fPIF | 2017

Organized by: Internet Society

Local Host: ARTCI

The Africa Peering and Interconnection Forum

Venue: Azalaï Hotel Abidjan
Boulevard Valéry Giscard d'Estaing, Marcory,
Abidjan, Côte d'Ivoire.

Date: 22nd – 24th August, 2017

MEETING SUMMARY


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15

The 8th Africa Peering and Interconnection Forum (AfPIF) was held at the Coastal city of **Abidjan, Ivory Coast,** from **August 22nd to 24th 2017.**

This year's forum attracted **227** participants from IXPs, ISPs, governments, content carriers, network providers, hardware providers and software service providers among others.

The meeting tool, which allows participants to discuss ways to exchange content, had **276** registered users who scheduled **170** meetings. Twenty networks introduced themselves during "Peering Introductions" sessions, held every day.

Over the eight years, AfPIF has been a resounding success, supporting the growth of IXPs, by working with local, regional and global Internet players to explore and advance the African peering and interconnection ecosystem.

From 2018, the Africa IXP community will take over organization of the annual meeting. The Internet Society will still be involved and supporting the IXP community.

During the discussions, it was noted that international CDNs, infrastructure and hardware providers continue to invest in Africa. At the first AfPIF in Nairobi eight years ago, *Google* was the only CDN; now, *Akamai, Yahoo, Netflix, Facebook,* and *Cloudflare* have a presence in Africa and continue to give their support.

The entry of hardware providers has allowed discussions on how networking equipment can be more efficient and cost effective to help lower cost of connectivity in the region. *Flexoptix* and *Adva* presented on some of their initiatives to develop products that are aimed at reducing the cost of building high capacity/bandwidth fibre networks

227 Participants

276 registered users who scheduled 170 meetings

23 Sponsors

Although Africa has made progress in intra-country and cross border connectivity, more discussions and efforts are important in improving connectivity in the region. The keynote speech by ***Funke Opeke*** showed the infrastructure operators still face regulatory bottlenecks in crossing borders.

Rwanda leads in regulatory progress; there was a presentation on how the regulator in Rwanda is using the Universal Service Fund to subsidize the cost of hosting, hoping to grow the cloud services business. The data center providers also pay a lower electricity tariff, with the expectation that Rwanda will be an attractive colocation destination.

With its extensive investment and efforts in Africa, *Google* has managed to keep **80** percent of the content local, showing that the goal of **80** percent local content exchange by **2020** is within reach for many operators.

Google is also improving its global cache infrastructure by setting up a virtual cache, allowing more people to peer and share infrastructure. This is already being tested in two locations in Africa.

The number of IXPs in the region has grown to **38** in **29** countries, anchored by diversity of peers; ISPs, content carriers, mobile operators, banks and governments among others. As IXPs mature, they are migrating into carrier neutral facilities that offer more reliable infrastructure such as power back up. In addition, more IXPs are contracting permanent and or part time staff.

Data and statistics are growing from the region – *Ripe Atlas* probes are collecting data, which is allowing others to use this data and develop their research. For instance, *Afrinic* in collaboration with LACNIC, the University of Cambridge and Queen Mary University have an ongoing project, analyzing latency clusters using Atlas probes and speedchecker.

The research used **229** Atlas probes in **36** countries and **850** speedchecker probes in **52** African countries. The study showed that, as expected, the interconnection is clustered along the sub-regional economic blocks of Northern, Southern, Eastern and Western Africa, despite some unique exceptions. However, the intra-cluster latencies in the Western region were significantly higher at over 200ms compared to Eastern (44ms), Southern (46ms) and Northern (76ms) regions. This was attributed to the networks use of European international transit points for intra cluster traffic. This shows a deficiency in cross-border interconnection in Western Africa.

This year there were **23** sponsors: *Seacom, Liquid Telecom, Angonix, Angola Cables, De Cix, Linx, Adva, Afrinic, Akamai, Dolphin, Facebook, Flexoptix, France IX, Google, icolo.io, Main One, Netflix, Netnod, Yahoo, MTN, Teraco, Medallion Communications* and *ARTCI.*

Day **One** Summary

The annual Africa Peering and Interconnection Forum (AfPIF) kicked off at the Azalai Hotel in Abidjan, Ivory Coast.

The first day is known as "Peering Coordinators Day" where peering managers from various networks, operators and policy makers meet and deliberate on the various ways to exchange content locally, lower cost of connectivity and increase the number of internet users in the region.

In the course of the three days, participants get a chance to discuss, exchange ideas and agree to exchange content, known as peering. Most peering agreements are through handshake and AfPIF encourages participants to take advantage of the various social events and share contacts. There is a session at the beginning and end of every day, where participant share their AS numbers, peering policy and contacts, allowing those willing to interconnect to reach out.

The first session explored the general data and interconnection landscape; *Telegeography* presented the latest statistics, which is derived from its annual survey.

Statistics show that the growth of submarine cables has led to growth in Internet bandwidth and local content. Five years ago, International transit was growing at **40** per cent, but this year, the growth is at **30** per cent, owing to the increase in the rising local content exchange.

The cost of IP transit continues to fall, currently at **$9** per Mbps. The cost is an average of the highest and lowest cost, usually varying between local and international transit providers. The cost of STM-4 was pegged at **$20,000** between London and Nairobi, London and Lagos is **$15,000** while London and Johannesburg is the lowest at **$8,000**.

38

The number of IXPs in the region, in 29 countries

$9

The average cost of IP transit globally

$20,000

The average cost of STM-4 transit between London and Nairobi

Intra-Africa capacity continues to grow but most of the traffic is still exchanged in Europe. Growth in data center and cloud services is expected to lead to increased traffic exchange within the continent.

Telegeography projects that by **2021**, Africa will have **541** million 3G subscribers, compared to **471** million subscribers registered in **2016**. LTE subscribers are expected to reach **201 million** by **2021** compared to **37 million** registered last year.

Low Cost Connectivity

The main theme at AfPIF revolves around lowering connectivity costs; *Adva Technologies* presented on the various ways they are facilitating low cost mobile bandwidth, especially in less densely populated areas. In Africa, the majority of people access the internet through mobile phones, and traditional base station construction is considered expensive to put up in areas with sparse population.

Adva, together with the *Telecom Infrastructure Project* (TIP) are working on Voyager – an open optical solution that will lower the cost of rolling out, supporting and maintaining infrastructure. Voyager will provide capabilities to monitor and locate network faults in real time, allowing the network to be more resilient.

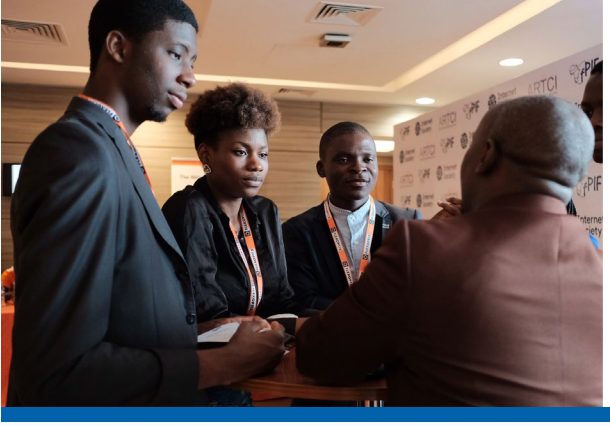
Google achieves 80% local traffic exchange

In the last eight years, *Google* has supported AfPIF in the quest to increase the level of local traffic exchange; this year, *Google* announced that it has achieved **80** per cent local traffic exchange in Sub Saharan Africa, and is hoping to reach 100 per cent by 2020.

Apart from Supporting AfPIF, *Google* has provided its global cache to networks in the region; provided they have achieved a certain traffic threshold or are sharing with other networks in the country. Most countries in African have a cache, in most cases more than one per country.

Over time, *Google* has noted that networks do not like to share the cache, mainly because it is used as a competitive edge within the country. While monopoly is not encouraged, Google has found a way to make networks share: a virtual cache.

The virtual cache will allow many peers to connect, making sharing easy, and make it easier to set up regional hubs. *Google* has hubs in Nigeria, Kenya and South Africa. The virtual cache is currently under tests in two locations in Africa.



Internet Measurement and Statistics

The last panel of the day was on Internet measurement and statistics; *Ripe NCC* presented on the **275** Atlas probes deployed in **36** African countries; the latest was deployed in Burkina Faso last week.

Ripe Atlas probes are used for network operations, monitoring, measurement and troubleshooting. The probes show traffic paths, not bandwidth. Globally, Ripe NCC has deployed **10,000** probes in diverse networks and locations.

The research found that traffic within Africa was hoping to European hubs before returning to the region; in some cases it had four hops, which increases the latencies.

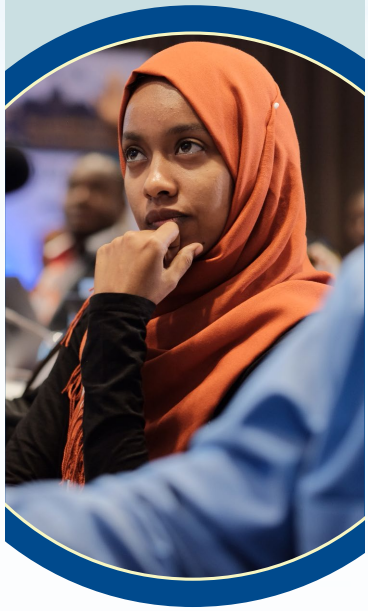
Seacom, Liquid, MTN, Telkom SA and *France Telecom (Orange)* are the largest transit providers in the region.

275

Number of probes deployed by Ripe NCC in 36 African countries

10,000

Number of probes deployed by Ripe NCC in diverse networks and locations globally



Day **Two** Summary

Since we launched the first AFPIF, we not only organized 8 such events but also had a high number of capacity building activities to increase local and regional peering in Africa.

– Dawit Bekele, Head of the Internet Society Africa Bureau

The second day at the Africa Peering and Interconnection Forum (AfPIF) is dedicated to plenary presentations and discussions between the technical community, the private sector, and government representatives.

The discussions aim to foster understanding of the landscape the various players operate in, the challenges faced, opportunities and ways to create synergies that guarantee increased connectivity, and exchange of content within the region.

The first session of the day was the formal opening ceremony, with ***Yves Miezan Ezo,*** *representative of the Conseiller Technique du Ministre de la Communicatiln, de l'Economie Numerique et de la Poste de la république de Cote d'Ivoire,* ***Caliste Claude M'Bayia,*** *representative of l'ARTCI,* and ***Moctar Yadaly,*** *Head of Infrastructure and Energy* at the *African Union Commission (AUC)*.

In his speech, ***Dawit Bekele,*** *Head of the Internet Society Africa Bureau,* welcomed participants to the 8th AfPIF session, noting that great strides have been made in Africa's technology landscape, and it will get better.

The first AfPIF session was held in 2010 by the ***Internet Society*** out of the realization that too much African Internet traffic was exchanged outside of the continent, and the region could save costs by exchanging the content locally.

Dawit noted that:

For the last decade Interconnection was the biggest focus of our activities in Africa. Since we launched the first AFPIF, we not only organized **8** such events but also had a high number of capacity building activities to increase local and regional peering in Africa. In particular, we partnered with the African Union to implement the first phases of the AXIS project which helped build the technical and organizational capacity for the development of IXPs in **30** countries around Africa. It was a great honor for the Internet Society to work with our continental organization the African Union in this highly impactful project. And we are very glad to have the steering committee of AXIS meet here in Abidjan alongside AFPIF in order to create further synergy between AXIS and AFPIF. I would encourage that you all use this opportunity to meet with the AXIS steering committee members and discuss how we can all build on the achievements of AFPIF and AXIS to reach our vision of having 80% local traffic in Africa by 2020.

2017 is an important year for Internet Society since we are celebrating our **25th** anniversary. In **1992**, a small group of Internet pioneers, including *Vint Cerf* and *Bob Kahn*, established the *Internet Society* with the vision to bring the Internet to everyone. That goal might not be reached yet but I am sure that you agree with me that we have gone a long way towards that goal. About 25 years ago there was no African country that had Internet access. Today all African countries have Internet access. Internet penetration is about **28%** and the growth has been considerable in the last decade. This happened thanks to the contribution of many organizations including the Internet Society. We are particularly proud of our capacity building work that the Internet Society as well as our contribution in the development of peering in Africa did in Africa.

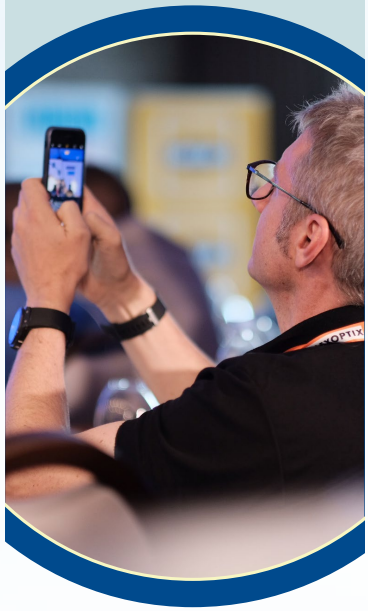
It is also going to be a new direction for the organization of future AfPIF events; the African bureau has decided to hand over AfPIF to the African IXP community. For the last 8 years, AfPIF has become a very sustainable event in terms of participation and funding, and *Bekele* believes it is time to transition it to the Association of African IXPs (AfIX). The Internet Society will still continue supporting the AfIX in organizing the annual event.

1992

The year a small group of Internet pioneers, including *Vint Cerf* and *Bob Kahn*, established the Internet Society with the vision to bring the Internet to everyone

28%

Internet penetration rate in Africa at the moment, compared to none 25 years ago



37,104

Distance in kilometres terrestrial fiber linking various regions in Nigeria

Currently, only 20 per cent of the content is exchanged locally in Nigeria, with 80 per cent of the people accessing the content via mobile. The Nigerian IXP is currently exchanging 31.5 Gbps with most of the capacity exchanged in Lagos.

Keynote Speech

Funke Opeke, CEO of MainOne, one of the largest submarine cable operators in Nigeria, delivered the keynote speech. Her presentation explored the possibility of achieving the exchange of **80** per cent of content locally in Africa by 2020.

Currently, only **20** per cent of the content is exchanged locally in Nigeria, with 80 per cent of the people accessing the content via mobile. The Nigerian IXP is currently exchanging **31.5 Gbps** with most of the capacity exchanged in Lagos.

Nigeria has **37,104 km** terrestrial fiber linking various regions, but no official interconnection arrangements with neighbors such as Cameroon, Chad, Benin, and Niger. This was as a result of nonexistent or little cross border engagement, licensing and regulatory issues, and different currencies, reflective of economic realities in the continent.

Opeke was optimistic that measured regulatory intervention, increased attractiveness to regional interconnection, mobile networks exchanging content locally, sustained economic growth, and ease of doing business will lead to increased local content sharing.

Content Distribution Challenges

Netflix, CloudFlare, Facebook, and *Rwanda IXP* were on the last panel of the day, discussing content distribution challenges and opportunities in Africa. *Netflix* provides video on demand services across **190** countries and is seeking to increase its coverage in Africa. Its preferred way of sharing content is putting servers on ISP networks in various countries. From there the user can be redirected to the nearest servers.

For *Netflix, Cloudflare,* and *Facebook,* South Africa is the first country in Africa that they set up, given the more developed Internet ecosystem, high traffic and the ease with which various players share local content.

The CDNs are exploring ways to set up cache in other countries, but peering and general sharing of services has to be established in order to raise the number of users accessing the service. For instance, more networks would access a cache at an IXP and more people compared to sitting at one ISP in a country.

The case of Rwanda has been exceptional because the industry regulator is working together with the ICT industry to improve the level of ICT business in the country. For instance, to promote the content hosting business, the regulator is using the Universal Service Fund (USF) to subsidize hosting for the next four years, after which the market rates are expected to have fallen.

The cost of electricity to data centers has also fallen because the facilities attract a different tariff, aimed at managing rising costs and improving sustainability of colocation facilities.

The ensuing discussions proved that AfPIF members need to continue engaging with regulators and educating them on some of the issues in order to make proper and progressive policy decisions.

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Day **Three** Summary

99.93%

Percentage of peering agreements in 148 countries that were through a handshake. This was an increase of from 99.51% in 2011

– PCH Study, 2016

In the five years, AfPIF members have increased the level of research and sharing of information. The information is important for decision makers and investors eyeing the different markets in the region.

Day three at AfPIF provides an opportunity for more research-oriented discussions and sharing of lessons learnt in a panel dubbed "lightning talks".

Getting more statistics

Research conducted by PCH reinforced the fact that most peering agreements have no formal agreement; they are a result of a handshake. The study done in 2016, and updating the initial survey done by PCH in 2011, found that **99.93** per cent of peering agreements in **148** countries were through a handshake. This was an increase of from **99.51%** in 2011.

The study asked questions such as: are there formal agreements, is the peering arrangement symmetrical, is the content is IPv6 or IPv4 and what are the laws governing the agreement. Out of the **1,935,822** agreements, **49** per cent comprised of matching peers, meaning it was easy to tell if both parties understood the peering arrangement well.

Russia had the highest IPv6 traffic, followed by Ukraine and the United States. Russia also had the highest domestic agreements with **57** per cent, Britain had **33** per cent while Germany had **17** per cent.

The Africa IXP Association (Af-IX) has also been collecting data, in order to enrich conversations around the level of content exchanged locally through the IXPs and the amount of money being saved.

Currently, the region is exchanging **234 Gbps** locally.

Research conducted in **2016** showed that the number of IXPs has risen to **38**; JINX in South Africa is the oldest, set up in **1996**, while Djibouti, Togo and Madagascar are the latest.

The diversity of peers has improved over time; more IXPs have attracted content carriers, ISPs, government services, mobile networks and private corporations. Ten IXPs are hosting at carrier neutral data centers with power back up, biometric and fire suppression equipment in place.

Challenges of setting up IXPs

West and Central African countries have the lowest number of IXPs, because of a combination of challenges. Lack of local content was cited as the main reasons that local operators don't peer at the exchange. The setup of Google Cache and root server copies has been identified as one of the ways to attract more peers to an IXP.

Cross border interconnection for IXPs to share content remains a challenge. For instance, Kinsasha and Brazaville are cities separated by a river. They have not connected yet because of regulatory issues and lack of high content at the two IXPs. Togo, Benin, Ivory Coast, Ghana and Nigeria are also exploring ways to exchange regionally relevant content more easily.

Governance structure, dedicated staff, availability of carrier neutral facilities with power back up, growth of local digital services and growth in government online services has been identified as some of the way to make the IXP more attractive to local players.

If you attended AfPIF 2017 please take a moment to fill out the SURVEY FORM

49%

Percentage of agreements out of 1,935,822 that comprised of matching peers, meaning it was easy to tell if both parties understood the peering arrangement well.

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