

Eduroam implementation: Case Study

Kenyatta University

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Abstract

Kenya Education Network, (KENET), is the National Research and Education Network (NREN) of Kenya. KENET is licensed by the Communications Authority of Kenya (CA) as a not-for-profit operator serving the education and research institutions. KENET provides affordable, cost-effective and low-congestion Internet bandwidth services to member institutions in Kenya. One of the services KENET offers is eduroam. This is a service that enables students and faculty wireless users registered in the home institution use their credentials in an eduroam service provider institution. Thus the student and faculty will not have to contact the service provider institution for access to the eduroam wireless service.

KENET worked with Kenyatta University to deploy eduroam on campus. Kenyatta University is one of the public universities with a population of approximately 60,000 students. KENET was the project manager during the implementation of the project. This involved developing the tender document and technical specifications, evaluating the tender and overseeing the implementation of the Campus WLAN. KENET configured eduroam for authentication against MYSQL database. This was an extension of the existing campus wlan from a previous installation of just 8 access points to 142 access points.

This paper will highlight the eduroam implementation process and the challenges that were experienced during the implementation. The paper will also describe the campus infrastructure for both the wired and wireless LAN, the uptake of eduroam on campus and the challenges that were encountered as eduroam was being promoted on campus.

Keywords

eduroam, campus wlan, database authentication, wireless, wlan

1. Introduction

Kenyatta University is located 16 kilometres from Nairobi City along the Nairobi-Thika highway and is set on over 1,000 acres. Kenyatta University is a public University with over 60,000 students offering a variety of courses in different disciplines. Kenyatta University also has a number of campuses across Kenya. With the vast number of students, it is important that the University ensures that the students have access to the University resources and Internet. Thus the University felt the need to extend the campus WLAN to ensure the students have access to Internet. More importantly the University saw the need to implement eduroam, ensuring the students and faculty have access to resources whenever they visit an institution that provides the eduroam service.

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KENET provides affordable, cost-effective and low-congestion Internet bandwidth services to member institution campuses in Kenya. We have set up a gateway to the advanced e-infrastructures for research that are available exclusively within the Research and Education Community anywhere in the world. We also provide shared services such as:co-location of servers, dedicated Virtual servers for e-learning systems, video and web conferencing, and capacity building for technical staff. KENET is the Computer Emergency Response Team (CERT) for the academic community. KENET also offers eduroam as a service and is the National operative body for eduroam in Kenya. KENET promotes use of eduroam across its member institutions and was able to work with Kenyatta University to provide eduroam services across campus for the students and faculty.

2. What is eduroam?

eduroam stands for **education roaming**, allowing students and faculty from a registered institution to access internet services in another institution offering the eduroam service. The Student/Faculty does not have to bother the visiting institution ICT Department by asking for credentials to access the wireless LAN. The student/faculty username and password is preconfigured on their laptop and all they have to do is open the laptop and join the eduroam WLAN service at the visiting institution. Each institution offering the eduroam service is expected to adhere to the KENET eduroam policy (<http://eduroam.ac.ke/kenet-eduroam-policy.pdf>)

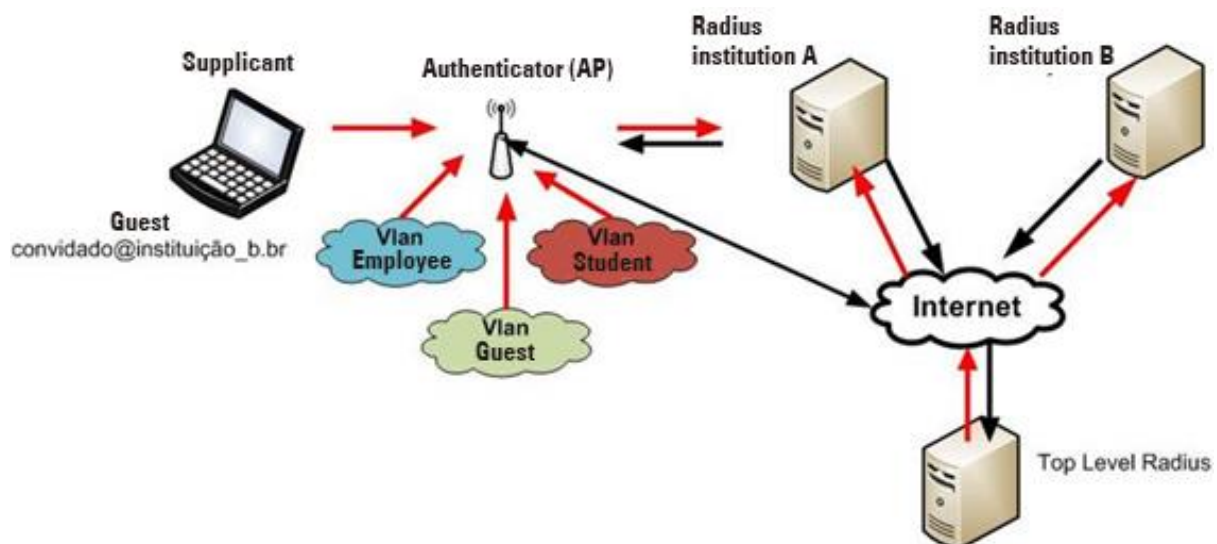


Figure 1 : How eduroam works

3. Project Background

KENET received funding under the KTCIP/ Kenya ICT Board infrastructure grants and successfully implemented pilot campus w lans in ten (10) member institutions in 2012. Most of the institutions did not have a proper campus wlan. The project was designed to give the institutions a taste of campus wlan and motivate them to grow the campus wlan. Kenyatta University was one of the beneficiaries of the project.

At Kenyatta University the campus wlan composed of 1 cisco 5508 WLAN controller, 1

server (RADIUS server), 5 cisco 1552e outdoor access points and 3 cisco 3500 indoor access points. The project implementation was completed in early 2013. KENET configured the controller and RADIUS server. eduroam was configured to authenticate against MYSQL database.

4. eduroam implementation

In October 2014 Kenyatta University decided that they would like to expand coverage of eduroam on campus. This was a result of many factors including: demand from the students and campus wireless security - with eduroam there is AAA (Authentication, Authorization, Accounting), thus they would be able to know who is currently connected on their wireless LAN.

Kenyatta University contacted KENET to assist in redesigning the campus WLAN to cover more areas on campus. The project was to cover areas where the students gather and study.

4.1. KENET's Role

A meeting was scheduled where Kenyatta University highlighted their needs and areas where they would like KENET to advise on. It was agreed that KENET will offer the following services:

- I. Site survey: This involves having meetings with the Kenyatta University team, carry out site survey and take necessary measurements.
- II. Report preparation: The reports include campus wlan proposal, detailed scope of works & bills of quantities.
- III. RFP and tender document preparation.
- IV. KENET was part of the tender evaluation committee.
- V. KENET was part of the technical negotiations: This involved meeting both the contractor and Kenyatta University ICT Team to discuss the technical aspects of the project, discuss and agree on the implementation schedule and agree on a responsibility matrix.
- VI. KENET supervised the campus wlan implementation: This involved having constant site visits to review the progress of the project.

5. eduroam implementation

Kenyatta University installed an additional 142 access points. This was 130 cisco aironet 1702 indoor access points and 10 cisco 1552 outdoor access points. The access points were installed in 39 different locations across campus.

As the access points were being mounted across campus, one of the indoor access points was stolen. This resulted in having all the access points being unmounted until the physical security of the access points was reviewed. This resulted in the design of cages that would secure the access points.



Figure 2: Physical security of access points

Figure 2 above shows the cages that were designed and implemented. Kenyatta University then proceeded to update the student database and ensure all the students had an account to access eduroam. The students and faculty were alerted to start using eduroam as the other ssid with passphrase will be disabled.

6. Impact

On completion of installation and configuration of the additional 142 access points, there was a noted increase of wireless users on campus.

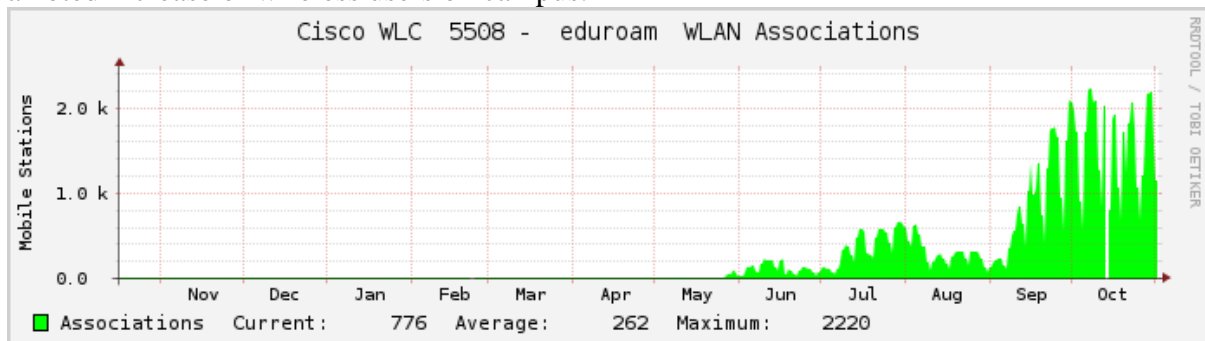


Figure 3 : the sharp increase in associated devices from the initial setup of users. From having minimal users on eduroam to having over 3200 devices associated to the eduroam ssid.

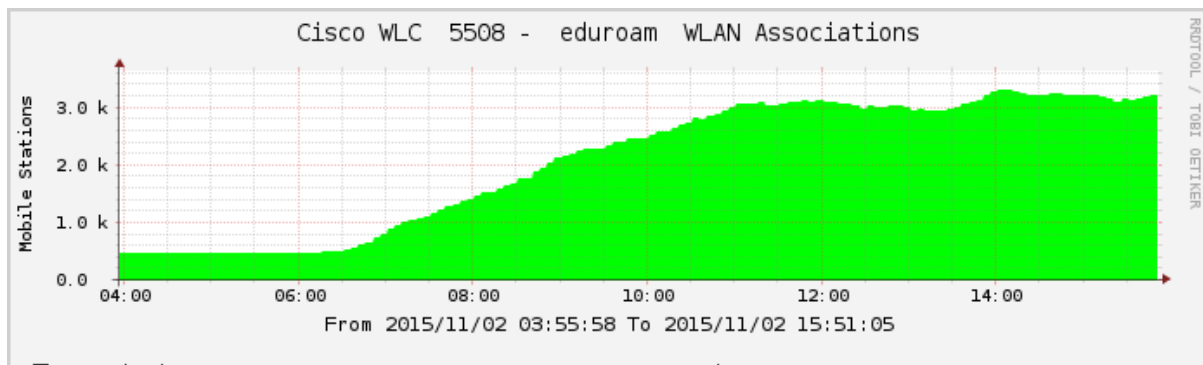


Figure 4 : the associated devices on a typical day.

The students were able to access resources from different locations due to the widespread coverage across campus.

7. Challenges

The following challenges were experienced during the implementation of the project:

- I. Access point security: This is in regard to the physical security of the access points. One access point was stolen during implementation and this resulted in having all the access points unmounted until a solution was found. This resulted in constructing of cages to securely mount the access points using roll bolts. Figure 2 shows how the indoor access points were secured using cages.
- II. Project delay: The project implementation was supposed to take 60 days; however it took close to a year to complete. The project experienced a number of delays for the following reasons : delay in receiving equipment, having to redo installations in some areas, construction of cages to secure the access points
- III. Lack of proper project management skills from the contractor.
- IV. Challenge in updating the database when students and faculty request a password change.

8. Conclusion

eduroam was successfully installed on campus. The students can now access secure wireless across campus.

9. Recommendations

Kenyatta University will need to invest in deploying eduroam across its other campuses thus enabling the students to roam from one campus to another. The other access points not on eduroam need to be configured to eduroam.

10. References

- <http://www.rnp.br/en/services/advanced-services/eduroam>
 KENET website <https://www.kenet.or.ke/>
 KENET's eduroam website <http://eduroam.ac.ke/>

Biography



Maureen holds a Bachelor of Science Electronic and Computer Engineering from Jomo Kenyatta University of Agriculture and Technology and is also CCNA certified. Maureen joined KENET in 2008 as an intern and was eventually employed as an Assistant Systems Administrator.

Maureen mainly focuses on Campus networks design and implementation. This includes both LAN and Wireless LAN design and implementation. Maureen is the lead in implementing eduroam in Kenya and also is the lead in the training services offered by KENET to member institutions. Maureen is also the lead in the KENET training program.