

SPEAKER:

Good morning, everybody. Good morning, everybody. I want you to be louder. It is a happy day. 20 years of AFRINIC.

I don't know which hat I am wearing but I will figure out later. Yesterday, I was standing here and I lost my words because the room was full. I wanted to tell the Minister, these are my people. But now I can say you are all my people and thank you so much for being here.

This is AFRINIC day. We have done this for 20 years. I am very proud to have been part of that journey and I am seeing a lot more people who are joining that journey and people who will come back in that journey.

Is Brian in the room? Brian?

OK, he is not here yet. We had an interesting conversation yesterday on tech speak.

I would like to ask our convener... I met him 20 years ago. His hair was not grey. And he told me that I was now part of AFRINIC. That was 2003, and we are still here, 18 years later. AFRINIC is back in Kampala.

OK.

Maybe we will just change it a little bit. Look, just say a few words. Off script, on script, whatever.

SPEAKER:

Thank you for being a good friend for these years. We have some beautiful things planned, goodwill messages coming from all over, but let's start with me sharing a few things about our journey.

AFNOG. We usually do this with AFRINIC. AFRINIC.

SPEAKER:

(inaudible)

DR NII:

Thank you very much. After 20 years of hard work, we have come again. It is obvious to me that we believe in what we are doing so much that we keep coming in spite of what of the difficulties we face. Working in an emerging economy is difficult, and in Africa, we face many challenges, but we still keep trying.

There were numerous barriers, there was pain, but we kept going forwards. Sometimes, we come close to giving up, but we did not. Sometimes, it seemed we were about to implode, but miraculously, we overcame.

Sometimes, it felt lonely and impossible, but we found a friend on the way who got ask the courage to continue. It must be a good cause, and I urge you to continue contributing to the internet in the next decade.

Look around, and you will notice that the community is with us. It has always been with

us urging us on, not to despair. At this point, we should shake somebody's hand, hug them, congratulate them for such admirable success. So please, shake somebody's hand.

Please, let's...

(Applause)

SPEAKER:

We are the good community, and we will remain that way. As you know, as I said yesterday, for some of you here, I used to move packets, but these days, I preferred to move good emotion, and I would like you all to do the same.

We will move onto the next segment, but I will make the following comments. From now on, please learn to dismiss negative vibes and embrace the positives as we soldier on in the next decade. A community with determination will always succeed.

I have received some goodwill messages on video which I would like to share from friends all around the world. We have very good friends, and we cannot let them down. We want to help ourselves, and we will continue to succeed.

The first video we will share is from a partner from the beginning in 2000, and some of you may remember the big books that we used to have, that we used to keep, treasure them. We didn't want to share them.

They have played a very important role in the first commissions of internet on the continent, and been active in the education community since the beginning. Let's watch a video from the NSRC group.

SPEAKER:

Hello, I am really sorry I cannot be with all of you for AFNOG's twenty-year celebration. I was there for the first one and I am missing my dear friends. Enjoy your time working with the research and education network community of Uganda and we look forward to hearing the news about the great success of the event.

SPEAKER:

A technical instructor, as well, I am sorry I could not join you for this amazing event. 20th year, it is incredible. We are hoping and wishing you very well and I know you will not let us down. There are millions of devices that everyone carries, they need connectivity, thank you very much.

SPEAKER:

You are absolutely right. I am Google's vice president, I'm here at NRSC, wishing you a 20th anniversary. Weeks and decades have gone by since the first meeting started. I wish you every success. I had to see in the next 20 years more success than the last.

SPEAKER:

And Harvey Alan, assistant director of the resource centre, I'm sorry I am not there as well. Somebody might notice grey hairs, it has been going on for a while. A testament to success. Everybody will do great like every single year, I wish you all the success for this event and wish to see you in the future.

SPEAKER:

The call for AFNOG is...

SPEAKER:
Success!

SPEAKER:
Kaplan, as they say.

SPEAKER:
Have a great event.

SPEAKER:
Good morning everyone.

(Applause)

DR NII:
We have very good friends and we thank them for all the support they have given us so far. We cannot let them down. Trust me, we will not.

Let me just start with a set of goodwill messages. This one is from someone who is an education champion, has been pushing to get the continent network for research going. Has also been part of the team and is a strong believer in the group community and education that we are building.

Let's hear from the doctor.

SPEAKER:
Dear friends, I am really sorry I could not be in Kampala to celebrate with you the 20th anniversary of the great African organisation. It is just because I am on another assignment with my fellow CEOs of AfREN. We would have loved to be with you in Kampala for this historic moment.

In the 20 years of existence, AFNOG has supported many network operators, communities, including AfREN. And the motto and spirit have always been self inclusiveness, collaboration and organic growth.

Among the thousands and thousands of African engineers have been trained by AFNOG and many of them are from the education and research community. Today, hundreds if not thousands of them are designing, deploying and operating compass networks as well as national and regular research and education networks.

So kudos and a big thank you to AFNOG. AFNOG... Our friends, thank you and enjoy the celebration in Kampala.

(Applause)

DR NII:
At the least you see a different message, for championing the research and education network, the importance, it is very important for us. And education is part of our development.

The next goodwill messages from another good friend of this community, a strong

believer in internet in Africa. He was in Cape Town in 2000 for the first one, convincing the then sceptical community to stick together and what was internet in Africa, please listen to the doctor.

SPEAKER:

I'm Vince Surf, chief analyst at Google. So kind to invite me to participate, unfortunately my 2019 calendar was conflicting and I was not able to come to join you in person. As you all may know, I'm very interested in the future of internet in Africa and the role that AFNOG plays. Google has made investment in infrastructure is particularly, optical fibre networks. There is a joint venture called CSquared that continues to work in Uganda and other parts of Africa.

We have significant investment in African infrastructure, we expect to continue making those investments as time continues. In the meanwhile I suspect you have a great deal to do, the internet access in Africa continues to grow, there is greater capacity. It will build out.

With the addition of potential very, very large-scale, low Earth and very low Earth orbiting satellites, so maybe 20,000 anticipated, or proposed, there won't be any place on earth were you when we are to escape potential access to the internet, giving you even more work than ever.

I'm interested to hear what happened at AFNOG and I hope the results will be summarised in the meeting. Let me encourage everyone of you to continue the work that you have been doing, please bring this capability to the rest of the continent.

Since I went see you in person on this trip, perhaps we will meet each other on the net.

(Applause)

SPEAKER:

I am Steve director of the network...

DR NII:

We cannot escape, let's not try to escape, let's move on. Vince has been really pivotal in connecting Africa and continues to be with us in all ways.

The next is from who encouraged us to solve the real problem we face in the development of internet in the region.

We worked to address the issue of women and this person was very instrumental in encouraging us to advance in that direction. Shall we listen to Lynn?

SPEAKER:

My name is Lynn and I was the Internet Society CEO from 2001 to early 2014, having joined (unknown term), I am honoured to be able to congratulate all those who have made AFNOG such a success, and especially congratulate Chris Pinkman and other pioneers who conceived of AFNOG. It extends well beyond the African continent. It is a sign of a successful partnership. In my early days with ISOL I travelled to many African countries and one that made an impact was the first AFNOG in 2004 in Dakar. AFNOG has not only train 10,000 engineers but it has transformed the system in Africa with support, incubation efforts for multiple regional internet organisations such as AFRINIC, AFTLD and others.

DR NII:

Am I done? Let's give a hand.

(Applause)

DR NII:

The next is from someone who eggs us on in difficult times, he found a way to keep government interest with us and advancing a stakeholder approach to things. He is known as Mr RFC1 and was the first elected on the African soil. Elected in Dakar. Let's listen to Doctor Steve Crocker.

DR STEVE CROCKER:

Hello there, I am Steve Crocker. Thank you for inviting me to help you celebrate the 20th anniversary of AFNOG. They were the event. When I first worked more than 15 years ago, I thought it was a technical challenge. The technical challenge was just for one party, networks bring people together, build communities and communities build strength, economic progress and education.

AFNOG is a premier example. Networks are not just about connectivity, though that is important, networks bring people together and AFNOG has been a fundamental force any development of both the technical and people networks of Africa.

I had the pleasure of visiting African numerous times and have lots of know some of the outstanding leaders, Neet Pointer is a giant, he mentors and sponsored many, Chhris Pinkham, Alan Berrett, outside Africa, Randy Bush, Joe Scott, Steve Rueter have played roles. I have left out many. It is not just limited to Africa, it is worldwide.

AFNOG is organised around network operators and their operational concerns but quickly expanded to include training and security. And hold 10,000 engineers have been trained. 10,000! The impact is enormous. There is the internet of things and security. AFNOG continues to be replaced to teach and to network. Congratulations on your 20th anniversary. Have a great meeting.

(Applause)

DR NII:

The next video is from another good friend of mine. He pushed me a lot. He is actually father of some of the things here, he is a great research and education connector and a force in Asia, Africa. Let's hear.

SPEAKER:

Hello, congratulations for the AFNOG, 20 year anniversary. I still remember I talked to a Doctor a few years ago, he was looking for the AFNOG to set up. That was the time we set up (inaudible). We set up the Asia-Pacific AFNOG, and now it is an internet summit. I look at the program and it is very good, very impressive, covering so many areas.

I see the evolution of AFNOG and Asia, Africa, internet summit in the last few years. I really liked it.

I attended this summit about three times. I hope to participate again soon, and looking at the program, one thing I could suggest to you, add AI. That is how we are going to start up AI in many countries, so the people in the internet community, (inaudible)

This is just my recommendation, and I hope we can have a good collaboration in the coming years. Thank you. Have a nice 20 year anniversary of the Africa internet Summit including AFNOG. Thank you.

(Applause)

SPEAKER:

I think the messages say it all, but I want to invite to people in the room. They do not know I will invite them, but I hope they will come. The first one is Alan Barrett and the second is Adiel Akplogan. Adiel.

SPEAKER:

Good morning, everybody. I have not prepared anything because this guy sprang a surprise on me. But that is OK.

I was part of the first AFNOG in 2000. I was approached to help organise the very first AFNOG, and the company I was at at the time, we hosted it in Cape Town, and several people that we see at this table there.

The highlight of my year was coming to thee AFNOG meetings. It was instrumental in forming AFRINIC. This was around the same time as AFNOG, we were thinking about forming AFRINIC but that took longer. To create AFNOG from the idea to the first meeting took less than a year, but to create AFRINIC from the idea to when it was fully operational took six years, maybe?

During that time, as the AFNOG meetings, there would always be some time, half a day, dedicated to discussion of what AFRINIC which do after it was formed, so to get people used to the idea that AFRINIC should be created, so I would like to thank AFNOG for helping to form AFRINIC, and it is really great to see so many people here. When we first started it was much smaller and it has grown and it is fantastic. Thank you.

(Applause)

ADIEL AKPLOGAN:

Thank you very much, Doctor. I think it is an honour, always, to be here, but specifically after 20 years, being at the first meeting and seeing what has been achieved over the past 20 years is very encouraging, and actually, it gives us hope that, with determination, persistence, we can achieve a lot.

AFNOG has helped not only share awareness, share knowledge, but also, it has helped build a strong network of experts and technical engineering around the continent, and it is very... It is very encouraging for someone like me to see that we are able, despite our differences, despite, challenges, despite the fact we live in an emerging continent, we have been able to sustain an organisation like AFNOG over the past 20 years, despite all these challenges and make it grow. When AFNOG started, it was a few workshops, now we have seven. We have more coming every day. This means the system is working and growing and addressing some of the new challenges that we have.

We have IoT, blockchains, we have new technology and usage of the internet that is coming, and we need to understand those to solve concrete problems and issues that we face.

So, I wish AFNOG more success. I want us 20 years down the road again to be here, talking about new success, talking about how this group, this community has helped Africa to put its fit into some new technology to solve our issues. Thank you so much, Doctor, for all your support.

(Applause)

SPEAKER:

Let's find out which groups are here. Who were the first AFNOG participants? If any of them here, I would like them to stand up so we can honour them. First participants, instructors, everybody.

We all participated. Yes, yes, yes.

(Applause)

SPEAKER:

We really respect you very much. Thank you very very much. First AFNOG instructors. Alan Barrett.

(Applause)

SPEAKER:

You are in multiple sets. Participants who have become instructors over the years. Those who grew to become instructors. Now we can see!

We have a natural way of regenerating ourselves, and it is good to see that.

First time the disappearance. I would like them to stand and join in, 20th celebration. If it is your first I'm coming to AFNOG, please stand up. Let's see you.

(Applause)

SPEAKER:

Thank you very much. Keep coming. This, for us, is a pilgrimage.

Current instructors. Who are the current instructors? You can stand.

(Applause)

SPEAKER:

We really, really appreciate your volunteer spirit, sacrifice, your time, all to help us grow.

Initial secretariat. Are any of the folks...? Nancy, OK. OK.

(Applause)

SPEAKER:

Thank you, thank you, thank you. I think he remembered John Scott was mentioned. Thank you very much.

And current secretariat. The current secretariat. If you are here, let's see you. Thank

you.

(Applause)

SPEAKER:

No, we have a particular group among us that we treasure so much and we will refer to them as AFNOG chicks. If you are here, let's see you. You are the only group that is being called. Please.

(Applause)

SPEAKER:

It is not only guys here! Thank you very much.

OK, we are now due to hear a brief short story on the 20 year journey, and that will be done by now. Noah.

SPEAKER:

Hello, everybody. I volunteer as an instructor and I chair the program committee. But I work with an organisation called Seecom and we provide internet connectivity for the event.

I will take us through... I will take us through the 20 years of AFNOG... OK. OK. I will take us through the 20 years of AFNOG by sharing a few pictures and stories so that we basically have an idea of the entire journey over the past 20 years.

So, like, the folks you have seen, Dr Nii, Steve who was speaking in the video, when the internet happened in the early 1990s, there was a need to view at capacity across the entire world. For the case of Africa, a few friends came together as you can see in the picture. They decided to volunteer inside AFNOG so that it would then be the driving force behind capacity building in terms of engineering, internet engineering, human capital in the continent.

So, AFNOG happened and then, two tracks were introduced at the time. The first one was the (unknown term) services which looked at systems in terms of email and all that stuff, and the second was the infrastructure. Basically, the network and the infrastructure itself.

These were the initial two tracks at the time, and the participation as you can see, you can see some familiar faces there. You will see Adiel, Alan Barrett and many others in that picture, so it is basically a combination of students and instructors at the time.

This was in Cape Town in the year 2000, and AFNOG was basically born during this event.

The number of students was small at the time. Of course, some of you might see some familiar faces. If you recognise somebody smiling there, that is me, a student at the time. There is Brian there, and they are all smiling. And with everything, you have to plant a seed so a tree can grow.

The number of instructors was small. You can see the computers back in the day. These days, we walk around with small laptops, running around, but back in the day, you can see the computers were big. The number of instructors were small. You can see Steve,

Dr Nii there, and other instructors whose names I have forgotten. Essentially, the team was small. There is somebody behind there. Patrick, Elaine, Bran, sorry? Yes.

You know, the whole AFNOG agenda, the whole AFNOG initiative started to grow slowly by slowly. 20 years after, from the two trucks, now we have over eight trucks in different languages because diversity also became something important.

Now we run trucks in English and French, some of these trucks we introduce later on. The computer response team truck on cyber security. Monitoring and management, NMF, for the French truck.

Internet infrastructure also has a French version. And then the services. There has been a growth, of course, an increase in the number of trucks with the need of diversity, the expansion of these trucks.

The other thing from this picture, considering the original picture which was a couple of people you can see participation has grown. There are more people, students, instructors, that is a good picture in Nairobi where we had the AFNOG event some two years ago.

But essentially the seed has grown and the tree is continuing to produce more leaves. The number of students in the class is growing. This was an event in Kigali a few years ago. You can see the difference, there are few students and now we have more students.

In this event, from the students who stood earlier on, there has been a growth in terms of the demand to grow more capacity across the continent. So this is basically... I picked a couple of pictures from various...

These are basically pictures of different instructors over the years, they show the evolution from the small team. There was not enough space. There has spent a lot of instructors since the year 2000.

Of course, you will see there is also diversity, we still have more women instructors involved as volunteers. And, yes, essentially the number of instructors has grown.

Some of the faces there, from instructing, they are new instructors. Philip Smith... Elaine, you know, and you know, Franco Phil down there. Some have returned, some have joined the engine and the engine continues spinning.

Of course with the new technology we are embracing the fact that we have to adapt otherwise we will be extinct, we're looking at internet of things, automation, a truck which has been introduced through a tutorial, the idea is to expand.

You have to go with current trends and adapt otherwise you will be left behind. We have started to consider some of these new technologies and also introducing them into the AFNOG program, so that we also explore the advantages.

So central to AFNOG's mandate is the ethos, capacity building, as you have seen from the preceding pictures, collaboration. That is why we are all here, incubation and community, the community is everything to what we all do.

In terms of incubation, you had Alan talk about the fact that AFRINIC, it was incubated

and was born out of the AFNOG program. We have had other organisations like the AfREN, AFIX, FLTD for domains, and then AfricaCERT for Cyber security.

AFIX is one of the most important organisations, there is need for inclusion, diversity. And it was, of course, started a few years ago by some of the women who have been volunteering in the community.

It was about building human capital for women so we can inclusively have them as part of the African story. We have trucks, in this organisation, it is the network system and security, trucks.

They also have their own conference which is like an AFNOG style, it happens during the course of the week and it attracts women engineering where they discuss a lot of issues. You will see on this slide...

He has been very supportive over the programme. He is in the room, I would love for him to stand up.

(Applause)

Yes. Thank you so much for your support and for the support of the AF Chicks program, he will be presenting later, you will know more about him. Thank you.

That is basically a number of women together, you know, wishing the AF Chicks, this is... I think this was in Nairobi or Senegal, this is what AFNOG is about, inclusiveness, diversity, incubating different interest groups within our community.

Beside that, we're getting community activity, which embraced one of the most famous activities that happened in Rwanda, a community driven event where everyone is involved in the environment and planting trees.

We extended... Participated in this, it is not just about building capacity and talking about policy that we embraced the whole spirit of the community. You will see some familiar faces there, this was a fun event at the time.

The idea of community centric to the AFNOG agenda and we continue to do this.

Of course, over the years we have lost a few friends. I have two pictures specifically there, that is one. These were some of the people who were volunteers over the years but we have lost them. I thought we should give them a moment of silence.

Thank you. Obviously over the years we have had a lot of generous sponsors supporting the AFNOG organisation, a few logos are there to basically show that. We get a lot of support from the community, various organisations and we really thank all the sponsors over the years and the ones who will continue to support us in the future.

So, of course, everything we do here has some sort of... Are people behind us all being here. Coordinating everything and... The engine, I would love to request for Nancy to come and say a few words.

(Applause)

SPEAKER:

OK. Good morning and welcome once again to AFNOG 2019, 20th anniversary of building IT capacity in Africa. As you have already heard, AFNOG was conceived by (inaudible) USA and then AFNOG was born as an organisation with all of us devoting our time merely to support AFNOG.

It was hosted in Kenya in 1999. The initial event in Cape Town, South Africa, was run by Joanne Scott and assisted by Alan, Myriam of Ghana. In 2001, suddenly, Joanne Scott moved on.

Alan and I scratched our heads, decided... We sometimes improvised, got our act together and continued ever since. It is made up of (inaudible), from Ghana, and Uganda.

It is the local host this year. Elizabeth... We all do our work online, wherever anybody is in the world. It essentially runs AFNOG from the background.

For the country host, recommends a selected country host and consultation with the core organisers, AFRINIC.

AFNOG makes a visit to the country and selects venue, hotel as well as membership prices.

It also involves getting the application up, researching and then rallying round instructors around the globe, validating all applicants received.

We have sponsorship with participants and organise events. It is funded for all. And then ship equipment of the country hosts, and then to the events of the year...

We are show flights are in for all. And then we show successful events. Men and women (inaudible). A number are currently instructors.

(inaudible) was a participant in 2000 and rose to become the first CEO of AFRINIC. I was a participant in 2003 and in Seacom, including NOAA and many more. You have Elena, instructor in 2000 and became CT of AFRINIC.

There was a local host in 2000. It is AFNOG for life. We think Randy Bush, Chris, and others for foresight in establishing AFNOG. We have other partners and sponsors over the years, NSRC, ICANN, Internet Society, University of Oregon, Cisco World Bank.

Thank you for supporting us. Thank you for all of the donors including ISOC, ICANN etc. Thank you for supporting female engineers over the years. Our gender specific training has helped, and our female participation has grown to 30% of the total population currently.

So, from AFRINIC, we said thank you. Thank you for volunteering your time. We are thank you to the various countries involved over the years, and this time, the Uganda commission.

(inaudible), and we say thank you because you made us more determined to succeed. Thank you.

(Applause)

SPEAKER:

It is not perfect, but we keep improving yearly. It has been a long, hard road. Africa is still behind and there was a long way to go in order to liberate yourselves technologically. Come on board and help us bridge the divide. 20 years of building internet capacity in Africa, and I wish us all a happy 20th anniversary. Thank you.

SPEAKER:

Thank you come in and see, and thank you all for supporting us over the years.

Yes, so, besides the secretariat, they raise a number part of AFNOG which is invisible but very, very strategic. With out it, the network, the infrastructure, the supporting structures, the website, the internet connectivity ground, logistics, all that stuff, would not be possible. That is the infrastructure and logistics team.

So, I would like to call Sarah, Patrick, and everybody else from the infrastructure team to come and at least give us an overview of the hard work you do behind-the-scenes.

SPEAKER:

Good morning. The rest of the team is...

SPEAKER:

(inaudible)

SPEAKER:

Don't be shy.

SPEAKER:

They don't want to come. They have been busy working.

SPEAKER:

(inaudible)

SPEAKER:

I don't mind. Anyway, let's do the presentation. This talk is about building AFNOG networks. The networks we use. A little background, at AFNOG, we want to build workshops on real production grade networks, to emulate the environments we have back home. This sometimes poses a few challenges.

Now, fortunately, proof of our activities has largely been forgotten. We were able to deny them, but in some cases, pictures exist so I have to explain some of that. In any case, for some of the actions that we did and some that I will show, I will thank and apologise to pass local hosts and hotels.

So, this is what a classroom in 2000 looks like. As you can see, it had standard PC equipment. We would get real PCs in there. This would be a routing track, so we would have a real physical router that had to be set up.

We have to set up a test network and that was quite a challenge which required a lot of logistics. I think we would need many, many computers to do this. OK?

So, some of the problems we encountered, this was 2001, and you can see that we are working on power issues. This was in the scalable services classroom, and sometimes the power would go down, so we added UPS power supplies to the classroom, and we

thought that worked well.

In 2001, if you needed to set up a web server, it was not something you would download. You would download the source code, Apache, open SSL and then compile. One of the exercises was to download this stuff and compile it.

Unfortunately, this is where we failed. As soon as the classroom started to type, the UPS would go into overload, so basically, the whole classroom would shut down, and we fixed it by going to the classroom and sending the even people out for lunch so the odd people could compile, and when they come back from lunch, we would switch. That is one of the tricks we did.

This is 2002 in Togo. Is that time, there were very few buildings, and we were using microwave link connections. The big building you see in the background is the BCTI building, and all the microwave operators would put their equipment on that building without frequency coordination.

I would put my stuff up and we would all put our stuff up and it would interfere with everyone else's, and it became quite chaotic. Every system, every person would be stepping on each other.

Getting packets (inaudible), but usually, they were sniped by packets sent by other operators, so what we did, what we have to do, just something that we tried was reducing the packet size to the BCTI buildings to very small packets because then there would be less chance they would be swiped by others. This was one of the challenges we had.

We run the workshop in this way for three weeks. Click. Oh, that is the wrong way. OK, we are getting there.

We were using radio, and the antennae were on the roof. We had shields that were protected there. That is why we needed to use the cables. OK?

So, getting into this place, I don't have good pictures. I was scared. I was scared. There were people... I asked two guys to stand on each side and say, OK, make sure I have at least 4 inches while I was going through this room like that. OK?

So, the next problem, and you can see as adapting something here, we needed to get from that room to the rest of the hotel and the hotel said we could use (inaudible), so what we did, I pulled out my pocket knife and we started sewing on the door so we could close the thing. This is how you do networking in 2000.

So, 2003, that was the previous year we were in Kampala. We used (inaudible). They got us a satellite dish and we needed to put it together and install it. Unfortunately, the satellite dish was actually not one satellite dish but it was leftover parts from two or three satellite dishes which did not fit so somebody needed to climb under and put everything together to complete making a complete dish, and we spent days getting this to work. Eventually, we felt we got a lot... We spent days making this work because the screws would not fit.

This was not one hotel but too. The telephone exchange was whether connectivity would come from. Rest assured, not a problem. These two buildings, there was a table between them. Unfortunately, the table had leaked water and there was a lot of crosstalk, a lot of

interference. You could not make the telephone conversation from one building to the next building because of the interference with the cable, and we would need to use that to get the building where the telephone exchange was to where the conference was, so that was never going to work.

What we did was implement something new, using the palm trees between the buildings to get the cable between one place to the next and that is how we got connectivity for the event. You can see some examples here.

We not only fixed networks but other things, and I hope the picture is big enough. Something you should know, the AFNOG logo changes every year because the country... We have the map of Africa and the countries where we have been, we make them green. The country that we are currently at, we make it yellow, but the countries we have been, we make it green, and this was 2005. You can see an error here because Ghana is green, Togo was not.

The good news was this banner was not printed, it was stickered, so what we did, we took a corner of the text. The comma is missing, but this is one of the examples of what we did.

Another thing we needed to do in 2005, we were in a nice teaching building, and they had projection screens and they were hung up very high and there was supposed to be a tool to get them down, but the tool had been long gone so we couldn't, so we couldn't reach to get the screens down. So what you actually see here are a couple of (inaudible)

That is just one example of stuff that we need to do.

If we build classrooms - this is 2006 in Kenya - we want to make sure that people don't trip over cables. We need to do more. You see me fixing the hotel network, the hotel cabling because it was often broken. We had to spend many hours to get points that would work.

In 2006, we had another problem. I hope you can read what it says on the screen. Actually, you can't. We got the equipment that we use in the classroom, equipment that was donated to Africa, but they sent computers that didn't work very well. They had capacity problems, hard disks were broken, we had issues, so we try to get things working and we had exciting moments. The monitor on the text of the screen says that it caught fire, and literally, that screen caught fire when we plugged it in in the classroom, so that was a little bit of excitement there.

This is some of the traffic that we had to go through. Just the traffic signs that we saw in Kenya, speed limit is 20 km. 2007 was another satellite year. Just to explain something, we were using offset... An offset dish, this is a satellite dish, it points like this.

The thing is, we were in a hotel that used to use satellite to communicate, to get internet access but had changed and the dishwasher and microwave was still there. We could use the dish because it was no longer in use.

The Hotel was using a dash, a satellite in the East, it was no problem. When we used a satellite we had over the Panama Canal, we would need to change the dish to look like this.

Unfortunately we could not do that because a roof was on the way, from this to this. What do you do? If we do it like this, it will receive like this but the roof will be under.

What we ended up doing was put a satellite dish upside down, look at the text, the text is upside down, we put the satellite dish, put it upside down and you see the CEO of AFRINIC doing vital engineering work, this is what it looks like. It is not a good picture of the reverse satellite. You see in the background the roof and it explains why we have to put it up like this.

There was a bigger problem because the people who deal with satellite dishes, if you install a satellite dishes, there is something where you need to tweak the polarisation, you call the operator and they will tell you to tweak, rotate. That would be no problem in the normal position, it would be here. What did I do?

I did not want to do this. Can you put it back, please? I do not know what happened. Help? OK. That's OK.

OK. OK. Next one. So under normal circumstances it would be here and you could easily... Now it would be, several metres up. There was no way to get a ladder there, how do you get to it?

It is part of a method to twist it to make it work to the adjustment for the operator. We use the connection for three weeks.

Apart from these ad hoc things we have also done some technology developments. 2003 is the first year that we did IPv6, you see the operator out of this on the left. My laptop at the time.

I am happy to say that we have used IPv6 on our network since 2003, dual network, never had a problem. That is the way we introduced new technology. In especially the earlier years we were donated books and we would give books away, books are very expensive.

A pile of books like this would be an enabler for an engineer to learn more about the technology he was getting at AFNOG.

Books, they are heavy. This was difficult. Later on we decided to go to... We need to duplicate this. If you look, you can... There is a contraption like this, many are used at the same time. If you think it is a challenge, know all about it.

So some of the technology experiments we did actually did not work so well. This is an example where we actually reached the front page, because in 2009 when we were setting up the network connection, we caused a network incident.

This was on the news. A message saying that people have been using (inaudible), they found that suddenly it was crash. It was all over the internet. Many places, small ISPs in Eastern Europe who would be using it, found it would crash if it connected to the internet.

I had to send an announcement out. I will save you the technical details, it is on the screen if you are interested. We took out a bug in software they had never seen before.

How do you get the updates and software if it keeps crashing, that was a challenge. In

that weekend I received an interesting email from people who found their internet connection gone. It was not very nice.

So... So much for me speaking. Should I... No? You want to have a break? A little break now? You want to do it later? OK. I have been told the next part will be later, thank you very much. Doctor

SPEAKER:

So... Yes. Let's clap.

(Applause)

SPEAKER:

Now you know things are not easy. Things are not easy, so... You know. This is serious business. Thanks a lot. Over the years, all of those complications have been, you know, resolved.

These days you have things defined, it is much easier to set up the infrastructure. You still have challenges, because we are running Real Networks.

With that, I'd like to emphasise four things, and the need for community, we are a community that needs to continue collaborating, working together. I want to emphasise the fact that if there are other interest groups that need to incubate themselves, this is where you need to basically come and join the rest of the community. Most importantly, there is need for voluntary service.

We are all here as volunteers because we want to build the African internet and you can only do that by building capacity and collaborating and pushing the whole community engagement idea. With that, I just thank you. Thank you so much. AFNOG. AFNOG!

SPEAKER:

Thank you. OK. As we head for break, anybody who has any other comments... Any comments, besides that can I have someone from Kenya. Kenyan is after you.

SPEAKER:

I am from Africa. My name is (inaudible), I have a question. There was one bit missing there. How many were using during the first five years? In gigabytes.

SPEAKER:

Yes. I don't actually know what we did in Cape Town. Because we were using the University network.

The second year I know very well, there is another story here. We had two... 64K lines going to the operator telephone exchange. In most cases, one of the lines would work.

There is always the challenge of making calls and the operator was helpful. Once the technician found out what we were doing he said he would make it work and slept at the telephone exchange all week to make sure if the lines went down... I did not have a picture of that.

And then Togo was... Several hundred K, and in those days it was before YouTube. That would just work.

It has been improved this year. We have the gigabytes, you may have seen me looking at statistics, 128 MB... We haven't peaked. We have much more bandwidth. The early days, getting bandwidth, it was a challenge. I hope some of the pictures show the challenges we have. Thank you.

SPEAKER:

What we have done for 20 years, thank you.

SPEAKER:

Susan. Is Susan around? OK. Thank you, anybody else with a comment while I wait for Susan? I'm looking for ladies from Kenya. Is there a comment? Please get a microphone.

Is the microphone on?

SPEAKER:

OK, thank you very much, thank you everybody. I am (inaudible). To put this on the next level, to bring about the internet, we should be internet. There is something much more than ability, it is the ability to organise. The internet has made us discover we are more capable than we thought we were.

God created the world, he did not create any door anywhere in the universe. The only limitation that exists exclusively exists in our minds when we fail to use the internet. Thank you very much.

SPEAKER:

Thank you so much. You are a first timer. Thank you so much for your comment. OK. I am waiting for... I don't have a Kenyan in the room, there's a reason I'm asking for one.

Come up here. And a lady too. Michelle. You have been hiding.

(Applause)

SPEAKER:

You are going to teach us something. It is a happy day today. In my travels, I find certain people do things differently. Kenyans have adapted things differently, so you are going to digest how to sing happy birthday in Kenya.

You will teach us and then we will also get the way the Kenyans do it. How do they sing it? If you don't know how to sing, you can go back. All right, how do they do it?

SPEAKER:

Good morning, everyone. Listen to the words are not the voice.

SPEAKER:

Sing it first and then we will sing it together.

SPEAKER:

Happy birthday, dear AFNOG.
Happy birthday, dear AFNOG.
Happy birthday, dear AFNOG.

SPEAKER:

Let's sing it. Let's start again.

SPEAKER:

One, two, three.

SPEAKER:

Happy birthday, dear AFNOG.

Happy birthday, dear AFNOG.

Happy birthday, dear AFNOG.

(Overlapping voices sing)

SPEAKER:

Thank you, I felt like I was in charge there.

Can I ask (inaudible). Yes. Thank you for teaching us that.

SPEAKER:

OK, I want somebody from Zimbabwe. Anyone from Zimbabwe in the room? Please come up. Someone from Tanzania.

And Zambia. Somebody from Zambia? Somebody from Zambia, please come off. It is all about surprises this morning.

SPEAKER:

We are going to try to show our unity. We are going to sing the same song by multiple different languages. I am from west Africa. We want to sing.

SPEAKER:

Yes, they want us to sing our national anthem. Now, we stand up. This is what we do. We must all stand up. Please. Yes. So, we start (Speaks foreign language).

Now, let's start singing.

(Sings)

SPEAKER:

So, the importance of what we have just done is, part of this celebration of 20 years of AFNOG, to show the unity that we have in Africa. This was written by (unknown term), and it was adopted across the continent as a national and some, in South Africa, in Tanzania, in Ghana, in Zambia and Zimbabwe, and there are two or three other countries that sing the song, so it is important that we understand this.

This means God bless Africa. It says bless the people and bless all of its nations, and it is almost a prayer song for speaking blessing.

We have done this from Tunisia (inaudible), and it is now becoming a tradition. At the next sitting, we will invite more of you to come and join us and adopt this as our anthem. Thank you.

(Applause)

SPEAKER:

Sorry for keeping you so long, but I hope you enjoyed our celebration and thank you very much.

(Applause)

SPEAKER:

Thank you. We are running late unapologetically. We will just have a 15 minute break and then come in very quickly. I know there is enough out that you very quickly go and get a bite, so let's be here in 15 minutes. We will start promptly. Thanks.

(Break)

DR NII:

Good morning, everyone. Settle down so we can start the next session.

I will be moderating the next session. I have two speakers, and I will ask Uli Raich, a retired physicist in developing countries since 1981. Of course, he has been involved with an organisation called ICRT where he was teaching at the University of Ghana in 2017.

Uli, please welcome.

(Applause)

ULI RAICH:

Good morning.

If I ask you, what is IoT, what would you say? The internet of things. Now, this is exactly what I expected. If you ask people what is IoT, they will tell you it is the internet of things.

But what the hell is the internet of things? It has become a buzzword. Everybody is talking about it and nobody really knows what it means. Or, at least, very few people know what it is all about, and even fewer people now how to set up an IoT.

While, I am a physicist and physicists always want to know what is behind the things, so I am one of the people who hate buzzwords, so let's have a look.

It reminds me of the story of the child and the elephant, so the child asks what an elephant is, and since I don't really know myself, I tell him an elephant is a grey animal. That is certainly true.

Then, if I am lucky, the child will say OK, that is it, I have the answer and I will not disturb this guy anymore. He may even think that I am a clever person because I could answer him, but does he know anything more than he knew before? Not really.

So, what should I have done? I should have learned about elephants myself. Secondly, I should have told him everything I know about elephants. Now, learning about elephants, I tried to learn about IoT over the last 12 months, telling him everything about elephants. Now I have got 30 minutes to tell you everything about IoT in 30 minutes, which is clearly a challenge. So, I will do my very best, and then what I should have done, I should have gone to a zoo or I should have gone to one of the nature reserves in East Africa and showed him a life elephant.

Now, showing you one in this room is a bit difficult, and take you to the zoo would also be difficult, so what I did, I poured a baby elephant, a very simple IoT system, and unfortunately, I cannot make it run in the lecture hall, but you can come up to me and I can show it to you later.

This is how it looks. It is very tiny and this is my IoT system. So, what is IoT?

I stands for internet, and what does it mean for us? We need processes which are capable of running the internet or communicating over the internet. This means that it must be powerful enough to run the internet protocols on the one hand, and on the other hand, there must be able to interface to the internet in one way or another. Now, what sort of interfaces to we have? We have the internet interface which everybody knows, we have the Wi-Fi interface which everybody knows. We can have GSM to connect to the internet, and one thing that we often forget is that we can have another machine to which we can connect by whatever means and this other machine can have access to the internet. These are the four possibilities. How do we use the internet?

Most of you when you use the internet, you do web browsing, email, maybe social media. You may have Skype telephone chats, etc. All of these uses, if you think it over, they are human too machine or human to human communications. With IoT things are little bit different, in IoT you have things that will communicate without human intervention.

What are things? Things can be anything. One thing very important, coffee machine is a thing, washing machine, it could be a burglar design system, scientific measurements and so on, you name it. There are plenty of things in this world.

And we can connect to the internet. So how does this work? The process we are using needs some means to know the state of the thing. It knows the state of the thing, you have different types of sensors, which tell you which state your coffee machine is or burglar alarm system.

A burglar is coming into your house, he opens the door and the door will be opened. A sensor will tell you if the door is open or closed. Depending on the state it will act correspondingly.

This is how you find out the state, you can also control the system which is done through activators. You can switch off... On a pump, some lights, print out some text etc. All of these are activators.

Now the IoT system, we need a system with a number of processes that can read our sensors and control activators, that is the first one. Second point, the processes must be able to communicate with humans over the internet, second point.

We have to keep in mind, this is what we need in order to set up an IoT. We have to make certain design decisions and the first decision may be which processor shall use. The second one, which communication protocol should be used. Which application should be used to have a look at the state the IoT is in and also control functions of IoT.

And which programming language should we use to make the IoT work. I think there is always one point that is not only valid in Africa but all over the world, how much does it cost.

What I want to do first, when I started and tried to have....my IoT developments, I had a look at the application. Let's look at the application.

I found this thing. You see this is an application that creates an internet of things and down here... You cannot read it. It says design prototypes and complete IoT system with the first drag and drop project builder. This sounds fantastic, you have a certain number, pick it up with your mouse, the IoT is done. It is not exactly like this.

Since it says here, OK, I started to try it. The first page I saw was this. One of the design processes was to find out what we want. The system tells me you use one of these.

These are the most common controllers today on the market. Let's look at this first. This is a small computer, not just a microcontroller, runs the UNIX operating system, a CPU, 64-bit. That is really powerful. 1 GB of RAM.

UCD connectivity, we have definite. We have two USB ports, but seeing... We have a 40 pin extended IPO connector. It stands for general purpose input output. We can control the device, read the state and write something, make the activator work.

In addition to simple, it has more complex interfaces, the SPI, senior peripheral interface, it is used by many sensors so it will convert your data and you can read it over this interface. The cost of the device, it is \$35. You need a USB card, a few other things. So it can be 80 and \$100. It does not have an analog to digital converter. But it is not really a big deal.

Is this the ideal machine, processor for our IoT system? It can be. It depends on the application. If you have an IoT, planned your sensors, they are all in the same support, this may well be the best solution. If you come back to our burglar alarm system, we have 20 windows and doors in our house, the only thing we want to know is if the door is open or closed.

We read out a single bit. This one single bit we have to send to a central station that treats this information. It is reading a single bit. But such a type of system, Raspberry Pi is overkill. Let's look at the other one. Arduino, it is less powerful and cheaper.

There are different types, we have 32 kB. That is very little compared to the SD card, there is 2 kB and there is no network interface.

These standardised connectors. You can buy additional boards, piggyback boards like the ones you see here on the right. You see this is an application That creates an internet of things and down here... You cannot read it. It says design prototypes and complete IoT system with the first drag and drop project builder. This sounds fantastic, you have a certain number, pick it up with your mouse, the IoT is done. It is not exactly like this.

Since it says here, OK, I started to try it. The first page I saw was this. One of the design processes was to find out what we want. The system tells me you use one of these.

These are the most common controllers today on the market. Let's look at this first. This is a small computer, not just a microcontroller, runs the UNIX operating system, a CPU, 64-bit. F-Fi interface and this one you can simply plug onto your Arduino.

Typically this will cost you about \$12, \$15. It is quite a bit cheaper. But of course you can do less. I tried this, got it to work.

To get the Wi-Fi interface working was really difficult. So since I finally managed to get it to work, I understood how it works. In fact, what happens is the two machines, Arduino, host machine is going to talk to the Wi-Fi shields interface.

The Wi-Fi shield does the connection to the internet. You see the Wi-Fi shield acts as a gateway for the host processing.

We have another process. This one. This one actually has everything that a processor needs and it has in its flash a special program.

It's not just possible to skip Arduino altogether and only use that here? This one. You get rid of the program in flash and write your own program. Can you program this thing. It turns out you can.

If you look at the processor it has Wi-Fi on trip, 80 kB of RAM, 10 more than Arduino, 4 GB of flash, right on that trip. Very interesting. You can use the integrated development environment, use it on this process as well.

And SPI interfaces, it normally is enough. There are many sensors and activators, a few you see on the slide here. You can put this on the processor and they have activators and sensor boards, I have 10 or 15 boards.

OK? The CPU here costs \$2.50. That is all you need, really. There is another CPA which is an ESP 32, much more powerful. Otherwise it is the same company that produces it and that costs 4.50.

Now... I think we have more or less decided on the CPU we will use and the sensors you will use. Let's look at communication. In IoT they use message queueing telemetry transport.

It runs on top of TCP. What does it mean? A processor can subscribe, a broker as it is called, on a certain topic. This is the subscription. There may be another processor which talks to the browser who will publish on that topic.

And then the message that is published will be sent to everyone on this topic. This is how it looks like, can you play the first video, please.

So... It should run like this.

(Video plays)

Right, you see I started a thing called Mosquito, this is the post office you saw before. In this window I am subscribing to the topic.

You see the subscription has gone to the broker. I subscribe a second time to 18, it goes to the broker.

I publish and I publish first to 19. This message will go to the post office, the broker, window on the left. It will pass it on to everyone subscribed to this topic.

It is in the window, subscribe, to AFRINIC 19. The message for the AFRINIC 18 is unfortunately you are one year late.

This is going to go to the second window on the right side, it has subscribe to AFRINIC 18. Can we go back? Yes, thank you.

OK. Now... So far, the process that we want to use, we know a little bit about the communication. Now let's look at the programming language to be used.

The messages that, the protocol are simply streams. It is any programming language that can generate streams, so we can use a programming language like C, Java, Python, Java, JavaScript, all these languages that you can use, and for Cayenne, we have libraries in Python, so on ESP8266, we ran a Python interpreter, so we will use Python for our programs.

This is probably difficult to see in the back, so I will tell you what this does. It includes a library which is a library that connects to the client. Then, it finds the Wi-Fi credentials and the password, and it defines a server. Once that is done, it connects to the client and the broker, and then what we do, we generate... It is a temperature value which is just a dummy value, so I take this, and this will be sent to the broker.

We have timber to values every second and since we have access to sensors we can send this data to the central station to the broker.

Here, we have an LED. Beyond the LED, you see a voltage divider. So, this pen here, this one, you put this on to an ACD. If the light intensity changes, the value here changes, and then you will see that on the IOT system.

This makes the program to write in Python, a child's game, so (inaudible)

So, here you see a bit of a code. The LED has gone off. After some time, the program is switched on again, and after some time, it is switched off again. In fact, when it is switched on and off, if you have a look at the intensity measured, you will see that this also changes depending on the intensity of the light that the resistor sees.

Cayenne supplies the broker and uses a dedicated format for topic and payload, and it also supplies a certain number of things for control. When you subscribe, what you get is a username, a password, one for every module, you will get a client ID.

These things are put on top of the topic and allow you to select only those which are allowed for Cayenne. So, these are the definitions you see.

These are the definitions that you get. Then, we need to connect again to the broker, and once we have that, we can write the corresponding values which we see here. Here, I am sending a value to Cayenne, and this is what it will look like. You see the voltage which is light intensity that I had from a photoresistor which I see here.

Can we have the last video?

It just started from there. OK. Now, the light is on at the moment. Now I have connected to Cayenne. I have a light coming on telling me that it is dark. Then, I am going to switch the light on here and switch that on, OK. After some time, the system will see that there is more light intensity and the blue light is going to go off. OK. Now I

can switch it off again. Now, all of this can be done from anywhere to anywhere.

We tried the whole thing, me sitting in France and my friends sitting in Ghana and I can switch the light and an offer and they can see what the light intensity of my resistor is.

So, it allows you also to do so-called triggers which you see here. If the light goes beyond a certain value, the lamp is switched on. If the light goes above a certain value, it is switched off again. Then the blue light will go on.

Usually these types of systems do not need to be very fast. OK, we can stop it.

OK. Now, what Cayenne does, it keeps these values in their history, so what you will see here is the light intensity over longer periods, when the light is switched on and off, so you see the history over the last few hours.

This is it for the talk. If you want to know more about IoT, I must tell you that you have unfortunately missed the tutorial which we gave it to this conference, but there is a website on which we have all the different information, so this is the IoT workshop, and we also have plenty of the programs for this type of system which you will find, and if this is still not enough, then you have to see me for a beer in the bar somewhere. So, that is it.

(Applause)

DR NII:

Do we have any questions? 2 minutes for questions. Any questions? OK, good, a question. Come to the microphone.

SPEAKER:

Thank you for the presentation. My question is that when people are talking about IoT, it is the security bit of it.

ULI RAICH:

The security that you have, it is just for the client ID. The Cayenne username and password. It does three things don't fit, you cannot get access. Does this answer your question?

DR NII:

One more question.

SPEAKER:

What can we expect for small solutions in IoT? I am sure there are trends you want to share.

ULI RAICH:

I remember when I did a course. We had a microprocessor which is a 6800 which came out of the market. I remember that this was a real breakthrough because the machines that we bought at that time would cost you between 80 and hundred thousand dollars. That microprocessor chip, I think the first version cost about \$500.

Now, the system I have here with about 10 or 15 sensors, we could run an interpreter on it which cost you \$2.50. So, what I saw is that, in the future, they are just about trying to prepare a new microcontroller which will run again a full operating system.

If the \$2.50 is too much for you, I have one with a sensor already attached, and the processor will also cost you \$2.50.

DR NII:

Thank you so much. A round of applause.

Our next speaker is Jim Forster. He is taking us through the 20 years of AFNOG, but I didn't want to mention his name because I was going to introduce him anyway.

He is passionate about extending the internet. He started in 1998 and became a distinguished engineer. He has been working with several non-profit organisations in areas within Africa, in India, and his foundation has supported AFNOG, and he has also invested in four ISPs in Africa. (inaudible) He and Ben have started a fund, connectivity.com, in frontier markets. A round of applause for Jim Forster.

(Applause)

JIM FORSTER:

I realise that with delays I'm standing between us and lunch, I hope... If we get hungry, where is the advance. Here. Good. A nice introduction. Here we go. Some of you may have seen this famous shirt with layer models, they stuck (inaudible) on there, beside the technical ones there is the financial and political one.

Finance is a technical conference, we want to make networks. Finance is important, dollars are important. The engineer who does not care about dollars does not care about, storage users, bandwidth. My career, now a junior businessperson, have to keep learning.

I love coming to these things, I learned things at these events. NFNOG... Four times in 2006 to nine, I think it was twice to 16 and 18.

Testing in Africa, India, small companies, technical, mostly ISPs. More information, I and I Holdings.com.

More about the investments, there are interesting stories. In India, there is a word that means hurry up, quick, it is good for wireless. One of the things is we have about 130 people and most of the stuff came in with little technical skills, they were trained.

We have people with very little and now managing 10 people, they have technical responsibility for an area, HR responsibility, customer responsibility. They came in with nothing and now done very well.

You may have heard Microsoft is involved, I got involved, it was the TV whitespace network, TV whitespace is a fantastic policy initiative that has not been adopted in all countries. We've gone back to regular microwave, it is great. Another company in South Africa, too much Wi-Fi, a funny name. Have any of you had too much? That is what they say, too much.

Tanzania, Eric started it. Pretty much all the engineers came through this. Malawi we invested in last year. From the early days of AFNOG, the starter came from, we're doing equity investments. There is another way to invest. This is the purpose of the talk.

Driving on economies of scale, better bandwidth, equipment. The operations are smooth. How do you do that if you're starting out, you say you can't do it, you can, but you have to watch what you are doing. What are your specific financing needs and the consideration, why do you want financing and what are the different kinds.

What is capital for growth, it depends on the company cycle, starts from somewhere, some companies don't survive, some get big. A sidenote about committee networks, ISOC has been active, can increase penetration at low cost. By leveraging social assets. Not just purely financial, the communities involved. Some great examples. Internet Society. Africa summits.

They have 25 active. Some companies we have invested started as community networks. Eric's company, that was an association, Tanzanian committee network, even before the internet. We needed to be more organised as a commercial company.

They have 100 employees, hosts the exchange point, transition from a community network to a little company. It started as a community networking 2006. 2009 it was registered as a private company in India, put money on it, it has grown. 130 employees in eight states.

Talking about company lifestyle, little ones, big ones, this is a generic chart from young to old are too small to large. ISP, you start off with equity, say I can do it, know what I'm doing, getting pieces of equipment and connect them.

We're getting initial traction, I can borrow some from my father, uncle, friends, we will pull together and make something. You possibly get some grant funding, Internet Society has done some grants, it is a nice organisation and process out, working with them.

You might try to negotiate equity funding, apply for it. If you get a little bit more, you have both capital, you have something going on and you know what you are doing and want to do more. Demonstrated initial success but you want to expand.

That is when you can take both capital from loans or possibly... Finally, the last stage, you go to capital markets, it is not easy to stay there. That is maybe success or final stage.

If you have a network and you want to expand it, where are you and the company life-cycle and what is the true cost of capital? Need a loan, investment, what does it cost. It takes time. Months.

90% of the time... They are talking about investors. If you want to make money, you will be out raising money. And what type of control are you willing to give up? Investors want to pay attention, say, you should do this. You will give up some control, that is the way it is. Take some money, you give up control. Shares, Governance.

The funny thing is, the cheapest form of financing is sales, sell more. You don't owe anyone, have full control and demonstrate success. Sales is the best financing.

Let's talk about the different types of financing, mentioned grants, equity, this is quite interesting. They apply typically at different stages of company life-cycle, grants, nice, it just comes. The grantees is tolerant of risk, they want to do it.

Some grantees so you missed the window, apply next year. 10 months later. The reporting requirements are heavy, restrictions on use. Others control your fate, you have to say please can I have some more money.

Equity is another form, where you are selling shares. There is no interest payments, there is a longer term expectation, be successful later. It dilutes ownership, someone else has got it.

There is a trick here, investors want to know when do I get my money back. They talk about a liquidity event. Two ways to get the money back, dividends or liquidity event, when you sold the company to someone else.

Another form of investment we have done is debt, for the great stage. Your expenses are little bit less than your income, that is great. If expenses are less than income you can get money. That is what we are doing. You have to make repayments. There is interest as well, no free lunch, you have to pay this stuff.

You are not... For a period of time you pay it back, you go. There is trade-off in all of this, economics, control, transactions cost.

The important thing is why you are doing this and what you want to do with the company, ISP, think about that in the next few years, and what will you be financing, operational losses, network expansion, you want to put down the section of the town.

Or finance customer equipment, if you were previously asking for installation costs the customer mustered by the CB, a bit of a barrier. If we provide customer equipment we can offer it as part of the service and it will come back later.

Operational losses do not try to finance that. It will not work. If you lose money and borrow money, it will not help it.

So finally the last stage is when, how this is detailed, looking at expenses, planning, to expand the network. You say how are we going to do it.

It sounds simple but you have to have honest answers for this, you cannot say it will be great, just give us money. You have to be honest with yourself or you will be wasting your own time.

My colleague Ben and I have set up anything, a fund, we're making loans to small companies who want to advance, ISPs, we only the networking, we don't do apps, we do ISPs.

We want to expand the capital available for the internet especially in frontier markets. In business you have to be for a couple of years. We are looking for a turnover of \$250,000. If you think you're not that big, keep working, get there.

We're looking for management accounts, a registered company, you have to do that anyhow. You should have appropriate licenses and memberships. Membership of AFRINIC, attendance at these sorts of things, we're looking for community engagement, community involvement.

We are in the business of offering loans, 200,000 to 1 million, some people are here who do not need that, we will pass it. Term up to three months, flexible arrangements. We

are looking at business, Cashflow, a little different, banks don't go do that.

We think we can assess the credit risk by knowing the industry. How do you do it? I will skip ahead. Qualification, complete a short form online.

We will work with you to identify the options and if it looks good we will begin and the underwriting process, look at the finances. We will make a decision, go or no-go.

We expect a lot of applicants are not so many to complete the cycle, that is OK. Maybe come back next year do this or this. Don't give up.

My colleague Ben has some little brochures, business card, register online. And get going. Build the internet. Thank you, all.

(Applause)

DR NII:

Of course, any questions? Thank you so much. Any questions? Come on, I know we are mostly... It is important. Jim is telling you to talk to him.

QUESTION FROM FLOOR:

Thank you, Jim. My name is (inaudible). Thank you for this presentation, very interesting. I would like to hear from you regarding our environment in Africa. What are the main challenges when it comes to developing businesses.

JIM FORSTER:

Challenges in Africa, ISPs, there are some simple ones. Logistics are difficult, clearing customs, in the US we ignore the Amazon and it comes in one or two days, easy. More importantly is the regulatory environment. There are always challenges, it is better than it used to be. The government always wants to help but sometimes their involvement is less helpful. I like a nice open environment, I don't like it when they say because of security reasons we need to control the exchange point, it says maybe it is not ready for investment. The government will control everything. The number one challenge is the regulatory environment and it varies. It is Kenya, Uganda, each is different.

DR NII:

One last question.

SPEAKER:

Do you think there is some value in improving a local trade between African countries? Is there any value their?

JIM FORSTER:

Absolutely. When I first came to Africa, it had to go to a satellite and come back down again. Now there are more fibres. There is cross-border trade, and then they can be, useful.

Yes, absolutely. The internet enables that, as do roads. We need roads too.

SPEAKER:

Thank you.

(Applause)

DR NII:

We are running a little bit late, but could you stay for just one more last thing. We have some fake news, and I would like to call Elaine to report that.

This is the working group. Do you know what this is? No? At least you know about the working group. It seems to be a bit different for you. OK, no worries.

Yes, you can... That is at your own risk.

So, I am not a member of the working group and I am not a member, so what is happening is that, every year, magically, some slides come to my laptop and I am forced to present.

So, this is the official definition of the African working group. It is a not-for-profit, etc. Everything here should stay in the room. Do not talk to me or ask questions.

So, you guys have been enjoying the 20 years? OK. I do remember back in 2001, (inaudible), so I hope you have made some progress. Please keep going.

We do also remember the routers and setups and the computers that we showed this morning, but you have to see something. At that time, (inaudible), but no more juice at all. It is Whiskey.

You also saw this. This is something... It was difficult to train you guys to say AFNOG success. Maybe we should try again.

The gentleman who is trying to organise this was very good, and we keep using the AFNOG success, but it was not easy at that time. We have to try many times before we get AFNOG success.

So, what next? There is a new policy proposal about Food & Drink waste. What does it look like? The working group notices that you guys waste food and drink during the gala dinner, and this is the problem statement.

There are some pros and cons. The con is that we may lose some participants, but we have to balance the pro and con. You can send an email to the working group.

IPv6. This is still very bad. The whole continent... You keep saying the success, but your IPv6 is going nowhere.

But we know the reason. We are focusing on IPv6, but you guys are focusing on dollars. You are moving IPv6 to dollars. You have been trading amongst yourself, and now there are some transfers going on, so now we are focusing on dollars. Maybe we need to see how we can get dollars to help the community networks.

Because you need more IPv4, we noticed that, (inaudible), and that is yes. You can see the numbers are moving from here, but we can still adopt the transfer policies so that (inaudible), but if you look at these numbers, then we can convince some that it should be one way and not the other. It should be one way.

Next, there is also another global policy for those who are active on AFRINIC. You can see that this is the first time we will be discussing 15 policy proposals, which means that

some people are submitting too many proposals. The community response and says they need policy for violation, but if you want to submit, you have to follow a certain role, and you must also be willing to respond within a maximum of 6 minutes.

And make sure that the time zone does not count. You have to be up everyday and responding to policy proposals, otherwise, people don't have time to look at the policy proposal and the whole thing gets messed up.

This was sent to the working group, and we are still discussing this, so please send your comments to the working group.

Next, the working group had a global policy meeting and you can see how it works these days. Presenters ask for question, and you quickly say you oppose. You support. You strongly oppose. You oppose those who oppose.

(Laughs)

So, you can imagine (inaudible), and then we all go home with the meeting has adjourned. OK, OK. Now, this is a bit technical.

So, the root zone, we finally managed to look at the root case, a big achievement. We thank the community for moving and changing us from Cascade 2010 to Cascade 2017, but now what we're doing is kill the old one because you have the old system that needs to be destroyed. We open the safe, taking out the HSM and then removing the key from the HSM, then putting back think Hsm, so we are telling the Cascades 2010 because, at the beginning, there were so many people (inaudible)

We are making progress. (inaudible) to take over.

Oh, sorry.

The machines are learning to take over. You guys can keep enjoying your apps. We are then heading to (inaudible), so soon, we will have a human being connected to the cloud.

This is what we are calling (inaudible)

(Applause)

SPEAKER:

Thank you very much.

DR NII:

Thank you so much. OK, I would like to apologise again for the time, and I guess we can break for lunch which will be served down at the ground floor. Thank you so much, and see you in the afternoon, basically, we should be back around 2 for the next session, unless anyone has questions for the working group.

OK.

SPEAKER:

Good afternoon, everybody. I hope to keep you awake after lunch!

Could I have the presenters come up.

My presenters for this afternoon, please come up.

Okay.

We are not going to wait for the latecomers.

Let's just get moving. Then we can manage time properly.

Okay, I will ask the presenters to introduce themselves. Also tell us something interesting about themselves that we might not know or you might want to know. I will start with Musab.

Something interesting before presentation so they don't think about it. You can start.

MUSAB ISAH: Good afternoon.

My name is Dr Musab Isah, I work as a research engineer at AFRINIC.

Briefly about me, I have a PhD from Lancaster University and I spent some time doing research work at University of Cambridge.

Prior to that, I worked as an admin at government agency in Nigeria.

Although I am into computer science, I am also interested in (unknown term) in particular which is my mother tongue in Nigeria.

I like the movies, language, prose written in the language. Thank you.

SPEAKER:
Thank you.

(Applause)

You cheated, we wanted something funny! Let's move on. It's a happy day today. You need to press the button.

LIA HESTINA:
Hello. My name is Lia. I am actually here with my colleague Jesper, we will do the presentation together. It is better if you come here.

SPEAKER:
There is space.

LIA HESTINA:
Come and join us.

We are here to help create awareness about the RIPE atlas. I'm sure you know about it already.

I run the ambassador program. I manage the logistics of the distribution.

That is more or less it.

SPEAKER:

Thank you. This is the introduction now, then we will start.

DIANAH AJUNA:

Hello.

All of you know nothing about me, so I will start with the interesting bit. I love rollerblading. I am really good at it. I don't do the street rollerblading.

I am a cyber lawyer, currently doing my PhD in cyber law at University of Ottawa.

Internet law is my passion and you get to know more about me when I'm going to give my presentation.

SPEAKER:

Thank you.

CHARLES ECKEL:

Hello.

Very excited to be here. My first time in Uganda.

Let's see, I work at Cisco in our development network team. It's about helping people understand the APIs and integration points of our products and solutions so that they can integrate with them.

Within that, I do a lot with open source software and Internet standards, including in the ITF.

I started the hackathon in ITF. I am excited to be here and give the talk and work of my colleagues over the couple of days in the hackathon.

That's exciting, we bring the software development together with the standards we are working on. Interesting fact about me, I love being outdoors.

Used to run marathons. Don't do that anymore because my knee is no good. Now I am big into cycling and love riding my bike around and being outdoors. Anything outdoors is great.

Look forward to seeing the outdoors here in Uganda.

SPEAKER:

Thank you. Have you learnt any words in Uganda?

CHARLES ECKEL:

No. Swahili, is that official?

SPEAKER:

No, Luganda. There is a word here. Banange. Say it.

Up
CHARLES ECKEL: My first word!

SPEAKER:
What does it mean? Anybody? It is an exclamation.

SPEAKER:
I am yes but, I am a software engineer at Atlas. I am probably the only licensed engineer at RIPE. Unfortunately, my expertise is completely different, I am a licensed architect of buildings.

Right now, I am a software engineer. I am here to talk about Atlas.

SPEAKER:
Great. Thank you. I wanted us to do that because beyond the packets we wondered how the personal connection...

I have lost my seat up here so I will sit down there. Musab, please start.

MUSAB ISAH:
Hello.

Banange!

I have learned that one. I like languages. I have been in Mauritius for about eight months now and I have been trying to learn French.

I'm originally from Nigeria. English is official language but I have been trying to learn French and Creole.

I have not been successful so far but I have been pushing, I have learnt a few words, especially greetings.

Coming back to my talk today, it is going to be on Internet measurement in Africa. Where are we at the moment?

That is the title of my talk. I have introduced myself already.

This will be the content of our 20 minutes or so discussion this afternoon.

We will talk about what Internet measurement is a bit. The objectives of our survey. The kind of responses we got in the survey, from the survey, rather. The prevalence of measurement in Africa, whether we do Internet measurement or not.

Our key findings, where we are at the moment and finally some of the steps we could take to move forward.

When we say Internet measurement, what is it?

Put simply, it is the use of tools to ascertain the coverage, performance and usage of the Internet.

Any tool you use to determine how much coverage your Wi-Fi has or how much coverage

your 3G or 4G network has. That is some sort of measurement of the Internet. You can also measure performance, whether the speed of my Internet is high or low and how many packet losses on the path towards the destination.

Also usage of the Internet, how many computers are connected at a time. How many routers... How many mobile phones are connected to my wireless network and so on.

Network measurement also monitors and analyses the traffic on the Internet. That is important.

It also generally enables us to understand the behaviour of the Internet. We want to understand the Internet, how it works so that we can improve on it.

I think this is important on all aspects of our use, be it Internet or the work we do on a daily basis, we always want to understand it better. Then we can make it better.

This Internet measurement is usually conducted using two approaches. You have a passive approach and an active approach.

I will give a brief explanation of what these two approaches are before I go into the survey proper.

When we say passive Internet measurement, what does it mean? Basically, you try to log Internet traffic at some specific vantage points.

You analyse ISP or IXP or you run a simple enterprise network. You want to understand what is happening on your network so you start monitoring traffic, collecting data on a switch or a router or even on a personal computer.

It is the regular management of the day-to-day Internet traffic. Then you collected so you understand what is going on in your network.

There are many ways to do this. It could be access logs on your server, so you have a web server and you take logs of incoming traffic to your server. It could also be packet traces. You have a packet tracer on your route that monitors all the packets that are passing through the router.

All the packets that are passing through your switch.

If you need data for research and to publish, passive Internet measurement is tricky.

You will see in the course of my discussion, most of the African countries, we don't actually have... We don't know if there exists laws that govern the usage of personal traffic or private user traffic.

In our survey, what is actually of interest to us, mostly, is active Internet measurement because that is easier to conduct without going into legal tussles with the government.

This active Internet measurement involves using probes or servers which are hosted on volunteer networks to run some measurements. You run a server and sends packets into the Internet, to a particular destination, and then you base on the responses to the packets that probe the send the packet out, you try to infer the health of the link that you are on.

This measurement is usually initiated by the probe that you install on your network or it could be programs to run from time to time. You can measure all sorts of things, you can measure bandwidth, many metrics of interest. You can also do this using a passive Internet, and because it is tricky, with many issues involved, it is not usually used for research purposes. Coming back to our survey, what are our objectives? The first objective is we want to improve the understanding of performance measurement in Africa.

We want to know the status of Internet measurement, people really conducting measurements or not, and if they are conducting, what are the metrics of interest to them, what is the purpose that they are running the Internet measurement? We also want to establish the status of this measurement platform, so I mentioned earlier when I was explaining what active measurement is, that you usually conduct this measurement using some probes, some devices that are hosted on networks across the globe that sent packets from the probe to a server somewhere and then get the response.

We have these probes in Africa, if we have them, how many are they? How prevalent are they used? And what are the added challenge of using them? We also want to establish a good understanding of the needs of the African community, so most of the probes that we have are mostly developed outside of this continent. They are developed by companies and businesses outside our domain. They may not always capture things that could be peculiar to us in Africa. So we want to understand what ID needs of African engineers and general Internet users when it comes to measurement.

Now we got responses from different users across the region. We have actually got 123 responses and they come from 34 African countries. They also come from different business categories, as you can see here. So we have responses from ISPs, from academic networks, from end-users, from my XP, what have you. From the chat here, you can see that when we see ISP those are comprised of telecom operators and wireless network providers. The Academic networks are comprised of academic institution networks and national research and education networks. Others are comprised of enterprise networks and what have you. These are the people who responded. We also have end users who responded.

Then we look at the prevalence of measurements in Africa. So we can see from the figures there that not many people actually are running measurement campaigns in our part of the world. People tend to run short term measurements, they just want to know the throughput or measurement. When it comes to campaigns using the use of tools or running campaigns for a number of weeks or days, people don't usually do that. We have 25% here. For simple short-term measurements we have about 55% of respondents saying we run simple measurements. This is the figure by business category. You can see for ISP and others.

So long-term measurement campaign is vital for broader understanding of networks, so if you want to understand the network better you need to run a measurement of a number of days because it will tell you more. Having a data of one day or two days would not be useful. This is one of our key findings. The 67% say they run for network monitoring and the others for research. And we also ask which tools they use. As I mentioned there are different tools for different measurements. When we ask the type of tools that are used by our respondents, give us several answers. People mostly use on personal computers and they install software on the computer. When you have actually about when it comes to using hardware tools, you have 42%, sorry, 34% with RITE

access. I only have a few minutes. That was usage, when it comes to hosting, you can see that the RIPE access probe is the most popular in Africa.

We want to know why we have apathy. You can see the first here, the prevalent answer is lack of well-trained personnel. So when we ask about reasons respondents were not using the measurement platforms, tells us there is a dearth of skills in Africa when it comes to this. What we find out also from the survey is that the use of mobile mobile hotal.xx/Um.x.This is about privacy laws and awareness. We asked respondents whether they know Measurement is not popular. More than 60% say they are not using any mobile measurement platform.

Passive measurement is tricky because there are so many rules governing it.

So where are we at the moment?

There are more platforms deployed. Nevertheless ISPs we saw previously are not doing enough measurement campaigns. And for this reason we are behind in generating high-speed fidelity data. We also have a fairly poor number of deployed platforms. Out of more than 1000 probes that were delivered to between 2014 and 2019 in Africa, only 200 are currently online. Also many people don't realise they need to run measurements, or they know but they don't have important it is.

A few recommendations going forward, we need to increase awareness on the subject, and then we will go back to our blogs little locks and encourage our colleagues to run measurements. We need to increase the number of skill acquisition, this is obvious. We need to host more probes. And very important that we keep them online. Many people collect them, but we need to keep them online. You need to increase research collaborations between academics in Africa between academics and network engineers. Network engineers have more understanding of the network.

This is my final slide. I think the last thing I left this focus on Internet measurements which I mentioned. I have actually written a blog regarding the survey and it could be accessed from this website. If you just Google Internet measurements in Africa where are we. We will also send our results as a conference paper, hopefully it will get accepted. Finally you can join our measurement working group mailing list where we share most of these findings and also other research related to Africa,. We also conduct monthly study groups where we connect in our monthly conferences and we discussed issues relating to the Internet generally and the measurements in Africa. Thank you very much for listening.

(Applause)

SPEAKER:

Thank you. Any questions?

It has no IP address.

QUESTION FROM FLOOR:

Thank you. I am a postdoctoral researcher and carry out research similar to what you are doing. First of all I want to commend you for this wonderful presentation.

I have one question and one comment and I will go with the current first. Especially with the broadband and Internet measurement. I think we need a lot of these services in

Africa because most of these measurements results, when you look at them, there are no figures coming out of Africa which sometimes I do not agree with. When you look at the results, when you look at the figures, you see that one of the major problems is the fact that we are not taking measurements on a mobile broadband and that is one of 80 services we are doing to ourselves.

In terms of the question, what is AFRINIC doing in order to encourage people to actually take measurements using the mobile broadband? Because a lot of times it is a factor. Sometimes when I write papers and I see 50% of Africans are not connected, in my head I know it is not true but that is the reality of what you see. Thank you. In research projects where the goals of the

MUSAB ISAH:

At the moment, we are collaborating with some researchers from Norway that are conducting mobile broadband research to have a project called No Net where they install props at thousands of base stations across Norway.

It is probably the most comprehensive mobile measurement activity in the world.

We are currently collaborating with them, we invited one of their staff to our Internet measurement workshop, which was conducted on the 15th and 16th and he presented. He couldn't come in person but he presented his work remotely.

Actually, it is one of the reasons that we have conducted the survey, to inform our African community that this is what is happening. We need to do better. Our main source of Internet in Africa is mobile broadband. We need to conduct tests on mobile broadband.

We are doing our awareness campaign and trying to talk to people to encourage them to do this.

SPEAKER:

Thank you. I will take one more question and please write it down and we will take collective questions at the end.

SPEAKER:

I am very much interested in so much of the research you are doing at AFRINIC but I would like you to give an update about the utilisation of (inaudible) in Africa has been made and until that study has been made is there a link to the appropriate report on the utilisation of (unknown term) within Africa?

MUSAB ISAH:

I am actually not in the best position to answer a question like that in utilisation of IP resources because there is a department called member services who are responsible for that.

They have their things out there, you can talk to them to get that information. Thank you.

(Applause)

SPEAKER:

Members services are making a presentation tomorrow.

LIA HESTINA:

Hello.

Thank you for your time.

Fun facts for me, I haven't mentioned it earlier. I am a soccer mum.

In the Netherlands, it is a small country, in the Netherlands there are 500... More than 500 amateur clubs.

SPEAKER:

1500.

LIA HESTINA:

I think more. 500.

SPEAKER:

5000 inhabitants and three soccer clubs.

LIA HESTINA:

Okay. Another disagreement!

My name is Lia Hestina and we are here to talk about the RIPE atlas and we have an update about the community.

Let me have a look.

Let's see if I can read this.

A child does not grow up only in a single home.

(Applause)

Maybe to make it more easy, it takes a village to raise a child.

I think that fits with what we are trying to do with the Atlas.

With the Internet ever-changing, ever growing entity, monitoring this entity as a whole is not easy. It can provide ways to improve management, troubleshooting and also security.

That is where RIPE Atlas comes in.

SPEAKER:

We get a large amount of data also from Africa to our system of probes, and we store every measurement that is done locally in Amsterdam and that is a collective effort and 99% of all the measurements are publicly available and for free.

We don't charge anything for them.

Of course, they both run on IP four and six. A new feature, we have virtual anchors, which is (inaudible)

You are going the wrong way.

We are already at the fourth generation of our probes. The first two versions are probably...

I think there are only 10 or 15 in Africa, they are all in Mauritius probably. There are a lot. We also have lots of problems with them. Especially around USB sticks that became flaky after power outages.

Now we came up with a new probe which is a modified (unknown term).

It is a powerful machine but you can't do anything else than run it as a probe.

This is a distribution. As you see, we are heavily distributed in Europe and America, southern America is way worse than the North America.

In Africa, we have around 300 probes, either connected or disconnected. Disconnected means they can come up at any time.

Unfortunately, there is a lot of abandoned probes here which is also due to the USB problems we have but we also see lots of probes that never got connected in the first place.

This is the distribution over time. As you can see, since the second 1:45 thousand and 18, we were stable at around 10,000 probes connected at any given time.

There is approximately 20% disconnected. It makes a total of 12,000 available for measurement.

We have three major interfaces for people to use. The most used is the web interface. You go to Atlas.net. You will see it. The command line interface for people who are good with (unknown term) or fish or whatever.

Then we have a bunch of Apis which we call the API but it is at least 10 of them. They serve different functions and you can use them programmatically or you can also directly use them of course. This is an overview of the measurements.

We are running around roughly 25,000 measurements at any given time. This is the distribution. (unknown term), those are popular.

The rest serve more specific interest like I have never run a measurement in my life.

Our infrastructure very briefly, from left to right, on the left there is the user interface, those interfaces all connect to our Atlas servers which are hosted in Amsterdam for now.

These are the only ones that can talk to our data storage directly.

Then the at the service of the only ones who can talk to our controllers, they are geographically distributed. The controllers are the only ones who have an open connection to the probes and anchors. Probes and anchors can only communicate with the controllers. There is no way for a user to directly connect to a probe or obtain results

from a probe on their own software.

You can see, the Apple servers backbone, the backend are located in Amsterdam, a user might be located anywhere and our controllers are geographically distributed. We have around 35 or something.

We have a few in Africa.

We have a selection mechanism where we select the nearest controller.

LIA HESTINA:

As we all know, technology has impact on our lives and it is undeniable. When we created the Atlas, there were so many things we considered and weighed in, whether it will have impact on our social life or from economic point of view.

There are some design decisions we have made when we created the Atlas. Here are the list. It is only active measurement. It does not listen to the user traffic.

It has a low barrier to entry. The probe is for free and it is funded by the RIPE NCC and its members and also funded by the Atlas sponsors.

We have volunteers who host the probes. They are in form and they give consent but the terms and conditions of hosting a probe...

We take privacy very seriously. We don't reveal personal data.

All the data, API source code and tools, they are free and open for everyone. We do put limitations on the measurements. We do that to protect the host and also the system.

In order to create measurements, you will need credits. You will need credits. How to earn credits? Very easy. If you host a probe and you will earn credits daily as long as the probes are kept connected or you become... For the members, you can claim 1 million credits monthly.

You can become an Atlas sponsor. We are currently actively seeking sponsors.

The sponsors fund is used for purchasing the hardware so that we can keep on distributing the probes free of charge to anyone who would like to host it.

You can ask your friendly colleagues to host a probe for a transfer. You can become a atlas ambassador. The ambassadors are helping us spread the word about it. If they know about the atlas, they let everyone know how to use it and help us to distribute probes.

They get incentives of the number of credits they earn.

You can get a voucher from us, if you would like to do a demo, you can ask us. Enough for the number of people you would like to do the demo with or just ask the atlas community.

The community is quite active. Sometimes, people ask for credits and then millions fly away.

Now we come to the point where the atlas community, the most important part, actually, who are you, the community?

We have the users, they are people who can access the atlas. They can access the statistics, measurements and all the visualisation which is available on the web interface.

We have the Atlas house, they are people who have probes or anchors in the network. We have the sponsors, they are individuals or organisations who support us financially.

Of course, we have the ambassadors. Many of you here are ambassadors.

(unknown term)

He is one of them. He is going everywhere to help us distribute and spread information about the RIPE Atlas.

We are happy and grateful with the existing of the ambassadors.

There you can see the number of users of the Atlas and where we would like to have more. As you can see, in Africa, we would love to have more.

We would like to thank our sponsors, who are coming back or new sponsors.

How does the Atlas community participation look like? Right now, we were distributed around 23,000 probes already to volunteers and out of that around 10,000 are active. We have 36,000 users.

Around 282 article. These are all articles about the Atlas, whether it is announcement about it, papers, or just people who would like to share their experience on how they use it in their day-to-day job.

We have around 500 and it is hosted by operators. On average, we have around five sponsors every year.

We have around 400 ambassadors globally. They go to conferences and events.

RIPE NCC, as an organisation, we are quite small and the Atlas is a global project for the world. And we can't do this alone. That is why we join with AFRINIC. So what have we done? We signed an MOU in 2014 with AFRINIC and to join a RIPE Atlas in the African region. There are Internet measurements related hackathons and the Internet measurement day which has been going on the last couple of years, which is a great, great initiative where you bring people together with the same interests and create more awareness about Internet measurement.

So we are very grateful for the support that AFRINIC is giving us. So how does the think that community look in Africa? There are more than 600 probes connected and the connection rate in Africa right now is around 35%. There are 15 anchors connected in Africa, and five of them are sponsored by AFRINIC.

37 active ambassadors running around in Africa spreading the word about the RIPE Atlas. So some of you may receive an email from me a few weeks ago if you have probes which are either disconnected or have USB issues. So we reach out to these

people to ask if we can do anything, if we can troubleshoot do something about their probes.

It was very hard for me because I got so many responses and I get to know now new people, so network, and within 48 hours there were 22 probes reconnected, which is, you know, any reconnection is great for us.

So yeah, that's the graphs.

SPEAKER:

As you can see, hopefully you can see, South Africa is by far the most probes in all the continent. But on the other end, in northern Africa there has been considerable growth. Morocco has 20. Unfortunately we are losing lots of probes in central Africa.

In CDR, for example, on the side, that is not CDR... that is in Rwanda, I think. We only have one online.

These are the 15 anchors which are considerably... they are pretty well spread. Again, we would love to have more anchors in northern parts of Africa and in central Africa.

So these are all the countries, this is probably all the countries in Africa, I guess.

LIA HESTINA:

Yes.

SPEAKER:

We have lots of data visualisations, so we keep on building them. One of the easiest ones is you can look at latest measurement results, visualisation that has been around forever but is still very useful.

For these measurements, base measurements, you can use latency (inaudible) which marks it over time. You can see four probes here.

This tries to visualise how much probes have in common towards a certain target.

This seat visualisation uses locations from another project of ours and tries to put those on that. This is a measurement that goes from Nairobi to a destination somewhere in Europe, and goes through Uganda.

And I have just finished the new measurement detail base where you can have way more information about the probes used previously. On the topside, the coloured bus, an aggregation. On the bottom side is circles, an overview of the probes that you requested. This would be the movie. There it goes. It's an actual movie. It is the sports section, I guess. This is the latest results thing where you can select all columns.

LIA HESTINA:

You can see all kind of information from ASN and from the country the probe is located, everything is sortable.

SPEAKER:

This is a visualisation I actually hate.

I have been doing this for three years in a row now. From 2017 to 2018 there was a huge improvement. There are more probes and we have roughly the same (inaudible) going out of the country, a dark brown colour. The light brown colour is not going out of the country, not going to ISP. So it is pretty good.

This is the new measurement detail page which you want to skip. If you are interested I will tell you later on.

You can also skip this.

LIA HESTINA:

We are here until Thursday afternoon. Talk to us, we can give you a demo. The tool is there, the platform is there. It is ready to use, it is at your disposal. So join us and help us build the largest Internet measurement in the world so that we can have better view on the Internet reachability and connectivity in Africa. Thank you very much.

(Applause)

MC:

Thank you, you can't grow it so it is important that you actually measure it. Can we all stand up?

Please?

Stretch... your hands... and then say hello to the person sitting next to you.

If you want to give him a hug, do that as well. Right?

Thank you very much.

Any questions?

You can sit down now, thank you.

Any questions? We will have some questions later. Dianah, come and talk to us now.

DIANAH AJUNA:

Good afternoon, everybody. Earlier on I mentioned that you get to know a little bit more about me when I give my presentation. My name is Dianah Ajuna and my presentation is about Africa's role in promoting Internet governance. Before I give the presentation let me give you a brief background about myself.

I am a cyber lawyer and currently PhD in Law at the University of Ottawa. My area for specialisation is an international laws and cybercrime. And Internet governance models. That shouldn't scare you because I have no technical background and my presentation will not be anything technical.

But I am also working with, as a researcher, with open-air, which is open Africa innovation research network at the University of Ottawa. And I'm a member of the Canadian Association for African studies. I'm also the founder of the ICT law centre in Uganda that basically promotes the ICT law and cyber law for technology law feels in

Uganda.

I'm also an advocate of the High Court and all the subordinate courts in Uganda. I do volunteer to be a co-chair of the African Internet summit program committee, so I do number of things. As I mentioned earlier on, my presentation is not going to be technical.

I'm really bad at technical stuff.

OK, thank you for that. So Internet governance, for most people, has been defined as (unknown term), which is actually meaning inclined on the technical bit. But then Internet governance by the Internet society has been broadly defined to include a number of aspects where all of us, most of us do fall.

It includes a whole range of principles, rules, decision-making procedures and Internet and its use for communication and commerce. When I talk about this, this includes everything that we all do on the Internet, for example the practices by individuals on the Internet.

Africa is a continent would play a big role, plays a big role in promoting Internet governance, because we do take part in decision-making procedures and most of the African states had a whole range of principles that do govern the Internet, and also given the fact that we are here, having the discussions, we have the programs that share the underlying Internet and the use of the information and communications.

However, Internet governance also involves a collection of actors. These include, of course, the government, and in Africa that would be the African government. The private sector, governments working with the private sector or the private sector operators working on their own to establish these rules that I mentioned earlier on.

However, establishing the rules is not enough. It is also very important to enforce the public policy and resolve disputes that involve multiple jurisdictions.

When I speak of Africa as a continent, we all know that we have different countries, and that involves different jurisdictions, and the nature of the Internet which involved usage that cuts across all these countries. So it is also very important to understand how to enforce such policies while they have been formulated within these different jurisdictions.

The collection by African governments which involve international cooperation. We have seen that happen in different African countries. However, it needs to be strengthened because it is something that we have not yet reached at 100% level. We may not reach 100%, but it is important to strengthen the international cooperation.

This would include the regional cooperation we do have and also far beyond the borders of the regional cooperation by having mutual assistance treaties, treaties whereby the countries abide by the standard rules or agree to abide by standard rules, and strong collaboration.

We have so many actors but we need to strengthen the collaboration within the African countries. Already we do have the collaboration but we need to strengthen in a way so we can promote Internet governance.

The strengthening would include sharing information, resources and also expertise.

As you know, that is one thing that is globally a challenge, having expertise in specific areas.

It is important to share it in the African country so we can be able to strengthen the collaboration and be able to have a better Internet governance.

Also, it is important for African government to strengthen the already existing government agencies that specialise in Internet governance and also established the ones that do not exist. Examples would be cyber security departments, piracy departments and cyber departments amongst others.

Also it is important to provide education to different communities and also create awareness.

What I mean by creating awareness, I don't mean you call people who already have the knowledge on Internet governance and create awareness to them, but also spread it further to people who have no idea about Internet governance, the rules and norms and procedures.

It is also very important for African communities to train executives in Internet governance. Executives means government officials who have a strong say in policy formulation and also the judiciary, who end up having interpretation of laws and also the legislature that takes a big role in forming the laws.

Also law enforcement officials. It is very important to train them in Internet governance as they are key stakeholders in this.

Also it is important for the African governments of course... They have already.. They already have public policy in Internet governance, However we have to strengthen the ones which are people centred, protect Internet users and also be able to protect the human rights of online users.

In regards to the private sector, we need to encourage private public partnership.

They do already exist but we need to strengthen them and while the private sector has stronger expertise in Internet governance and also stronger enforcement power in Internet governance and also dialogue between Internet companies and stakeholders, the government stakeholders.

In regards to the rules and procedures, it is important to understand the rules in Internet governance. Cybercrime and also include economic crimes.

Usually when we are talking about cybercrime we always think about the obvious cyberstalking and the rest. We forget the economic crimes which are very important. African governments need to ensure that in their cybercrime need to include economic crimes and also promote the existing treaties or conventions within the African states.

One of them that you probably haven't heard of is the African union Convention on cyber security and protection. It is not yet enforced and that is because for it to be enforced 15 countries have to ratify it. Unfortunately, only four African countries have ratified the convention on cyber security and protection.

As African governments, we need to promote our own legislation and conventions that we have for us to be able to strengthen our Internet governance and be able to create awareness so that we can have our own laws and conventions and collaboration between the states.

Privacy and data protection rules too. We need to have uniform rules as African states so that we can have a standard and be able to connect with each other in the Internet world.

Since most of the Internet is open and borderless, for us to be able to promote Internet governance in Africa, we should have strong privacy and data protection rules that cover all African states with the same standard.

Also, we need to strengthen the relationship between state authorities and intermediaries. This is common with African countries. Some African countries where we have human rights obligations and responsibilities not known by the state authorities and also intermediaries.

It is very important to also have uniform standards that cut across African countries. In conclusion, Internet governance is broader than just names and numbers and it is important to understand that it encompasses all these aspects that we need to think about and everyone is a key stakeholder. As long as you are an online user, you are a key stakeholder in Internet governance. Thank you.

(Applause)

SPEAKER:

Thank you. Any questions? Yes, please. Approach the microphone. Just line up on the microphone.

SPEAKER:

Thank you for your presentation. My name is Yazid, I am from Benin.

My question is - what do you think as innovation to discuss with our governments? Because most of what you have mentioned are things that are already being done in many countries.

For instance, if I take mine, we are several organisations being disgusting with the government explaining them many things but unfortunately they are shutting down Internet.

I don't know which kind of discussion we can do with them.

If you can give us some practical examples, maybe we have to change the way we are discussing with them, I don't really know. Thank you.

DIANAH AJUNA:

Thank you for the question.

As I mentioned, African governments have to be able to uphold the rule of law and, if African governments have said a particular standard, if there is a treaty or convention already in existence or an argument that sets a standard for African governments,

requiring them to shut down Internet at all points, then that means if your government is a member or in argument with that, they would have to oblige to trade.

There will be sanctions if that is done.

However the standards have to be fit and agreed upon by the African government. That is why it is important to have the executives, who are decision-makers, the executives who have a lot of power in this government, have knowledge about Internet government issues. That is where the training should come in.

Yes, some of that has been done but it needs to be strengthened and promoted.

SPEAKER:

If you allow me, I would like to add more comments.

For instance, African union...

SPEAKER:

Allow you but make it short.

SPEAKER:

Since 2014, there is already an African convention on cyber security and data protection but until now very few of the countries have their own rules. It is quite difficult for me to understand what we still have to do. Thank you.

DIANAH AJUNA:

Thank you.

I was discussing with a friend about that.

That is where now the key stakeholders come in.

I mentioned that in the presentation specifically, so people are aware of it, its existence but that it is not enforced, only four countries have ratified it, meaning that they have to push the responsible parties to be able to promote the convention and in addition to that be able to push it to be either ratified or even improved in case there is anything that needs to be improved in the convention.

Then we can be able to have the uniform standard or have the treaty that does work.

SPEAKER:

Thank you. One question?

SPEAKER:

Thank you for the presentation. Really nice.

I missed the part on the implementation in the African governments. There is so much that is lacking when it comes to pushing policies, implementing policies. We have good lawyers, very inclusive, in the ICT law centre, but you find that we have very good policies but I missed to hear the part of how we can best implement the policies that we have.

That is one of the questions I have.

The other one - sometimes, I wonder what is happening because basically in the cyber security bit of it, when the countries, Uganda, we have a very good security law and we are doing well but I wonder recently on the news, I heard there was money laundering between BOU and people who make you money in Germany and I think there was too much communication from the country with the people in the other country but then they could not trace it until they had to get the money at the airport.

I do not know if you heard about it.

SPEAKER:

Make the question short.

SPEAKER:

I would want is here more about why these things are taking place in Africa and the countries when we have good cyber laws. Thank you.

DIANA AJUNA:

Thank you for your question. I will start with the second one. You're asking why crime, cybercrime still existing even with the laws. It is like asking why other criminals even with the criminal laws we have.

It is a big challenge. The criminals will always exist.

The laws are there to help in dealing with such criminal matters.

Your first question was in regards to implementation. Implementation is the... Enforcement of the laws has always been also a very big challenge.

One thing that has taken place is that the strategies are used in the off-line world are also used in the online world to enforce these laws.

At the same time, training of law enforcement officials has taken place so they can be able to adapt to the online world and know how to deal with these multiple jurisdiction issues, the Internet being borderless.

SPEAKER:

You mention something interesting about the fact that government react based on treaty because they have treaties, they adhere to that and use that to define policy.

The problem is when it comes to the Internet most of the policy, the best practice or the frameworks of combating abuse, are not treaty based. The challenge for government is to adapt there usually way of harmonising law through treaties to the policy development process that exists on the Internet.

Does your study try to provide or are you looking at how to help those governments, especially in developing country, because they believe only entreaties, how to adapt that policy-making process to the one that is governing the Internet till now? That is the big problem.

The treaty does not cover all the best practices of the Internet and there is no global treaty for governing the Internet. How do you...

DIANAH AJUNA:

The treaty basically sets the standard. It will not be set on different governments to raise or lower... while they can't lower the standard once it is set. But it sets a best standard that the government should have. So when it comes to their own individual laws, different governments, the minimum standard has been set and they can have higher standard, or even something stricter.

But the treaty is there to make sure that the uniform standard for all African states or even the state that are party to that particular treaty.

SPEAKER:

There is no treaty that covers all of them.

DIANAH AJUNA:

Of course, there is no law that can cover everything.

SPEAKER:

Thank you very much. Do you mind if I move time, can we take that after? Is it pressing? Great, Charles, please.

CHARLES ECKEL:

OK, so just to remind you, I am Charles Eckel and very excited and happy to have the opportunity to talk to you about two of my favourite subjects, open source software and Internet standards.

The reasons why the potential benefit I see being out there when you combine these two.

First of all, why standards? What is the importance there? And I think for those of you who have been in this networking space for a while, you have seen that standards have played a key role in networking in the industry's associated with it.

It is demanded by customers, by industry itself, that if you are a vendor or a solution provider, you would adhere to the standards and the standards would be in place. The reasons are to avoid vendor lock in with anyone vendor, and also to have that interoperability when you do get it from multiple different providers, that they can work together in a network of heterogeneous equipment.

For the most part, vendors have participated very well in this standards process. They have cooperated with their partners and with their competitors to define these standards. The reasons for that is that for these vendors, they need to do that in order to make their products viable.

And they also, in turn, benefit from this interoperability because they know they need, for the equipment to be able to work with not only their partners equipment but also with competitors equipment, when plugged into the same network.

So then why open source? For open source, the impact has been more recent, but certainly in the last five years at least, and arguably many more years, open source has really come on the scene and the networking space and in the Internet to have a huge impact, to the point now that open source is actually demanded by the industry and by customers.

When you get an RFP, a request to make a proposal for a solution, you really need to have an open source story in order to even have a seat at the table when you are talking to a customer about the solution you want to provide for them for their network.

You can see open source being used defensively, and what I mean by this is that if you think of an industry where you have been defining standards and seeing a lot of value from those standards, then in order to continue to get the benefit of those standards going forward, it is important to add support for those standards into emerging open source projects. You can also see open source being more often, and in this case this would be perhaps you don't have a strong foothold. You have don't have a product in that space. You can open an open source alternative to whatever your competitor has in that space, trying to commoditize it. If you think of multiple different vendors can all cooperate on some shared software, and instead of each one of them taking the time and effort to develop with themselves, to cooperate and create a common shared instance they can all benefit from, and that is really a big benefit of open source.

Looking at the traditional standards processes, as I said it has worked quite well for us for a number of years. For those of you who may not be familiar with it, just to outline, the ideas that multiple different vendors and customers, people who are interested in something, they come together and it could take a number of years to reach a consensus and define a standard.

Once you have the standard, you need to add support into your products for it. That could take a couple of more years.

These products and solutions can start shipping, but just because one vendor implemented that standard and another implemented that, doesn't mean they are going to necessarily interoperate from day one. There's a lot of complexity defined in the standards. It takes a couple more years.

Eventually, things do interoperate, which is great. And we have benefited from that. But this takes a lot of time. You don't always have that much time, especially the way things are moving today.

Then when you look at open source, what we have seen is the ability to innovate at a tremendously rapid pace. Two really leveraged a vast community of people working together on a common problem, and to really transform an industry, sometimes much faster than the standards can keep up. When that happens, there is actually the possibility of open source software emerging a sort of de facto standard.

And coming out before there are any standards, and therefore becoming a standard itself, just due to its own widespread adoption.

I missed some important open source projects in the networking space there on the right hand side.

It is certainly the case that open source can be beneficial, but there are some problems.

It can be hard to know how to configure and deploy the software, how to upgrade it and continue to work overtime. The documentation may not be very good because it is kind of a community effort, and what developer wants to spend time on documentation when they can be adding new features and writing new code instead?

Sometimes the projects fade away. It may not start it may start by promising but there is not enough backing around it. Even in the good case, where there are very strong, well established open source projects that work very well, it is never really the case that one open source project would do everything you need. The end solution that you have is going to take multiple different open source projects and maybe some proprietary software as well, and combine that and integrated together to perform your solution.

There is that responsibility you take on as well.

So really the idea here is to bring those two together, because we see a lot of benefits from standards and a lot of benefits from open source. They each have their weaknesses. If we can combine them in a way that we get something better than just using the two of them separately.

We want to bring that speed and collaborative spirit of open source into the standards world and we want to get that stability, that concreteness that exactness that we get out of the standards and lend that into the open source community.

Ways you can do that is by adding support for key standards, into open source projects, and also creating code that goes along with the standard, so that from a development point of view, you really speed up the time to adoption. Instead of just having a written standard, you have some code that you can use to implement the standard or to jumpstart and adding support of that standard into your open source project.

There we can really kind of get a multiplying factor. I used addition here, but it is really multiplying the benefits.

Just as an example, how many of you are familiar with opendaylight?

You don't actually need to be that deeply aware of it or know its uses to follow the analogy here of the example I want to make. Looking at this, there's a lot of... this is a block diagram of OpenDaylight.

There are plug-ins to interface and to support networking protocol that has been defined. On the northbound side you have Apis on top of which you can write applications.

I'm going to do a show in green all the places that are directly implementing and adding support for just ITS standards. You can see it is all over the place, actually. Completely top to bottom there is support for standards throughout OpenDaylight. This means that OpenDaylight can be used easily by a service provider who already has a lot of network equipment that supports these key networking standards that have been in place over the years. It makes it easier for them to adopt and start using OpenDaylight benefit was just trying to go on its own and define its own ways of networking.

This where the open source community benefits because their project can be used and also the standards community benefits because this open source project supports those key standards and continues to make those key standards valuable.

OK, I have mentioned ITF and I want to look more closely how it is providing a positive influence on how software in general is providing a positive influence. More of you have probably heard of IETF. How many of you have heard of IETF? You benefit from the work done by this group every day when you are using the Internet. That is where the key protocols on which the Internet runs have been defined. And it continues to define new

protocols to make the Internet work better and evolve with us as our needs change over time.

Key protocols, like TCP/IP, DNS, also new are networking protocols like NETCONF.

It can sometimes be a slow process. If you look at the community, the community is ageing and there is not a lot of new people coming into that community, at least not at the need that would really be beneficial.

You start to see the pace of open source projects sometimes overrunning all being done within the IETF so that those projects come out with something before the standards can be fully defined. So we don't get that best case scenario where we are able to leverage each other.

The goal, then, is to move... I would say in the IETF, a little bit too much time was placed on just the standards development process and that definition of achieving rough consensus. s4a "nus"source software. With the IETF Hackathons that was the idea, to advance the pace and relevance of IETF standards, by having them develop faster because you are influencing them at the same way you are defining them. You take what you lead and you bring that back into the standards process.

We want to attract new people into the IETF by letting them work on something that's exciting to them, code, as opposed to just reading a spec or using email to comment on a specification.

These are very collaborative events. People working on a joint effort of making the Internet work better and all of its key protocols work better.

You can see in the graph on the right hand side, the tremendous growth in participation in the hackathon. The first one was four years ago. We had 45 people.

Just touched on a few projects. Now this last one, we had over 400 participants and touching just about every single project or working group within the foundation.

I can see the foundation embracing the use of... Going more to where developers are. One example of this is using Git Hub. It's a great place for sharing code.

We have an organisation for the hackathon, we use it for sharing code and sharing presentations and results, what came out of it.

Going to where the developers are and engaging with them in a way that they are comfortable with.

Also even for the definition of Internet drafts, in addition to continuing to use the internal tools within the foundation like the data tracker we have always used and mailing lists, now there is an ability to use Git Hub for that as well.

Lowering the barriers and encouraging developers to get involved in the standards process.

Over the next two days here, another example of the hackathon, this is the hackathon at AIS. This is bringing the technology here locally to an important conference within the African region to help compensate for the fact that it can be difficult for people here to

travel, it is expensive and takes time to travel to a foundation meeting and participate in an IETF hackathon.

Here you can see that we are building our technical capacity around networking standards here within the African community and we have five projects which are very closely related to the foundations technologies which you can see here. They will be worked on over the next couple of days, really to raise more awareness of the standards and to encourage contribution back into the standards by implementing the standards, using them and feeding that back into the foundation and the standards process.

I would really like to encourage you to become a champion of this. The goal is that we want to make standards more consumable by developers so they will go ahead and use them and deploy them and make open source modifiable by industry by adding support for key standards into them so that it makes it easier for industry to develop and adopt and use these key open source projects being defined.

Thank you very much for your time and open up for any questions.

(Applause)

SPEAKER:

Any questions? We can now combine any questions with the last two presentations. Any questions? Okay. Yes.

SPEAKER:

Hello. Thank you for the presentation. How do we participate? How do we join the project that you have going on?

CHARLES ECKEL:

I mentioned two, the hackathon and the one at AIS. The one here is now closed for registration. We reached maximum capacity there but you can... There is a wiki you can get to from the program page and there is information on all the projects and you could follow along that way even if you are not physically in the room.

With the IETF hackathon, I didn't point that out so much on my last slide but the next one is at IETF 105 in Montréal. It is open to everyone, it is free, you can participate in the room, which is fantastic and most beneficial, you can participate remotely and we have had a number of people including a team that almost always participates remotely from Mauritius but from other places in Africa as well. We encourage that.

You can participate that way. If you want more links, see me afterwards, I will make sure you have them.

SPEAKER:

I'm from Zimbabwe. I want to make a comment and appreciate the work you are doing.

It is critical but I feel that if we can have country coordinators to assist you on that it is easier for them to deploy, especially in education. We are able to actually make it easy for you considering the vast difference of service providers.

I had one question (inaudible) will we not have the same issue we currently have with the United Nations with regards to human rights? It is a must like human rights, legislation and every country differs. We don't have the best practice for everyone. That

is the reason why it is tricky to say we want these treaties signed when Zimbabwe is a country that does not know exactly what they want from cybercrime.

They have the framework first and the treaty comes on top. Maybe as well as the (inaudible) we appreciate the issues to do in terms of conditions of people using Internet in Africa. If that is going to be defined and people agree on that, because currently in my country we have an issue summary who posted something against something and they said you should prove beyond reasonable doubt that it was them who did it.

Who is responsible is therefore the account online? The issues with surveillance, privacy, Internet freedom, that is what we need, governance. Besides (inaudible) we shouldn't need to collaborate. Thank you.

SPEAKER:

Thank you. Respond to the question?

SPEAKER:

Thank you for your kind words and contribution.

We are happy to work with people. If you can see me after my presentation, we could have a discussion, you could be our ambassador in Zimbabwe. We are always happy to work with people.

What we lack at the moment is, after this meeting, we have people communicating with us, engaging with us and after sometime they tend to drift away until next meeting.

I will see you after the meeting and we can start a relationship. Thank you.

DIANA AJUNA:

Thank you for the comment. As you mentioned, the Internet freedom in different countries is quite a different challenge because of various reasons.

It is important to separate the human rights aspects from the political issues.

As you mentioned, yes, we have the basic human rights and it depends on which country you are in whether you have Internet rights but you mentioned that in Zimbabwe you do not have cyber laws.

The treaties are there, even the discussions, the treaties are there to push the countries to have these laws in place. As you know, some African countries including Uganda, who didn't have cyber laws until recently, and that is because we were pushed to have them.

That would be the same thing with Zimbabwe. If the treaty is ratified and so many countries are working together to have this treaty ratified, then a country that is lagging behind will have to also meet the standard.

SPEAKER:

Thank you. I work for the East African community and I am also an African fellow.

I have a question for Musab.

Just to follow up from the previous (inaudible)

African union has set up and divided Africa into a different economic blocs or regions and commissions. East Africa community, (unknown term), (unknown term), this can also be of help because (inaudible)

The second question would be on the data you collect. Unlike Atlas presentation, where they say that there is a disclaimer, they don't share the data, I did not see that in your presentation.

My question is - what is it for? The data you collected? Thank you.

MUSAB ISAH:

The data we collected in our survey is actually available via git hub. It is public data. We made sure we didn't collect any personal information, we did not collect IP addresses.

The responses were neutral responses. They give us the information we need without necessarily outing the person who filled the data.

Because we are collecting data from ISPs and academic institutions and other networks, some people may not be comfortable giving up their data regarding what they do as it relates to measurement. We did not collect any personal information and the data is available on git hub.

You can access it and I will give you the link afterwards.

Regarding your first comment about utilising groups from EU, definitely... AU rather, I will definitely look into that and we will take it further after this meeting. Thank you.

SPEAKER:

Thank you. Can we have large applause for my panel?

(Applause)

That is your break. We have a 15 minute break, we are running 10 minutes behind the clock. Before that, I would like to remind you that we have cocktails tonight in Victoria and then for the operators there is in RPKI session later as well today.

Let's have a break and be back in here in 15 minutes for the next session. Thank you.

(Break)

SPEAKER:

This will be our last session.

Basically, in this session, a lot of things are going to happen but we will start off with at least some papers being presented by members of the panel here. I have two panellists.

I will request each of them to introduce themselves before the first panelist comes to present their paper.

I will start with Samuel.

SAMUEL MIRUKA:

Good afternoon.

I am from Kenya. I am a connect support engineer at Safaricom. It is an ISP from Kenya.

SPEAKER:

Thank you. Michelle?

MICHELE MCCANN:

Good afternoon. Michele from South Africa. I have (inaudible) at a co-location facility and the other is an ISP.

SPEAKER:

Thank you. Can someone close the door? There is a lot of noise coming from outside. We will start with Samuele. Please take the podium.

SAMUELE:

Thank you very much. I'm excited to be here with you.

I'm here to share with you my experiences with deploying IPv6 in mobile networks. We have done quite a bit of work and from the lessons I have gathered I hope to share with you and hope that those who are working with mobile operators across the continent can also take a step to deploy IPv6.

I would assume that many of us do understand the need to deploy IPv6 but there are certain aspects of the technologies used in mobile broadband that will make it even crucial for you to begin to start thinking about deploying IPv6 sooner rather than later. We will also see what will be required for you to successfully deploy IPv6.

As with any other IPv6 deployment, be sure that you will meet some challenges, we will discuss some of them and we will see how best we can go about them.

We will actually try to cover some of the strategies you can deploy after you have done an assessment of what you are required to do on your network.

There are some specific things about mobile that will actually drive you to adopting IPv6. I can give an example, like when smart phones came into the market, smart phones or devices that actually are very hungry for connections. We have devices that will require Internet access even when you're not actually using them. If you have enabled data on your phone you can be sure that your phone has acquired an IP address that has been located to you by your ISP. With the introduction of 4G and LG, it makes it more interesting. 4G is exclusively IP based connection and as long as you are attached to a 4G network, you have occupied an IP address. Regardless of whether you have enabled mobile data on your device or not, this has actually driven utilisation given a high voice over LTE is a technology that uses IP for voice calls. So it moves away from the traditional setup we have been used to for so many years. With VoiceOver LG you create an extra IP connection to connect to the voice proxy server, so if you are an operator and you have the voice proxy server connected, you might need to use a public IP address.

If you are locating two public IP addresses for each user, your IP address utilisation will increase. And lastly, Internet of things, there was an excellent presentation about

Internet of things before lunch and if we connect all these devices, TVs, fridges, microwaves, the Internet, the IPv4 address is not going to be enough to connect all these things that are going to be connected to the Internet.

Once you have actually come to a point where you see that as an operator you need to deploy IPv6, the first thing for you is to actually examine your architecture and understand what points within your network that you need to make modifications, so as to support IPv6.

Here I just have a sketch or a layout of a typical mobile network, very simplified.

You have a database known as the home subscriber server, so what if I have in a brown font are the terms related to 4G, LG. The rest are related to 3G and 2G.

This is a database... With all the information about what you need to access in the network and also it aids the core network in authenticating you a subscriber.

The information is uploaded to the SGS and MME. once it is uploaded, it aids in the creation of some tunnel between your phone and the GSM or S Gateway or P Gateway.

This allows you to get access to the Internet. So the protocol that is in use to create the pipe is known as the GPRS (unknown term) protocol and the pipe in 3G terms is known as a (unknown term).

Once you have looked at the architecture, you need to look at the features inside the devices and see which ones you need to look out for. Most of the features are what you would expect to be given to you by your fender out of the box. It is not a matter of if the equipment has this feature is, it is about you going and trying to find out how do you configure them.

The P Gateway needs to be able to communicate with the IPv6 Internet, and being the primary locator of IP addresses it is to be able to do that with IPv6 as it does with IPv4.

These need to be able to support the creation of those pipes that are located in the sessions. The database I have just talked about needs to have the subscription information that indicates that you should create sessions that allow to browse on IPv6 and most importantly the mobile device needs to be able to work on IPv6 as well. In this layout, where I have highlighted in green, you just need the GSN to have connectivity to the IPv6 Internet through some form of outing and it needs to have your mobile terminal also supporting IPv6. So how you go about deploying starting from the HLR or the HSS, you make sure each subscriber has at least an IPv6 subscription record. Then you define a large pool of IPv6 prefixes.

From this pool, you locate each mobile provider a /64. a /64 is a big space. You need to remember that your mobile phone could be some form of a router, or I could just have a router on a 3G or 4G providing Internet access to its clients. With IPv6 we are moving away from having Routers doing NAT for Internet access. You want your device to locate a single IP address from the /64.

It removes the need for network address translation that happens on this devices.

With this setup, you have basically enabled IPv6 on your mobile network but you start facing some challenges, for example you can have an IPv6 on the mobile network and

there are some servers on the Internet which are only on IPv4. As with many deployments, not just mobile, you will find yourself needing to deploy Nat64 and DNS64.

This translates IPv6 packet into IPv4 packet and vice versa.

How it works because of the limit of time that we have.

I have also prepared, just to show you how the Internet hosts without IPv6 is translated into an IPv6 address using a 96 bit graphics. The concept is that the part of the address are embedded into the prefix. For those of you who are using DNS on Linux, this is how simple it is for you to enable it.

So we have talked about servers that are on IPv4 only.

What about applications on mobile devices that did not support IPv6? I can think of Skype, for example. Skype on your mobile phone does not support IPv6 at the moment. If you are using an IPv6 only network, you will have a problem with such applications.

T-Mobile USA came up with an ingenious solution to create what they called client address translation and. So what this demon does is, as IPv4 packets come out of your application, they translate to IPv6 before they leave your phone and when this packets actually get to the network they are transmitted back to IPv4, because these packets need to access some IPv4 servers. This has been a positive development, they submitted it to the IETF and Google adopted it as from jellybean 4.3.

Most android devices do support 464 excellent.

Some other extra features you will find in the network are the (unknown term), a feature on the dual address.

This is based on the assumption that if a device request for a dual address, this is a device that can support IPv6 only.

With 464 excellent, especially Safaricom , this has been a safe assumption and we are currently using this feature to avoid giving out IPv4 addresses, which are getting depleted. This will help you to accelerate your deployment.

Looking at the STS M, some which you might have to activate a feature that allows the PDP context to be created using dual stack.

Another cool feature with SDSM is an override. Like I mentioned before, you need the HLR HSS to update subscription information to the SDSM but you can also instructed to obey the HLR and define a range of users or all the users or users of a particular network to have the subscriptions modified.

This has been important for us. Especially because we have HLR which does not have the option of subscribing for dual, it has only IPv4 and 6.

We are playing it safe, we want subscribers that have the option to select either but at the network we prefer to locate them IPv6 only.

Let's talk about handsets. This is a screenshot from an android handset. They allow you

to select what is called the protocol so you can select, depending on whether your provider has enabled it, you can select how you want to be located on an IP address.

It is not just android devices, there are routers as well that allow you to select the APN protocol. We have had success in trying to inform this device manufacturers to have for our network the different set to IPv6.

We noticed that iOS 4 iPhones does not have such an option and we have tried to engage Apple with regards to it. We don't have anything to show for it but we hope they will be able to make that consideration so that we can also have the iPhones using IPv6.

Operators, just trying to overcome the challenge of the previous slide. Operators have a way of sending APN settings to mobile phones.

The challenge we have at the moment is that the server we have does not have a parameter setting that allows us to change the APN protocol to IPv6.

As at this time, we have not found a way to do it. I hope very soon if we find a way to do it we will be able to try it out and see whether we will have these phones that are currently on IPv4 and we don't have a way of telling subscribers a change, we will be able to do it from the network side.

This will be a huge breakthrough.

Talking about some positives, some of the industry leaders, there was an announcement by Apple on June 2016 that all apps submitted to the App Store must be able to support IPv6.

I think that was a positive move. Apple and Windows are also joined to support client translation. Just like android have done.

If you are deploying IPv6 and you are worried about map 64, what you need to know is that the major content providers and most of the cloud providers have already enabled IPv6.

Facebook, Insta gram, what'sapp, Google, YouTube, all that, they are all on IPv6. We expect to see 64 declining and more service to be reachable by IPv6.

The backbone of your network since mobile connections are purely based on tunnels, they are basically 64 tunnels...

You don't need to worry about your backbone. If it is on IPv4 or MPVS or your connection between (unknown term) and (unknown term) is (unknown term), it is not necessary to have it because it is a relevant to what is locating IP addresses to subscribers.

All your network devices at the moment show that they support IPv6. That would be the least of your worries. This is just a summary of the setbacks I mentioned in the previous slides about phones that are still on IPv4 and the servers that are still on it, they make the move to IPv6 regressive because it forces ISPs to invest in very expensive carrier grade devices in order for them to be accessible.

There is a website here, it is a list of shame for all the big content providers, the likes of

Skype, Amazon. It shows which ones of those have not still implemented IPv6.

As a security engineer, you need to appraise your knowledge on the threats that are apparent when IPv6 is involved.

When it comes to strategy, you just need to assess your architecture and see what works for you.

You can decide to do what we have done, we have encouraged users to request dual stack on the network.

We have control of whether we allocate them IPv4 addresses or not. You can also decide you're going with dual stack where you supplement the declining public IPv4 addresses with private addresses and then deploy it.

This should not be your favourite way of going about it but it all depends on your network.

Just examine your network, see what works for you and it is better to try one wrong way than not to try at all.

In conclusion, I think it has been discussed here. It is going to be beneficial to us if we need to connect more people and more things, especially because in this continent the penetration of Internet access is on mobile.

We need to look at the long-term sustainability of Internet connectivity and AP addresses is something that is very crucial for us to have a look at.

For many providers, the fight at the moment is for us to have devices adopting IPv6 by whichever means we can and sensitising the manufacturers to be aware that there are networks that are supporting IPv6 and they should set their devices to be ready to access IPv6 right out of the box without having to bother users to change their settings and stuff like that.

I appreciate I have had this chance to share this much with you.

If there are any questions you would like me to answer, please let me have them. Thank you.

SPEAKER:
One second.

(Applause)

We will just take some questions but someone will have to answer after the second...

SPEAKER:
More than a question, a small clarification.

I have deployed already or help to deploy IPv6 in 50 networks. I just want to clarify a couple of points so people don't get the wrong idea.

It is not a development of two mobile, it was the first operator to implement it but it is

an official ITF standard.

I don't recommend any more to just deploy it, the way for is (unknown term) in silver networks and broadband networks. I can point later to anybody that has interest in it to a document, it is becoming (inaudible) it is 40 pages explaining the deployment of it in mobile and broadband networks and one of the key things you mentioned is Apple support IPv6 but you need to speak with Apple, you need to have your network ready, they will test it and they will OTA allow the iPhones in your network to use it.

It works perfectly. The last thing is the implementation in Apple, it is only for the catering.

Why? Because Apple is supporting IPv6 in the Apple Store from 2016 but they have implemented version 2 that actually is making for the applications built in the Apple, like Skype and others, to support as well IPv6 in automatic fashion.

For applications in the silver phone, they are fine, they work, but they are mandatory supporting IPv6. Skype supported in Apple, otherwise it will not be allowed to stay in the Apple Store.

For the catering is where you have the (unknown term). That is it. Thank you. Anyway, I am here all week, I am happy to help anyone willing to understand this better or having any additional questions. Thank you.

SPEAKER:

Thank you. Any other question? Okay.

SPEAKER:

It is not a question.

What do you say for some operators who have many vendors equipments in their network and sometimes when they do the assessment they noticed that they have a lot of (unknown term) to do before going for IPv6 but at the same time we have a lack of addresses? What is your suggestion?

SAMUEL MIRUKA:

There are some features that are standard to all equipment vendors. This is defined in the treaty. If it is a standard that is defined in the (unknown term), you need to find out how it is implemented or talk to your vendor and ask them if they need a licence or if you need a software upgrade.

There are some features which we noticed are available in other vendor's and they are not available in other vendors.

These are the features that will actually enhance your deployment of IPv6.

The advice would be to start early, check whether your vendor's can support these features and, if they can't support these features, then you need to make a formal feature request to them. Some take even up to 1.5 years to come up with this features.

They have R and D and I am sure if other vendors have implemented it, it is something that they should also be able to implement.

SPEAKER:

Thank you. Round of applause.

(Applause)The next speaker will be Michele McCann from Teraco.

MICHELE MCCANN:

SPEAKER:

Good afternoon. I know we are running over, but I want to take you through a little bit about what is happening with cloud. There has been a couple of discussions previously but I want to take you through what is happening, where we are at, where we are going because this will affect a number of your network strategies.

Before going about where we are going to, I'd like to take a step back and using territory as an example, a lot of people talk about neutral co-location. We have had discussions with African countries around investment, neutral co-location, what does it mean, what do I need to do? I'd like to use Teraco as an example.

We started in Cape Town in a storeroom that we had converted.

We then grew. The total IT load we had original investors and was sitting at about 2 MW. Today, this is just Johannesburg, it is sitting at 40 MW. This is the new site that is happening in Johannesburg, so there is a pointer.

That is the one you and 1/2 ago. This one here, called little Teraco was the original Johannesburg site. To this, which is phase 1, going live in February 2020 with over 60 MW of power. This kind of thing, how did this happen? This investment has been sitting in excess of \$250 million. How did this happen? What happened in South Africa's culture to allow this kind of investment to happen?

Essentially before 2018 we were a highly regulated market. We had limited cable capacity, single operators, and as many of you may or may not know, for a neutral data centre to be successful you need as many operators as possible.

In 2018, sorry 2008, there was a court case which deregulated the whole market. We are now 11 years old, and if it wasn't that deregulation we would have never existed which means that investment in South Africa would have never happened. If I look at today, we are sitting at over 400 unique ASMs. We have two successful ISP operators. Most of the content operators have invested and now the club has actually invested. So why was the time right? As mentioned, your starting block is deregulation. Some of you may like that, some of you may not. That is what drives this kind of investment happen.

The other starting block is around latency. A lot of you will know this, this is latency to South Africa and would like to see in the world of IP, it is flat.

Essentially latency was a massive issue. We didn't have things like YouTube, Facebook, all these kinds of things. We ended up having to go via Europe and back again which made it not usable. It started becoming quite a reality, that this kind of investment had to happen. Pleading the cloud is coming, but it is actually here. Some of you may not know but Microsoft has gone live in South Africa with the Africa region. Amazon has made it public available that they will be live in quarter one next year and the South African region. Google is on the way in terms of their cloud deployments. What does that mean for you guys as technical audiences? How do you connect?

How do you take this value back to your customers because they are all essentially asking for it. In terms of cloud, we are turning up cross connections to these cloud providers on a daily basis. It is not a pipe dream, it is something that is physically happening right now. How do you change your network architecture? How do you adapt your products and commercial offerings to be able to get your plans access to these environments?

We have launched Africa's Cloud exchange. It is available out of Teraco Cape Town and Teraco Johannesburg. As long as you can reach it, you can do a physical VLAN service to anyone of those cloud providers. A little bit different to some of the other models, but we believe Africa literally has a huge opportunity to start creating a commercial product and taking it back to your various countries. That is why we have once again been the nice guys.

This is how to connect, but please come to chat with me. You can email to, we are working with a number of neighbouring countries so you can definitely just email us through any questions, any technical questions. Essentially it is as simple as that. Get to Teraco has back either by a provider, or if you have your own space, to access the VLAN service and we will get to live immediately. So anyone of those cloud providers.

What does it mean from a latency perspective? What we did was we saw, OK, this was a test done in the first week and that went live. We turned up a virtual routing environment, and you will see it is called South African North which is Johannesburg versus West Europe, which is the previous one worked with. On South African or Johannesburg North we essentially got less than 2 ms to the cloud but in Europe where we were sitting at 1.71. It makes a huge difference in terms of your clients, and they are looking at this already.

The banks have already turned up, and we are dealing with a number of neighbouring country banks were wanting to connect as well. What does this mean? AFRINIC did a fantastic study around cross-border latency results. You can look it up. What it means is that our cross-border connectivity is becoming more fundamental. This means we actually have to start working together really closely because our clients are going to want us to do this.

You will see here, 2018 you will start seeing the intra-African roots becoming more strategic in their growth. This means cross-border is becoming more relevant in the strategies.

He added a bit of a comparison. Entry routes 2017 versus entry route 2018. The key things that are driving this is a cloud, access to content, you are seeing the pickups starting to emerge. South Africa is kind of done, but you have seen the next areas of the next DC growth have been within Kenya, Djibouti, Nigeria, Ghana, Morocco. Where we are seeing the intra-route happening rather than losing to Europe and happening. Stable infrastructure, so a lot of people look at us and say, wow, I was sitting next to this American lady on the plane and she said it is so dark in Africa.

And you know what, yes, in certain issues we have power issues. But we are seeing huge innovations coming out of Africa, so I don't know if you know around Ethiopia, it is actually using waste to convert into power. It is starting to become innovative to overcome the struggles and create stable power. We have lots of wind and land and sun. You're starting to see these innovations happen to create the infrastructure required for

this investment.

African ISPs are real. Kyle will do a presentation shortly on this, but with the work that has been done, you see large ISPs emerge and become larger than some of the European operators. So kind of like Shakira, it is time for Africa.

In terms of our revolution, and I had to go through this a bit because I want to try to keep this on the track. But you will see, and I love this slide because it is exactly... a lot of people start looking and going straight to the business sector or enterprise sector or launch XP without having a neutral co-location operator. But this is kind of the magic formula that we follow in order to create, and we have seen the access around it. Where deregulation happens, neutral DC is formed, successful XP starts emerging because there are lots of eyeball networks.

Enterprise and consumer business start having a far better user experience which therefore means they start growing in the market and therefore start attracting cloud regions. That is essentially the secret sauce around it.

I don't want to take too much time, so any questions anyone? Any ideas?

No one?

Amount track?

SPEAKER:

You are on time. Comments, questions? We're talking about the African cloud. Michele just gave a very nice presentation. You don't want to connect to the cloud?

MICHELE MCCANN:

Thank you very much.

(Applause)

MC:

As we wind down, we have a panel discussion that is going to be taking place this evening. But after that, we will have a cocktail event for closing the AfNOG day and then at 7 PM we have a whiskey event, so if you are an operator in the room, I request that after we finished the panel discussion you go to the AfNOG desk to sort out your certificates in preparation for the event at seven.

Without any further ado, Michele and Samuele and I would like to invite Elaine and the panel for the last session.

SPEAKER:

I just need two minutes of your time. Just to elaborate, this evening at 7 PM we are doing in RPKI (unknown term) and whiskey bar. There will be drinks and other front we will be verifying if you have created and RPKI (unknown term) and if you have certified yourself as being manners compliant.

If you are verified live here, there will be a special T-shirt that says you are verified. We look forward to seeing you then.

MC:

Thank you. Elaine?

Can I have all the panellists for this last session?

SPEAKER:

Okay. Let's start. Maybe Adderall can join. My name is Alan. I will moderate a session on the future of (inaudible)

We started the day delivering the 20 app. Before we close, we look at the future. To do this, I will moderate the panel. On the site, you can see...

Hello? On this site, you can see I have the veterans here and the young bloods here.

Veterans, maybe I should just let each panellist introduced themselves.

(unknown term) must be at my right. Then here I have Danny. Maybe you start quickly to introduce yourself again.

SPEAKER:

You don't remember from this morning? I dunno.

AfNOG Volunteer.

SPEAKER:

(unknown term) in Uganda veteran means something very different. I wouldn't claim to be one yet!

SPEAKER:

(unknown term), welcome. Just introduce yourself again.

SPEAKER:

(unknown term).

SPEAKER:

Then Evelyn.

SPEAKER:

Hello. Evelyn. Global community engagement with the society.

SPEAKER:

I am a instructor on the solution-based organisation for the instructor training.

SPEAKER:

Okay. This is what will happen - we all know AfNOG but let me remind you that it is the African network operator group. It is important we remember that. It is supposed to be our operator group. This operator group supposed to follow but provides the operators to meet, not to exchange experience and when they meet they also talk and try to set up business for communications collaborations corporations.

When we leave here, it is the AfNOG, how many people in this room are subscribed to

the AfNOG mailing list?

How many people have posted an mail on the mailing list?

Then we have more people in listen only.

Okay, we will hear from you why that... You are not using your right to post or engage on the list.

Then we have the mailing list. Then every year we meet and when we meet for AFNOG we have the workshop, tutorials, then we have the meeting.

This is a comprehensive description of what it is.

What I want to propose is that we do a quick retrospective analysis of 20 years, a quick 20 years.

Then the questions will be... The panellists will be given five minutes to tell us how they see the journey, what is the success point, what are the challenges, what are the impacts from your point of view?

Then, after the panellists have given us their assessment of the 20 years, we will hear from the floor. We want to hear from the community.

Then we will come back to the panellists. We will come back again. Then the question will be to discuss the future. What do you think we should do differently? How do we position AFNOG for the coming 10 years? Then we will also get feedback from you. Then we will close and go for a cocktail before the whiskey.

If you don't like whiskey, I will go for you. I will drink for you.

Let's start. I think I will start with (unknown term). No? Okay. Then (unknown term) first.

The question is, what is your analysis, assessment of the 20 years from how AFNOG, the mailing list, the meeting format et cetera, how would you in a few words... Your assessment...

SPEAKER:

My first assessment, you all witnessed how they abused me!

Thank you very much.

As I mentioned this morning, I think the journey of AFNOG has been an interesting one. Tough sometimes. At the end of the day, the perseverance of those who'd believe in what it was has produced good results.

One of the key invisible aspects of the success has been the evolution of its workshop part of the event.

As we have seen this morning, it has evolved from two workshops to 8.

With a very diverse topic. Interesting aspect, the tutorial. Every year, the tutorial

evolves. There are new topics that come in during the tutorial.

They address new technical issues related to the usage and evolution of the Internet technology itself. For me, that is a success because, when AFNOG started, with a very limited resource, there was no...

It wasn't clear how far it would go. How much sustainable it would be Because you need to realise it is not an organisation like AFRINIC, which has revenue to service it provides.

AFNOG is an organisation loosely organised that basically relies on donations, sponsorships and volunteering and engagement of both people who train and people who speak.

Something like that to survive 20 years but not only survive, evolve, is a very interesting success point. For me, it has significantly evolved.

The challenge is how to continue integrating, changing, adapting the content to align with the evolution of the technology, not the technology itself but also the usage of the Internet as technology.

We hear about new usage like artificial intelligence, which uses some of the power of the Internet to deliver or provide a way of solving issues but using the intelligence of the network, how can we embrace that technology to solve some of our issues? Is there room for AI in problems, block chain, IOT, all those things?

How do we integrate them effectively into the agenda?

One critical aspect as well is not only giving the knowledge to people but also helping them to use that knowledge to solve issues and also create a kind of wealth. Let's call it. Create means to sustain their own environment but also to support back AFNOG.

We say donation and sponsorship, it would be interesting to see people who go through this program to run or launch companies, lodge initiatives, that in turn can contribute back financially or by their time to support AFNOG.

I will stop there and allow the panel to add. Overall, it was successful. New challenge ahead. We should adapt.

SPEAKER:

Okay, the second part. We were asking to help us look at how we will address the challenges.

SPEAKER:

Thank you.

In 20 years, AFNOG has evolved. If you reference back to the presentations earlier, by both Noah and DJ, we have seen a change. At the same time, the industry is changing.

One thing that is definitely not going to change much is the statistics about which jobs will be available in 20 or 30 years. The network or the need of the network is always going to be there.

It will adapt but it is always going to be there.

How will we do what we do in terms of being able to bring people together and share knowledge? That has also changed but the one thing that has not changed is the cost. You need to be able to understand the financial side of doing what we do and seeing how you can adapt that. We have gradually, if you go back 10 years, less, you do not have this many banners in the room because at one point we were anti-commercial.

We have slowly evolved to allow a bit of support in terms of financial, as the growth has come. How we continue to balance that with out... While avoiding capture is an interesting challenge and we will have to look at it.

The other thing we use a driver that we need to strengthen again is the growth of local nodes. They helped us raise the level, the entry level so we can deliver deeper training and I think some more focus needs to be put in there so we can...

The five days we spend doing the technical training, we could push the level higher if we strengthened a lot more in what is happening in the local nodes. As we have evolved and seen, we cannot delink the AFNOG side from the AFRINIC policy side.

I foresee a need for deeper policy trainings so we have people who understand a bit more on the policy decisions so that before as we get into policy side, we have a wider community that can actually deeply debate policy.

Maybe that is something we might need to figure out. I'm not sure there is a track or workshop. I see that coming and being needed a bit more. We need to be going a bit higher in the layers.

The sustainability of knowledge transfer. When you do knowledge transfer, as long as you are not continually transferring the knowledge, it dies somewhere.

How do we create a structure that enables the sustainability of that knowledge transfer that you have a multiplier effect?

We had a workshop and a presentation this afternoon about measurement.

We need to track, figure out how we are measuring the impact when we say that... We have 200 people going through the training, how do I track that not only have they added value but they have gone back and multiply that value by two or three people, four people? The need to be able to get that, because the interesting experience I have had is that... I am a AfNOG through and through but to explain that to sponsors, and most of the sponsors, until they walked into this room, did not understand the impact that AfNOG is, including the dignitaries we had yesterday.

We need to find that relevance. We all know the relevance of it, we need to be able to find a messaging play-off of making that happen. Besides that, I like the adaptation. We are growing, we are adapting. We are adapting at the rate that we can adapt. Maybe down the road we might need to adapt a little bit faster, but all in all, I think we have done pretty well and we can continue, and the future is quite bright in terms of the possibilities. I will stop there.

SPEAKER:

Thank you. I have a quick question for you, it looks like up to now you are the only one to host two events. As an individual host.

Can you say that it is easier now to host compared to the previous one? Is it easier this year compared to 2003?

SPEAKER:

2003 has slightly different challenges. Now the challenges are slightly different in terms of what we hire, in 2003 we had not more than 100 people. I'm not quite sure what the numbers were. But we were 200.

The bar has changed, but it is easier because I know more about the organisation. It has evolved quite heavily.

SPEAKER:

Thank you.

SPEAKER:

I was able to make a few notes. The positives but also the other side. I think things have changed a lot in 20 years. When we started, AfNOG was basically the only thing that exists these days and I'm very proud of it. In many countries the viable national communities exist, national NOGs and I really appreciate that and I can see, I would like to think it is a result of some of the work.

It fits Africa rather well because unfortunately, as we all know, the centre of travel is Charles de Gaulle or Heathrow airport. Travelling is expensive and difficult.

I am proud of the people I had the privilege to meet and I'm proud to see people grow. That is one side of the story.

But I also have my worries. Meetings are getting large. It is getting harder to find venues to meet our needs. While I'm not involved in funding, and I don't know anything about it, it can't get easier as costs rise.

Putting someone in a hotel for two weeks is not cheap.

To find venues that are big enough to fit us is getting difficult. It is only the biggest hotels that would put us. If you look at this hotel, it is very big and we stretch it out to the max. We took out the restaurant so we could have enough classrooms.

If you get this big, it limits your ability for negotiation. I'm happy that we got here but with some countries, how does that work? It is getting more complicated. If you have a small event it fits in one hotel. You can do the workshops in one hotel. We have had years where the workshops have been different hotels, a lot of logistics, people having to get buses and all that stuff. Difficult, difficult.

Last year we even had people in half a dozen different hotels and it was madness. That combined with the cost of getting people to the country gives me worries.

Another thing is about synergy. We have this combination event which has everything from workshops to tutorials to special groups and interest groups. But I sometimes wonder about synergy. Later this week there is the AFRINIC meeting and while I appreciate what had happened there, I wonder what the relationship is and membership

meeting to people who just what about BGP or DNS. What happens in the AFRINIC meeting, this is an important but it is in a different scale.

We feed the people, it costs. I wonder if one big event has a side effect. Also there's the thing about language and I know that people on the table may not agree but I will mention it anyway.

You found out that I'm Dutch, English is not my native language. I hope you allow me to see a few comments.

If you become a medical doctor, you learn Latin. Not because Latin helps but because every muscle in your body and everything in your body has a unique Latin name. It has no other function than to have a unique name, it could be Latin or Russian or Swahili but it should have been but it has one name.

If we start adding more classes in more languages, French, I have heard about Portuguese at one point, at one time I'm happy that it allows people get training in their own language. At the same time, the lingua franca for technical and Internet is English.

If you do it in Spanish and you learn the technical terms for the technology in Spanish, if that helps them, if they need to look up something and type in a technical term to Google because they will not get the English information that is out there, I have mixed feelings on that.

So concluding, I'm happy with the result that we have. I worry about the future, but the scaling and about the setup and perhaps because we now are able to get the possibilities to do more localised events, perhaps that is one possibility for the future.

SPEAKER:

Thank you, I hear that you worry for the future but we're going to do it (inaudible). Let me turn to these people.

I don't want you to be scared by what these people have said.

I know these people, they always talk nonsense.

(Laughter)

Evelyn, please tell me. (Inaudible)

Tell us your experience and what do you see as a success story and challenges for you to join and to stay and to proceed with what you are doing..

EVELYN:

a lot of the points I wanted to make we have covered. But really since 2007, when I did my first AfNOG, and that was in Nigeria, one of the things that is the evolution of the courses.

You would either come and do one of them and you are done. For most of us who wanted to come back, we didn't know what else had to do, so that has created a void in terms of how to give back to the community, what can I do? How can I feel more capacity in that moment? That was a challenge but I think I love what I see now, because within the last 20 years we have seen more courses coming up. Of course we

will have the discussion in terms of, is what we have more relevant today, especially as we start thinking about emerging technologies.

When we think about before the Industrial Revolution and the future of jobs and the youth and what AfNOG is doing today in terms of content, of addressing enough?

That is the one thing that keeps ringing in my mind in terms of if we are preparing ourselves for these things.

Another thing that I cannot fail to talk about with the in-house statistics, we are now at 30% in terms of gender identity for the AfNOG and for AIS in general. I think 30% is still low so we need to get equals in terms of the numbers. One thing I should say is that we had the AfNOG Chicks, so I was an instructor to build capacity for women. We went to Nairobi and Botswana. But because AfNOG dependent sponsorships, we no longer do the AfNOG Chicks courses. Those were very significant because of so many women came together. I did my courses where there were men and women but it also was part of the AfNOG Chicks as an instructor. Women would come and they were so free to express themselves and they actually came back and become part of the community. For me, that is the one aspect I feel and I would have hoped it would have stayed.

Hopefully we can get more funding and more people interested in that.

I think aside from that... I will be happy to talk about what I think the future will be. For me, the last 20 years we have made a lot of progress. I have seen more numbers coming up, so many of us are going for this event. Whether we decide to either scale large scale deep in the content, that is a topic for discussion.

I think we have shown this is relevant and that is why I keep coming back to give back to the community that really helped me in my earlier days.

SPEAKER:

Thank you for this.

Maybe we should speak some French. When was your first AfNOG?

SPEAKER:

It was in Nairobi.

SPEAKER:

What were your challenges?

SPEAKER:

I did my first in 2006 in Nairobi.

Now I install Web server, I was so excited. My journey started from there. I want to thank you for this training which grew, and I worked as a system engineer. After I worked as a cloud solution architect in France and now I am CEO of the company I created.

I want to thank you because this made me who I am. I'm very grateful for this.

It is community-based and it is amazing. But we need to make it grow and help our people to grow as well and have this feedback, this feedback from you is quite important

because this community gave me almost everything that I have now.

There are some ways to make it much better.

SPEAKER:

Thank you. I am going to open the floor for a couple of questions. Let me warn you, I don't want to hear fellowship, this and this. If you want to complain about towels and ships, let me know.

I was joking. The floor is open. Any time you open and complain about the other time I applied, I didn't get selected and this and that. I want to hear that but let's focus on the fellowships, we can address them. We hear that AFNOG needs money. Okay, then we talk to sponsors but the participants also have to time to time put money on the table.

The floor is yours if you want to but we are discussing the 20 years now. Then we will go for the future.

Five, four... Okay.

SPEAKER:

Hello.

I just wanted to share my experience, which is similar to Danny's. Danny, you said you joined in 2006. Mine was 2007.

Since then, I feel this community gave me a lot personally. Like you, I worked for AFRINIC for a while and I feel that the work being done here is admirable. I think it has prepared a lot of the new talent to get into areas of development in Internet that would not have been there without this platform.

I do have ideas about things in the future but I am understanding you want that later. I just wanted to say thank you to all the people that have been doing this for 20 years. It has been amazing. Thank you.

(Applause)

SPEAKER:

Thank you.

SPEAKER:

Hello. I am from the Congo.

This is my first AFNOG and it's a pleasure for me to be a member of AFNOG.

The way I have seen the path of some instructors, it was amazing. I was looking for this. I was waiting to hear from him because he was one of my instructors here.

I get inspired by him.

Me joining AFNOG will bring up some (inaudible) it may be a shame for me to leave and go inside. According to 2000 up to now, there has been no AFNOG organised in Congo. I would implore one of the organisations to take place in Congo because it is a big great city, a pleasure for me to one day go and visit my country like came and visited Uganda.

Thank you.

(Applause)

SPEAKER:

Which Congo? We have two. DRC or the other?

SPEAKER:

Congo DRC.

SPEAKER:

I am also from there. I would think it would be good if one day we organise this event.
Thank you.

SPEAKER:

Are you a candidate for a host?

SPEAKER:

Be careful!

SPEAKER:

Maybe Nicole. I should not say if I'm a candidate or not.

SPEAKER:

Okay. I can see DRC people are doing manoeuvring. It looks like we have a network of them going on here!

SPEAKER:

(Speaks French)

SPEAKER:

The next meeting in Kinshasa! We shall be very happy to receive you there. We are candidates.

(Applause)

Thank you.

SPEAKER:

They will be glad if they have the applications accepted. We will wait. Maybe there will be an announcement before we close on who will be... Maybe tomorrow, after the ending, we will know who will be the host.

You need to do some networking!

Thank you.

SPEAKER:

For me, also, I would take this opportunity to thank AFNOG. My first meeting was in 2010 in Kigali. I was coming straight from my bachelors degree. In this community, I have met so many people.

I have received very good advice. Specifically when it has come to education, I have to

pursue my studies and all of that and as I'm standing here I am also seeing myself as a AFNOG product and that is... I will come for the future but what it has done for Africa as a continent is amazing.

All of us, we have a responsibility to support AFNOG in different ways.

(Applause)

SPEAKER:

Thank you. From what I hear, I have to do put a proposal on the table. We create a trust and it will be in charge of collecting revenue for anything, any money the products make and we also put it into a trust!

I will close after that lady. Please.

SPEAKER:

I work for IPT P. I would like to make a testimony for AFNOG.

First of all, I would like to say thank you to (unknown term) who was my first teacher in Burundi back home. He was the one who announced me regarding AFNOG. Since this is my seventh participation, I can say that the one who brings me who I am to the networking platforms, they are people I met during AIS.

Regarding the technical basis we now have, we are getting them from AFNOG.

We are happy for the good job, please keep moving forward.

(Applause)

SPEAKER:

Madam, you go first.

SPEAKER:

Thank you. My name is Rita. I am from Uganda. This is my first time.

One of the presenters said the first AFNOG in Uganda, there were very few sponsors banners. Forgetting the name of the gentleman who said that it is hard nowadays, really hard, the economy is stretched, to convene a conference for two weeks for people in a five-star hotel, very true.

Mine is just a suggestion, how about bringing these hotels on board with sponsors, we could have their banners as well and then they give us good rates! Thank you.

SPEAKER:

A good suggestion. I think the people are in the room. We are taking note of these things for you to look at.

My brother from Senegal.

SPEAKER:

My name is Alpha from Senegal. We will be speaking in French.

SPEAKER:

I went speaking French. I want to start by thanking everyone here. I want to tell you a small story. In 2009, we participated here, me and my colleague in Egypt.

We came, we trained by someone who speaks good French. We went back home to Senegal. We did something.

We started having some consultants and they taught us what to do. Because of things which we got here. The studies we got here.

We are very happy because of the expertise, the training they gave us. All the time, when there is a meeting for AFNOG, as a regulator, I do my level best to come.

We think it is a good initiative to continue. In 20 years, we are now mature. Those days we were held by the hand. We used to look for funds and after 20 years we now have it.

Perhaps it is better to look for a job as we support it as an individual now. We have to think how we can finance ourselves.

I think it is a good reflection in which we can think of and I know there are possibilities which we can't... Thank you so much and I encourage you and I tell you whatever you need. The government and regulators, the Senegalese will always be on your side.

(Applause)

Thank you so much.

SPEAKER:

Looking at the future. What shall we do differently? How do we project AFNOG in the coming 10 years? As I promised, I will go to Evelyn first. I will do this side. You guys who exhaust the ideas.

Evelyn.

Okay.

SPEAKER:

As I say, I got a lot from this community. AFNOG gave me almost everything. There is room for improvement.

Unfortunately, after my first AFNOG in 2006, the content of the course I'm having today quite the same.

It might be room for adding new content that can give another sparkle to somebody else. To just come up with some idea to create something for Africa or to bring our community from a place to somewhere.

There is room for creating a new track, new trending environment because what we have in 2006 was not the same that we have now in this current environment.

Before it was only installing a web server and application or mixed server but now when there is a lot of automation, when we are talking at cloud solutions, AI, IOT, there is still room for creating stuff.

The hard skills are becoming less useful. We need to go for something that can improve or enhance the soft skills.

This is my idea of where I'm seeing the next generation of AFNOG, even in the tracks we are providing.

SPEAKER:

Thank you.

SPEAKER:

Thank you. Coincidentally, we had some discussion with Danny because 2006 I met him there in Kenya.

The course content we had at that point is the same we have today. We are thinking about how about automation, that is one of the biggest things we have been talking about. We have a set up week for setting up the systems and have that still set up week and we do a lot of things the same way.

I don't know if that is by design but if that could be cut short or if there is new things that could be added into the course content, that would be awesome.

I think another thing looking at the future, again, that is the same idea I talked about about AFNOG...

I don't know what new ways we can imagine so we have more women involved in actually the policy development discussions because I know you say that how many people joined the mailing list and most of us are always super quiet. There are not many women always involved in those discussions.

I don't know what can be done on that aspect, but to bring more voices and make sure women can be involved in those processes and know what is going on, and actually be a part of the future. I know that is a question I also need to ask myself, but I think it is an aspect we need to encourage more.

SPEAKER:

If my data is correct I think we only had one lady, so we need to get more women involved.

So, the future.

What about the future? What shall we do differently and how do you see AfNOG in the future?

SPEAKER:

To start with I will say, don't change anything that is successful. AfNOG has been successful, so I think the core needs to stay as it is because over 20 years it has proved successful. The core, which is building capacity, bringing people together and building a network of knowledge, I think that has to be maintained. But as I mentioned, looking at how to readjust the content and the structure to address some of the new technical challenges we face is something to look into.

I think Danny and Evelyn have mentioned the importance of looking at some of the content, and the way we do things, take advantage of technology but being able to also include them.

There are a few areas that I think deserve a little bit more attention. We were talking about the engagement from the Senegalese regulator, I would love to see coming year more regulators standing behind the mic and acknowledging the impact that an initiative like AfNOG has on them, as on the engagement, locally with operators with the Internet technology, with the way they address some of the challenges they have.

We have serious gaps between policymakers at the local level and the expertise of the Internet technology. We are seeing from our perspective more and more legislation, laws, directives, coming from government, but if you look at them closely, they are putting the Internet in danger. Why? Because the understanding is not there. It is not their fault. They want to protect the environment. But the deeper understanding of the country, and the way it works, it's not quite there.

So how do we build a more sustainable bridge between those two worlds? I was saying a few days ago that in the early days regulators and governments were part of the ITU, and the ITU is an intergovernmental organisation. So the process is built in already to take ITU recommendations, build them into policy and do that because the structures are already there.

Today there isn't, because they are not happening at the ITU any more. And there is no bridge between the institutions of government. So how do we help? We build those bridges, have a government, our regulator, policymakers to understand and work with us and build a future that addresses some of the challenges like privacy, security going forward. That is one of the challenges I see. Teaching and only focusing on technology has proven its limitations.

Focusing on policy only has proven its limitation. We can do something about that.

The second challenge that I think I see and I believe that we can address is showing the sustainability of the system. But there again, I know it has been mentioned all the challenges that local hosts may have funding hotels, finding the appropriate venue and accommodating more and more people.

I think those challenges are good challenges, that means we are growing. That means we are doing something that is creating more and more interest in what we're doing. I believe that those challenges are not going to go away and it shouldn't worry us. We have to learn to be more confident and see growth challenges as positive things and find more innovative ways to address them.

Bringing more hotels as partners, giving some way of seeing the AfNOG event for their own communications. We need to see the challenges as opportunities instead of the things that keep us worrying. And that is something in our community, or in our region as well, confidence. Sometimes we lack confidence in our ability to address challenges. We look at the challenges, we find them too big for us to address and we walk away. But we shouldn't. I think we should be confident, that should be part of AfNOG as well. Teach our community, our young people, to be more confident, to trust in themselves and to trust their ability to find solutions.

The challenges are there, but we will address them. Those are the two things I would say. Build more bridges between the different communities and policymakers, find a way, an innovative way to address some of the challenges which I consider opportunities.

SPEAKER:

Thank you. When you are speaking you mentioned the challenges of I Can.

We are running a bit of time so...

SPEAKER:

My points are really not very much different from the previous ones. But there is very little you can do without the human interaction, and so for me the size, people networking, that needs to stay as it is because nothing beats spending two weeks connecting and exchanging with people from the entire continent.

I personally look forward to it every year. I look forward to being here and doing that for two weeks. So we really shouldn't be changing.

Some of the things I would look at in the future, again referring to some of the challenges that we have expressed is looking at maybe hosting, how do you host so it makes it easier for future posts to be able to create an event that leaves memorable experiences for people.

Because a lot of our learning is always supported by the experience that you get around that learning, so those of the some of the things I think we can look at.

In terms of the content, in the morning somebody says something about this ability of regenerating ourselves over the years and changing and adapting, and I see with all the collective knowledge that we have and put together and ideas, I'm not worried in terms of how we generate ourselves and keep track with the technology and the need, if we look back when we started in the tutorials, for me we need to spend a deeper side of those tutorials because that when we introduce new things.

I remember when we did the blog change in Nairobi, the... I've forgotten. Google software, was it called? Android.

Yeah, so we have done a lot of these different things and we introduced that particular sessions and it triggers different ideas and get people back to build when they get back. We talked about the policy side, and in my mind I see a few more asters coming up. We don't have the legal side. We don't have that.

I attended some of the second sessions, and the policy side could be another track because it gives you conversations across different topics and over the years, if you see how (unknown term) has grown, I see that being needed to go because that is the collective... we talked about the legal presentation earlier, it is about the collected mind share that creates your ability to be able to go back and convince and create policy along a shared value point.

Because our policymakers need a reference, so if we are saying the same thing in Kampala, the same thing being discussed in Togo about the same thought process, whatever we do, what they do comes from us. So I see adding that side of it on to the discussion so that we really cover the space. I believe technically we are right on top, but administrative and policy, the higher layers, we need to look at that. Besides that, I think it is good. The size is good. The continent is growing, the economies are growing. We will have a hotel that will take 1000 people.

I don't see that as a problem. Have the ability to manage that. So yes, I look forward to AfNOG '30 with a thousand people in a room, a hotel, and we are able to do that and our ability to regenerate and adapt to the need. I'm not worried. I'm very optimistic that we will actually double our sizes. I don't think we are anywhere near what we can do.

SPEAKER:

Thank you. You look like you have been involved in the thinking because the past three years we were thinking of introducing a track business, how people make money from the Internet. We are lacking it. How to introduce this kind of business leadership? Now you look like you are involved.

SPEAKER:

My experience on both sides, I'm involved in some regional policy levels and if we are not... If we don't have that critical mass technically to be able to instruct the policy side, the business will suffer. And so we need to be able to, on the policy side... In the process to get here, when we spoke to the major organisations, there is a big space between the technical guys who are benefiting in the business decision-makers.

I think you can't jump to business until you are able to actually influence the policy at the back end. So I'm still at that side and still business, but I'm learning that there are some steps you need to take.

SPEAKER:

If that idea is around, I will encourage that because as I was saying what we want is that people who go through AFNOG training and capacity building programs become people who also create wealth, work, build business. Make this knowledge sustainable in a way or another. If they don't have the business 101, it will be difficult for them to set up a company and sustain it because it is one thing, it is easy, but sustaining it, making it grow...

This morning there was a presentation about financing ISP, how do we get to those layers effectively is an easy challenge when you're an engineer but making the jump to that layer, it can be boring. Why do I need to care about that aspect? I do my thing, move the beat, my work. Money should come. It doesn't work like that.

You can move as much as beat you want if you don't have effective processes, you don't have good business management processes, you can move as much as beat you want, you want to make money, create wealth, sustainable processes.

It is an important thing we need to look into as well to sustain this. It is strategically good for AFNOG itself because those who emerge from that could give back to us in terms of support.

SPEAKER:

Thank you.

SPEAKER:

You made earlier comments about running out of time full stop since I already said most of what I said, let's keep it brief.

I would like to make a few comments about something because I am involved in logistics and setting things up. Every year, there is lots of energy when it happens. Every year there is an oh yeah, we must do things differently. Change it, do it the way that we do.

Unfortunately, I regret to say, I see this also from myself... Is that we are all unpaid volunteers, we do it next to our jobs, this week there will be lots of enthusiasm to turn left to right, up two down, then everything goes quiet. It stays comatose until next meeting starts, when we start late and then we have additional costs and complexity because stuff didn't start on time. Certain steps were late, whatever.

I regret to say that one of my conclusions is that we have been good in reproducing the challenges that we see year after year. Some of the (unknown term), that worries me a bit.

I'm hoping this will be picked up and maybe in a different context we can really make some progress.

We know what the goal is and perhaps it should not be done exactly this way with light planning, incomplete things, but do things more efficiently, which has a direct impact. If we do that, they could be more people in class and that is what we are aiming for.

SPEAKER:

I appreciated. Let's open the floor. We are finished but I am happy to open the floor. You join the queue. Who else? We close the queue. Okay. Gregor.

SPEAKER:

Thank you.

I want to echo something said at the beginning. Developing those local and national mobs. That needs to be taken into consideration after 20 years. How many national mobs we have here?

I'm speaking as somebody who has his hands in a dozen mobs around the world. Either being on a PC or kickstarting it or others. Developing that.

If you want to continue at the pace you are going and grow, that needs to be considered. Tying it into something more tangible. One of the things that one of the mobs I am involved with is we have something called...

It is me nog and we have a roadshow. We tour around the different countries and do something similar to the workshops done here but on a small scale and address a bit more of the technical issues in the country. One of the things that we have done successfully is as though we have done the training, we try to organise a day will be bring the players together to get them in the habit of talking together and that is something that maybe we can take into consideration while looking into something like this.

I have other thoughts I would love to share.

You mentioned about the mailing list. One of the mailing lists that I see very vibrant in Africa is the Sudanese mailing list, very talkative, chatty, there is a lot happening.

Not all of us have active mailing list. Maybe it is something to be looked into. Just

because it is quite as mean there isn't anybody interested. Maybe you need to look into different channels. Some of the other organisations I am involved with use telegram.

It is closer to the mentality of people they have there. These are quick ideas but I'm happy to share more after. Thank you.

SPEAKER:

Thank you. (inaudible) just two things to share. One of them is does AFNOG have headquarters anywhere? If not, why can't we build one and turn it into an institution?

SPEAKER:

The administration is with Nancy. Headquarters is where Nancy works. She does this next to her job and her family. That is something to consider. It is not like we have something where we have a big building with (unknown term) or anything like that, she has a busy job, a busy family, and for a few months per year we get to loan her from her family to do her work here. That is the office we have.

SPEAKER:

I thought that was the point of having a plan for next 10 years or 20 years. Maybe have them as full-time. A suggestion, not a question.

Why not partner with universities? I have seen what the African university does whereby in some countries they partner with universities and some courses are done online and degrees are offered or exchange programs.

Among the ethos we saw in the morning about this could be one of them in the capacity building. Throughout the week, I've been talking to people and Wendy said at university at times some learn almost nothing.

Maybe we can come and be practical. If courses are given and they take two weeks and then they are gone.

SPEAKER:

Thank you. My name is Greg. I am from Lesotho.

Diversity for languages. It is a call for French people, this year is the only one track for French, it is something common when we have meetings in English countries.

I think we should call for more participation in French. Also maybe we should review the way the fees management, how participants are paying. Maybe we can open the door for students that want to pay by themselves, not by companies.

And then the topic, you mentioned it, I would say it is critical because we have all the topic. We should have... We should do the upgrade of those topics and also maybe we should open in the next year a committee that will share on the mailing list a new topic or idea and we validate before going to the track. Thank you.

SPEAKER:

Thank you.

SPEAKER:

I am Douglas from Uganda. This is my first attending. I want to thank the organisers. We were looking at the way forward and I thought of something.

I happen to be working with a company that has many consumers sitting in here. I have not seen any manufacturers of what you consume. How do we see if we contact these people? I was speaking to one of our coordinators in Malawi and we are on the networks and I would love to engage with somebody who could engage with them. I am ready to share the number because they requested me to.

See how (unknown term) can partner with the next or event they will organise. There's a lot that can be done in here but I have seen potential and a lot of innovation and which of these innovations. I would like to share for the next event. Thank you.

(Applause)

SPEAKER:

Thank you. (inaudible) or you want to share with the secretariat as soon as they can handle it. Let's see how we handle this.

SPEAKER:

Hello. Isabella. I am one of the instructors.

When the discussion on changes to be made in AFNOG and technologies, I think we have already started adding the latest technologies for some tracks. Perhaps I talk about my track.

That is the scalable Internet services. We already started adding the latest content and technologies into our course content.

The other thing I wanted to mention was new trainers or instructors. I believe we do not have a structure for bringing in new instructors and I believe it would be one that would be very beneficial for AFNOG.

If we are trying to look at making improvements, or looking at how we can add more staff... Add more content onto the courses because I believe with new people we get some developments for the good...

SPEAKER:

Yes, thank you. You want to make a comment. Please.

SPEAKER:

Two comments.

One was about getting new instructors.

There is always a big fight between your class and our class. I should point this out. What we do in SIE is sometimes after the workshop we look at the people we had in the class and we look at which students really stood out as into helping other people and explaining things and would make good instructors.

For the class I am in, we are in the process of all instructors being retired and getting new instructors trained. Part of this is basically yourself, when you teach and you drive the class, see which students are checking their Facebook account and which students are actually helping others and engaging and getting things done.

The latter, you should have a talk and see if they are interested and that is how we have done that.

As far as equipment goes, I am getting old. I forget things.

Senior moment it is called. You will have it as well in the future. Just telling you.

In the workshop material website, we have a separate directory where we keep a description of the setup that we use for the class. The description should be enough that we need to do another workshop and we should have prepared and we've got to prepare, we didn't have time and how can we make it work because people start to arrive on Friday, we can build a classroom.

At least for our track, we put a note in with the additional advantage that if people want to take the materials and take the mythology

The materials, including the setup, or on the website. If you don't know where to find it, come and see one of us and we will tell you. We would like you to take it, steal it and make it better. Thank you.

SPEAKER:

Thank you. You maybe have something to say. But before, I have a question here, how will the community get the capacity for AfNOG (Inaudible) online you can use it.

There is an application form (inaudible) people to apply to the workshop and there is an application process for that work. If you want to introduce a new tutorial, please talk to the Secretariat or if you want to join as an instructor, go through the Secretariat or talk to 1 of the instructors who can help you. Before you guys speak, I want to call someone. (Inaudible) we were discussing the future of AfNOG. So please say something.

You can come here. I don't want to introduce you. Tell us what are your thoughts of the future of AfNOG.

SPEAKER:

You have put me on the spot about this. I was listening when I came into the challenges, but AfNOG has faced... has been a journey. But I want to pick out very much related to the capacity that has been (inaudible)... it's a very African type of instructions which to me has been a real big positive after a long journey AfNOG has had. Apart from the fact that the other challenges that we all witnessed of each year, of course each time AfNOG has gone to different countries it has left incredible capacity.

Let us give a thought to the creation of other Nogs at the national and regional level. That would appear to be something that AfNOG should seriously consider. On the other hand, I want to post a question on why there would still be a need for the kind of support that AfNOG needs and supports from our partners, is that they can also reach out to local sponsorship in a more proactive way by engaging with local businesses in these countries. To me, that is obviously something that should be seriously considered.

And you put it very correctly, there has been... There should be a way to regenerate the team of instructors year in year out, and my observation that has happened, because as you will know, it all started off by what I call ghost instructors.

This should be a consideration for partner universities. I notice the demography of the

students has come on considerably. But I notice the student has been quite young, but maybe not as young. It has been brought a lot lower in terms of the age group.

I did sit in one of the sessions and you see that probably they should be... There should be a serious look at who comes in and who is selected. The other hand, (inaudible) partner with universities. However, in terms of immediate impact, probably that doesn't happen. If the (inaudible) are not immediately applicable to the industry. A lot of the students would probably have a few years before they get into the workforce.

That itself could put you on the ground and impact. Thank you.

SPEAKER:
(Inaudible)

(Applause)

Add something? Anyone?

SPEAKER:
Personally I want to add one word, a motto.

We grow as we share.

SPEAKER:
If we need to build that, each one of us giving back to the community that is AfNOG. This year Uganda was hosting and I didn't have to be a local host to actually give back my time and really helped everyone who was coming into my country to do the work we did. I know what I got out of this community and it meant a lot to me. I make sure I give of myself to help us thrive. If we can each give our time and resources I think we can make this grow even bigger.

SPEAKER:
Thank you.

Let me thank the panellists. Took some notes, I will consolidate the notes and send them to the secretary at and then maybe we share them on the AfNOG mailing list and to stimulate some discussions. OK.

SPEAKER:
Just to continue on what you just said, I think it would be good to maintain this momentum, to keep the momentum by opening a channel on the AfNOG mailing list, specifically on the AfNOG future and the outcome of this discussion there for people who have ideas to join and build something and give ourselves the goal that AfNOG 2000 will start seeing some of the situation so don't fall in the same traps.

SPEAKER:
Thank you. Let's give a round of applause for the panellists.

(Applause)

OK, so it is time to close.

SPEAKER:

Thank you.

(Multiple speakers)

SPEAKER:

Thank you all so much for the patience, it was a long day. I think a very successful day. For our 20th anniversary of AfNOG. I would like to ask for some closing remarks.

SPEAKER:

I wish to express on behalf of the secretary our appreciation for the contributions you made, the inputs you have given us and all the good comments that have come from the community on the value that you see in AfNOG. I would also like to thank different groups that make up the AfNOG and all the organisation that has gone on. I'm exceedingly happy that we are very successful and what we have been doing. With that, AfNOG, let me fill you.

You seem tired. It is not over yet. We are just transitioning to the second half of the life here. Show me you have some energy to go. AfNOG!

ALL: AfNOG!

SPEAKER:

We have a closing cocktail at the Victoria restaurant. Please, let's go there, and share, talk, drink and exchange ideas. Most importantly, keep the spirit of AfNOG alive.

We have whiskey and bites at 7pm in this room.