HISHAM IBRAHIM: Good morning, ladies and gentlemen, and let me welcome you all to this IPv6 session co-organized by IANA and AfriNIC to discuss IPv6 deployment and development within the region. For those of you that have attended the previous ICANN meeting in Singapore, you probably have sat through a similar session where they gave an overview of the efforts that APNIC and the Asia-Pacific v6 task and other regional initiatives have been doing in terms of IPv6.

This session will also try to attempt in 90 minutes to try and discuss and focus and shed light on some of the IPv6 initiatives here in Africa in a very non-technical way.

I'm honored to have a panel of experts, very diverse experts, from all over the region and different backgrounds that will walk us through their experiences within their respective fields and countries.

But before that, let me take a couple of minutes to give an overview of the regional perspective of what's happening in Africa and the efforts AfriNIC as the regional Internet registry for the region is doing.

So I forgot to introduce myself. Excuse me for that. I'm Hisham Ibrahim, the IPv6 program manager of AfriNIC. And this is my presentation.

So the NRO, which is the Number Resource Organization collectively, and each of the five regional Internet registries in their respective service regions serve their communities by providing I.P -- Internet resource numbers to them. And through that process, they engage their communities in education awareness programs and outreach programs. And over the last couple of years, they have invested a lot of time, effort, money and manpower to train and to spread awareness to the governmental, civil society and technical society on the issue of IPv6.

And just to put some perspective on what we're looking at here in Africa, this slide -- this is a slide that I always like to look at. This is a slide that shows the true size of Africa.

What they did here is they tried to mix and match a bunch of the big countries to give a better perspective of how big the African region really is.

And if you see, it has at least 18 of the major countries, like the United States, China, India, eastern European -- Europe, France, Germany, all of these combined to try to give the impression of how big the continent is.

And it's really big, and it is really diverse. And not only that -- so on this continent, we have at least a billion inhabiters that represents almost 15% of the entire world's population. So this is our service region here in AfriNIC.

Quick slide on what we're doing here. As I mentioned, the regional Internet registry for the African region, which is AfriNIC, overlooks a bunch of different functionalities. First of all, it manages the I.P. pool, which is the IPv4 and IPv6 pool. It also looks over the autonomous system numbers. We also manage the reverse DNS tree. We have a WHOIS database for our I.P. addresses.

We conduct two biannual meetings -- face-to-face biannual meetings where we have a public, open, free-of-charge meeting where we have our policy development process that anybody, any stakeholder, can come and talk and discuss vital issues related to Internet resource management within the region.

We also do a bunch of stuff for infrastructure here in Africa, like ISPs, the DNS root server copy, any kind of services for the ccTLDs. I'm running through this quickly because there is a lot of functions we do in AfriNIC, but our main perspective here is the IPv6 point. And that will lead me to the last part of this slide, which says that we conducted over 100 trainings in more than 45 countries in 2005. We have trained over 1,000 African engineers on the technology of IPv6 and how to manage it

and how to deploy it in their networks. We've done this for technical people. We've done this for non-technical people.

And this is one of our main objectives and one of our main concerns because IPv6 requires hardware upgrade. It requires software upgrade. It requires firmware upgrade. Before that, you have to upgrade he meatware, the human beings, that are operating these hardwares and softwares. So you need to build on human capacity on training, on getting people to know what they are facing and how can they face it. And this has been a huge portion of what we've been doing for the past couple of years.

As I mentioned, since 2004, we've bone doing a lot of awareness and capacity-building trainings. We've invested over 1 million U.S. dollars over the past five years in those trainings, which are free of charge as well. In 2005 -- And this will actually put things into perspective. So in 2005, there were only four networks in Africa that had IPv6 prefixes, and they were not visible on the Internet. Today we have 240 networks with assigned IPv6 addresses, and most of them are visible on the Internet.

We have 10.5% of the publicly visible networks in Africa compared to the global average which is 8.7. So we are doing a good job here in the African region. We are visible in terms of IPv6. We are aware, and we are going forward with it.

These are a bunch of facts. First fact, the IANA central pool has exhausted in February. It's gone. There was a press conference. It was really nice. There was cake. People were happy. And it's exhausted.

So if we want to get the 1 billion people that we've just mentioned on the continent to connect to the Internet, we need to look into IPv6 because it is the only sustainable and it is the only long-term solution that is there.

Second fact is Africa has one of the fastest Internet users growth, and that is simply because we are one of the late -- we are the late-comers in the game. So we are catching up quickly. We are getting there. Like I

showed you, we are good in terms of IPv6 prefixes. The numbers are jumping rapidly. But we also need to be thinking of IPv6 while we're doing that. We cannot keep on depending on technologies that we know now or we were trying to prolong as much as possible. If we are trying to grow, we cannot keep on depending on that.

And for those who say we have a lot of IPv4 space left in the region, what I would say is during the past year, the numbers that we've allocated in AfriNIC has doubled and they could have tripled if it were not for all the auditing that we do and trying to manage the pool properly. But there has been a large rush in getting the IPv4 addresses, which, again, we still have some. But we always keep telling people, you should look into IPv6 as well.

This chart shows the IPv6 data from the region. So as you can see, the huge jump on the left side -- bottom left side of the slide, a huge jump of IPv6 allocations in the region. The spider web representation shows countries with the most allocations. So we have South Africa leading. Then there's Kenya, Mauritius, Nigeria, Egypt and so on.

We have -- out of the 54 countries that we have in our service region, we have 33 countries with at least one IPv6 prefix. So that also says that at least each country is aware of the issue and trying to deploy it.

Also, a bunch of other initiatives that AfriNIC is doing. We are launching in our coming-up meeting in Cameroon in mid-November an African IPv6 task force where we are collecting the initiatives and efforts of all the different national task forces, civil societies, ISOC chapters and trying to bring them together to build a common platform. We're launching an IPv6 portal which we are aiming to be a one-stop shop for all information regarding IPv6 in Africa.

We also have a bunch of mailing lists, documentations and so on. You can see me more for more information. I would just like end up inviting you to our AfriNIC-15 meeting which will be from the 19th to the 25th. We have a full day dedicated for IPv6.

Today you will hear some of the updates, but we'll try to get more and more of them during our meeting. So if you are keen on hearing more, please attend this meeting. Thank you very much.

So it is me again. So I'd like to invite my second presenter from the Senegalese government. Would you please introduce yourself.

(Scribes not receiving translation.)

DOUDOU GAYE: I'm speaking about the IPv6 situation in Senegal. As it was mentioned before, IPv6 is the protocol of the future. And it will become the most used protocol in the future. To join IPv6 in Senegal, my presentation will speak about this fact.

We're going to speak about the committee in charge of IPv6 and the results of the research that has been done about the various public and private embodiments in Senegal.

Before speaking about the transition committee, the transition to IPv6, we may say that this transition started in 2008. There was a forum implemented at that time. And the government assigned the work to this forum. The universities were involved. And, formally, the process was launched three years ago. There has been training sessions organized for that effect during this year. And the last block -- the last sessions were held in February.

The national committee to migrate to IPv6 was implemented. On April 29, 2011, we defined the information for IPv6. The committee is made up by coordination from the ministry, from the private sector and from universities.

The committee plan -- the purpose of the committee was to present the current status about the situation in Senegal and whether there was compatibility with IPv6.

An additional objective of the committee in the action plan is to evaluate how IPv6 is deployed after December 2012. This is an action

plan determined and defined by the committee to delegate and deploy IPv6 as well as to set the IPv6 policies for Senegal.

One of the purposes of the committee in the action plan, as we had mentioned, was based on what the IPv6 committee has requested about conducting a survey about the deployment of IPv6.

Always thinking about information and communication. The results of the survey were that the country had some internal needs and the infrastructure elements of the public sector and the private sector are supportive of IPv6.

That survey also covered the security aspects of IPv6. Additionally regarding the standards and information, there is some technical groups created for IPv6 to be used before the deployment of IPv6.

So, the main topics or the objectives of the survey was the implementation of IPv6. We have some operators, ministries, universities and private entities working on that. These are the purposes of the goal -- of the survey. I was part of the team that carried on the survey that got in touch with the operator, the private institutions, universities or stakeholders to check whether IPv6 was implemented or whether they were using it or not. The results of the surveys will be addressed to route in applications, networks, security and information.

With respect to the results of the survey, we achieved our purpose. We surveyed 23 respondents and 81.3% showed compatibility of routers. As I've said, 81.3% of routers are compatible with IPv6 and 18.8 are not.

Most of the routers in the survey may be adopted to IPv6 because you just need an update of the operating system. This represents something very important for deployment and implementation of IPv6 because you just need an update.

Now, we're going to say something about the operating system. We have Windows 2003, 2008, Windows Vista, and they support IPv6. For Windows XP, you just need to install a service patch and then you need the IPv6 operating systems. With respect to the database management

systems, we have versions of 2005 that are compatible with IPv6. So there will be no problem with the applications with the operating systems used. They support IPv6, and you can just directly use IPv6 on them.

With respect to networks, the services that are used on the networks work with DNS. So the transitory DNS are abridged to get to IPv6 and the domain names that are being requested as a whole will be updated so as to give support to IPv6.

In terms of security, of the 23 structures that were surveyed, only six were using IPv6, 26%.

This percentage is slow when considered the use of IPv6 that is much more secure. So the technical teams should be better trained on IPsec so extend its implementation.

With respect to training, 17.4% of our technical teams have been trained in IPv6. The technical teams we're asking, we realize that this percentage was very low. So only 16.4% of the 23 respondents were using and know what IPv6 is. It's just four of them. So these are the different results when we surveyed the public companies of Senegal, universities, operators and the private sector. In some we may say that most of the equipment are compatible with IPv6 because the routers, as I mentioned before, just need an update at Cisco to use IPv6.

The transition will depend on training because the technical stuff is not well-prepared for IPv6. In our survey, we ask people that was not aware of the significance of migrating to IPv6 and some others thought that IPv4 was okay. So training on IPv6 is key for the transition.

The technical teams in Senegal, the technical staff in Senegal must be trained on IPv6 to use it and to take advantage of the benefits of IPv6 when compared to IPv4. These are the results of the survey. And the committee I chair may anticipate that it will be difficult when we think about the services that are in charge of this implementation in Senegal and also to enforce some laws to allow for the import of some material that is not currently used in our industry in Senegal. These are the

results of the survey that we conducted in Senegal. And this is the end of my presentation. Thank you very much for your attention. If you have any questions, please.

HISHAM IBRAHIM: On that note, I would like to go to my second presenter which is a remote presenter.

Trilok, are you on?

TRILOK DABESSING: (Speaker off microphone).

HISHAM IBRAHIM: Trilok will be giving the Mauritian steps they have been doing in terms of IPv6 with a regulator perspective. I will leave you to make your own introductions.

TRILOK DABESSING: (Speaker off microphone).

I will also share with you some practice experience and issue that we encountered while trying to deploy IPv6 ourselves. And I will -- (feedback).

(Speaker off microphone).

Public consultation.

As I mentioned (indiscernible) strategy plan.

(speaker is off microphone).

Right now from the information we gathered from AfriNIC.

(scribes are not receiving speaker through audio).

Now in terms of the public consultation (indiscernible) specific questions I will lead you through.

(indiscernible) .

In that respect we (indiscernible) organization will need to be sensitized during this awareness campaign (indiscernible) early adoption of IPv6.

Next slide.

In terms of (indiscernible).

Initiatives you believe are required. The outcome based on feedback from stakeholders is there is a need to set up (indiscernible) which will look into the different streamlines into awareness, capacity building, security, research and policy investment.

In terms of the initiative I mentioned previously regarding the government. We recommended that government lead the way by example. And for that purpose it will have to designate an IPv6 transition public agency, and we have also set some deadlines in terms of by when this should be compliant. In fact in terms of phase one, we said that public-facing (indiscernible) IPv6 by the end of 2013, and in terms of the (indiscernible) application, the deadline is up to the end of financial year, 2015.

Next slide.

In terms of the transition mechanism (indiscernible).

Since we were going into the (indiscernible) regulator should not be recommending any specific (indiscernible).

Do we need the kind of creation (indiscernible).

(speaker is off microphone for scribes).

Address allocation at the national level.

Next slide. So based on the feedback we got from the stakeholder, we saw the regulator should not be interfering into this specific

(indiscernible). Rather we (indiscernible) between the allocation that is made by the ISPs and the consumer.

So the next slide pertain to regulatory issues related to transition from IPv4 to IPv6. This summarizes the different initiatives we are taking from a regulatory perspective.

As I mentioned previously we will be issuing appropriate directives to monitor (indiscernible) end users, if required.

The other one is an administrative initiative that we'll be taking in terms of amending the license we are providing to ISPs because in the present license we are specifically mentioning IPv4 IP addresses. This need to be amended.

And the other major issues that we'll be looking into is in terms of the (indiscernible) IPv6 (indiscernible) equipment. In fact we will be looking (indiscernible) feasibility of making (indiscernible) equipment de facto IPv6 compliant on (indiscernible) basis.

Next slide (indiscernible) involved in experimentation program with ISPs. Unfortunately we saw there is no such initiative. This is specifically with pilot projects, pilot -- I mean, some kind of offers, pilot offers, that have been made (indiscernible) IPv6. (Indiscernible) no such offers from the ISPs, and the possible reasons pertaining to that might be the no business drivers and the other major reason may be are these reflected by which the transition (indiscernible).

Make sure all the ISPs open to the IPv6 initiative at the same time.

So in order to boost up this experimentation (indiscernible) universal service fund, and we will be exploring the possibility of tapping into this fund for the deployment of experimentation program with IPv6.

And here again, we will be examining this proposal at the level of the national IPv6.

(indiscernible).

(Scribes not receiving discernible audio).

Web server IPv6 compliant. The major difficulty we faced is -- (indiscernible) -- with the firewall in terms of update being the firmware and the software. We also have to change the firewall rules to make sure that IPv6 traffic goes through. And the practical difficulty that we encountered is in terms of support that we had from our world local service as local firewall suppliers.

Next slide. Regarding our own experience in the deployment of IPv6.

I'm tempted to say that in all cases, there's no free lunch. What I mean by that is, IPv6 is a good technology, yes, but it comes at a price, and this price is very sound and very secure implementation practices. It's not a question of having the same mind set which is deployed from IPv4 to IPv6. It's a bit more complicated than that. And special attention need to be taken with respect to security issues.

Next slide. This is the one I have already talked about that. Some thoughts on implement of IPv6.

In terms of the transition process, this slide pertains to the presentation that was made during our public consultation to highlight the fact that this process involved different organizations such as the ICANN, IETF, the ISPs, the infrastructure vendors, the business and (indiscernible) vendors and the end users.

Now, in terms of this last slide, just to summarize the initiative that we have taken in versions, we recommended that there's a need to set up a national IPv6 task force, and in this IPv6 task force, there will be an oversight committee which will be the apex body for make being decision, and it will also be providing strategic national direction for IPv6 in Mauritius.

There will be, under this oversight committee, the setting up of a Steering Committee, and the main purpose of the Steering Committee will be to supervise and oversee the activities of the working groups, and in terms of the different working groups we will be setting up, one will be in terms of training and awareness, one will be IPv6 implementation, the next one will pertain to standards and

specification. The other one will be IPv6 implementation government, application support, and finally security working group.

So this is basically an overview of the initiative that has been triggered by the regulator in Mauritius.

In fact, now to kick start the real process of implementation and rolling out of IPv6 in Mauritius, this will be the task of the IPv6 national task force.

So that's all from me.

Thank you for your attention.

HISHAM IBRAHIM: Thank you very much for your presentation. And I think you gave a lot of stuff for our last presenter to talk about from the ISP world. But before we go to that, we will go for our last country update from South Africa, which is one of the highest Internet resource number consumers in the region.

So Mark, please, if you would do the introduction.

MARK ELKINS: Good morning, everybody.

My name is Mark Elkins. I live in South Africa.

I wear multiple hats. I may confuse them during this presentation.

Briefly what I was asked to do was to look at IPv6 deployment in South Africa, and I basically have just five slides as to where we are, what's happening, current usage, peering and other initiatives.

So why should we look at South Africa?

The three pie charts, the first one is membership of AfriNIC by country. Don't worry about not being able to read numbers, but the big blue bit is South Africa.

Again, if you look at the middle pie chart, it's IPv4 addresses by country. And again, South Africa is the big blue bit. And it's only when we look at IPv6, the third pie chart, that it's round about a quarter of the pie. But when you consider that the standard allocation of IPv6 of address block for /32 is relatively large, then perhaps it's not surprising we don't need quite so many blocks as, proportionally, as IPv4 address space.

The graph is slightly (indiscernible). I would like to point out AfriNIC, which has a number of IPv6 resources which is listed under Mauritius, probably all sit in South Africa anyway.

So how much actually is in use? I have been trying to get to the 6 access network for a while to figure out on an allocation-by-allocation basis, but that doesn't seem to be working. Currently we seem to have 69. It's actually gone up by one, allocations, of which 32 are visible. So approximately half of everything that we have got is being advertised. Which isn't too bad.

From my point of view, how much is actually visible from my point of view?

A while ago, the JINX Johannesburg Internet Exchange, did a IPv4 and IPv6 numbering exercise, and I set up a Web site to go and poll and see what was happening.

We have approximately 56 devices connected to the peering point, which is 32 discrete members. That membership includes people like packet clearinghouse, ISC NetNode, ultra DNS, and community DNS.

Of those 32 people who are peering, eight people have IPv6 and only seven actually use it to peer with anyone.

The number -- I did these slides about a week and a bit ago and it's now nine people have IPv6. So we have growth.

Of the Anycast type services, only the community DNS has IPv6. And as all these Anycast type providers are such bright and intelligent people, I started probing around as to why that is, and it's essentially because one of the larger ISPs in South Africa still hasn't got its act together and

normally provides transit. They are certainly providing transit for IPv4 connectivity for a number of these people, and they simply haven't gotten around to doing the same thing for IPv6. So this is the problem that we sit with in South Africa.

From peering, moving along to more or less the last slide, what else is happening in South Africa? Well, one of my other hats, I sit on the UniForum which is the co.za registry in South Africa, and a long time ago, back in 2007, we decided we should no be in the way of any IPv6 transition for the local industry. So way back in 2007 -- in fact, in 2006, I was able to get my own block from my own ISP, and using that, was able to set up native IPv6 transport to the outside world as well as the one or two people at that time peering in South Africa. We then looked at getting the registration of IPv6 glue, as well as IPv4 glue, obviously, into the DNS, so we have been doing that since 2007. We had DNS resolvers, lookups, et cetera, that were working on IPv6 over IPv6 transport. And if, by chance, someone actually registered a domain using IPv6 glue, we also had the IPv6 transport so that we can go and do checks to make sure that -- we do these strange checks within the co.za system to make sure everyone has everything set up before we put glue records and name server records into the zone file. So we finished that years and years ago.

What else has been happening? Change in the order slightly. The local ISPA, Internet service providers Association, has been pushing its members to adopt IPv6 for a number of years. There was a survey about two years ago which started off with questions like, "Are you totally IPv6 compatible yet?" Are you planning to do IPv6? Down to sort of the last question is, "Have you a clue what IPv6 is?" And it was surprising how many people were ticking the boxes towards the end of the list rather than the beginning of the list.

We considered carrot-and-stick approach. I am more for giving free membership to people who do have IPv6 but that didn't do well with some of the other members. It's an ongoing battle to get people to move, but never mind.

We're changing hats once again. The middle point here is what is our government doing? Our government, Department of communications, set up an IPv6 task force. This happened literally a month or so ago. The first meeting was just three weeks ago. There was another meeting this Thursday last week as well.

So that's very, very much in the beginning slides. Because we are so late in the whole show, we are hoping that we can steal lots of ideas from lots of other people that have already gone through this process.

So, Mauritius, if you are still looking, I would love to see all your work in its finest, goriest details as well, please.

The Mauritian government probably has done one of the nicest presentations in IPv6 migration.

So that is everything, and after the last speaker, I will take questions.

Thank you very much.

HISHAM IBRAHIM: (No audio).

So our last presenter now comes from the ISP world and he will give us their experience in IPv6, and not to spoil his presentation, but I would like to say they are one of the leading IPv6 ISPs in the region.

So, Modou, please.

MODOU SALL: (in French).

(scribes need translation).

I am going to speak in French. And I will speak about IPv6. And I am going to share my experience with my colleagues on IPv6.

Why the strategy summarizes the context of IPv6. IPv6 is very important in terms of organizations. When we talk about

communication, the lessons we learn, IPv6, as you know, we, ISP, Internet Service Providers, are closely related to IPv6.

IPv6 was the only solution, long-lasting solution, to face the lack of IPv4 addresses.

The service must go on. There will be several IPv4 islands. So some customers will be remain on IPv4, and we have to ensure service provision to IPv4.

So we have to point out that IPv6 is the milestone. Everybody knows that.

The significance of the Internet, the economic development, and to ensure the growth and the sustainability of business depends on IPv6. We have to think about mobile data as well.

Everybody has a mobile phone, and we have to think about the development of the Internet on these devices.

This is really a challenge for telecoms.

IPv6 must be present there, as well as the device-to-device service. And I will give you an example.

You establish developed consumption. People moving from device to device and the possibility of ensuring continuity of Internet ensures continued service of the Internet, continues service of the Internet. This will only be possible on IPv6 in the future.

IPv6 is not just confined to any site in particular, any location in particular. Business need it to continue doing business, and is extremely important because today, we speak to be always in connection, and you will receive your video stream and you may receive it through a Wi-Fi. And you have to have constant access, permanent access, whether 2G, 3G or any other device that you may use. This connection sudden be there. And this is only possible on IPv6.

IPv6 is really needed.

In the case of mobiles, we have some value added services that are quite interesting. Facebook and all that social media that will only be supported by IPv6.

Some private companies provide these services, and we should not forget the multiple play, any play, and all the companies that sell content.

So the strategy at Sonatel and the Orange group in particular is that we are focused on ISPs, and everything related to services: Data, video.

This is the IP concept all around the world.

As a matter of fact, you need IPv6. The network should be capable of supporting IPv6.

In this light, you see the very heart of the network with the labeling committee, the "P" that will support the links to the customers so as to provide a service based on a given performance standard.

We have some points of presence, and you always have to remember that the routers and all the devices used by the customer should be compatible with IPv6. As well as IPv4. Because we have to give support to both of them. And at home or at a business center, we need to have certain devices that may provide access to Internet.

And in the future, everything will go through the Internet: The fridge, TV set, everything. So everything will be supported by IPv6.

We are moving towards a convergence of networks. This is called IMS, and has a specific protocol, and certain applications will need certain infrastructure to be supported. This is a concern because IPv6 will then provide -- will then ensure the provision of all services.

With Sonatel, our goals have been set higher. We have a globalization of Internet because we are an Internet service provider. So we need our customers and consumers to get IPv6 content anywhere around the world.

Today we spoke about that you no longer need -- or you no longer have to have an IPv4 address. The IPv6 service should not be restricted. So at Senegal, we need to offer this possibility to our users. We have a kind of technical leadership. We know what to do. We have to show our customers what we know how to do. As a network, we are ready to be with them, to be supportive of them and to be one of the reference benchmarks in the implementation of IPv6 in all its branches of Africa. So we need to help our customers as well.

As I was saying, it is extremely important to monitor, to oversee IPv6 -- IPv4 addresses. You cannot use these addresses being blind, so you have to monitor them to find which are the segments used in the addresses and which are the measures we are going to take. We have to find out the applications registered in IPv6.

I think the government has started work on that. I'm a member of the committee that was mentioned before. And at the level of Internet network provision, we need to go not only to the server but to the content servers -- not to the routers, sorry, but to the content servers as well as the regulators as it was explained before.

Everything related in the relationship with the customer should be downward, and these information systems should also be taken on board.

With respect to implementation of IPv6, I have three things to share with you. We have three task forces, architecture, implementation, operation, and maintenance. We have to bear in mind communication marketing and information technologies as well.

The training of the technical staff is something that is needed. We are already working on that in all of our branches in this region. But in terms of governance of this projects, it must be discussed with the rest of the world because this is strategic. So it has to be available anywhere in the world when appropriate.

As I've said before, regarding IPv4 addresses, monitoring, and practices, we have to optimize all these aspects for the proper use in the network

including routers and services assigned to customers. And we have to quickly calculate all that so as to know which is our current position and improve our change our routine to speed up processes.

We have talked a lot about this. It is not just router, DNS, IDN strings, so we need to publish some documents about the network topology to put IPv6 only.

Sonatel as a provider has been working from 2009, and we have implemented the VPN on IPv6 so they are VPN6 for businesses that need an IPv6 connectivity to connect all their sites, all their locations. This is a reality, and we are able to offer that to our customers.

We may also do all the testing on IPv6. Of course, we face difficulties because as was mentioned by the regulator, the devices are not always compatible. So we had some problems, and we had to make the whole system more transparent, even though it is not 100% compatible. We have made some tests on IPv6 and access on IPv6 is a reality today.

As you have seen at this meeting in ICANN, all of you are using laptops on IPv6 by default. And all of you will immediately get an IPv6 address and during the summit meeting, we had connectivity on IPv6 without tunnels. It was certainly innated connectivity with our chain values. So this is our challenge to move on the mobile side. We are going to discuss an IPTV and mobile networks so as to provide better work.

This is the communication, and we have been working very hard on communications since 2009. We have invited all the regulators of the community to participate in the migration to IPv6 because at an economic level, they may have some interesting perspectives. So now routers have to be purchased, and the plan has to be that the routers will be changed to migrate to IPv6.

I think it was very interesting for them for regulators, to attend these meetings. But there are two multinational companies that have visited us because during the summit, they wanted to migrate to IPv6.

In this experience, we found that the actual challenge is transition in itself. IPv4 and IPv6 are two different worlds, and they had to keep on

living together because IPv4 is here with us. The transition is complex, that's true. And we have to be aware of that fact.

With respect to the customer devices and equipment, perhaps they need a specific decoder for IPv6. We are taking all this into account, a group arranged. And the key for success is partially to have the necessary resources -- properly trained human resources to follow up with this process and to take IPv6 as an opportunity and not as a duty. Thank you very much.

HISHAM IBRAHIM: You gave us a very wide-range of expertise like I mentioned in the beginning from a government regulator, ccTLD world, ISP. I'd like to jump right away into questions, and I understand we have a bunch of remote questions. And I will take questions from the floor.

Okay. Please. We'll take the remote ones first.

We would like them to go to the microphone, please. There should be a standing mic in the front of the room to read the questions.

ANNE-RACHEL INNE: So this is a question for Trilok. Bakary who is online says: So Trilok mentioned that special attention is needed on security issues, although online never 100 but expects IPv6 more improved security solutions than IPv4. Could he further enlighten us about the security issues concerning IPv6 he talked about?

TRILOK DABESSING: Thank you. Can I reply?

HISHAM IBRAHIM: I would like to take a couple more questions, then go ahead.

So is there anything else from the remote?

Okay, yes?

>> Thank you very much. I'm (saying name), is my name. I'm from Uganda. I work for the minister of ICT. I have been impressed by the (indiscernible). Mine is just a comment from the perspective of government.

The government of Uganda (indiscernible) set up a task force as well and has been weighing through the purpose of developing a strategy for transition to IPv6. This was approved last month by our minister of ICT, but our (indiscernible) working with stakeholders is the issue of awareness creation and how we build capacity within our local population and have been (indiscernible) things.

One, we have organized local workshops with all the ICT officials within the government, both the central government and the local district authorities to an extent that some of our ICT officials within the local district governments would be aware of the term "IPv6."

Some of the universities that we went to, even the lecturers that teach ICT, were not aware of the term "IPv6." So that struck us as a big challenge in order to incorporate in terms of capacity-building and awareness.

So what we propose is set up IPv6 testing laboratories in our public universities and also we've made a resolution that on all our correspondences, on all our (indiscernible), and on all of our head papers would put a footnote, something talk about IPv6. So if it goes out from the ministry, someone will be able to see IPv6 and a key message. And I have a sample here of what we are doing.

So it takes a little bit of effort for awareness creation because the technology would always be sought out by the technical people. But as governments, we need to concentrate more on awareness creation and collaborating with stakeholders and building capacity. Thank you very much.

HISHAM IBRAHIM: Thank you for that from that Ugandan perspective.

Yes, please?

AMADOU DEME: Thank you. I'm Amadou Deme, head of engineering for network and I.T. of Sonatel in Senegal. Thank you all for your presentations. I have one question to Hisham.

We have heard yesterday in the workshop on DNSSEC that IPv6 will impact the Internet as we expose internal DNS servers. How does AfriNIC plan to support the stakeholders leading this migration from IPv4 to IPv6?

I have another question to Gaye en francais.

When you conducted the survey, I would like to know -- because you said 80% were compatible and 17% of the training and the migration had taken place. So why this distribution in the pie chart between the consumers, users, public administration, ISP and university, for instance? Perhaps this would help you see -- yeah, what are the less compatible portions. It would be interesting to know what are the action plans requested by these type of measures? So the IPv6 compatibility is possible.

When the regulator took the floor, he said that we have to walk the talk so that by 2013, IPv6 will be fully implemented. So what is the position of the ministry in this respect?

>> I'm from the University of Francophonie speakers, and I would relate my question to what the person from Sonatel had said. I'm one of the end users and I am using IPv6 with four tunnels. You said that IPv6 could be used directly, directly from you. So what shall I do? Shall I write an e-mail to you or can you give me a contact person? What can I do to use it directly?

>> Hello, my name is (saying name). I come from Benin. I am an ICANN member, and I have some concerns with respect to IPv6. Because we are aware that IPv4 is kind of obsolete, and it will be great to make migration to IPv6. Each country makes its own efforts. We're not speaking in IDN terms.

But is there any group connection among some countries so that we may together move to us the transition and towards IPv6? I think it would be important to see that one country migrating -- is migrating to IPv6 while some others remain on IPv4.

I would like to know how cooperation works at this level. I think it's important to think this as a progressive process.

HISHAM IBRAHIM: So, yeah, last question, before we go to comments? Yes, please.

>> Good morning. I would like to make a comment on what Mr. (saying name) has wrong. IPv6 as we are seeing right now is not an option. It is a mandatory issue for us. We will have to migrate to IPv6. But there is a problem of security. I think that this should be mentioned because based on this problem, we have to do everything necessary to sort it out. What do we have to do in this respect? What are your ideas with respect to these security issues?

If IPv6 could be implemented, it would be better because there's some elements there in IPv6 that we did not have in IPv4.

So, any equipment, any device that may be used in IPv6 will be maintained; isn't that right?

HISHAM IBRAHIM: So I would like to ask Trilok to take the first question that was addressed to you and then we will see if anybody else on the panel would like to take the issue of security as well.

TRILOK DABESSING: (indiscernible). But in order to tap into these security features, in order to benefit from these security issues on IPv6, there is a need to make sure that we have a very good and sound implementation practice in order to harness security features of IPv6. And from our own experience, what I was saying is that we now represent (indiscernible). The logic you have in terms of security, privacy that you apply with respect to IPv4, it is not a mechanical contribution of the security policy from IPv4 to IPv6. It is more complex than that.

So what I'm saying is that there is a need to be very sensitized about the need to implement good IPv6 implementation practices in order to tap into security features of IPv6. Thank you.

HISHAM IBRAHIM: Yes, Mark? You had something to say?

MARK ELKINS: Mark Elkins here, yes.

I think it's a bit like trying to move a Windows user to Linux. IPv4 has been around for such a long time, everyone knows how it works. Everyone is reasonably well aware of the security issues, and IPv6 is no different. It's got its security issues but slightly different. The problem is people haven't been playing or practicing.

So I'm sure that just as I manage to move people from Windows to Linux and they never look back, people will move from IPv4 to IPv6 and, again, never, ever, ever look back.

MODOU SALL: There was a question posed by the student regarding security-related issues. These security-related issues are very important at this level because we do have firewalls, filters, mechanisms, et cetera. But as you know, security is managed by the end user who plays a role in the whole picture. The end user has to protect his local network, his environment. So at our level, our concern has to do with spam, with malicious Internet traffic, and we focus on that so as to effectively fight spam and other problems.

HISHAM IBRAHIM: The points that were addressed to me personally and the regional perspective of them, which were, first of all, the talk about moving together not only country by country but as a region. So as I may have mentioned in my presentation that started off, we are kick starting an African -- regional African IPv6 task force which will combine all the national efforts that are done in terms of task forces, in terms of projects, ISPs that are committed, university research and development, all of that. Anybody keen in IPv6 in the region can find a common platform to work together and share experiences. Some countries have been doing this for a long time. Some countries are still getting into the game. So we will -- we are building that common platform, which will be launched, like I said, in, like, two weeks' time in our Cameroonian meeting -- AfriNIC Cameroonian meeting.

There was also another question about DNSSEC and what AfriNIC is doing. AfriNIC is very invested in DNSSEC. We are doing a lot of initiatives there and also going back to our meeting, we have a full day of tutorials on DNSSEC and how can you better implement them on your networks and how can you start from initial stuff to advanced stuff. I would like for all of you, even if you cannot participate in person, these things will be streamed and you can participate as well.

Are there other questions that any of the panelists want to go to?

I will just take John's question, first. John, please?

JOHN CURRAN: John Curran, President and CEO of ARIN. I also wanted to speak on the security issue regarding IPv6. As has been noted by the prior speakers, you have to consciously look at your security architecture for IPv6. It doesn't just transform from v4 to v6. You have to take an effort. What I would remind people in the room and people listening to this is that the decision to look at IPv6 security is actually one you don't get to make. You have to do. Even if you don't turn on IPv6, the transition mechanisms that exist between IPv4 and IPv6 are probably active in your network right now today.

So even if you don't turn on IPv6, you probably need to go to do the IPv6 security exercise of figuring out what those protocols are, how they're configured, whether you're filtering and blocking them. Because without even turning on IPv6, you may have users who are sending IPv6 packets and don't even know it.

So, alas, someone might say, I'm going to put off my IPv6 deployment, I'm worried about security. It is actually not a valid option. IPv6 security is what you have to look at, even if you don't turn on IPv6. Thank you.

HISHAM IBRAHIM: Anne-Rachel.

ANNE-RACHEL INNE: This is a question from Aderonke Adeniyi. He is online. I would like to ask Trilok if he did say if ISPs were involved in their survey on awareness creation in Mauritius? Also, in a situation wherein fewer ISPs are operational in the Nigerian market, what are the options for the regulator?

HISHAM IBRAHIM: Okay. But before taking that question, there were still pending questions. So I will give the floor to Modou.

ANNOUNCER: Excuse me, we will have to end this meeting no later than 10:30. We have another meeting coming in and we have some prep work to do. Thank you.

HISHAM IBRAHIM: Noted.

MODOU SALL: We need to speak about the allocation between operators and universities using IPv6. We could say that operators in Senegal use far more IPv6. I don't mean to make any advertising campaign here, but they are the ones working on IPv6. We have connectivity proposals regarding IPv6 at universities. IPv6 in Senegal show -- or in that regard, we have Sonatel, for example, as an operator that is already deploying IPv6.

We've held training sessions during the first IPv6 forum, and this committee started using IPv6. And we have a transition plan to migrate to IPv6. That plan was set forth by the government of Senegal.

Regarding IPv4 -- I mean, there is an agency that is very well-informed regarding IPv6 and is in charge of training seminars at the university level.

As regards the deadline for the transition, we see there isn't a specific deadline for that transition. Transition towards IPv6 has to be staggered, gradual. Therefore, we do not have a deadline. However, we need to inform companies in their decision-making process so that they can migrate towards IPv6. The committee issued an action plan in this regard.

Therefore, I will try to quickly answer all the other questions. The Francophone -- as regards the Francophone University, let me say that we work intensely with other universities, such as the Dakar University, they have Sonatel-provided IPv6. There is a tunnel -- VPN tunnel connecting them with us because we need to migrate towards IPv6. And that we know how to do at university.

We are working on this. We have native connectivity. As regards Francophone countries, we work with Noelle (phonetic). And, yes, it could be said that we can have a tunnel or else we can have native connectivity. This is something we could talk about or we could say upon completion of this session.

Regarding the last question posed by the student, let me say that all training centers, schools have connectivity. And if you're not allowed native connectivity, you need to set up a tunnel that will enable access. Thank you.

HISHAM IBRAHIM: Final comments really quickly.

TRILOK DABESSING: Thank you, Hisham. With respect to the question, just to clarify, when we launched the public consultation process in March 2001 (indiscernible), what we did we sent a technical survey to the ISPs to assist the state of readiness with respect to IPv6. So this is how we proceeded in the public consultation process. We asked general questions about policy directions to be taken care of, exactly the steps that needed and the issues that arised.

But from the ISP perspective, the questions we asked were technical ones. And if you may wish, you can find the outcome and the survey questions and the outcome of the questions on our Web site, which is www.ict.mu. All of these are available online. Thank you.

HISHAM IBRAHIM: Mark, 30 seconds, final comments.

MARK ELKINS: 30 seconds. You have a choice. You don't need to go to IPv6, but then you will be closing shop and changing industries. IPv6 or nothing.

HISHAM IBRAHIM: Modou, 30 seconds, final comment.

MODOU SALL: Last comment. (Scribes not receiving translation.)

The committee thought about working on this so as to convey the survey results showing a smooth transition towards IPv6.

HISHAM IBRAHIM: I'm very happy with the turnout we had. I would just like to close with something that I heard from Vint Cerf at Kenya, the IGF meeting, which was in terms of content providers. So he said that for next year -- We had this year the IPv6 day. So they were planning for an IPv6 week which is a date that we can all look forward to in terms of everybody was talking about a date. We can look forward to trying to take more African participation during that week.

What he said is for January 1st, 2013, they will turn on IPv6 and keep it on. So these are -- if we are looking for dates, these are dates that we can try to work with and try to cope with. Thank you very much. And a round of applause to all of you and my participants. Thank you.

[Applause]

[End of audio]