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# In focus: Broadband

## Broadband: the most powerful weapon governments have to support national development



International  
Telecommunication  
Union

As well as marking the ITU's 150th anniversary, 2015 was the year when the UN's Millennium Development Goals (MDGs) were due to have been met.

The MDGs were adopted at the turn of the century, and among the targets

they were expected to hit was increasing internet access around the world. While the proportion of households in the developing world with access was more than 34.1 per cent by the end of 2015, it fell short of the goal of 40 per cent. In sub-Saharan Africa only one in nine households was connected.

UN members have now adopted 17 Sustainable Development Goals (SDGs) which cover a variety of issues, and the targets they aim to hit by 2030 include building resilient infrastructure, the promotion of inclusive and sustainable industrialisation, and the fostering of innovation.

At a meeting held in Dubai in March 2016, the UN's Broadband Commission agreed that broadband networks, services and applications have enormous potential to deliver dramatic results in education, health and socio-economic growth. It believes high-speed networks will be a key factor in achieving all 17 goals.

The organisation also discussed the importance of adding new targets to measure the utilisation of selected broadband-enabled public services, the choice of statistical indicators to accurately gauge broadband access at the country and community levels, as well as the choice of data sources and methodologies for generating accurate, reliable measurement.

It agreed that 'National Digital Scorecards' should be developed to measure a country's progress towards achieving broadband targets.

The Broadband Commission's 60+ leaders and experts from government, UN agencies, civil society and a broad spectrum of business sectors will now work to formulate concrete, measurable broadband connectivity goals that could be agreed by the next full meeting to be held later this year in New York.

ITU secretary-general Houlin Zhao said agreement on new targets in September will serve as the next stepping stone to the commission's vision of 'broadband for all'.

Zhao also serves as co-vice chair of the Broadband Commission alongside UNESCO director-general Irina Bokova. She believes the world is going through a "staggering confluence" of emerging technological breakthroughs that can open vast new horizons for growth and development.

"There remain 1.3 billion people without electricity today, and over four billion people without access to the internet. Access and connectivity are absolutely crucial for societies across the world. This is why the message of the Broadband Commission for sustainable development is so important," said Bokova.

Established in 2010 as a top-level advocacy body promoting broadband as an accelerator of global development, the Broadband Commission is chaired by Rwandan president Paul Kagame and Mexican telecoms tycoon Carlos Slim Helú.

### *Time for an 'information revolution'*

According to the ITU's *State of Broadband* report published in September 2015, broadband internet is failing to reach those who could benefit most, with 57 per cent of the world's people still offline.

In a document entitled *Transforming our world: The 2030 Agenda for Sustainable Development*, the UN says "the spread of ICT and global interconnectedness has great potential to accelerate human progress and to develop knowledge societies". The document sets out ambitious ICT development targets in the goals agreed for education, gender and infrastructure, with ICTs recognised as a 'means of implementation' for all SDGs.

The document says there is now a great deal of evidence that states affordable and effective broadband connectivity is an essential enabler of economic growth, social inclusion and environmental protection.

The ITU points out that although figures for global mobile penetration seem to suggest that most of the world is now connected, in reality the digital divide is proving "stubbornly persistent" with regard to broadband access.

According to the ITU's latest data, while 43 per cent of the world's population is now online with some form of regular access to the internet, around 4.2 billion people still have no regular access.

The situation in the 48 UN-designated Least Developed Countries (LDCs) – which mostly include African nations – is particularly critical, with more than 90 per cent without any kind of internet connectivity. The lowest levels of internet access are mostly found in sub-Saharan Africa, with internet available to less than two per cent of the population in Guinea, Somalia, Burundi, Timor Leste and Eritrea.

One of the hurdles that needs to be overcome is extending last-mile access to infrastructure to remote and rural communities. But there are worrying indications that internet growth globally is slowing as broadband services extend out of



urban areas to these more remote and less densely populated areas.

However, empowering people via broadband needs much more than infrastructure alone. Among the billions who are still offline, many may be unaware of the internet's potential or cannot use it because there is little or no useful content in their native language. Extending access must therefore be accompanied by the development of relevant content in different multimedia forms and new services, such as e-commerce and payments in local languages, for example.

Countries need to adopt effective policies and strategies to make broadband available, affordable and accessible. An 'information revolution' is needed to help inform and improve policy-making. Public and private sectors must work together in close partnership to achieve broadband for all.

It is now more important than ever that developing countries prioritise digital development in order to enhance their national competitiveness and to deliver tangible improvements in their citizens' living standards and welfare, including closing gender gaps in access to ICTs and broadband.

Investments in broadband must be combined with new investments in training and education to ensure that every woman and man has the skills and capabilities, as well as the opportunities, to make the most of ICTs and new technologies for human rights and dignity, for social inclusion, for poverty eradication and for sustainable development.

RANK	ECONOMY	SUBS. PER 100 CAPITA
25	Libya	80.6
59	Cape Verde	51.3
67	Tunisia	47.6
74	Egypt	43.5
105	Sudan	27.2
106	Morocco	26.8
108	Côte d'Ivoire	24.6
110	Senegal	23.7
112	Algeria	20.8
120	Uganda	14.7
122	Mauritania	14.4*
125	Sierra Leone	13.0*
130	Nigeria	11.7
131	Mali	11.3
135	Congo (Rep.)	10.8*
138	São Tomé & Príncipe	9.8*
139	Burkina Faso	9.6
142	Kenya	9.1
143	Gambia	8.0
146	Liberia	7.6
147	Ethiopia	7.5
162	Malawi	4.1
164	Djibouti	3.2*
168	Benin	2.8
169	Guinea	2.2*
171	South Sudan	1.3
173	Somalia	1.0*
175	Niger	0.9*
177	Burundi	0.5*
178	Central African Republic	0.3*

SOURCE: STATE OF BROADBAND REPORT, ITU, SEPTEMBER 2015

Active mobile broadband subscriptions per 100 inhabitants in Northern equatorial African ITU member states, 2014. \*ITU estimate.

## Africa has a long way to go – but is on its way

Broadband internet is failing to reach those who could benefit most, according to the 2015 edition of the ITU's *State of Broadband* report. It stated that while broadband internet access is reaching near saturation in the world's rich nations, it is not advancing fast in the developing world.

The report revealed that 57 per cent of the world's population remains offline. The situation in the 48 UN-designated 'Least Developed Countries' – which mostly include African nations – is particularly critical, with more than 90 per cent of people without any kind of internet connectivity.

The lowest levels of internet access are mostly found in sub-Saharan Africa, with internet available to less than two per cent of the population in Guinea, Somalia, Burundi, Timor Leste and Eritrea.

In its table of 189 member states with active mobile-broadband subscriptions per 100 inhabitants, the ITU ranks the top three countries as Macao (China) Singapore and Kuwait, respectively. Libya is the first African nation to appear in the table. Cameroon, Chad, Equatorial Guinea, Eritrea, Gabon and Guinea-Bissau all ranked at the bottom with a zero or an estimated zero number of active mobile broadband subscriptions per capita.

The union said among the challenges that need to be overcome to expand web access is to create a truly multilingual, multicultural internet, and make services and devices more affordable. The cost-effective rollout of networks into remote and rural areas is also a key obstacle.

The ITU said one factor contributing to the slowing of internet growth is that the business

### JANUARY 2015

MENA Submarine Cable System has deployed Infinera's *DTN-X* platform across its trans-Egypt terrestrial network. Infinera said its *Intelligent Transport System* provides multi-terabit capacity and network services to MENA, and will enable it to differentiate its services and manage costs as it scales. A subsidiary of Orascom Telecom Media and Technology, MENA owns and operates a submarine system that connects Egypt to Greece, Italy, Oman, Saudi Arabia and India. This latest deployment will enable it to provide wholesale carriers with terabit capacity as well as a range of connectivity services from STM-1 to 100Gbps.

### FEBRUARY

iWayAfrica has become one of the first ISPs in the region to offer global bandwidth as

a service to enterprise users in Zimbabwe. With its MPLS-like managed solution, iWayAfrica claims business networks gain the advantage of guaranteed international bandwidth, visibility of their global traffic broken down by applications and sources, and the ability to define intricate priorities and policies. The cloud-based service is enabled by DiViNetworks which specialises in software-centric network systems. Unlike other MPLS or DPI solutions, DiViNetworks says its service does not require any CPE or capex investment.

### MARCH

CETel has launched services using extended C-band capacity in partnership with Arabsat. The two firms have jointly built an Earth station at CETel's teleport in Germany, and it's claimed their new services will

offer "unprecedented business expansion possibilities". CETel will use *Arabsat-5C* which orbits at 20°E along with its own teleport facilities and services across Africa, the Middle East, Europe and Central Asia. Arabsat and CETel say extended C-band offers not only trunking and backhauling applications but also corporate network connectivity between regions and continents.

### APRIL

Botswana has launched a cybersecurity project that will help it make the most of open access to the internet without the fear of being targeted by hi-tech criminals. Speaking at the CTO's *Commonwealth Cybersecurity Forum* held in London, Botswana's minister of transport and communications Tshenolo Mabeo said the

case for service providers is less compelling for the areas in which the remaining 57 per cent of unconnected people live. It cited the World Bank and its call for the private sector to take the lead in providing internet infrastructure and services, but noted that public investment or intervention is sometimes justified where the private sector is unable to provide affordable access.

The union also recommended levies on operators to finance USFs, mandatory infrastructure-sharing, and government-led national strategies. Africa certainly needs to be ready. According to Cisco's 2015 Visual Networking Index (VNI), annual IP traffic is forecasted to triple over the next four years to reach a record two zettabytes globally in 2019.

Factors expected to drive traffic growth include global increases in internet users, personal devices and M2M connections, faster broadband speeds, and the adoption of advanced video services. Doug Webster, Cisco's VP of service provider products and solutions marketing, said: "It took 32 years – from 1984 to 2016 – to generate the first zettabyte of IP traffic annually. However, as this year's VNI forecasts, it will take only three additional years to reach the next zettabyte milestone with more than two zettabytes of IP traffic annually in 2019." In Middle East and Africa, the index predicts mobile data traffic will grow 15-fold from 2014 to 2019, and will reach three exabytes per month by 2019, up from 199.5 petabytes per month in 2014.

The good news is that companies are already moving to satisfy this increasing demand. April saw Liquid Telecom claim to take the crown for the fastest broadband speeds available in Africa, at the time, with the launch of its new fibre-to-the-home (FTTH) service in Zambia.

Liquid, under a joint venture with power transmission and distribution company, Copperbelt Energy Corporation, launched *Fibroniks*, a new FTTH service that is claimed to deliver superfast speeds of up to 100Mbps. The service was initially launched for around 8,000 homes and businesses in Lusaka including the areas of Rhodes Park, Northmead, Long Acres, Sunningdale and Kabulonga.

Another massive boost to Africa's long-term broadband ambitions comes from TI Sparkle who teamed up with DE-CIX to establish an internet exchange (IX) as a key landing site for online traffic to and from Africa, the Middle East and the Mediterranean region.

The new exchange is designed to allow carriers that land their IP backbones in Sicily to directly interconnect with each other and to other providers that have a presence in the hub.

"Our partnership with DE-CIX and their new IX node in our Sicily Hub is the most important milestone in the creation of a massive IP gravitational centre in the middle of the Mediterranean," said TI Sparkle CEO Alessandro Talotta. "We will be able to better serve ISPs in the area, including Africa and the Middle East, by bringing worldwide content directly to their doorsteps."

### Increased cable is the key

Ever-increasing demand for broadband means that Africa's global connections will need upgrading or new cables being laid.

Deals to lay two new cables connecting Algeria to Spain and Angola with Brazil were signed in 2015.

Infrastructure company Alcatel-Lucent signed with the Algerian Ministry of Post,

Information Technology and Communications (MPITC) to build a 560km fibre optic undersea cable that will link Oran in Algeria to Valencia in Spain. The cable system has been given the name 'Orval', and is expected to be completed sometime in 2016.

When fully operational, the system will deliver 100Gbps but has an ultimate design capacity of 20Tbps. This projected speed and capacity will enable the delivery of broadband services to an estimated 42 million internet users in Algeria and Spain, claimed Alcatel-Lucent.

Also, Angola Cables signed a contract to build the world's first submarine cable system across the South Atlantic. The international wholesale carrier will work with NEC as the system supplier. Stretching 6,165km, SACS (South Atlantic Cable System) will connect Angola with Brazil, directly linking Africa to Latin America for the first time.

In Angola, it will land at the Sangono cable landing station near Luanda, while the Brazilian landing point will be at a purpose built data centre in Fortaleza. The total amount of investment for SACS is estimated to be around USD160m. It will feature four-fibre pair cable and optical transmission technologies with an initial design capacity of 40Tbps (100Gbps x 100 wavelengths x four fibre pairs). Construction is expected to begin before the end of 2015 and the system is targeted to be ready for service during Q4 2016.

Along with new cables, existing connections have also been upgraded.

The West Africa Cable System (WACS) was upgraded for the first time since it was commissioned in May 2012. Phase 1 of the upgrade was completed in July 2015 and focused on the 'Express Fibre Pair' (Fibre Pair 1) between

project is important to "guard the safety, security and resilience of cyberspace, so that we can enjoy its socio-economic benefits".

#### MAY

NAPAfrica warns that without innovative approaches to bridging the digital divide, Africa is unlikely to ever have full access to critical information. It said the continent has yet to fully realise the benefits of peering which is currently under-utilised. NAPAfrica claims to be Africa's largest internet exchange point, and is based at Teraco's carrier- and vendor-neutral data centre facility in Johannesburg. "There is significant proof that peering is not only fundamental, but also an essential part of any network landscape, particularly across borders," said Teraco CEO Lex van Wyk.

#### JUNE

The Communications Regulators Association of Southern Africa (CRASA) has signed an MoU with Ericsson to support the accelerated development of ICT policies and regulations in the SADC region. Under a three-year deal, the two will facilitate capacity building workshops aimed at the development of national broadband plans. They will focus on specific concerns related to ICT in the 15 member states of the SADC who are planning, developing or revising and amending their broadband policies.

#### JULY

ZTE has launched its *iRail* railway radio broadband system in Africa. It said the communication solution is based on "cutting edge" LTE technology and provides broadband applications such as passenger information

services, patrol alarm systems, and digital advertisements. ZTE entered the railway industry in 1999, and claims it was the first manufacturer to commercially introduce LTE into the sector. In Africa, the company's rail transport solutions have so far been applied in Ethiopia, Morocco and Nigeria.

#### AUGUST

Telecom Namibia's infrastructure continues to be a target for thieves and vandals. Since August, the operator said 12 poles have been cut down and stolen from the Erongo fibre optic backbone route which links Swakopmund, Henties Bay, Uis, Omatjete, Khorixas, Kamanjab, Outjo, Omaruru, Karibib, Arandis, Usakos and Walvis Bay. The route is also used to transmit internet data to neighbouring countries. TN has called for increased police patrols in the

South Africa and Portugal. It resulted in the addition of nine 100G wavelengths to the existing 24 10G wavelengths.

Phase 2 then upgraded Fibre Pair 2 (South Africa-Nigeria- Portugal), Fibre Pair 3 (South Africa- Angola-DRC-Côte d'Ivoire-Portugal), and Fibre Pair 4 (all landing stations), adding eight 100G wavelengths to the 32 10G wavelengths that existed across the three Fibre Pairs at the time. At the Swakopmund landing station in Namibia, an additional four 100G wavelengths were added on top of the existing eight 10G wavelengths.

SEACOM also completed an upgrade to its global IP and MPLS network. According to SEACOM, the upgraded backbone gives service providers and operators access to gigabit ports offering up to 100GbE at "affordable" prices, as well as the ability to dynamically turn up bandwidth on demand. In addition, the new network will extend the availability of native IPv6 services to all users, and provide translated IPv6-to-IPv4 services.

## Broadband for everyone?

Africa will undergo dramatic change in the next few years as a result of robust growth in the number of people going online, according to the Internet Society.

Speaking at the Africa Internet Summit held in Tunisia in early June 2015, Internet Society president and CEO Kathy Brown described the continent as "the frontier" for the next phase of growth for the internet. "Africa's recent economic growth rates and growing entrepreneurial spirit are combining



Internet Society president Kathy Brown said the mobile internet has transformed Africa's technology landscape.

to create a climate of opportunity," said Brown. "Advances in internet infrastructure and the meteoric rise of the mobile internet have already transformed the African technology landscape."

But she warned that there are still many barriers to overcome, such as the high cost of broadband access, online fraud, lack of local content and fragmented markets. "Africa is now the frontier for the next wave of internet progress. While there is huge potential for Africa to continue building an internet that will best serve its needs, it is critical that true collaboration across Africa's technical community, a culture of innovation and entrepreneurship forms part of this process."

According to a report produced by the society, the vast majority of Africa's 54 countries have between 0-20 per cent internet penetration. Only South Africa, Egypt and Morocco are estimated to have more than 60 per cent penetration.

Operators seem only too keen to help increase that penetration. Openserve, the wholesale division of South Africa's incumbent operator Telkom, had multiple rollouts throughout the year, including Pretoria East, and Bryanston as well as across multiple additional suburbs of Johannesburg, Pretoria, Durban, Cape Town, Bloemfontein, Kimberley and Port Elizabeth.

On top of that, the firm's MD, Alphonzo Samuels, said "Openserve is committed to Telkom's goal of reaching one million homes with fibre access by 2018, and already has the largest fibre network in the country."

Ooredoo Group are tackling another aspect of the problem, quality. The firm now using advanced technologies from Nokia to boost 2G, 3G, 4G and LTE-A networks across its global operations.

According to Nokia, Ooredoo has taken the lead in network performance across

its footprint, offering 4G+ in Qatar and Kuwait, 4G in Oman, Tunisia and the Maldives, in addition to launching the first commercial 3G in Algeria and Myanmar. The aim is to prepare for the huge data demand and to ensure what Nokia's EVP Ashish Chowdhary described as "the ultimate personal gigabyte experience".

## Submarine and satellite connecting more nations

July 2015 saw construction of phase II of the ACE (Africa Coast to Europe) submarine cable successfully began, with the aim to extend from São Tomé and Príncipe to South Africa. As part of the second phase, ACE will also add Benin, Nigeria and the Canary Islands to its network.

At the time it was claimed the number of people connected by the system had risen 53 per cent to 200 million. Under phase I, which was launched in the Gambia in December 2010, ACE connected 15 West African countries to Europe. They include landlocked Mali and Niger which are linked via a terrestrial extension.

After the completion of the second phase which is due by the end of 2016, the cable will be extended to Cape Town and will cover 17,000km. Branches will also connect the DRC and Cameroon, as well as Angola and Namibia. Cameroon has also become the newest member of the ACE consortium after signing the construction and maintenance agreement in June.

ACE management committee chairman Yves Ruggeri said the addition of the country will bring more value to the cable system. He also said ACE's development continues to improve direct connectivity within Africa and to the world at large. "It will contribute to the overall objective of ACE to reduce communication costs and drive social and economic growth in Africa."

area, and is also offering cash rewards of up to NAD20,000 for information that leads to the arrests and convictions of the perpetrators.

### SEPTEMBER

Kenya Education Network and the County Government of Nairobi have teamed up with the Wananchi Group for the provision of free internet in schools. As part of the USD2m *WazED* project, city authorities will leverage Wananchi's fibre infrastructure to help deliver ICT services to an estimated 2,715 schools in Nairobi County. Initially, the project will be piloted for 15 months in 245 schools. Fibre will be rolled out during the first three

months while the rest of the time will be spent on evaluating progress.

### OCTOBER

Alcatel-Lucent Submarine Networks has been commissioned to build the 1,900km Sonangol Offshore Optical Cable system in Angola. The network will connect to landing points at four locations along the coast, and promises to give the country's oil and gas industry "very large" offshore data bandwidth with low latency. A high-speed connection will also be established between Luanda and Cabinda. Construction is scheduled to start during the second half of 2016.

### NOVEMBER

A cut on the fibre cable connecting Annaba to Marseilles disrupted internet traffic to Algeria on 22 October. Algeria Telecom (AT) said a break on the SMW4 submarine system 15km off the coast of Annaba caused it to lose 80 per cent of the international bandwidth transiting via the cable. MECMA, the international consortium responsible for maintaining SMW4, initiated repair work but AT warned customers that this could take several days depending on local weather conditions. To mitigate the impact of the cut, AT re-routed traffic to the Algiers-Palermo cable.





ACE management committee chairman Yves Ruggeri (right) said the addition of Cameroon to the consortium “adds value” to the system. Also pictured is Camtel DG David Nkoto Emane.

The cable system supports 100G and has an upgradable design capacity of up to 12.8Tbps. Working in collaboration with its contracted supplier Alcatel Lucent, ACE has also recently tested 300G which it plans to deploy in the near future.

WIOCC claimed a first in May by connecting Somalia to fast internet for the first time. WIOCC said it had “fundamentally changed” the international connectivity landscape in Somalia with the landing of a high capacity fibre cable system that now provided a vital platform for sustainable economic growth.

Somalia had lacked direct fibre optic connectivity. The only way the country’s 10 million inhabitants could access the internet was via “expensive, inflexible and capacity-restricted” satellite links, claimed WIOCC. But in 2014, and working in partnership with local partner Dalkom Somalia, WIOCC landed the >10Tbps capacity EASsy (Eastern Africa Submarine cable system) cable in Somalia and linked it to a purpose-built landing station and data centre in Mogadishu. It took six years of work.

One big difference was a reduction in latency of up to 80 per cent. WIOCC said people had been flocking to hotels and internet cafés to experience a fast service for the first time. It added that the improved

availability, affordability and reliability of consumer mobile broadband have led to growth in mobile and social media network subscriptions.

Despite being just one of many services supported by broadband, social media has taken an interest in helping people in Africa gain access to fast internet connections. For example, under a multi-year agreement with Spacecom, Eutelsat Communications and Facebook will utilise the entire broadband payload on the future *AMOS-6* satellite. They will build a dedicated system to accelerate data connectivity in sub-Saharan Africa.

Scheduled to start service in the second half of 2016, *AMOS-6*’s high throughput satellite architecture is expected to contribute to additional gains in cost efficiency. Spacecom said the satellite’s Ka-band payload is configured with high gain spot beams covering large parts of West, East and Southern Africa, and will be optimised for community and direct-to-user internet access using affordable, off-the-shelf customer equipment.

Under their agreement, Eutelsat and Facebook will share the capacity and will each deploy internet services designed to relieve pent-up demand for connectivity from the many users in Africa beyond the range of fixed and mobile terrestrial networks.

Eutelsat said the capacity will enable it to step up its broadband activity in the region that was initiated using Ku-band satellites to serve professional users.

For Facebook, the initiative will be a continuation of its Internet.org project that aims to address the barriers that are keeping people from getting online. It plans to work with local partners across Africa to utilise satellite and terrestrial capacity to deliver services to rural areas. Facebook added that the partnership with Eutelsat will also enable it to investigate new ways to use satellites to connect people in remote locations.



Shola Taylor,  
Secretary-  
general,  
CTO

Shola Taylor was appointed secretary-general of the Commonwealth Telecommunications Organisation (CTO) in 2015. With a career that has so far spanned more than 30 years in the telecoms industry, he has worked with Nigerian telco NITEL, Intelsat, Inmarsat and with the ITU

where he led the RASCOM (Regional African Satellite Communication) study which looked into the telecoms and broadcasting requirements of every African country.

In 1999, Taylor established Kemilinks International, a consultancy firm based in his home country Nigeria. Over the next 15 years he became even more active professionally, not only in Africa but also globally. In 2002, he was elected vice-chairman and then chairman of the ITU’s Radio Regulations Board which dealt with, for example, spectrum issues faced by global satellite operators.

“Working in an international organisation gives you a special privilege to see how the various countries have developed their networks,” says Taylor. “It shows you how they have faced challenges to create efficient systems and efficient access to orbital spectrum.”

During this period, Taylor was also an advisor to ministers in South Africa and Rwanda, and was appointed as a board member to the Nigerian Communications Commission (NCC). That coincided with the time the country adopted its first GSM system, and he was responsible for issues of interconnection and spectrum licensing.

Clearly then, Taylor brings a great deal of private and public sector telecoms experience, both in Africa as well as globally, to the CTO. Which should come

## DECEMBER

Liquid Telecom Rwanda’s FTTH service is now available to homes and businesses in Kigali. With speeds of up to 100Mbps, it’s claimed the service offers the fastest-ever internet access available in the country. Liquid is investing more than USD35m in laying Rwanda’s first FTTH network which will continue in Kigali and expand to other cities in the future. It says more than 15,000 homes will be passed by the network by the end of next year. The service will also be available from mobile operators and ISPs in the country using wholesale access from Liquid.



H. Sama Nwana,  
Executive director,  
Dynamic Spectrum  
Alliance

**The year ahead:** Ensuring the digital switchover across Africa in order to release the digital dividend for mobile broadband will be a good start. But this needs political will, funding and a good TMT strategy.

Inane public officials in control of TMT policy at ministries and regulators must truly realise what a brake they are on African countries. There is usually neither urgency, strategy, funding or competence with these officials. This sort of culture must go and new competences developed.

What Africa needs are visionary ministers, regulators and TMT leaders who have the commitment and management skills to execute on projects of national importance such as DSO, fibre, 3G/4G, and all whilst addressing affordability and accessibility concerns.

The business case is simple: for every 10 per cent growth in broadband subscriber numbers, there is 1.3-1.4 per cent growth in GDP in sub-Saharan markets (World Bank). So it makes simple sense to build these 4G and Wi-Fi networks, and keep doubling the speeds.

*The above is an extract from a feature first published in the July-August 2015 issue of Southern African Wireless Communications.*

in handy as he says there is “much work” to be done. So during his four-year tenure as the organisation’s secretary-general, what will that work entail, particularly in the context of Africa and the mission to deliver ubiquitous broadband?

“First of all there is a need to encourage regulatory certainty. There are many cases where investors are not quite clear of what a regulator might decide on a particular issue, such as spectrum, the timing of allocation, the process that is used, etc. There are also policy issues around broadband. Most of our member countries talk about broadband but unfortunately there is still a lot of work that needs to be done here.

“It is not about the technology – the technology is there. But there are a number of constraints. Why? You have mobile operators who are the main players because the fixed line operators are virtually non-existent. So you need to focus on how the mobile industry can provide the broadband that you need.

“However, mobile operators are business entities. They are there to provide services but ultimately they exist to make a profit. There are certain areas that it would not be profitable for them to go to, and broadband objectives therefore become constraints.”

While MNOs find it difficult to make the business case for remote and rural connectivity, aren’t initiatives such as so-called universal service obligation fund supposed to help here? Taylor agrees that while universal funding is working in many countries, it is the actual implementation of its real objectives that is proving to be a challenge.

“Let me give you an example. In one particular country (I won’t mention the name), one of the things the universal service agency did was to buy computers for politicians because they said they needed laptops. That wasn’t the reason why the agency was set up. So there must be a conscious effort for the agency to do what it is actually supposed to be doing. It’s not just about setting up an agency.”

He continues by saying that some of the agencies were initially somewhat clueless – they had a lot of money coming in but didn’t know how to spend it. “And because they didn’t think it through very well, money was spent on projects that didn’t really solve the problems.”

When it comes to the ongoing quest to roll out broadband networks to the unconnected, Taylor does not expect the mobile industry to work in isolation. He says while many of the big name operators carry out CSR activities which should be recognised, what governments must do is capitalise on that by making conscious efforts to do their bit.

“There are issues of right-of-ways. That’s a big challenge as operators need to have licenses from federal authorities, local authorities, etc. There are also issues of vandalism and security, and operators need to protect their systems and people in remote areas. So the government has to come in with policies that enable those who want to invest. And they should also find some other ways, such as incentives for companies to invest in those areas.”

Taylor recalls that when he was with NCC, one of the incentives used was to award operators a license for, say Lagos, provided that they also deployed networks in other and less attractive locations.

“That was quite difficult. Generally, the operators agreed and said they would go to those areas. But then they faced all kinds of issues. They were being told that they would have to pay license fees for right-of-ways, pay for every antenna installed, then the minister of environment would say there are environmental issues that need to be paid for, and then other politicians would get involved and there would be backhanders, etc.

“Government across Africa must get out of their cosy environments and do much more for the industry and create ease of access and make it easier for operators. There must be the political will to connect with the reality on the ground.”

Of course, even if and when operators and governments do manage to get internet and high-speed networks in place, what those networks actually offer becomes the next key challenge. For instance, Taylor says a lot of work needs to be done in terms of e-applications. And then, with more networks and more network users, there is the ever-present and growing threat of cyber attacks.

“One major issue that I find in virtually every country is the ability to respond to cyber threats. I see this as one of my priority objectives in the next four years. I want to see every single country in the commonwealth, including in Africa, to not only have a robust policy and strategy but also to ensure that they have the ability to implement this policy and strategy. Implementation has to involve all stakeholders.”

As explained in the introduction to this chapter on p51, the deadline for the UN’s Millennium Development Goals (MDG) came and went in 2015 but the objectives were missed. Taylor wasn’t surprised as he points out that the process of implementing the goals required much more effort than the countries envisaged.

“From the very beginning it was clear that you needed a lot of awareness building programmes and a lot of tuning in of national

programmes to the MDGs. Many countries talked about it but when you actually saw their economic and industrial blueprints, there were disconnects. Funding was also an issue.”

Taylor says the CTO will continue to support its members in achieving the new Sustainable Development Goals, but points out that the challenges need to be acknowledged. For example, he says the culture of democracy is still very new in some African countries, many administrations are bogged down by bureaucracy, there are protocols to follow when trying to engage with high ranking government officials, passing legislation in some countries can take four or five years, etc.

“So we need to deal with those constraints. There needs to be a conscious effort which says that when we go out at an international level and collectively agree to reach certain goals, the mechanism to translate those goals to the domestic environment is a big process.”

Another deadline that Africa missed in 2015 was the migration from analogue to digital broadcasting. This switchover creates the so-called digital dividend as spectrum that was previously used for broadcasting can be re-used for mobile communications and broadband connectivity.

Later this year, the CTO will host a digital switchover conference for Africa in Nigeria, and is working towards promoting 2017 as the continent’s new deadline for a digital switchover.

In the meantime, Taylor says he was “very disappointed” that African countries couldn’t meet last year’s June deadline: “Despite all the noise, the work that has been done by ITU, CTO, etc., it was not achieved. This shouldn’t have happened. By far the biggest challenge was political awareness.”

He cites an example when his former company Kemilinks was appointed as consultants for the digital switchover in Nigeria. “We were advising the committee appointed by the president and delivered our report in 2009. That report never left government offices until 2012. Three years and nothing happened. There may be reasons why that can be justified but for me the result is nothing happened.

“In South Africa, it is more or less the same story – the policy is there, they have a very robust committee that looks at it, and they have a strategy in place. But it’s all convoluted. They were more concerned about who buys set-top boxes, who does this, who does that... at the end of the day nothing was happening. And this is in the continent’s biggest economy.

“Politicians tend to be very narrow-minded. They do not see the bigger picture. They want to protect what is so small and leave out the bigger picture.”



Edward Lawrence,  
Director of  
business  
development,  
Workonline  
Communications

South Africa-based Workonline Communications is a privately owned global network service provider, and says it offers high-quality IP transit and connectivity services with QoS guarantees to almost any location in the world. Its customers include some of the world's largest telecommunication companies.

According to the firm's director of business development Edward Lawrence, 2015 brought renewed investment in IT and networking infrastructure with the focus remaining on Africa and its global investors to deliver, regardless of the downturn and recovery process. He believes this is especially relevant to telecoms carriers, with the majority expecting significant returns from this emerging market.

"Considering the investments made in fibre networks, in particular, there has been an increase in solutions from carriers as a means to remain ahead of the fast changing demands of the market.

"With regards to executing and expanding fibre footprints, many carriers are looking to make use of partnerships to effectively deliver what their clients expect. These carrier investments and partnerships are critical, as businesses now require higher bandwidth fibre connectivity for internet access and other related services."

Lawrence says Workonline Communications saw a 100 per cent growth in IPv6 traffic and peers last year. For instance, he says the IPv6 traffic increase on NAPAfrica, the IXP hosted at Teraco's data centre in South Africa, grew from 10 IPv6 peers with a 2Mbps peak in August 2014, to 55 IPv6 peers and a 664Mbps peak in August 2015.

He also says there is a growing trend of collaboration which is essential if Africa is to meet its growth predictions and the worldwide economy is to see returns on its investment.

"The collaborative approach of global players leveraging regional network expertise accelerates the availability of high-quality IP transit and connectivity, and ensures that their go-to-market rates remain relevant.

"Through collaboration, we are able to extend the reach of our fibre-based connectivity to regions in the world where we are not present, while extending the reach of other global networks in sub-Saharan Africa. Our overall goal is to improve the quality of the internet in Africa, while simultaneously driving down costs and increasing market penetration."

Lawrence explains that Workonline Communications' international links connect South Africa to the rest of the world through all available routes, and are "amplified" by its partnerships with many of the world's leading global tier 1 IP transit providers.

"This allows us to provide the lowest latency world-class transit services possible to our clients across sub-Saharan Africa. Through our multiple PoPs, we offer remote peering services to international and local exchange points, such as NAPAfrica, LONAP and LINX. Collaboration of this kind ensures the stability, resilience and high quality of our global network."



In its *Mobile Economy, Sub-Saharan Africa 2015* report published in October 2015, the GSM Association (GSMA) said that the transition to mobile broadband is well under way.

"The region is seeing continued migration to higher speed mobile broadband networks. Commercial 3G networks had been launched in 41 countries across Sub-Saharan Africa as of June 2015, while 4G networks had been launched in 23 countries."

According to the report, 20 per cent of mobile connections in sub-Saharan Africa are now based on 3G, up from just five per cent in 2010. 3G The GSMA says adoption in the region will surpass the global average by 2017 and account for more than half of total connections by 2020.

The association says the main factors driving the uptake of 3G are network coverage expansions, declining device prices, and the launch of 4G technology in new markets.

"For example, Airtel Africa added 783 3G sites across its 17 markets in the region during the first quarter of 2015. In Cameroon, Nexttel launched the country's first commercial 3G network in September 2014, while MTN, which launched its 3G network in March 2015, has announced plans to extend coverage to 75 per cent of the population by 2018."

The report also points out that LTE is still at its very early stage in sub-Saharan Africa, accounting for just under one per cent of the connection base compared to a global average of 11 per cent. It says factors limiting 4G adoption in the region include a lack of greater network coverage, unavailability of LTE spectrum, and an under-developed device ecosystem which leads to high costs of ownership of mobile data connections.

"Nevertheless, 4G is gaining traction in several early-adopter markets, particularly

Angola, Mauritius, Namibia and South Africa. This has been helped by the establishment of enabling regulatory and competitive environments that encourage investment."

As an example, the GSMA cites Vodacom's 4G network which now covers more than 40 per cent of South Africa's population. It adds that the operator also launched the region's first commercial VoLTE service in April 2015 which helped it, in part, to differentiate its service from Telkom which has launched LTE-A earlier in December 2014.

The report continues by stating that 4G adoption for sub-Saharan Africa as a whole will grow to account for six per cent of connections by 2020. "Fifteen new commercial 4G networks were launched in the last year, including for the first time in Ethiopia, Kenya and Rwanda. In the technology-leading markets such as Angola, South Africa and Zimbabwe, 4G will account for around one fifth of total connections by 2020."



Sub-Saharan  
Africa,  
Mobility Report  
2015,  
Ericsson

In November 2015, Ericsson published its latest *Mobility Report* for the region. With LTE networks predicted to cover 50 per cent of sub-Saharan Africa by 2020, it says there are two basic ways in which ICT acts as a change agent across industries: efficiency improvements and service disruption.

"The introduction of mobile data services has enabled access to even more services that not only benefit individuals, but change industries as well," states the report.

Ericsson believes m-commerce is one of the great unique success stories of mobile innovation on the continent.

"It has allowed the 70 per cent<sup>1</sup> of unbanked and marginalised segments to start to see the promise of financial inclusion as mobile money services take form across Africa.

"Mobile operators have also been beneficiaries of this revolution. Leading operators in the region are deriving up to 20 per cent of their revenue from mobile commerce services, improving business prospects even as voice revenue growth slows.

"Starting from basic person-to-person money transfers, many platforms now provide savings, insurance and credit applications. This has further progressed to mobile commerce and stock management solutions. Purchasing goods and services is increasingly done via a mobile phone."

<sup>1</sup> Ericsson ConsumerLab, M-Commerce study, 2015



Citing statistics from the World Bank<sup>2</sup>, Ericsson sub-Saharan Africa transfers more funds domestically via mobile money than any other region in the world. In 2014, up to 28 per cent of the population had received a domestic remittance. By comparison, only four per cent of the population in South Asia did so in the same period.

The report says the next wave of services within the region's mobile commerce ecosystem will include more mature offerings such as micro-insurance and advanced subscriber to subscriber/subscriber to merchant solutions.

For example at the end of 2015 in Kenya (which Ericsson describes as arguably the "most developed" mobile commerce market in sub-Saharan Africa, Safaricom opened up its platform to application developers, enabling design and integration of third-party solutions.

The report says that an improving regulatory environment is supporting Africa's development of mobile money, as governments increasingly realise that the widespread availability of payment and other financial services is a key pillar in socio-economic modernisation.

As is well documented, sub-Saharan Africa has faced challenges in the provision of basic health services. However, as Ericsson points out, mobile solutions are enabling the delivery of basic health services to underserved populations across the region by successfully addressing important challenges, such as cutting infant mortality rates and helping to fight contagious diseases remotely.

"Mobile technology proved to be extremely useful during the 2014-2015 Ebola crisis that afflicted parts of West Africa. In order to combat the spread of the disease, volunteer doctors collaborated with government agencies to set up helplines and social media accounts which informed and provided response on Ebola risks. This approach was particularly effective in Nigeria, which became Ebola-free within a few months."

Another example of how mobility is having a positive socio-economic impact is in optimising agriculture which, according to Ericsson, is sub-Saharan Africa's "economic backbone".

"Use of mobile solutions is helping farmers in Africa to minimise economic risk by knowing when to plant their crops, as well as reduce the time it takes to get crops to the market.

"Considering that agriculture employs more than half of sub-Saharan Africa's workforce and accounts for a third of its GDP,<sup>3</sup> mobile-based solutions will go a long

way towards improving the socio-economic environment in the region."

As more of the region's people adopt smart and digital devices, Ericsson says new modes of content consumption are increasingly being explored and viewing habits are moving away from conventional devices. It believes local consumers increasingly want to pick and choose payment and subscription methods of digital media.

For instance in Nigeria, the company says 51 per cent prefer to watch TV and video at their convenience, 56 per cent want access to video content across all devices, and 55 per cent would like to select the media channels that they subscribe to.<sup>4</sup>

"Even as mobile broadband networks become increasingly accessible across Africa, satisfaction levels are low, which indicates that consumers in some places are in need of higher speeds and better quality connections."

Ericsson concludes that with low internet penetration, booming consumer spending, and a high unbanked population, sub-Saharan Africa's economic potential remains strong.

"Players in the mobile ecosystem in the region aim to support socio-economic empowerment and inclusion. At the core of this is enabling mobile broadband access to the unconnected population through increased 3G and 4G network deployment.

"This will drive uptake of services such as m-commerce and infotainment, enabling service providers to differentiate their revenue streams and at the same time offer higher value services to their customers.

"With more consumers gaining access to connectivity, and consumer behaviour subsequently changing, ICT will have a far reaching impact. While the past decades of ICT progress have shown significant promise, it has only laid the foundation for what is set to come in Africa."



George Kalebaila,  
Senior research  
manager,  
Telecoms &  
digital media,  
Africa,  
IDC

// Africa is undoubtedly a mobile continent. At the dawn of this century when mobile was taking off in most African countries, fixed infrastructure, later on fixed broadband, was in a poor state where it existed and non-existent in most cases except in a few countries such as South Africa.

"Mobile quickly became the *de facto* connectivity option even for the enterprise. This was a period of intense fixed mobile substitution. But with all the benefits of mobile, it has not lived up to expectations

especially to deliver the bandwidth required to support triple play or better still quad play services in Africa. Fixed broadband, and fibre in particular, provides a better alternative and it is no surprise that fibre has been steadily growing across all regions in Africa.

"Almost every major metro's landscape is punctuated with some sort of trenching for fibre deployment. In some countries, such as Kenya and South Africa, FTTx deployment is reaching a crescendo with small and large operators staking their claim. Others, such as Nigeria, Zambia, Rwanda, Ghana and Tanzania, are not far behind with varying levels of speed of deployment.

"What is common in all these countries is that the FTTx market is very fragmented with smaller players targeting niche consumer segments such as affluent estates as has been the case in South Africa. Some have called it the broadband land grab. It is reminiscent of the early days of mobile deployments in Africa when the first wave of entrants were in a race for wider coverage and subscriber acquisition.

"In 2015, IDC predicted that adoption of fibre will begin to accelerate driven primarily by increasing demand for triple play services in the consumer segment. Consequently, fixed mobile substitution will begin to slow down as fixed mobile convergence takes root especially in the enterprise segment.

"This is important because it means that the growing adoption of fibre will not be at the expense of mobile. Both will co-exist and will be used where most applicable and suited. As adoption of data centre and cloud services continues to grow in Africa, enterprises are seeking better and cost effective connectivity options to deliver the capacity required to efficiently run these services. Fibre is undoubtedly the connectivity option of choice in this regard.

"However, it seems the lessons of the mobile era in terms of infrastructure sharing and open access have not been learnt. Although there are some proponents of open access to reduce the cost of fibre deployments and allow competition based on services, at this stage it seems as if it's everyone to him/herself as operators race for widest network coverage. Once again, and reminiscent of the early era of mobile deployment, the network is a source of competitive advantage in fibre broadband.

"In those initial mobile days, every operator had a coverage map on their webpage showing how extensive their network coverage was compared to the competition. As a young network planning engineer I remember how we prided ourselves on how many sites went live each month, updating our coverage maps as

<sup>2</sup> World Bank Global Findex Database, 2014

<sup>3</sup> World Bank Economic Forecasts, 2015

<sup>4</sup> Ericsson ConsumerLab, TV and media report 2015, Nigeria

bragging rights to rival competitor network teams. At that time, the network was even more important than the services for which operators existed in the first place.

"But over the years, mobile operators have learnt that their core business was actually not the network but providing services and maintaining customer relationships. Many have since outsourced their network infrastructure and it is just a matter of time before the few other operators who are still holding out follow suit.

"Infrastructure sharing is becoming the norm rather than the exception. IDC contends that fibre broadband network providers need not relive this painful history; early on, they need to pool their resources and embrace open access to reduce the cost of network deployment and compete on the services they provide to their customers. That's where the value is, as connectivity is fast becoming a commodity, even in Africa.

"But this may not happen on providers own volition. It may need regulatory frameworks that encourage infrastructure sharing and promote competition on services and customer experience. Regulatory bodies need to step up and for once provide the direction needed to encourage open access and infrastructure sharing business models.

"Without this intervention, we will witness more chaotic application of capital investment that could have been best utilised on developing digital services to make our lives better and more interesting. Metro and country landscapes will continue to be scarred unnecessarily when a better consolidated and environmentally-friendly standard way of network rollout would have saved us the trouble of constant trenching and disruption to urban traffic and routine.

"In the medium to long term, it is common knowledge that there has to be consolidation for long-term sustainability of the industry. Economies of scale due to the low margins of connectivity business will drive this trend. Small niche players will remain important for market development but will eventually have to give way to market consolidation by big players who can exploit economies of scale for survival.

"The pace at which consolidation will take place will differ from country to country depending on maturity and stage of the development. For instance in South Africa, consolidation has already started as big players start to reflex their muscles, although some nimble small players are proving their worth.

"However, competition in these early stages is what will drive the development of the sector and help bring down cost of

the service, which is still a premium in most countries save for Kenya and South Africa.

"In the long term, fibre land grab is what will usher Africa into joining the rest of the world in enjoying the benefits of digital economy. With mobile and fixed broadband all existing side by side, we can only hope that operators and regulators alike learn from the mistakes of the past and avoid costly business models that will lead to unnecessary casualties and misapplication of capital."



Casimir Fotso Chatue, CEO, Afrikanet Oxford Consultech

Afrikanet Oxford Consultech is a telecom company registered in the UK and operates five fully redundant virtual network centres in Europe and the US using iDirect and Comtech's *Vipersat* platforms.

Through its partners in more than 20 countries in Africa, Afrikanet provides broadband internet

services via VSAT along with any necessary equipment, as well as technical support and on site training if required. With over 15 years experience, the company continues to expand its activities and cover new ground.

"2015 has been a very positive year for Afrikanet, especially regarding our involvement in the banking and microfinance sectors, embassies, regional institutions and airport management," says CEO Casimir Fotso Chatue, referring to some of the Afrikanet's projects conducted last year in Côte d'Ivoire, Congo and Cameroon.

"We have seen a big development of WiMAX technology, allowing us to help ISPs and businesses boost their products and expand their services using technologies such as LTE and 4G. It has proven very successful with our European link which undoubtedly set us apart from the competition by its reliability."

For this engineer-turned-CEO, staying on top of the latest technologies and answering customer needs with the best solutions available is a priority. Chatue believes 2016 will turn out to be an exciting year in this regard.

"The price factor will now be very volatile with the impact of Ka-band. The increase in medium and low Earth orbit satellites is presenting customers with very efficient services for an affordable price. Ka-band will be a game-changer, offering up to 20Mbps download and 2Mbps upload for only about USD100."

Chatue does not intend to miss out on this industry trend as he explains that Afrikanet is currently building plans to be

a master distributor, as well as managing deals with high throughput satellite owners to bring Ka-band solutions at a competitive price to West Africa.

"Ground solutions, fibre optics and transatlantic cables will have to take new players like O3b in consideration, and this competition should prove very interesting for both the industry and of course our customer base in Africa, who will benefit from more options and opportunities than ever to access effective, reliable broadband."

Chatue continues by saying that Afrikanet's mission continues to be about bridging the digital divide between north and south, empowering customers and bringing connectivity to the continent. As a result, he has recently announced the launch of Solar Access, a new company under the Afrikanet umbrella that is focused on solar solutions.

"Renewable energy is the future. Not only for Africa but for the world, and we are delighted to be in a position to work towards better environmental understanding, thoughtful living, and to offer our customers the opportunity to make a difference with us.

"In this day and age, businesses cannot sustain growth or answer customer needs appropriately without an effective energy plan. We have realised the need for solar solutions and renewable energy for a while, and are now filling this need, starting in two countries in Central and West Africa, and looking to expand throughout the whole continent soon."

This involvement with solar energy is not the first time Afrikanet has undertaken social and responsible initiatives. "In line with the United Nations Global Goals, we have been pushing to get involved with non-profits in Africa, offering our services and solutions, serving as liaison between the organisations, donors and philanthropists. Being a human-sized company with a dedicated team allows us to tailor each and every project individually, and to do our best to reach out and go the extra mile whenever possible.

"The objectives for this year are to keep building meaningful deals and relationship, being ready for the mass market introduction of Ka-band for customers, and being an active part of the global change towards renewable energy and universal access to the internet."





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