

ANNUAL
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EXECUTIVE DIRECTOR'S NOTE



Welcome to the 2019 Annual Community Newsletter. The stories in this newsletter show how the KENET community has been developing the digital skills that support the transformation of administration, learning, teaching, and research using ICT. These stories are aligned to the theme of the 2019 Annual Heads of Institutions Forum - *scaling-up development of digital skills - critical foundation for the digital transformation of institutions in our community.*

Intermediate and advanced digital skills are essential for transformation of teaching, learning and research. They are particularly important in open science practices and data intensive research in science, technology, engineering and math (STEM). The transformation requires new digital infrastructures that not only include excellent campus networks but also access to private, community and public clouds for research and education. Digital skills are also

required to support the emerging Kenyan digital economy that includes digital government, digital business, and digital payments.

The development of intermediate and advanced digital skills shall require upgrade of the digital infrastructures of research & education institutions as

Intermediate and advanced digital skills are essential for transformation of teaching, learning and research.

well community cloud infrastructure operated by KENET. The Kenya Digital Acceleration project is likely to support upgrade and expansion of digital infrastructures in universities

and TVETs. This will be subject of some of the plenary sessions in the 2019 Annual Heads of Institutions Forum.

In this newsletter we share stories of how we have continued to support research and faculty champions in data intensive research areas through research and travel grants, and the KENET virtual lab ([see https://vlab.ac.ke](https://vlab.ac.ke)). The virtual lab is an example of cloud-based scalable digital infrastructure that can be used to support the development of advanced digital skills. The virtual lab currently provides compute and storage services for researchers, faculty and graduate students that are early adopters of new digital skills.

Prof Meoli Kashorda
Executive Director
KENET

GOVERNANCE

In the year 2019, the Board of Trustees approved the second supplemental trust deed, the board charter and a membership charter. These are supposed to strengthen the governance of KENET. The 2nd Supplemental Trust Deed shall enhance the professional diversity of KENET board through two new slots for independent board members with financial and legal expertise. The 2019 KENET membership charter shall support increased community participation in governance and sustainability of KENET.

New Trustee and Members of the Management Board Appointed



Prof. Laban Peter Ayiro, Trustee

In March 2019, Prof. Laban Peter Ayiro was appointed a trustee replacing Prof. Timothy Wachira, the former Vice Chancellor of Daystar University. Prof. Ayiro is the current Vice Chancellor of Daystar University. He is a Fulbright scholar who holds a PhD in Business Management, Master's in International Relations and Master's of Science in Entrepreneurship Studies. He is a professor of research methods and teaches research methods and statistics to PhD and master's students. He joined other 10 trustees and is the nominee of Daystar University as one of the five founder universities. His biography is available at <https://www.kenet.or.ke/node/10>.

The KENET Board of Trustees also appointed four new management board (MB) members to replace four MB members whose terms had expired. Mrs. Alice Chemtai Muraguri Acwanyo (Daystar University), Prof. Stephen Kimani (Jomo Kenyatta University of Agriculture and Technology) and Prof. Rose Cheptoo Ruto Korir (Moi University) are nominees of their founder universities. CPA Mrs. Cathrine W. Juma is an independent management board member who will also join the Audit & Risk Committee. She is the managing consultant and trainer in financial management at Centwise Business Consulting.

The full profiles of the management board members are available at <https://www.kenet.or.ke/node/12>

COMMUNITY GROWTH AND ACTIVITIES

Seventeen New Institutions Join KENET Membership

In the year 2019, 17 new institutions joined KENET increasing the membership to 160. The new members are mainly from the categories of technical and vocational education and training (TVETs) and hospitals and nursing schools.

Fund (UFB), Tharaka University College and Uzima University College. The TVETs that joined KENET in 2019 include Coast Institute of Technology, Katine Technical Training Institute, Kibabii Diploma Teachers Training College, Siaya Institute of Technology, Karumo Technical Training Institute, Nyeri National Polytechnic and Sang'alo Institute of Science and Technology. Most of the new institutions are already connected to the KENET network. Table 1 shows the membership status as of November 2019.

The new members include: Kenyatta University Teaching, Referral and Research Hospital, AIC Kijabe Hospital, Living Room International Hospital, Technical and Vocational Education and Training Authority (TVETA), The Universities

Table 1: Membership and Connectivity Status as at November 2019

No.	Membership Categories		Number of Members as at November 2018	Connected Members as at November 2019
1.	Public universities and university colleges	36	35	36
2.	Private universities and university colleges	34	33	31
3.	TVETs	34	27	29
4.	Teaching hospitals and medical colleges	10	8	10
5.	Government institutions	20	17	16
6.	Research institutions	20	20	16
7.	Affiliates	6	5	6
	Total	160	145	144

Breakfast Meeting with Councils/Directors of Public Member Institutions

KENET convened a breakfast meeting with heads of institutions, chairpersons of university councils and chairpersons of board of directors of research institutions on 29 March 2019 at the Safari Park Hotel in Nairobi. The meeting reiterated KENET's mandate as the National Research and Education Network (NREN) of Kenya and its role in the country's national innovation ecosystem.

Over 100 participants representing public universities, private universities, research institutions and government bodies had an opportunity to deepen their understanding of KENET's role in research and education and the part their institutions played.



Participants pose for a group photo

“KENET was identified as a part of the national innovation ecosystem in the draft. Science Technology and Innovation policy of 2013” noted Prof. Timothy Waema, a member of KENET’s management board.

Mr. Timothy Were, the Director of ICT services at the Ministry of ICT lauded KENET for advancing education and research. He also noted that the Ministry was undertaking several initiatives aimed at expanding the ICT sector. “KENET is doing a wonderful

job in connecting universities and providing students access to Internet for education and research,” he said.

KENET was endorsed as the National Research & Education Network (NREN) of Kenya by the Ministry of Education in 2010. KENET in addition has been recognized as the NREN of Kenya in the new National Broadband Strategy 2018-2023 with the special role of providing broadband connectivity to educational and research institutions.

KENET Holds Procurement Officers Forum for Public Institutions



Panel discussion at the Procurement Officers Forum

KENET hosted a procurement officers’ forum on 7 June 2019 at the Mövenpick Hotel and Residences in Nairobi. The half-day forum, attended by 76 participants from public universities, government and research institutions, served as a platform for discussing pertinent procurement matters. Legal officers, finance and ICT officers also attended the

forum. The participants discussed the government directive on procurement of ICT services and equipment, as well as the Public Procurement and Asset Disposal Act (PPADA) 2015, and other associated public procurement regulations. The forum also sought the best way for members to procure KENET services in compliance with the directive.

ICT Directors’ Forum Examines Institutional Readiness for Cloud Based Services



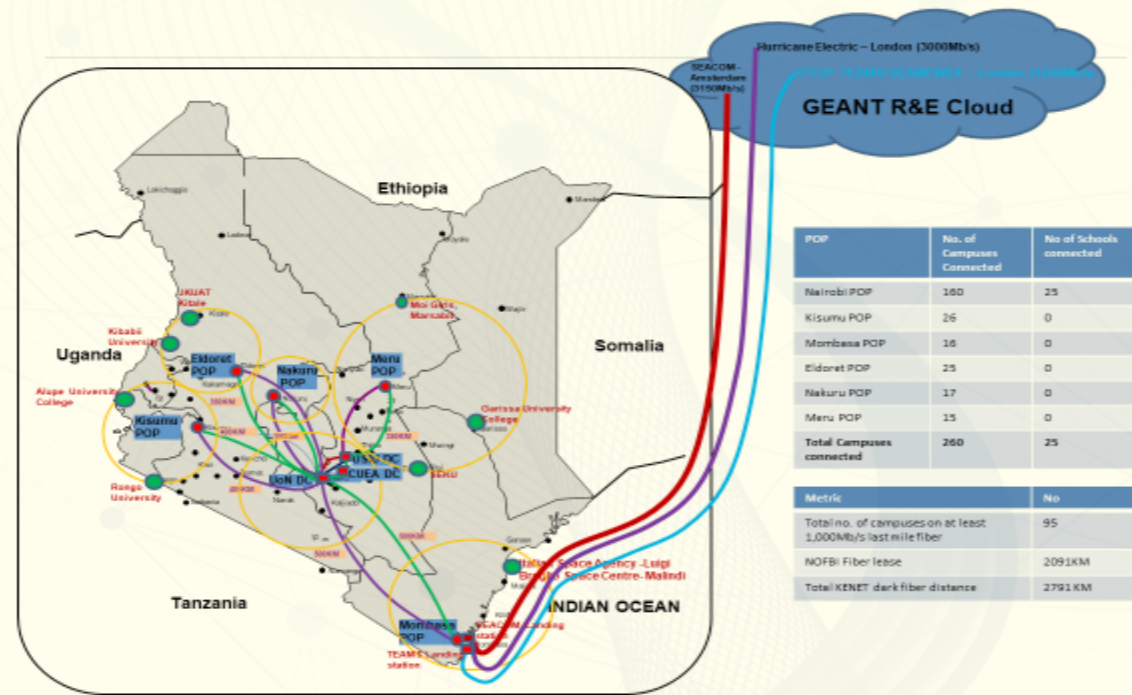
Participants of the 2019 ICT Directors Forum

The 2019 ICT Directors’ Forum was held from 8 to 9 October 2019 at the Safari Park Hotel, Nairobi. The forum discussed ways of enhancing the ICT readiness of KENET member institutions particularly in emerging digital infrastructures with a focus on cloud-based services that support administration, learning, teaching and research in the KENET community.

The one-and-a-half-day forum whose theme was “Institutional Readiness for Cloud-Based Services” attracted 191 participants. The theme was centered on how KENET member institutions could leverage on cloud-based platforms to promote education and research, and how they could support education and research initiatives in learning institutions and within the KENET community through collaboration and partnerships.

KENET BROADBAND NETWORK EXPANSION IN 2019

KENET National Broadband Network Coverage



By July 2019 KENET had connected 58 out of 61 main university campuses to last mile fiber at the high speeds of 1 Gb/s necessary for supporting cloud-based research infrastructures. As of July 2019, up to 85% of the 270 connected campuses were on last mile fiber.

KENET had activated approximate 2200 Km of fiber for interconnecting member institutions by November 2019. Most of the long distance fiber in western and central Kenya regions is leased from NOFBI, the government-owned

fiber infrastructure. Last mile and access fiber expansion in 2019 was achieved by leasing dark fiber from commercial operators as part of infrastructure sharing.

The highlight for last mile fiber connections was connection of Jaramogi Oginga Odinga University of Science and Technology (JOUUST) through a combination of KPLC fiber and NOFBI, Karatina University and University of Eastern Africa Baraton. KENET plans to connect the remaining rural universities using KPLC dark fiber by June 2020.

Connection to last mile fiber now means that universities can support data-intensive research and access to educational technology services over the low congestion network at low costs and upgrade their bandwidth to 1 Gb/s and above. The increase in bandwidth capacity also paves way for universities

to access free advanced research and education content, KENET cloud services and other value-added services such as disaster recovery. It also makes it possible to reduce Internet prices through Internet bandwidth allocations.

KENET Connects International Livestock Research Institute Kapiti Research Station

KENET successfully connected the ILRI-Kapiti research station to its network on 14 October 2019, using a microwave radio link. The Kapiti ranch, owned by ILRI, is remotely located in the semi-arid lands of Machakos County. Being in an area where there was no existing network infrastructure, the users and researchers found it difficult to effectively carry out their daily duties as they had to depend on modem (3G/4G mobile) bundles which limited the data transferred from their research work. The successful connection enabled

the staff and researchers to effectively run, manage and execute their daily duties and projects. They were also able to access resources from the ILRI headquarters. Further to this, they could access open resources at KENET, such as the KENET Virtual research and computing lab, that are useful for their research.

More on research services: <https://www.kenet.or.ke/research-services>



Aerial view of ILRI Kapiti

KENET Connects KMTCC Campuses

KENET is working with the Kenya Medical Training College (KMTCC) to interconnect all its 67 campuses to its headquarters through a secure virtual private network (VPN) that encrypts the data exchanged to ensure data is transferred securely. KMTCC is rolling out an ERP system that will consolidate all its resources for efficient service delivery and resource mobilization in all its campuses. The sensitivity of the data being exchanged between

the various campuses and headquarters created a need for a higher level of privacy and security.

KENET designed a unique solution for each campus since the KMTCC campuses are semi-autonomous. It is expected that KENET will migrate at least 35 KMTCC campuses to its network by December 2019.

KENET- AFCHIX Partnership to Connect the Community Network

KENET has signed a partnership agreement with AfChix to connect a community network project in Lanet Umoja Area, Nakuru County. In July 2019, KENET and AfChix, a network of women in technology, formalized the agreement on the Lanet Umoja Community Network project. This agreement is envisioned to set a precedent for Internet connectivity in the region.

“We chose KENET as a partner because of the great model of connecting learning institutions such as universities and colleges, schools and research institutions,” said Mrs. Irene Miso, the Project Coordinator at AfChix. “This is in line with our objective of connecting schools and in the process connecting the community to ensure that the unconnected are connected.”



AfChix founder Dorcas Muthoni with the Lanet Umoja Community Chief Francis Kariuki

The project is aimed at implementing a local wireless community network for the public within the Lanet Umoja area. As part of the sustainability plan for the project, KENET organized a five-day training for students of Murunyu High School to equip them with skills to support the network.

The Lanet Umoja Community project supported by area Chief Francis Kariuki, is funded through the USAID’s Women Connect Challenge, a global call for solutions to improve women’s participation in everyday life by meaningfully changing the ways women and girls’ access and use technology.

In recent years, KENET has been keen on working with community networks through partnering with community outreach projects. Last year, KENET partnered with Tunapanda Institute which operates a community network based in Kibera that aims to connect schools and community centres in the area to support ICT skills development.

Read full article: <https://schools.kenet.or.ke/>

“We chose KENET as a partner because of the great model of connecting learning institutions such as universities and colleges, schools and research institutions,”

ENTERPRISE SERVICES

Over 18 Institutions Benefit from Direct Engineering Support Services in 2019

In 2019, 18 KENET-connected member institutions benefited from direct engineering support (DES) services and activities amounting to KES.13,610,017. Through DES, KENET aims to improve network performance and security, enhance operational efficiency and implement transformational changes to ICT resources and infrastructure. Some activities

carried out during the DES include: backbone network infrastructure surveys, securing campus network, campus network redesign, bandwidth monitoring and optimization, installation of Wi-Fi access points to increase wireless coverage and making recommendations on best practices regarding the network.

Table 2: Direct Engineering Support Services Activities In 2019

	Institution name	DES Description
1	Karen Technical Training Institute for the Deaf	Expansion of wireless network and redesign of existing ICT infrastructure
2	Laikipia University	Network audit of the main campus ICT infrastructure
3	South Eastern Kenya University	Expansion of wireless network and redesign of existing ICT infrastructure
4	Daystar University	Expansion of wireless network and redesign of existing ICT infrastructure
5	Alupe University College	Campus technical advisory services with detailed bill of materials for network expansion
6	Garissa University	Expansion of wireless network and redesign of existing ICT infrastructure
7	Maasai Mara Technical Vocational College	Expansion of wireless network and redesign of existing ICT infrastructure
8	Hekima University College	Expansion of wireless network and redesign of existing ICT infrastructure
9	Nyabondo Medical Training College	Expansion of wireless network and redesign of existing ICT infrastructure
10	KEMRI Headquarters	Network audit and preparation of BoQ for ICT infrastructure development
11	KEMRI Kisian	Network audit and preparation of BoQ for ICT infrastructure development
12	Cooperative University of Kenya	Expansion of wireless network and redesign of existing ICT infrastructure
13	Meru University of Science and Technology	Improvement of Wi-Fi coverage
14	Technical University of Mombasa	Expansion of wireless network and redesign of existing ICT infrastructure

	Institution name	DES Description
15	Rift Valley Technical Training Institute	Expansion of wireless network and redesign of existing ICT infrastructure
16	Pwani University	Expansion of wireless network and redesign of existing ICT infrastructure and setup of virtual library lab
17	KMTC Lodwar	Expansion of wireless network through donation of Wi-Fi access points
18	Multimedia University of Kenya	Expansion of wireless network and redesign of existing ICT infrastructure

KENET conducted a DES at the Moi Teaching and Referral Hospital (MTRH) after connecting the hospital to the KENET network. KENET redesigned the hospital's local area network (LAN), by installing a network security firewall, segmenting

the user traffic and installing Wi-Fi access points. After the DES, the hospital recorded an improvement in user access experience while using the institutional network to access digital resources.



EDUCATION TECHNOLOGY INITIATIVES

KENET-Connected Schools Participate in Virtual Discussions during South Africa's Science Week

Three KENET-connected high schools took part in a climate change discussion during South Africa's **National Science Week (NSW)**, a country-wide celebration of science involving various stakeholders conducting science-based activities. Alliance High School, Alliance Girls High School (AGH) and Moi Girls High School in Marsabit took part in the event that virtually brought together schools from South Africa, Cameroon, Zimbabwe, Poland and Germany. Between 29 July and 2 August 2019, the students took part in discussions on the theme, '*Facing the harsh realities of climate change*'. KENET provided the web conferencing equipment to the three Kenyan schools as well as on-boarding the users with its **Web Conferencing Platform** based on Big Blue Button (BBB), an open-source web conferencing system

that provides real-time sharing of audio, video, slides, chat and screen. Although the students were located miles apart, they were able to hold discussions in real-time.

In 2014, KENET launched the **Schools Connectivity Initiative (SCI) project** which aimed to connect all schools in Nairobi to affordable Internet. As a result of the SCI project, the Academy of Science of South Africa (ASSAF) invited KENET-connected schools to participate in the event. KENET identified three schools that were under the SCI project to take part in the week-long event, which is an initiative of South Africa's Department of Science and Technology (DST). The annual event runs across South Africa's nine provinces simultaneously.



Learners from Jeffreys Bay discussing climate change with learners from Alliance Girls High School

Between 29 July and 2 August 2019, the students took part in discussions on the theme, '*Facing the harsh realities of climate change*'.



Students from Kenya, Germany, Poland and South Africa exchanging ideas on how to combat climate change

At Moi Girls School in Marsabit, a region classified as arid, semi-arid and semi-humid, two students participated in the climate change discussions on the first day. "The School is located in Marsabit County. It is near Chalbi desert which is expanding due to climate change and students were willing to share the challenges they face in relation to the school environment. We pass our appreciation to KENET and the

South Africa team for supporting our participation in South Africa's Science Week," said Mr. Wekesa Barasa, the head of computer studies at the school.

Read full article: <https://www.kenet.or.ke/content/kenet-connected-schools-take-part-virtual-discussions-sa%E2%80%99s-science-week>



CAPACITY BUILDING

Over 20 IT Professionals Equipped at the Scalable Campus Network Training

Network and systems administrators from 22 KENET-member institutions benefited from a scalable campus network training held from 6 to 10 May 2019. The training which offered an advanced course on improving campus networks was organized by KENET as part of its capacity building initiative. The participants, drawn from public and private universities, research institutions and hospitals, were equipped with necessary skills to administer their institutional campus networks.

The intense non-residential five-day training was aimed at equipping the participants, who had background knowledge in general data networking concepts, with practical skills required for the configuration and operation of large-scale campus networks. The training, conducted by five qualified KENET engineers, imparted participants with knowledge in the areas of design, implementation and security of a large-scale campus wireless local area network (WLAN).



Mr. Cornelius Achiki, a KENET Engineer trains participants during the Scalable Campus Network Training

KENET Cyber Security Awareness Online Course

KENET provides an online course on cyber security awareness that is open to members of its community. The course, which was rolled out to the KENET community in October 2019 during the ICT directors’ forum, was received with enthusiasm from eager members keen on enhancing their skills in identification of cyber-attacks and how to protect themselves, their devices and their network.

Cyber security threats are becoming more and more common and it is everyone’s responsibility to protect their computer systems from theft or damage to their content, software and/or hardware. KENET saw the importance of educating its community on the various types of cyber-attacks and how to guard themselves against them. The objective of the

course is to provide the KENET community with a general understanding of threats to cyber assets/information that they face, help them to identify the threats and vulnerabilities to their institutions’ information assets and respond to them appropriately, including detailing the counter measures that can be adopted.

The course has fourteen modules which can be completed within two weeks. Each module varies in length from between 30 minutes to 45 minutes. Learners are required to go through the course material and attain 70% and above to obtain a KENET certificate. The first cohort was enrolled in November 2019 and had over 1000 participants. Registration for the course is currently ongoing on the KENET website.

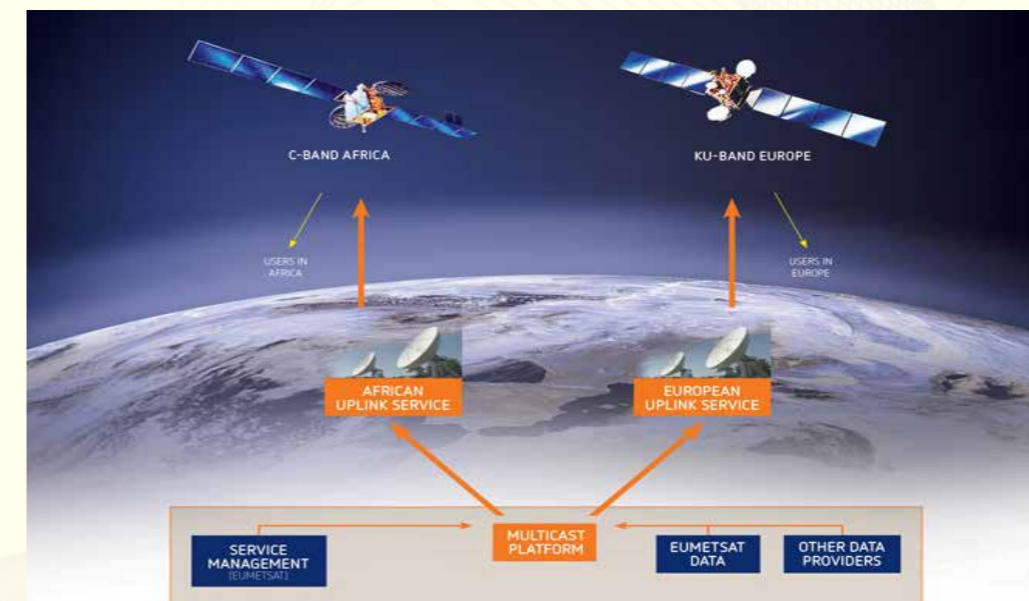


RESEARCH SERVICES

KENET-RCMRD Partnership Rolls Out First African Connection to EUMETSAT for Earth Observation Data

Barely six months after joining the KENET community network, the Regional Centre for Mapping of Resources for Development (RCMRD) has expanded its reach to the rest of the world. Through KENET, the geo-information disseminator connected to EUMETCAST, a global multi-service dissemination system to receive earth observation data. This partnership makes a ground-breaking advancement for earth observation not only for Kenya but for Africa, which now becomes the last continent to join the European Organization

for the Exploitation of Meteorological Satellites (EUMETSAT). This milestone was realized when RCMRD through KENET joined the existing user community for the EUMETCast terrestrial service, a scheme operated by EUMETSAT. This service allows the dissemination of real-time environmental data based upon a multicast client/server system that brings Copernicus Earth Observation data to a global user community. Using fiber, researchers can now access and process data in real-time.



EUMETCast Terrestrial Service, a scheme operated by EUMETSAT.

EUMETCast System Description. Source: EUMETSTAT

The EUMETCast terrestrial service is exclusively available through research and education networks to allow data acquisition from EUMETSAT ground stations. KENET therefore acted as the implementer, connecting RCMRD to EUMETCast terrestrial over fiber. EUMETSAT connects to Europe's GEANT network which is a KENET partner. As such, through the KENET network, RCMRD can acquire the required services from EUMETSAT reliably. The EUMETSAT data is used in different thematic areas to help with solving problems in natural resource and environmental management.

KENET connects RCMRD via a 1Gb/s last mile fiber and assisted the RCMRD ICT team in optimizing their local area network (LAN) to ensure seamless connectivity to EUMETCAST which require a low latency and reliable connection during data transfer. The use of NREN networks facilitates the exchange of data with their unparalleled connection speeds that facilitate research.

Epidemiological Modelling Workshop Participants Benefit from eduroam Wireless Internet

Access to *eduroam* (wireless network) granted by KENET greatly benefited participants of the epidemiological modelling workshop held from 8 to 11 April 2019 at the University of Nairobi Institute of Tropical Infectious Disease (UNITID). The workshop jointly organized by the South African Centre for Epidemiological Modelling and Analysis (SACEMA), UNITID and Washington State University (WSU) required high-speed Internet for statistical computing and epidemiological modelling. KENET was one of the workshop sponsors supporting the workshop in various ways including the provision of high-speed Internet that enabled the participants to use models to infer the impact of infectious disease interventions.

The workshop drew 20 participants from 12 academic and research institutions in Kenya who are early to mid-career researchers in the field of medicine, statistics, mathematics, biological sciences, and public health. Through lectures and interactive sessions

carried out by five faculty from three institutions with diverse experiences in the field of epidemiological modelling, participants were able to deepen their understanding in techniques available for analyzing and interpreting epidemiological data on infectious diseases and for predicting the impact of disease control and elimination programmes.

Dr. Juliet Pulliam, Director of SACEMA and one of the workshop facilitators had first connected to *eduroam* at the University of Florida where she served as a faculty member prior to moving to SACEMA. She noted the ease in which she was able to automatically connect to *eduroam* at the workshop without using any credentials. "My devices connected automatically to the network because my *eduroam* credentials are stored, making the transition seamless. *eduroam* worked very well during the workshop, and I didn't notice any difference between using the connectivity here in the US, UK, or South Africa," said Dr. Pulliam.



Mr. Ronald Osure from KENET taking participants through use of the Research Cloud

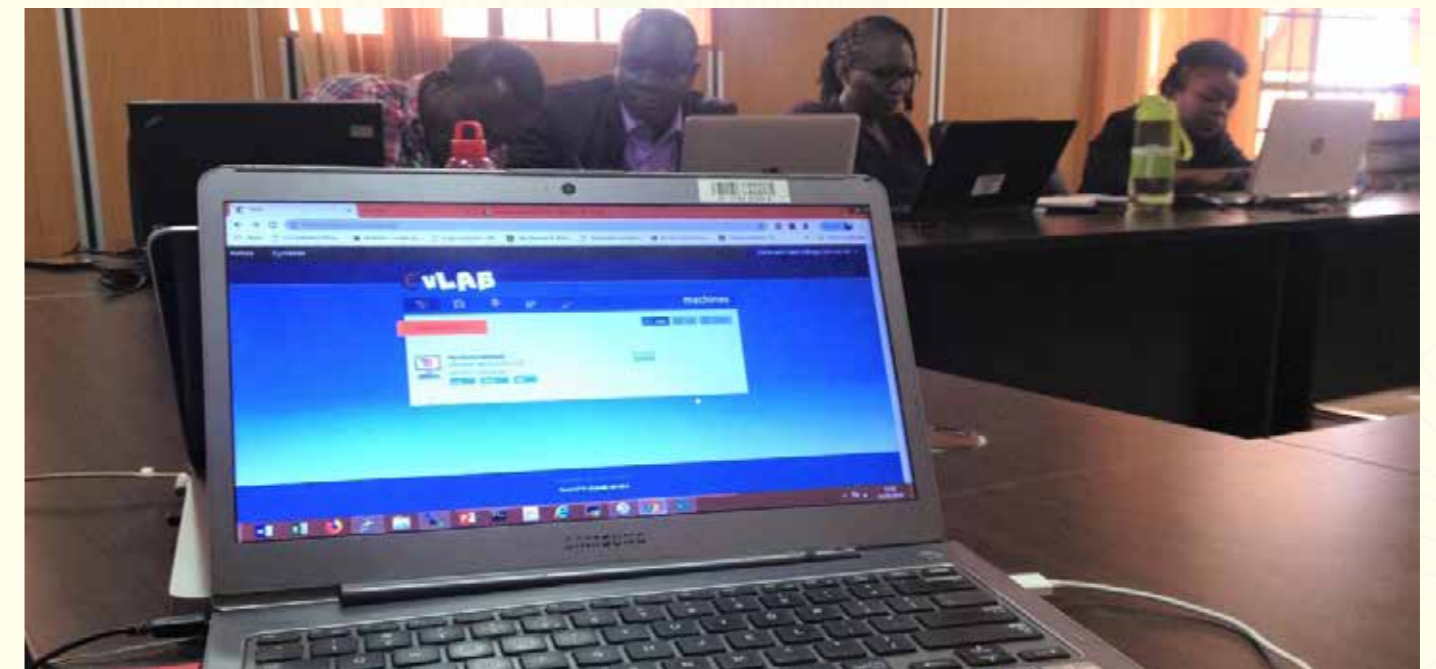
Egerton University Explores the KENET Virtual Lab in Teaching and Research

The KENET virtual lab (VLab) has been used for research and teaching purposes. In February 2019, Dr. Kiplangant Ngeno, a lecturer at the department of animal science at Egerton University used the research cloud infrastructure to facilitate an MSc course in Quantomics and Genomics in Animal Breeding and a Ph.D. course in Bioinformatics applied to animal breeding. Students from both courses were able to run genome sequence analysis (huge data) using the KENET VLab for their courses.

"The teaching of postgraduate students (MSc and Ph.D.) has been a challenge, especially on genomic-related courses due to the usage of huge data. Handling, processing, and analysis of such massive data require high computing power, but such infrastructure was lacking at the university. The introduction of the KENET VLab was imperative as it

addressed the challenges. We utilized the VLab in teaching the courses," explained Dr. Ngeno.

The KENET VLab is a key research infrastructure that has so far successfully served over 25 researchers in various areas such as medicine, bioinformatics and agriculture. There are also several instances in teaching where lecturers have created lab environments for their classes on the platform. Because users can self-provision the virtual machines by specifying the amount of computing power, memory and storage space desired to run the appliance, students could easily deploy their own compute instances on VLab. Dominic and Ruth, both Ph.D. students at Dr. Ngeno's class, attested that, "As Ph.D. students, there was no need of prior training because the KENET VLab is user-friendly."



The KENET VLab facilitating one of Dr. Ngeno's classes

KENET holds Six Forums on Research Cloud Services

In 2019, KENET held six research forums at Machakos University, Pwani University, Technical University of Mombasa, Maseno University, Moi University and Egerton University. The forums were aimed at strengthening ties between the institutions and KENET; enhancing understanding of the institutions' research and education needs; and creating awareness of KENET's research services.

In addition to providing basic high-speed Internet as a facilitator of research, KENET aims to expose researchers to advanced KENET research services through such forums. The forums assessed the needs of senior faculty, lecturers and graduate students and how they can use ICT to aid in their research productivity, visibility and benchmarking.

KENET Executive Director, Prof. Meoli Kashorda, in his presentation at Machakos University, titled '*Beyond Basic Connectivity—KENET Cloud-based Educational Technology and Research ICT Services*', gave examples of digital technologies

transforming science and education such as big data and analytics, artificial intelligence (AI) and machine learning algorithms, the KENET research and education cloud, among others.



KENET Executive Director, Prof. Meoli Kashorda making his presentation at Machakos University

Research Mini Grants in 2019

KENET's mandate is to catalyze collaboration in research and education among member institutions. KENET promotes collaboration through facilitation of special interest groups (SIGs) and provision of research and education mini grants to researchers and member institutions. In 2019 KENET awarded \$ 135,000 towards the computational modelling and materials sciences (CMMS) and computer science, information systems and engineering multi-disciplinary (CSISEE) mini grants.

The CMMS mini grants focused on the areas of energy conversion using basic and applied sciences and technology for environmental safety and health applications. KENET awarded \$ 75,000 to the five awardees representing the following member institutions: Kenyatta University, Jomo Kenyatta university of Agriculture and Technology, Egerton University, Technical University of Kenya and Masinde Muliro University of Science and Technology.



CMMS mini grant winners pose for a picture with KENET Executive Director (centre) and staff

The research focus for the CSISEE mini grants was on Internet of Things (IoT) in Agriculture and Health. Four researchers from the following KENET member institutions: Moi

University, University of Nairobi, United States International University, and Jomo Kenyatta University of Agriculture and Technology, were awarded \$ 60,000.

KENET CS/IS Mini Grant for Research on Real-time Surveillance of Crop Pests Using Deep Learning Techniques



Mr. Amos Chege Kirongo during the ICT Faculty Forum in 2018

A team of four Computer Science/Information Science (CS/IS) grantees from Meru University of Science and Technology briefly described their research problem, achievements and what impressed them about the KENET mini grant. The four were led by the Dean, School of Computing and Informatics, Prof. Geoffrey Muchiri Muketha, a specialist on software metrics. He was the principal investigator assisted by Dr. Eric Mworira, a specialist in agronomy; Mr. Amos Chege Kirongo, a specialist in machine learning and image processing; and Mr. Daniel Maitethia Memeu, a specialist in physics. Their project on real-time surveillance of crop pests and diseases using deep learning techniques, that aimed at solving the problem of crop losses caused by plant diseases that directly or indirectly affect food security in Kenya, was one of the projects awarded the mini grant.

When asked about the key achievements of the project, Mr. Amos Chege Kirongo, a co-researcher, said, "We successfully managed to develop a machine learning digital imaging model, and also developed the web interface and mobile phone application for diagnosis of the maize and tomato stresses. The mobile phone application was used with farmers during training and also during post project application. Accuracy level of the model was above 97.8%."

KENET builds a platform where researchers can link with other researchers locally and internationally, share and access data and advanced research e-infrastructures for the worldwide research and education community. Therefore, it is required that the grantees should share their work through credible journals and build a researchers' community. As

a result of this, the team proudly narrated that they had published a paper manuscript and submitted to Hindawi, Journal of Mobile Information Systems, and initiated student

interest in the research and that ten students are currently engaged in big data and machine learning.

Backup and Computation of Bioinformatics Data on KENET Virtual Lab for Research

Upon returning from an environment full of computational resources (King Abdullah University of Science and Technology, Saudi Arabia), Dr. Timothy Kamanu, a data scientist was faced with serious challenges in accessing

similar resources in Kenya. He could not access the necessary computational infrastructure to effectively research on his wide range of interests, and his institution was not able to fully support the required technical specs and storage.



Dr. Kamanu makes a presentation during the IT Directors Forum at Safari Park in October 2019

The solution by KENET was the use of VLab; which has been successful amongst educators and researchers. Using this research infrastructure is as flexible and convenient as it should be for any user because it allows the users to specify their desired technical specs; CPU, RAM, and software. He used the VLab in configuring several Unix-based machines using the appropriate software for computation and used the storage for backing up the high-throughput bioinformatics data.

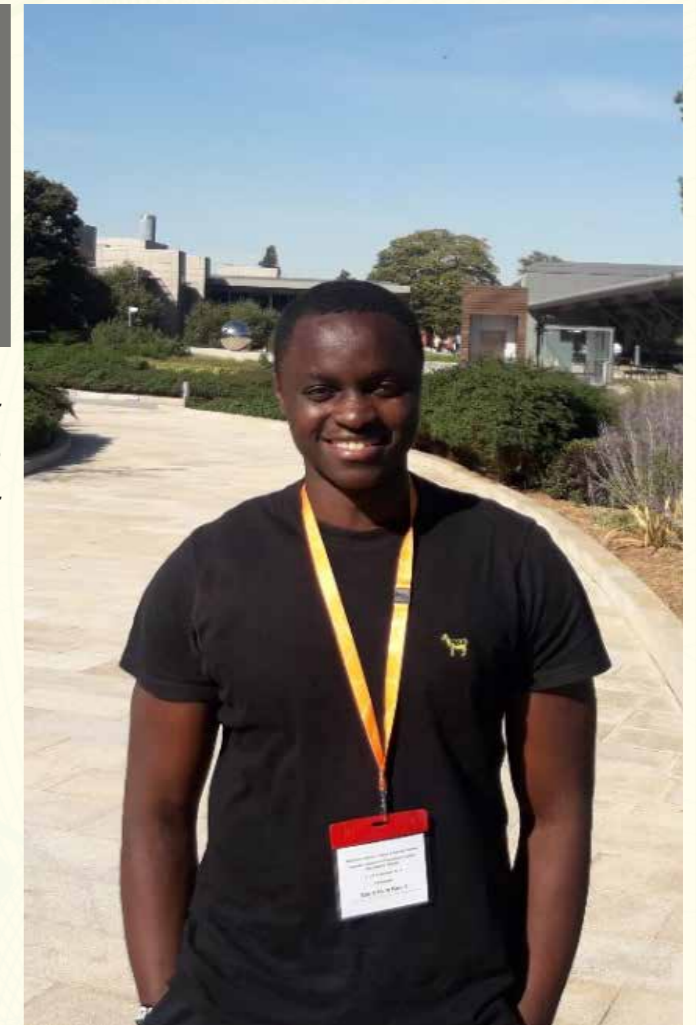
Speaking about VLab and the support, Dr. Kamanu said, *"Technical assistance has been exceptional if not selfless since they are available on/off hours." On cost and flexibility, he went on to say, "since I undertake the research at my own cost, I have greatly appreciated the provision of KENET VLab service at no cost. Being able to customize, maintain and configure the computational machines at VLab has afforded great flexibility."*

Kevin Esoh—Using Big Data to Eliminate Malaria in Africa through the KENET Virtual Lab

"As long as predators exist, preys will thrive. As long as drugs and vaccines exist, diseases will thrive. The fight is therefore not against disease emergence but resistance to treatment and control!"

This magnetic headline in Kevin Kum Esoh's blog captures his interest and lays bare his passion for inspecting human genetic variations with resistance to severe malaria. According to the World Health Organization (WHO), 92% of malaria cases were reported in Africa in 2017, the highest globally. We catch up with the DELGEME MSc student in Molecular Biology and Bioinformatics at the Department of Biochemistry, Jomo Kenyatta University of Agriculture and Technology (JKUAT), who besides working towards malaria elimination in Africa, possess talent outside science in singing and playing the harmonica.

Kevin Esoh



Read the full interview: <https://www.kenet.or.ke/content/qa-using-big-data-malaria-elimination-africa>

