	0
Nakuru POP	19	0
Meru POP	22	0
Total Campuses connected	306	25

Metric	No
Total no. of campuses on at least 1Gb/s last mile fiber	132
Total NOFBI Fiber lease distance	2090 KM
Total KENET dark fiber distance	2960KM

Pre-COVID-19 Setup

- **Lecture Halls Scheduling**
 - Scheduling of face-to-face classes
 - Students physically attending classes
- **Campus-based Connectivity**
 - Planned upgrades of Campus WiFi networks
 - Students required basic devices for connectivity access
- **Practical Courses/STEM Courses**
 - Based on physical labs for engineering, physics, chemistry, medicine, etc
 - Lab manuals based on physical equipment at the lab
- **Library**
 - Majority of students accustomed to borrowing of printed media
- **Examination**
 - Students sat for physically proctored examination at designated exam rooms

Pre-COVID-19 – KENET Catalytic Projects

Remote teaching pilot projects

- **Motivation** – multi-campus teaching by one faculty member
- **What was involved** –
 - equipped seven classrooms with remote teaching equipment @ US\$ 15k per class
 - Customized e-learning platform for each university (Moodle) to support remote teaching (blended learning)
- **Setup KENET remote teaching platform** – classroom and laptop-based
 - *Open source KENET web conferencing platform*
- Faculty and instruction design training and support
- **3 universities participated** – CUEA, Daystar, UoN

Networked Learning Readiness Indicators

- Preferred learning mode – **blended learning** (75% of the students sampled)
 - *Least popular according to students – 100% online learning!*
- **About 48% students owned laptops** – that means that over 300,000 students did not have a laptop
- **90% of students lived off-campus**
 - Many needed access to cyber café for off-campus Internet + computers
- **Campus WiFi coverage limited** and often did not include campus student hostels
- Most universities had a **basic LMS hosted** in their server rooms, but uptake was low for most courses
- **Remote teaching using a web-conferencing platform** was not common except for a few universities with int'l collaborations (e.g., Google Meet or KENET BBB)

Requirements Since March 2020

- **Online Lectures**
 - Online learning platforms
 - Reliable devices for both students and faculty
 - Students attending classes online
- **Off-Campus Connectivity**
 - Student & staff requiring connectivity from anywhere
 - Some students relocated to very remote areas
 - Cost of connectivity in remote areas expensive
 - Reliable devices for use with off-campus connectivity
- **Practical Courses/STEM Courses**
 - No access to physical labs
 - Exploration of virtualized labs to meet learning outcomes
- **Library**
 - Extend the catalogue of online resources
 - Access the online library from anywhere
- **Examination**
 - Examinations conducted online
 - Proctoring Conducted online
 - Need for reliable devices and connectivity by students

KENET response to COVID-19

- **Implementation of Remote Helpdesk & Call Handling**
 - Restricted movement in the first few weeks of reported cases
 - Implemented immediately to allow all incoming calls & enquiries to be handled from anywhere
 - All KENET operations continued uninterrupted (run remotely, from home/anywhere)
- **Negotiation of discounted data bundles**
 - Based on 500,000 university students' projection
 - KES 500 per 10 GB, normal is KES 1,500 (Safaricom)
- **Implemented KENET Private APN (3G/4G LTE)**
 - Sponsored discounted bundles service for lecturers
 - 5,000 FREE sponsored 30GB monthly TKL bundles for faculty and staff
- **Facilitated whitelisting of educational resources & mobile numbers**
 - URLs and Mobile numbers for discounted bundles
- **Introduced new eduVPN service**
 - For secure remote access to Internet (leveraging on existing identity databases of users)

KENET response to COVID-19 (cont)

- **Extended 50% discount on quarterly Internet bills with effect from April 2020**
 - *Allowed KENET to sustain infrastructure*
- **Monthly webinars with ICT directors** – sharing stories of successes and challenges
- Developed **community guidelines** for remote teaching and e-learning
 - This allows universities to specify upgrades or requests for LMS hosting
- **Monthly webinars with VCs since April 2020** with panelists sharing their experiences with remote teaching & e-learning
- Upgraded or hosted many new university LMSes (24 universities)
- **Trained faculty on cybersecurity awareness and use of Moodle.**

KENET remote teaching and learning platform – some usage statistics (**locally hosted**)

Month	Meetings	Participants	Comments
April	1,768	5,760	Administrative and faculty training
May	5,177	55,083	Admin + online classes
June	9,374	138,485	Mainly classes –
July	12,578	190,522	Mainly classes
August	11,618	170,874	Reduced number of classes
September	16,679	322,144	New semester; many admin meetings
October	14,737	406,193	More classes, fewer admin meetings

KENET remote teaching and learning platform – some usage statistics (locally hosted)

Meeting room statistics

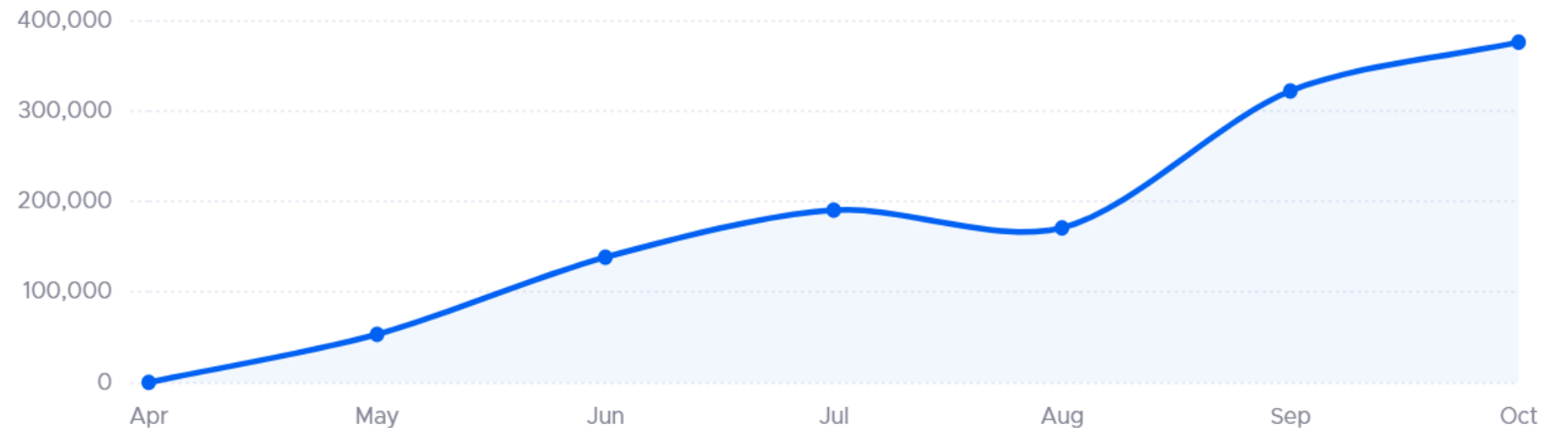
Find more meeting room data in the meetings list

Continue

Total meetings

72954

Meeting participants monthly trend



Meetings monthly trend

Key Barriers to Online Learning

- **Limited student laptop ownership**
 - Student laptop ownership community program shall address this problem
- **Lack of affordable home Internet bandwidth outside home fiber coverage areas**
 - Mobile 3G or 4G bundles inappropriate for online learning even with discounts
- **New off-campus community broadband solutions required**
 - *KENET exploring ways to extend campus broadband Internet to neighboring student hostels and homes (with student authentication).*

Ongoing Community Working Group Projects

- **Working Group on Student Laptop Ownership**
 - *Aims to form Student Laptop Ownership Program to drive prices!*
 - *Target - \$300 to \$400 per university student laptop*
- **Working Group on remote exams proctoring**
 - Promote affordable remote proctoring solutions
 - KENET has customized a low-cost, open-source solution based Safe Exam Browser and video based on BBB or Zoom or Teams
- **Working Group on Virtual Labs for STEM courses**
 - Access to affordable software
 - *Has attracted the largest number of lecturers to develop innovative solutions*
- **Integrated KENET remote teaching platform** with YouTube and Facebook for live streaming and large classes

Conclusions

- *Support for Broadband Connectivity Research & Education*
 - *Extension of broadband to remote stations*
- *Support for Remote & Online Teaching*
 - *Through Pilot Projects since 2017*
 - *Aggressive transition due to COVID-19*
 - *Capacity building for lecturers during COVID-19*
- *Support for Off-Campus Connectivity*
 - *Private APN for Staff & Faculty*
 - *Discounted Mobile Internet Bundles for Students*
 - *Option to extend off-campus bandwidth access to the community*

Thank You

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