chapter 6 Broadband

Martha Suarez, president , DSA

Over the years, collaboration and regulatory changes have contributed to an increase in broadband access in South Africa, providing with it positive social and economic benefits to more people across the continent.

In South Africa, there is extensive 3G population coverage with only 3.5% lacking coverage, but 21.8% of the population live in areas without 4G/LTE coverage, according to the summary of network coverage gap analysis conducted by the Council for Scientific and Industrial Research (CSIR) in November 2018. Approximately two million people, out of the total population of 55.8 million, do not have coverage from a 3G or 4G network. The provinces with the largest coverage gaps are Eastern Cape (9.55%), Kwa-Zulu Natal (6.5%), Northern Cape (4%) and Limpopo (3.95%).

Market demand for broadband access has been on the rise and most recently internet traffic has risen by up to 15% due to a continued lockdown, according to SEACOM. As a result, spectrum has been recognised as a key resource and the Independent Communications Authority of South Africa (ICASA) has been considering special decisions to release more of this valuable resource. Now is the time to enable dynamic spectrum access to support the increasing demands of the country now and into the future after lockdown. The demand and need for internet access has never been more important as the economy, healthcare and education systems have increasingly grown to become dependent on it during a pandemic.

It is expected that Internet traffic will triple in South Africa between 2016 to 2021, making an annual growth rate of 26% according to the latest 2021 Forecast Highlights by Cisco. As we reach 2021, this internet traffic will be 172 times the volume of the entire South African Internet in 2005. This rapid growth must be met with the same growth of broadband access across all regions of Africa in order to drive economic growth. The current health crisis has proven the importance of connectivity in all sectors of the economy. Now more than ever, sectors rely on efficient broadband to maintain healthcare systems, provide home education and working and sustain increased levels of data traffic to satisfy entertainment needs.

In terms of spectrum management, there needs to be better trade-offs between licensed and unlicensed spectrum access. While spectrum is a finite resource, there is much of it that can be shared more efficiently to maximise current broadband resources available to South Africa.

As we look ahead, connectivity is one of the most important pillars for the 4th Industrial Revolution and no one should be left behind. Currently, the government is engaged to address wireless connectivity demands and to provide access to critical information services to mitigate a health crisis. ICASA has played a key role to temporarily assign radio frequency bands to alleviate network challenges and ease congestion on the network to ensure broadband services can be accessed. ICASA has also turned to the innovative use of TV White Space (TVWS) to ensure rural and remote communities also have access to affordable broadband access. TVWS use will be able to help bridge the connectivity gap in those places where there is limited broadband connectivity.

The recent steps taken to enable dynamic spectrum access during this health crisis reflect the impact that innovative dynamic spectrum sharing solutions can have. South Africa should progress this action and even consider new ones to support its current broadband growth rate to provide more socio-economic benefits at a sustainable level for the future economy.

There is significant potential for South Africa to continue benefitting from wider access to spectrum in underserved areas. In recent studies, it has been found that increased broadband access has led to a number of benefits such as increased efficiency in consumer markets with new markets and services becoming available for the economy. Greater access to health mobile applications also enabled more people to access affordable healthcare services in developing countries, according to the latest ITU report. The report also concluded that a 10% increase on fixed and mobile broadband contributes an increase in GDP. For mobile broadband this is 2.5% GDP increase and for fixed broadband this is 0.3%. With broadband contributing so much economic and social impact it is limiting to see the current broadband growth slowing down at a time where demand is increasing. Governments and regulators must step up to continue growing broadband access in order to match demand and see the benefits on the economy.

If broadband access does not grow, there will be a low throughput which will place more pressure on current broadband resources. It is important to open broadband access and provide coverage and high capacity in regions that are underserved and unconnected.

The management of spectrum has a huge impact on connectivity policies to ensure spectrum access is not a barrier, as it is right now in many cases across the world. The Dynamic Spectrum Alliance (DSA) promotes the efficient use of this natural and abundant resource. In most of the unserved or underserved communities, spectrum occupation is extremely low. New regulatory decisions could be made to change this by allowing local wireless internet service providers, or any other interested party, to deploy networks, to help reduce the barriers they currently face to access spectrum. South

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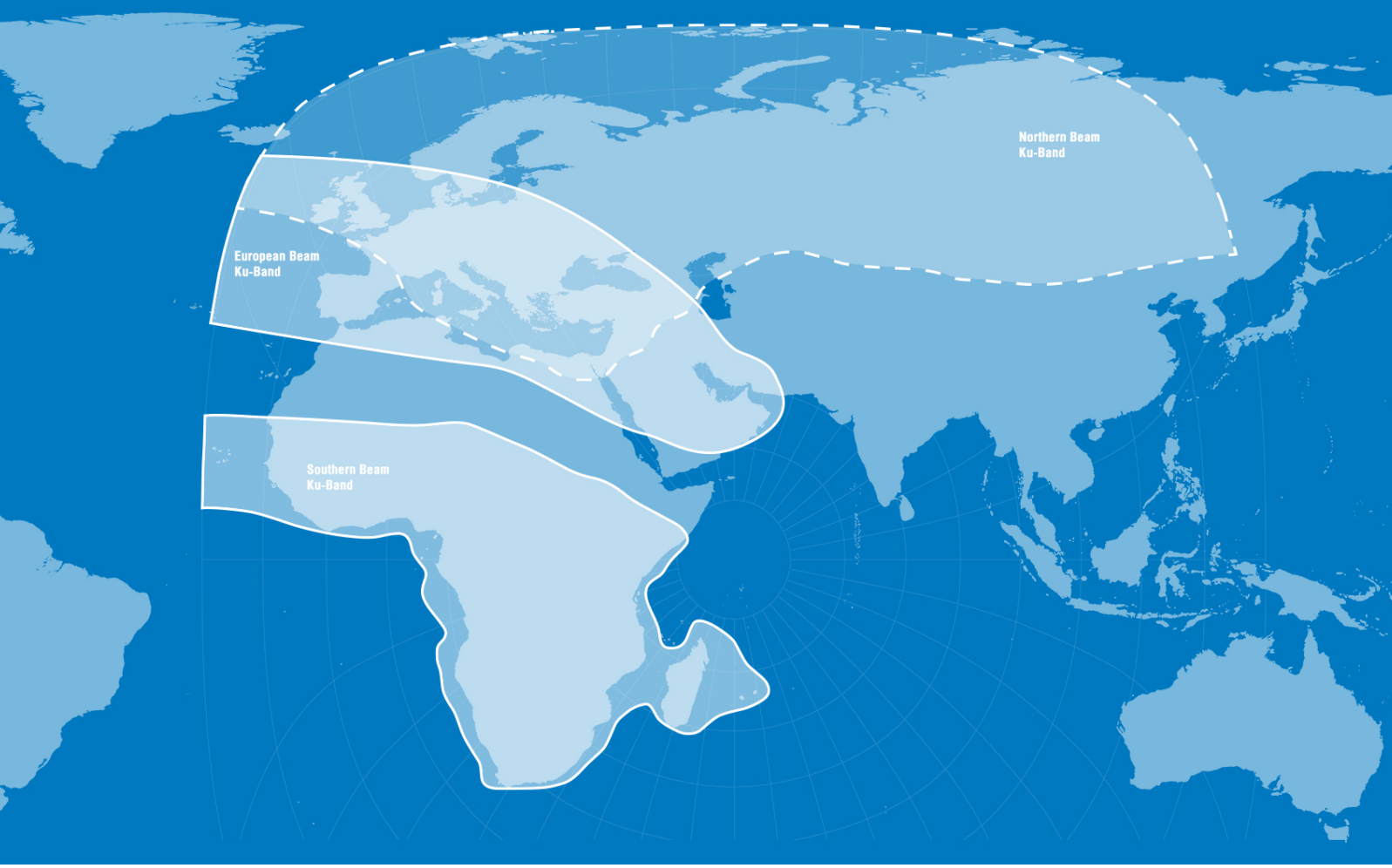

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Africa would also benefit from a much healthier competitive broadband market in which multiple companies such as large Internet Service Providers (ISPs) and smaller ISPs can operate.

Across Africa, the average cost for just 1GB data is 7.12% of the average monthly salary, according to the A4AI Affordability Report. In order to promote competition on the market, dynamic regulation must be adopted for affordable services to be offered. Policymakers and regulators must encourage new entrants into the market to achieve this.

A key barrier to broadband access in areas of South Africa is affordability. Traditional connectivity solutions have proven not to be cost effective in terms of coverage. It is time to allow local WISPs to access spectrum and connect those that today remain unconnected. Therefore, not only will competition provide wider access to spectrum, it will also enable more unconnected areas to be able to afford broadband.

Policymakers, governments, regulators and industries should also work together to encourage this competition of services as well as provide dynamic access to spectrum. For example, earlier this year the Dynamic Spectrum Alliance (DSA) collaborated with the United States Trade Development Agency (USTDA) to develop an economic strategy for deploying broadband to rural South Africans by using Television White Space (TVWS). TVWS technologies help maximise spectrum access as they utilize unassigned broadcast channels to extend wireless connectivity to areas where other technologies are not cost effective. The DSA has long championed the use of TVWS to transform communities and enable them to experience the benefits that broadband connection brings. The DSA welcomes this economic strategy as the success of projects like this really depends on industry stakeholders coming together to address and fully understand how to manage and utilize spectrum access.

The USTDA project will assess the feasibility of placing TVWS connections within walking distance of citizens in rural communities across South Africa, with 1,600 base stations reaching 50,000 hot spots and servicing a potential 13 million rural citizens. This also offered a commercial opportunity for ISPs to connect to customers too. It is projects like these where multiple stakeholders come together from different companies that help to make significant progress towards dynamic spectrum access.

The DSA along with Policy Impact Partnership (PIP) also released in September last year a whitepaper proposing to enhance connectivity through spectrum sharing. This study explores how new forms of spectrum sharing could enable many more people to benefit from broadband connectivity and digital services. It considered the opportunities in Colombia, Malaysia and South Africa – large and populous economies in very different regions of the world.

Public sector and industry stakeholders in South Africa have also indicated they would support trials of new spectrum sharing technologies in IMT bands. Such trials would provide stakeholders with insights into the potential of tiered models for spectrum sharing and any related technological and regulatory issues that might arise. Within South Africa, technology trials would also help to raise awareness of the potential of new forms of spectrum sharing. It was found that the optimum way to implement technology trials would be through partnerships between the relevant industry players, authorized by the spectrum authorities and, in some cases, with the support of an independent entity, such as the Council for Scientific and Industrial Research (CSIR), which has already participated in TVWS spectrum sharing trials.

In South Africa, parts of the 2.3GHz, 2.6GHz and 3.5GHz bands have been assigned to mobile operators. The government looks set to license several IMT spectrum bands to the WOAN (wireless open access network) and other licensees this year. This could involve auctions of frequencies in the 700MHz, 800MHz, 2.3GHz, 2.6GHz and 3.5GHz bands. However, if necessary, the 900MHz and 1800MHz bands could be employed for a near-term spectrum sharing technology trial in South Africa.

One of the conclusions of the study is that there is a clear consensus, across public and private sector stakeholders, that well-designed dynamic and other spectrum sharing models could expand access to mobile broadband, whilst ensuring incumbent applications are protected. Both governments and industry players recognize the clear need to make far more efficient use of the valuable resource of spectrum. That is an important step in the path of implementing flexible and innovative regulations.

Matthew Reed, practice leader, Omdia

The number of mobile broadband connections in Africa will continue to grow over the coming few years as service providers expand their mobile broadband networks and as data devices and services become more affordable (if not as affordable as is desirable).

There will be about 1.08 billion mobile broadband connections in Africa at end-2024, representing 78.9% of the 1.37 billion mobile connections on the continent, according to Omdia forecasts (see Figure 3). The number of W-CDMA connections in Africa will continue to increase through to 2024, in contrast with the global trend for the number of W-CDMA connections to decline. But the number of mobile LTE connections in Africa will increase at a more rapid rate, rising from 97.5 million at end-2019 to 335.6 million at end-2024.

The availability of affordable data devices is a key factor in African markets, where average incomes are typically low. Both MTN and Orange have recently introduced "smart feature

JANUARY 2019

Clear Blue Technologies International has been selected as the power service provider for BRCK, a hardware and services tech specialist based in Nairobi. BRCK says that because connectivity is too expensive for the average African to afford, the majority of citizens in developing markets rely heavily on Wi-Fi. The company has developed its free to consumer Moja platform of Wi-Fi hotspots but says powering them is crucial for success. In 2018, Clear Blue supplied its Smart Off-Grid technology to power Wi-Fi hotspots at 10 sites in Kenya. With the success of these installations, BRCK is now planning a wider rollout. Clear Blue will provide its technology and service for a multi-year rollout of thousands of Wi-Fi hotspots across Africa, set to begin in 2019 and running through 2024. The company will manage, monitor and control the systems remotely from its service centre. According to Clear Blue, its Smart Off-Grid technology provides a low-cost, highly reliable off-grid power solution. It also features automated remote management and control, predictive weather forecasting, and the ability to optimise systems remotely. The vendor also claims that its "extensive" troubleshooting capabilities facilitate quick resolution of any issues, keeping systems running with "unmatched reliability and long-lasting performance, while at the same time reducing installation and maintenance costs by up to 80 per cent". Canada-headquartered Clear Blue will manage, monitor, and control the systems remotely from its cloud-based service centre.

Clear Blue says this latest alliance with BRCK adds to a wide variety of similar strategic partnerships with innovative, visionary organisations and investors. The firm says its technology and services are now bringing off-grid power through more than 500 projects in communities around the world. It adds that they are being sold into an array

phones" that use the Kai operating system and are priced at about $20 as a means of encouraging wider take-up of data services.

Tecno, backed by Chinese company Transsion, has become one of the biggest mobile phone brands in Africa by offering affordable smartphones with features tailored to the African market, such as long-life batteries.

Although South Africa's two biggest operators, MTN and Vodacom, have been preparing for 5G for some time, it was data-only service provider Rain that became the first in the country to launch commercial 5G services when in September 2019 it started to offer 5G fixed-wireless home broadband in some districts of Johannesburg and Pretoria, with plans to expand to Cape Town, Durban, and other cities.

MTN and Vodacom say their plans to launch 5G in South Africa have been held up because they do not have access to the spectrum that is required in the sub-1GHz bands, as well as in the 2.6GHz and 3.5GHz bands. In 2018, Vodacom launched what it said was Africa's first commercial 5G service in Lesotho, using spectrum in the 3.5GHz band to which Vodacom has access in Lesotho but not in South Africa.

Although wireline broadband penetration is low in Africa, Omdia expects the number of FTTx subscriptions on the continent to grow strongly over the coming few years, from 1.28 million at end-2019 to 4.07 million at end-2024. At end-2024, South Africa will have 1.22 million FTTx subscriptions, making it the biggest FTTx market on the continent (by subscriptions), followed by Morocco, Algeria, Egypt, and Kenya, forecasts Omdia.

Wi-Fi networks are increasingly important for broadband connectivity in Africa. Facebook and Google both have Wi-Fi ventures on the continent: Facebook's Express Wi-Fi operates in Ghana, Kenya, Nigeria, South Africa, and Tanzania; and the Google Station Wi-Fi service currently operates in Nigeria. Media reports say Google is planning to launch Google Station in South Africa.

There are prominent local Wi-Fi providers too. Kenya-based Moja Network offers free Wi-Fi access in matatus (informal buses) and other locations, subsidized by charging businesses to run surveys of Wi-Fi users. Moja's parent company, BRCK, acquired the Surf Wi-Fi network in Kenya in February 2019 and said that the combination of Surf and Moja made it the largest public Wi-Fi network in East Africa, with close to 500,000 active users each month. BRCK also plans to use LTE to extend the coverage of the Moja network and service.

There are also efforts to improve connectivity in rural areas, using a range of technologies. MTN Group is working with the Facebook-backed Telecom Infra Project to test and deploy lower-cost wireless networks designed for rural areas. Loon, a subsidiary of Google's parent company Alphabet, is to run a trial with Telkom Kenya of its plan to use giant helium balloons to bring wireless broadband connectivity to remote areas.

Until about ten years ago, Africa had very little cable connectivity to the rest of the world, which restricted the availability of internet access and raised its cost. However, Africa's connectivity has been transformed over the past decade with the installation of multiple new undersea cables linking Africa to other parts of the globe, with further cables planned. During 2019, Google announced plans to lay out a new submarine cable, Equiano, which will run along the west coast of Africa from Portugal to South Africa, with branch lines to other African countries. A recent trend has been for cables connecting the west coast of Africa to South America, including SAIL, SACS, and the planned EllaLink.

International connectivity to Africa via undersea cables has increased greatly, but there are still gaps and bottlenecks in terrestrial cabling across the continent. However, steps are being taken to remedy this shortfall. In 2018, the UK's development finance institution, CDC, said it would invest $180m in African fibre network operator Liquid Telecom to help Liquid to improve connectivity to some of the most underserved parts of the continent. In mid-2019, Liquid Telecom and South Sudan's National Communication Authority agreed that Liquid would set up a 300km fibre backbone network in the country.

CSquared, a joint venture between Google, Mitsui, Convergence Partners, and the World Bank's International Finance Corporation, aims to improve internet access in Africa by investing in and operating wholesale networks including fibre infrastructure. CSquared currently operates in Uganda, Ghana, Liberia, and Kenya.

Satellite systems continue to play an important role in Africa by connecting the continent's many remote and underserved regions and markets. Significantly, satellite services now tend to be more competitively priced than in the past. Additionally, there are new satellite providers, such as Yahsat (backed by UAE sovereign wealth fund Mubadala), which in 2018 formed a joint venture with US-based Hughes Network Systems to provide satellite broadband services in Africa, the Middle East, and Southwest Asia. Yahsat has partnered with local operators in several African countries to sell internet access services. ■

Year in review: Africa broadband, the way forward

Mobile Broadband connections across Africa have increased significantly in recent years, but the pace of increase has largely been dependent on the potential returns on investment associated with the provision of what are expensive outlays on infrastructure. Africa must position itself for the future involvement in the fourth industrial revolution and part of this is investing in broadband access for its populations, for education, and for financial and commercial inclusion.

of high-growth segments which, according to research, will represent an estimated addressable market worth USD38bn by 2023.

FEBRUARY

Angola Cables and Broadband Infraco build upon their memorandum of understanding in which Broadband Infraco will extend internet connectivity in southern Africa. The potential to interconnect over 14,960 Km of African terrestrial network of optical fibre to Angolan international submarine cables. The additional data capacities provided, courtesy of the agreement, could help the South African firm to deliver on its undertaking to provide high-quality internet to the "Square Kilometre Array" project antenna in South Africa.

Angola Cables has concentrated on the 15 member states of the South African Development Community, based upon its position as the main international telecoms provider to the Angolan market. Executive Chief Officer of Angola Cables stated the partnership would provide an opportunity to collectively fast track the continents connectivity. There is now the potential to link the BRIC nations of Brazil, Russia, India and China, via a high speed. Low latency connection.

MARCH

Fixed broadband subscriptions in sub-Saharan Africa (SSA) are tipped to multiply three-fold to 17 million by 2023 from 6.6 million, according to a report released by Omdia, a London based technology research and consultancy firm and entitled Fixed-Wireless Access Broadband Development in sub-Saharan Africa. The author of the report, Julian Bright, senior analyst at Omdia, stated that SSA's legacy of poor fixed-network coverage represents a significantly large and untapped market for broadband service providers. However, strong demand for broadband connectivity in SSA is not being adequately addressed by wireline technologies such as XDSL and fibre. Bright said, "Coupled with the speed of growth and

With an estimated third of the population of Africa not being able to access broadband, the proportion differing within each African region, it is going to require significant cash investment to achieve the universal, affordable and reliable internet access that Africa needs. At present Africa countries make up 21 of the 25 least connected countries in the world.

The report released at the Annual Meeting of the World Bank Group, called for urgent action to close the internet access gap, while also providing a roadmap for the achievement of this goal. They estimate that 1.1 billion more people need to be brought online. As they point out this will need a significant level of cooperation from interested groups, ranging from central governments to the private sector and civil society. With the reported increase to over 400 million broadband connections by the end of 2018, a figure of US$100bn has been circulated as the cost to bring universal broadband access to Africa.

It cannot go without notice the levels of investment that China puts into the region and that some of this investment will be made available, often by means of loans to governments to improve IT infrastructure and internet access. The involvement of Huawei cannot be underestimated in their potential to enable the 'Broadband for all' agenda. Africa will require not only capital infrastructure investment but also the development of the skill base of its citizens to run universal broadband.

Namibia sets a strong target for broadband access

The Namibian Government has set itself a target for achieving a 95% broadband coverage by 2024. A new policy for broadband and an implementation action plan, was introduced into the National Assembly. The formulation of which was assisted by help from the International Telecommunications Union and with stakeholder consultative workshops input.

The Deputy Commissioner for Information and Communication Technology Engelbrecht Antiochus Nawatiseb stated that, "High speed internet access or broadband is critical to economic opportunities, job creation, education and civic engagement. But there are too many parts of this country where broadband is unavailable in both urban and rural areas." He also stated that, "Broadband is not just a basic structure but a fundamental structure in any given economy." The policy will work to a definition of broadband as being high-speed connection to the internet and sets a minimum download speed of 2Mbps.

The plan sets out to achieve affordable and reliable broadband access via the provision of infrastructure capable of achieving complete coverage of Namibia for universal access. It has a goal of achieving a 100% access to broadband for all Namibian primary and secondary schools to support learning. Less ambitious is the target to achieve access to 70% of health facilities in the country. A government steering committee was set up to monitor the implementation action plan. The National Broadband Steering Committee will investigate how the policy can be achieved.

The year saw a growth in Fibre To The Home (FTTH) and Fibre To The Business (FTTB) as a response to the need for infrastructure enhancement for broadband expansion in Africa that covers both domestic and business requirements. The historically slow growth in FTTH and FTTB across the continent of Africa is well noted and has been attributed to several causes. The cost benefit analysis between wireless networks and fibre networks favours wireless overall and especially when dealing with rural areas. Fibre has its market and cost per kilometre is dependent on whether it is suspended in air or if it must be buried under ground. The potential damage to fibre from construction work is significant in developing areas such as Africa and to damage from the actions of individuals, often looking for tradeable copper cable.

In South Africa there is a significant increase in FTTH and FTTB connections in urban and city landscapes. Some countries have adopted a national strategy for fibre optic cable deployment, an exemplar being Mauritius, often viewed as a leader in telecoms improvement in the region and with the policy to make telecommunications a pillar of economic growth. The economic advancement in countries such as South Africa and the creation of a wealthier middle class moving to new housing developments gives a potential for fibre cabling as new towns and urban areas are developed. The FTTB market has increased as business enterprises have increased in number, although mainly in city areas and commercial and business parks.

The development of fibre optic networks is inhibited by the inability of governments in some regions of Africa to allocate financial resources to install cabling. They have to leave it to commercial organisations to fund the laying of cable and their priority is return on investment rather than any social aspect of improving access to education or health services via broadband. ■

Franck Simon,
President,
France-IX

Internet Exchange Points – aka IXPs or Internet hubs – are a part of the Internet's physical geography. They are usually hosted in datacentres where a large number of network operators have chosen to collocate. In these locations, carrier networks, CDNs, social networks, cloud, hosting, gaming and IT service providers can · in pursuit of the common interest – physically interconnect their networks using infrastructure provided by the IXP. They can then easily and rapidly exchange domestic IP data traffic with each other, which is known as 'peering'. As more networks arrive at a location,

appetite for new digital-media and internet-based services among consumers. Among businesses and the public sector, this calls for broadband solutions that are cost-effective and can be quickly deployed. Where the economics are favourable FWA provides an effective complement to or even a substitute for, fixed wireline connectivity. Further opportunities for FWA will continue to open up as operators and service providers in the region realise the benefits of LTE-based FWA."

FWA has emerged as one of the most significant growth drivers around the world, demonstrated by explosive user growth in both developed markets like Japan, Germany and Italy and emerging countries like South Africa, Philippines and Mexico. There are claims that 5G FWA will have a significant impact on fixed broadband just as 2G had on fixed voice over 20-years-ago.

APRIL

A report issued in April indicated the rapid growth in fixed broadband connections in sub Saharan Africa, presently at 6.6 million. Omdia, a London based research company intimated that this market could triple by 2023. The Omdia report titled Fixed-Wireless Access drives Broadband development in sub Saharan Africa, highlights the legacy of poor fixed network coverage and the opportunities for broadband service providers in the region.

The author of the report Julian Bright said, "Coupled with the speed of growth and the clear appetite for new digital-media and internet based services among consumers, among businesses and the public sector, this calls for broadband solutions that are cost-effective and can be quickly deployed. Where the economics are favourable, FWA provides an effective complement to or even substitute for, fixed wireline connectivity. Further


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"On the Indian Ocean islands of Madagascar, Mauritius and La Réunion, ISPs face the same challenges of distance and cost when it comes to providing access to Internet content from around the world"

particularly those perceived as being critical commercial players such as content and service providers, a hub's attractiveness increases which in turn leads to even more network, IT and Internet related businesses joining.

IXPs play a vital role in the functioning of the Internet because they provide the shortest and fastest connection between peering members, allowing local Internet traffic to be directly exchanged under an agreement that is often free and is always cheaper than having to pay for international IP transit. A way to explain this is to think of the postal system. If you want to send a letter between locations in the same country, the UK for example, you wouldn't want it to be routed via Los Angeles as this would both slow down the delivery time and be very expensive. But this kind of routing is exactly what is happening in Africa as Internet traffic is routed over expensive international links simply to reach local country destinations. To add to the unfairness, this traffic must be paid for in foreign currency meaning local country ISPs must pay international rates for local delivery.

In addition to cutting out the need for expensive international transit costs, IXPs improve latency and increase bandwidth thanks to the direct connection they provide between peers. Also, as many IXPs are hosted in local datacentres, content can also be downloaded faster (and more cost effectively) by local users. All this adds up to a better functioning and more reliable Internet, which is crucial in building a sustainable domestic Internet ecosystem and is a great accelerator of economic growth.

The African IXP Association currently lists 45 active IXPs located in 41 cities across 33 countries in Africa. This is a 50 percent increase since 2008 and traffic has more than doubled, with over 205Gbps of traffic exchanged across all these IXPs, up from approximately 100Gbps of traffic in 2013. The growing number of IXPs is good news but many more are needed to increase Internet penetration, which currently stands at under 10 percent, lower than the 20 percent considered to be the critical point for delivering economic benefits. One strategy is for ISPs to peer at IXPs in Europe.

On the Indian Ocean islands of Madagascar, Mauritius and La Réunion, ISPs face the same challenges of distance and cost when it comes to providing access to Internet content from around the world. They are also experiencing incredible growth in Internet traffic. We know this as two of La Réunion's ISPs, Zeop Reunicable and Parabole Reunion, and two of Madagascar's ISPs, Telma and Gulfsat Madagascar, as well as the main ISP on Mauritius, Mauritius Telecom, are peering members at the European IXP, France-IX, and we can see their internet traffic figures. In 2015, when only Zeop and Telma were peering members, their subscribed capacity totalled 4 Gbps. Compare this to 2018/19 (now including Parabole, Gulfsat and Mauritius Telecom) and we see an increase to 44 Gbps, which indicates an explosion in capacity with an increase of 925 percent. This growth is being driven by consumer demand for social media and streaming video with Netflix, Google, Youtube, and Facebook all top user destinations for Parabole, Zeop and Telma. In Madagascar, SSL and Bit Torrent are also important and Akamai is in Zeop's top four content providers.

All five providers peer at France-IX for the reasons outlined above. Zeop, Parabole Réunion and Telma explain the benefits:

"We have various strategies for keeping up with increasing demand for Internet access," says Martin Vigneau, Deputy General Manager at Zeop. "We work with CDN partners to deploy cache servers to have as much content as possible available locally and we have increased our capacity at our point-of-presence (PoP) at the France-IX Internet exchange point in Paris. Membership allows us to control costs and have a balance between transit and peering. As we are quite small, it's difficult for us to have affordable transit prices because it's around 30 to 50 cents in transit cost to reach Paris with our current providers."

Richard Tchissambou Telecom and Network Manager at Parabole Réunion, says: "70 percent of our international traffic goes through France-IX and our gains in terms of latency are significant. The average annual growth of our IP traffic is currently 25 percent and we keep up with this increasing demand by proactively sizing our international connections accordingly, while adapting our local infrastructure with cache servers, placing the content geographically closer to the end-users, and so reducing latency and helping us make bandwidth savings."

Lastly, Joël Randrianasolo, Deputy CEO/ Group CTO at Telma confirms the cost benefits of IXP membership: "We gain a reduction in the amount of traffic that must go by expensive transit providers and so reduce our costs and we also get an improvement in latency time."

France-IX has a longstanding commitment to supporting the expansion of Internet connectivity across Africa by offering affordable, reliable, low-latency Internet peering services from France. African network members are either directly connected in Marseille or remotely connected through a reseller partner – AFR-IX, Angola Cables, BICS, Congo Telecom, Epsilon or Telecom Italia Sparkle. The most recent member is Congo Telecom, which joins Ooredoo Tunisia, Dolphin

opportunities for FWA will continue to open up as operators and service providers in the region realise the benefits of LTE-based FWA."

JULY

Chinese tech firm Huawei said it wants Morocco to be the first country to launch 5G in Africa. The company outlined its goal for the north African country at the 9th annual North African suppliers conference in Skhirat, south of Rabat in July. "We are the [world] leaders in 5G, and we want to be the leader in Morocco," said Chakib Achour, the marketing and strategy director of Huawei in Morocco. "We want the Kingdom to be the first to launch 5G in Africa." According to Achour, the company is now only waiting for the green light from the government. 5G is the new generation of mobile internet connectivity, which promises much faster data upload and download speeds, wider coverage and more stable connections. However, Huawei does face stiff competition in this space. In March 2019, competitor Ericsson organised a live 5G demonstration at Maroc Telecom headquarters in Rabat, showcasing the technology's capabilities. According to a recent report by the Moroccan National Telecommunications Regulations Agency (ANRT), access to the internet by Moroccan households has increased three-fold over the last eight years. Some 74.2% of households now have internet access.

DECEMBER

December saw the number of mobile broadband connections of 3G and above become the majority for the first time in Africa. It indicates the shift in how consumers are using digital platforms in the region. The expansion of 3G and 4G networks has resulted in 3G covering 75% of the continent and 4G covering 46%. The reduction in the cost of 3G and 4G devices for consumers will be a further determinant of network subscriptions and usage.

Telecom, Ecoband, Guilab, Orange Senegal, Orange Cote d'Ivoire, AFR-IX, Angola Cables, Zeop Reunicable, Djibouti Telecom, Parabole Reunion, Liquid Telecom, WIOCC, Seacom, Mauritius Telecom, Telma, and Gulfsat Madagascar. France-IX also actively assists in the creation of local African-based IXPs by providing equipment, training and mentoring. To date, these include CAS-IX in Morocco, SEN-IX in Senegal and the most recent in Brazzaville, Republic of Congo – known as the Congo Internet Exchange (CGIX), managed by the Regulatory Agency of Posts and Electronic Communications (ARPCE).

Kyle Whitehill, CEO, Avanti

"Looking back on 2019, Avanti Communications has been on a journey of change and accomplishment. We have achieved a lot, from the successful launch of HYLAS 3 to sponsoring the fastest man in South African history – Akani Simbine to help him reach his full potential for the upcoming Tokyo 2020 Olympics. As well as partnering with Project Everyone and the UNHCR to provide remote regions in Africa with internet access. As a company we delisted back in August as part of the wider transformation of the business, after refinancing earlier in April. From these events we have won great contracts with Turksat and Vox Telecom and are in a much stronger financial position than we were 12 months ago. Our objective is and has always been to bring connectivity to areas where it doesn't exist, providing individuals, industries, critical public services with leading Ka-band HYLAS satellite technology to extend and guarantee coverage.

"Our objective is, and has always been, to bring highly secure and resilient connectivity to areas where it doesn't exist, providing our communications industry partners with high-quality Ka-band coverage"

2020 has brought challenges to many and, like others, we have been faced with adapting our businesses in light of COVID-19. As the world seeks to stay connected from behind closed doors, satellite connectivity is playing an important role in guaranteeing secure and reliable communication for government bodies, first aid responders and health organisations. Using HYLAS 4 capacity, we are providing resilient and secure satellite connectivity and equipment to 10 government sites across the country, keeping lines of communication open for key government bodies in Niger.

Within our company we have also recognised that many are "switched on" and working additional hours while at home and so we initiated a four-day week throughout the month of May for all staff members across all our offices, covering nine countries – including UK, USA and Nigeria. This is the latest in a series of initiatives that we have introduced to support our employees through lockdown. As a company we also brokered a unique broadcasting partnership to create an "At Home With" mini-series for staff, which includes exclusive interviews with athletes and entertainers including professional boxer, Isaac Chamberlain and Scottish curling champion and NHS nurse, Vicky Wright.

As we start to come out of this pandemic we will be looking forward to continued advancements in satellite technology, working with industry and governments to build relationships and grow our coverage capability to connect the unconnected."

"Avanti Communications is the leading Ka-band high throughput satellite capacity partner to the communications industry in EMEA - extending and guaranteeing coverage for defence missions, enterprise solutions and critical public services.

Through the HYLAS satellite fleet and partners in 118 countries, Avanti provides dedicated fixed and flexible-beam satellite connectivity, with extensive coverage across Europe, the Middle East and Africa. The Group has invested $1.2bn in a network that incorporates orbital slots in Ka-band spectrum, satellites, ground stations, datacentres and a fibre ring."

Will Liu, managing director, TP-Link UK

The wireless market in Africa is still significant as total, but diverse in different countries/regions. That's the view of Will Liu, managing director of TP-Link UK. "For the relatively developed markets, 11AC, together with MiFi and LTE gateway, has become more and more popular in 2019 while there are still notable demand on 11N, including 11N xDSL in emerging markets," he adds. "First of all, Internet penetration is still inadequate in some Africa countries. It is an incremental market with great potential. Secondly, MiFi and LTE Gateway may become an alternative besides PON technology for some regions."

When it comes to big challenges, Liu says the capital construction, including the internet, needs to be faster as there are still areas without reliable access to the Internet. What about TP-Link's big push for 2020?

" It depends," he says. "Different push for different regions, based on the demand from the local market. From product lines to human resources, we will converge more on the Africa market in 2020."

Nevertheless, Liu believes Africa's Wi-Fi

Martha Suarez, president , DSA

The year ahead: Finally, it will be important in South Africa to think about the future of Wi-Fi and all the new wireless ecosystem that will be part of many 5G use cases. There is an ongoing movement in the USA, the UK and Europe to enable unlicensed access in the 6 GHz band for Wi-Fi and other wireless devices while protecting the incumbent users of the band. Most recently, the US Federal Communications Commission (FCC) enabled unlicensed use of 1200 MHz of spectrum in the 6GHz band to advance connectivity for increasing bandwidth demands across industries, Internet of Things Applications and vital healthcare and education. The impact of this decision will also support wireless internet providers provide access to the 6GHz band in rural and remote areas of the US. By looking to other success stories of spectrum sharing, South Africa can find new innovative ways to ease the pressure of increasing bandwidth demands.

South Africa has a clear vision on how to move to the 4th industrial revolution and has been moving into implementing dynamic spectrum solutions, however the connectivity challenges are still significant and a way to overcome them is to strengthen collaboration with the industry and allow more stakeholders to access spectrum and provide broadband internet access all across the country. Regulations are necessary to establish a stable framework for investment into dynamic spectrum management and the clear rules for competition, that at the end will benefit all South Africa citizens.

"First of all, Internet penetration is still inadequate in some Africa countries. It is an incremental market with great potential"

market still has incredible potential in 2020, as lots of countries have already begun to increase their budget in upgrading their internet penetration and the speed of it. "It is a superb phenomenon," he says. "The Internet cannot create wealth directly by itself, but more wealth can be generated with the help of the internet. This market needs various product lines to meet different requirements. N300 WiFi Router and ADSL modem may not drop next year in Africa. Entry-level of 11AC/AX Router, VDSL, LTE Gateway, and Smart Home is supposed to bring us some surprises next year."

Liu says "new technology such as Mesh" may not so well be known and accepted compared with developed markets such as North America and Europe and it will take more time to get there. "The same situation applies to Smart Home," he continues. "Pioneer markets such as South Africa has already given us positive feedback in the year 2019, and I believe more and more consumers in those markets will know and try new Wi-Fi technology in the coming years."

Mario Di Mauro, chief executive officer, Sparkle

Sparkle is TIM Group's fully owned global operator, first international service provider in Italy and among the top 10 worldwide, with a proprietary fibre backbone of around 530,000 km spanning from Europe to Africa, the Americas and Asia.

Services offered include a complete range of IP, Data, Cloud, Data Centre, Mobile Data and Voice solutions to meet the needs of ISPs, OTTs, Media and Content Players, Application Service Providers, Fixed and Mobile operators as well as Multinational Enterprises.

Sparkle has a major presence in Africa and is first Tier-1 backbone, with points of presence in Egypt, Tunisia, Nigeria, Tanzania and Djibouti and commercial relations for Voice traffic, Roaming and Mobile services, Internet and Bandwidth connectivity in almost all countries.

Sparkle's "technological heart and intelligence of network" is in Palermo, Sicily, that is increasingly establishing itself as the main hub for Internet traffic in the Mediterranean. Sicily Hub is Sparkle's latest generation open data centre launched in 2015 and featuring state-of-the-art data security technologies. Thanks to its proximity to North Africa and the Middle East, to its connectivity to all the international cables landing in Sicily and to the integration with Sparkle's global Tier-1 IP transit network Seabone, Sicily Hub offers to content providers and international internet service providers an IP interconnection point with reduced latency, from 35 to 15 ms, and superior performance, from 50% to 80%, compared to any other European peering point.

The recent announcements of the investment in the BlueMed cable as well as the opening of a new Point of Presence (PoP) in Nigeria and the selection of Djibouti Data Centre as its IP hub for the expansion to East and South Africa, suggest the start of a new expansion phase for the global operator in Africa.

"Africa and the Middle East have always been a reference area for Sparkle and we will be even more so in the future: starting from north Africa, whose countries were the first areas on which Sparkle invested, to arrive to major projects that envisage a renewal of existing bilateral connections or the opening of new PoPs," says Mario Di Mauro, Sparkle's chief executive officer. "In terms of capacity, Sparkle has sold and activated more than two terabyte of capacity in North Africa only, and this figure is set to increase year over year."

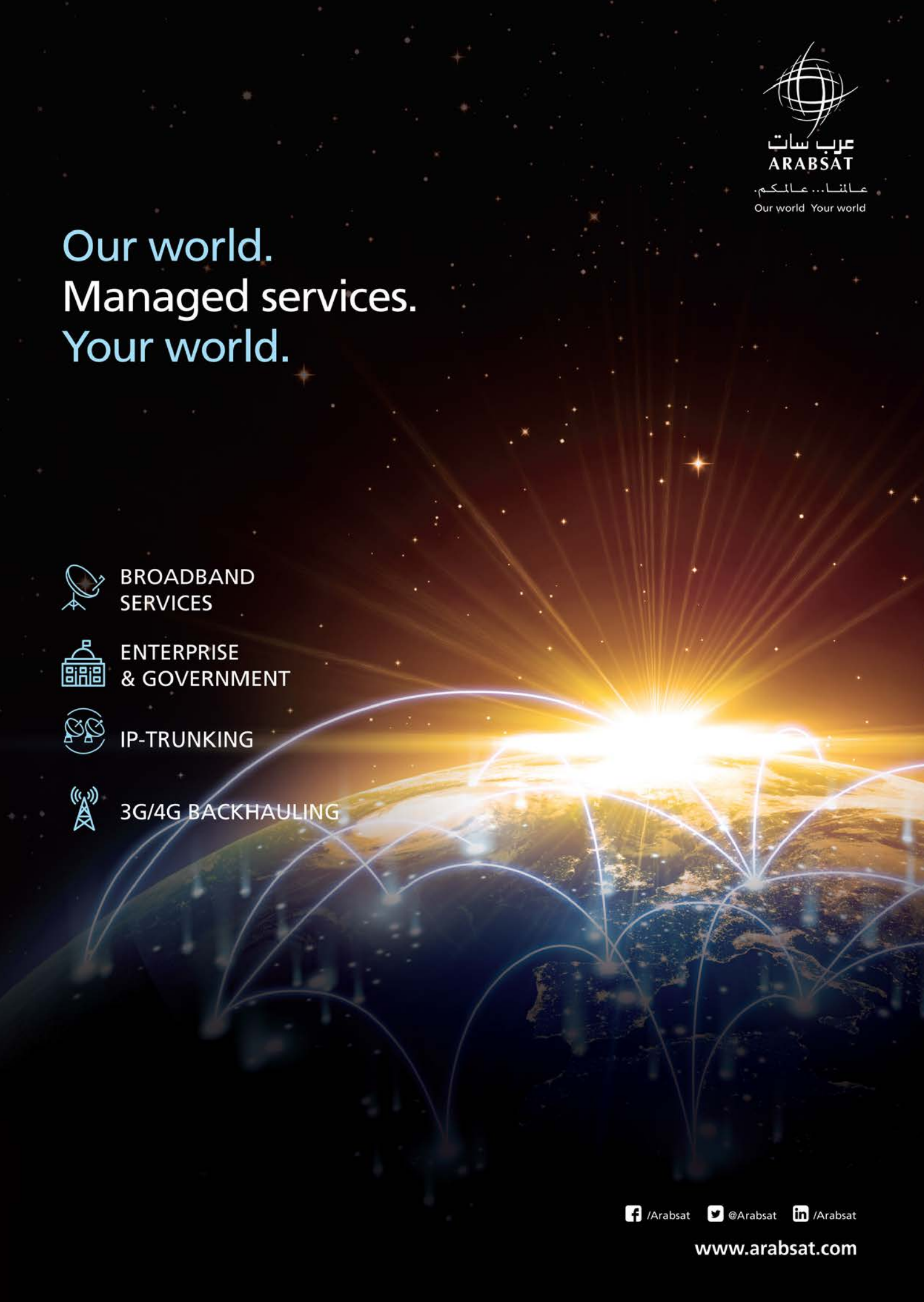
The company was very active in 2019, too. "In the last year we have further expanded our African backbone opening a brand new PoP in Nigeria and selecting Djibouti Data Centre (DDC) as our IP hub for the expansion to east and South Africa, leveraging on DDC's direct access to all major international and regional cable systems connecting the European, Middle Eastern and Asian markets with Africa and thus delivering IP and capacity services with even higher performance than before," Di Mauro continues. "During 2019 we have also announced several network investments in the Mediterranean aimed at enhancing Sparkle's backbone and consolidating our leadership in the Mediterranean basin."I'm talking about BlueMed for example, our new proprietary submarine cable project that will cross the Tyrrhenian Sea connecting Sparkle's Sicily Hub open data centre in Palermo, which serves eighteen international cables, with Genoa's new open landing station, directly connected to Milan's rich digital ecosystem."

He says BlueMed will also include multiple branches within the Tyrrhenian Sea and is set to support further extensions southbound of Sicily. The new cable, that Sparkle plan to put in service by 2021, will support capacity up to 240 Tbps, providing advanced connectivity between Middle East, Africa, Asia and the European mainland hubs with up to 50% latency reduction than existing terrestrial cables connecting Sicily with Milan. "In addition, Sparkle's new open landing station in Genoa is set to become the alternative priority access for other upcoming submarine cables looking for a diversified entry way to Europe, thus strengthening Italy's role as digital gateway between Africa, Middle East, Asia and Europe," adds Di Mauro.

He is also very optimistic about the coming year. "In 2020 Sparkle will further invest in the continent to drive digital transformation and connect African countries between themselves as well as with the rest of the world, relying also on its security service portfolio," says Di Mauro. "We plan to open new PoPs, especially in those countries which do not have direct access to the sea and therefore do not have direct landing points for cables, and looking carefully at the data centre market to support local operators in offering global solutions to their enterprise customers."

Mobile is another key area for Sparkle Di Mauro says the firm will set up new roaming interconnections with African mobile operators. ■

"In terms of capacity, Sparkle has sold and activated more than two terabyte of capacity in North Africa only, and this figure is set to increase year over year"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