chapter 3 Data centres

Kevin McLoughlin,
chief commercial officer,
Open Access Data Centres

In a year when many of Africa's businesses and much of its urban workforce is adjusting to a 'new normal' of hybrid working and the migration of many functions into the cloud, Africa's data centre (DC) industry is also moving rapidly towards a new normal.

Currently representing only 1% of global DC capacity, Africa's burgeoning DC industry is set for huge change. Recent analysis by Balancing Act reports that over the last two years, the number of carrier neutral DCs on the continent has grown from just 20 in 15 countries at the start of 2021 to more than 50 in 26 countries today (November 2022). Over 70 additional facilities are in planning or deployment, with between $5·6 billion earmarked for investment in the expansion and/or construction of new facilities over the next 3·5 years.

This huge increase in DC footprint · which includes the existing, well·established regional hubs of South Africa, Nigeria and Kenya, and a wide range of new DC markets such as Botswana, Cote d'Ivoire, the DRC, Ethiopia, and Uganda · is based on several important drivers:

- Global cloud operators are increasingly extending their network edge into Africa and are encouraging wider use of cloud·based services. 2022 has seen announcements by Google, Oracle, AWS and Huawei of new cloud zones and/or cloud regions in Africa.
- The COVID·19·related imperative for extension of corporate networks to remote/home workers has driven very significant increases in bandwidth demand, and expedited business adoption of outsourced ICT solutions, including storage, services, and applications.
- Data privacy and security concerns, together with data sovereignty legislation that enforces retention of certain business data within national borders, are driving demand for secure, local data storage facilities.

This year has also seen key global DC operators stepping into the African market.

- In January, Digital Realty announced plans to acquire leading South Africa operator Teraco Data Environments.

Combined with its earlier investments in Medallion (in Nigeria) and iColo (in Kenya, as well as Mozambique) the deal, completed in August, gives Digital Realty a footprint covering the three key African regional hub markets.

- Digital Realty's announcement was just preceded by that of Equinix's initial expansion into Africa, through acquisition of leading West African DC and connectivity provider MainOne, which gave it an immediate presence in Nigeria, Ghana, and Côte d'Ivoire.
- In July, Vantage completed construction of the initial (16MW) phase of a $1 billion, 80MW facility in Johannesburg, its first in Africa.
- This was swiftly followed by NTT's October launch of its 6MW DC a few km across the city.

South Africa has also seen expansion by existing operators such as Africa Data Centres and Teraco, whilst newcomer Open Access Data Centres (OADC) has rapidly established DC facilities in Cape Town (at Rondebosch and Brackenfell), Durban and Johannesburg, as well as constructing a unique edge DC network comprising 30 DCs across the country. Yondr also announced a $4 billion war chest for Africa, initially investing in construction of an 80MW DC in Johannesburg.

Across the rest of southern Africa, a National Data Centre has been launched in Malawi, TelOne in Zimbabwe and BofiNet in Botswana have both constructed facilities, and in Mozambique both iColo and Raxio have broken ground in Maputo.

West Africa has also experienced significant growth, with MainOne's build-out to new countries, Africa Data Centres' development

"Currently representing only 1% of global DC capacity, Africa's burgeoning DC industry is set for huge change."

of sites in Nigeria and Ghana, and Raxio constructing in DRC and Cote d'Ivoire. In Nigeria, Open Access Data Centres, Kasi, Galaxy Backbone and 21st Century Technologies are all building DCs. PAIX have announced plans for a DC in Senegal. Paratus supplemented its existing portfolio with construction of its Windhoek DC in Namibia, launched in August.

In East Africa, there has been growth in several markets. In Kenya, IXAfrica, PAIX and iColo have all launched new data centres in Nairobi. Two new DCs are in development in Tanzania, with Raxio building in Dar es Salaam and Oman Data Park in Zanzibar. Raxio has also launched the first phase of its 1.5MW Kampala DC in Uganda, which has expansion capacity up to 400 racks. Four separate DC initiatives are underway in Ethiopia, with all operators (including wingu, who are also building in Djibouti) focusing on Addis Ababa.

Open Access Data Centres closed its funding in November 2021 and since then has established itself as an influential and important player in the African data centre ecosystem. The company has so far deployed five core data centres in Nigeria and South Africa and established a network of 30 smaller edge data centres across South Africa to support expansion of mobile and broadband networks and extend the cloud edge closer to the point of content generation and consumption. The company's plan is to extend its core-to-edge proposition to other markets, starting with Nigeria in 2023. ■

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Harry Van Schaick,
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State of the African data centre market

Data centres (DCs) are the lifeblood of the global digital economy. Throughout Africa, DCs are fast becoming an essential for MNOs and service providers in the face of exponentially growing data volumes. Consisting of large groups of networked computer systems and servers, DCs remotely store, process, and distribute vast troves of data, and have been widely referred to as 'the new gold.'

Supply and demand

Gartner estimates that the global market for DC provision will reach US$200 billion in 2021, up 6% year on year.

African DC market revenue is expected to expand at a compound annual growth rate (CAGR) of 12% over 2019-2025 to US$3 billion. Increasing demand for cloud-based services and modular DC solutions from SMEs and government agencies will underpin the market, with more than 70% of African organisations estimated to shift to the cloud by 2025.

Demand has only recently justified the rollout of multi-tenant facilities in major markets. Late adoption has produced a massive supply gap – Africa needs up to 1000MW and 700 facilities to meet demand and bring capacity density up to par with that in South Africa.

Data centre capacity

Africa had 140,000 square metres of DC space from just over 100 DCs at the time of writing. Rapid digitisation and the rollout of 4G and 5G mean that supply is poised to increase by 50% over 2021-2026.

Capacity is unevenly distributed, with more than 66% in South Africa: Johannesburg alone hosts 55MW of capacity. This is due to several factors, including the size of its economy (US$351.4 billion in 2019), links to subsea fibre-optic cables and a long-standing liberalised telecoms market. It is also the locus of Africa's largest internet exchange, NAPAfrica, which retains the largest number of peering connections on the continent.

Another leading market in Africa is Nairobi, which hosts 19MW of capacity. Kenya sits on four major subsea cables and boasts strong cross-border fibre connections, making it well placed to become a regional centre. Nigeria and Côte d'Ivoire boast similar advantages, as do Ghana and Senegal.

According to Xalam Analytics, 10% of the existing DC capacity serves nearly half of sub-Saharan Africa's economic output and broadband connections. Moreover, 33% of Africa's 80 cities with a population of more than 1 million people have a DC rated Tier-3 or above, demonstrating the scale of the distribution gap.

Analyst estimates for the growth of the African DC market are based on a confluence of driving factors, not least a rapidly growing population. The UN forecasts that more than half of the global population growth between 2020 and 2050 will occur in Africa. The sub-Saharan population is estimated to double over the next 30 years to 2.5 billion. The UN also predicts that more than half of Africa's population will live in cities by 2040, eight of which will be mega-cities of 10 million-plus inhabitants.

15 African countries currently have economies and populations large enough to develop DC and

cloud service ecosystems. 40% of the African population had access to the internet in 2019, set to increase by 11% over the next decade. The internet economy is projected to be worth US$180 billion by 2025, growing to US$712 billion by 2050. Meanwhile, data sovereignty regulations demanding that data is stored in-country, or at least within the five sub-regions that partition the continent, will help drive demand for localised data storage.

International Data Corporation (IDC) estimates that annual cloud computing subscriptions in South Africa alone will grow from US$370 million in 2019 to US$1.7 billion in 2024. Governments are increasingly driving demand for DC capacity. Senegal will transfer all government data and digital platforms from foreign servers to a new national DC, maintained by Huawei, to strengthen its digital sovereignty.

Data consumption drives growth

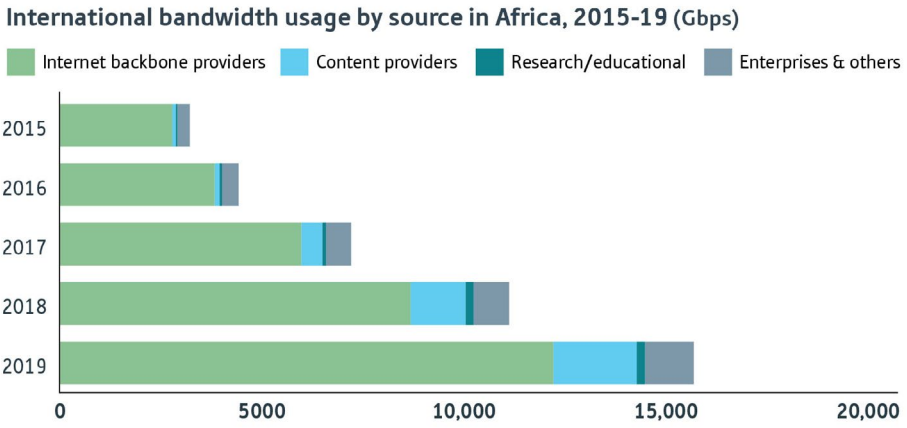
Economic growth is driving data consumption and production in Africa, with digital inclusion playing a leading role in recovery from the COVID-19 economic contraction. Benin, Côte d'Ivoire, The Gambia, Lesotho, Madagascar, Namibia, Togo, Uganda, Zambia, and Zimbabwe all improved their social protection efforts during the pandemic through mobile money platforms and electronic cash transfers.

sub-Saharan Africa is forecast to experience the globe's fastest growth in mobile money technology through 2025. Mobile banking is key to driving the digitalisation of the informal

iGDP* for selected African countries

	2020E		2025F		2050F	
	$ bn	% of GDP	$ bn	% of GDP	$ bn	% of GDP
Kenya	7.4	7.7	12.8	9.2	51.1	15.2
Morocco	7.8	6.8	12.1	7.8	48.1	12.9
South Africa	21.6	6.5	31.5	7.9	125.1	12.9
Senegal	1.5	6.2	2.9	7.1	11.6	11.7
Nigeria	24.6	5.7	36.5	6.9	145.3	11.3
Algeria	9	5.6	11.9	6.2	47.4	10.1
Cameroon	2.1	5.4	3.3	6.2	13	10.2
Côte d'Ivoire	3.2	5.3	5.5	6	22	9.9
Egypt	15.4	5	26	6	103.3	9.8
Rwanda	0.5	5	1	6	3.9	9.8
Ghana	3	4.4	5	5.3	19.9	8.7

**iGDP measures the contribution of the internet to GDP*



sector, which the World Bank estimates to account for more than 35% of output and 60% of employment across the region.

Traditional financial institutions are migrating their operations to DCs as they look to expand their digital offerings.

First Bank of Nigeria and KCB Bank, Nigeria both have mobile apps with more than 1 million users, while Kenya's Equity Bank allows free bank-to-mobile wallet transfers. Fintech will be a driver of data consumption, and WeeTracker estimated that US$679 million was invested in African fintech start-ups in 2019, primarily in Kenya and Nigeria.

Governments will also drive demand, with several pursuing digital transformation agendas to diversify their economies and streamline processes.

"Incorporating sustainability into DC design is important in Africa because higher temperatures necessitate additional cooling power."

While South Africa accounts for nearly half of all cellular IoT connections in sub-Saharan Africa, use cases are emerging across the region and could help address region-wide challenges in energy, water management, agriculture, transportation and logistics, manufacturing, and healthcare.

African DC principles

Africa's largest DC players are in South Africa, led by Teraco, which has invested in hyperscale carrier- and cloud-neutral co-location DCs, several in Johannesburg (with a capacity of approximately 55MW), which serve as the on-ramp for AWS, Google and Microsoft's Azure cloud services. Teraco's smaller facilities in Cape Town (5MW) and Durban (3MW) allow direct access to NAPAfrica.

Other major players in South Africa include Business Connexion; MTN Business, which operates both enterprise and colocation DCs across the continent; and Dimension Data.

Africa Data Centres (ADC) operates facilities in several South African cities, including a Tier-4 DC in Johannesburg and a 5.5MW DC in Cape Town. ADC also maintains the largest DC in Kenya – a 7.5MW facility in Nairobi – and is building a 10MW DC in Nigeria.

Raxio Group seeks to establish 10 to 12 DCs in underserved areas by 2023. Having already established a DC in Kampala, Uganda, Raxio plans to construct another in Kinshasa, the Democratic Republic of Congo, and a 3MW, Tier-3 facility in Addis Ababa, Ethiopia.

Nigeria is an emerging hotspot. Rack Centre's Tier-3 DC has at least 40 carrier connections, while MainOne's unit MDXi has 26 facilities at its Lagos operation. MDXi also operates DCs in Abidjan, Côte d'Ivoire and Accra, Ghana.

The fragmented picture of DCs on the continent is changing rapidly as new players enter the market. IXAfrica broke ground on a DC in Kenya in April 2021 as part of broader plans for a 42.5MW rollout in East Africa, which is estimated to cost US$250 million.

Sustainability

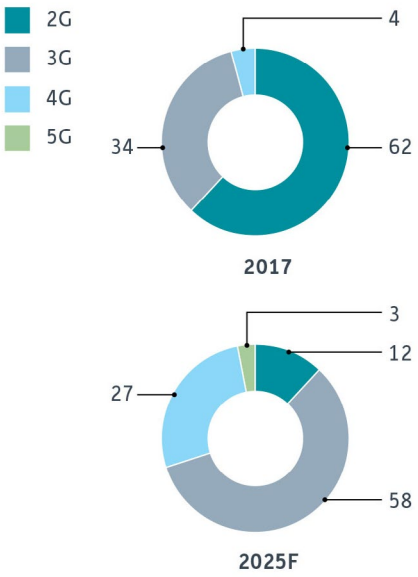
Incorporating sustainability into DC design is important in Africa because higher temperatures necessitate additional cooling power. Access to renewable energy sources is therefore essential.

Solar power has great potential for operators on the continent. Nine African countries are enhancing their solar capacities, and Egypt and South Africa are already members of the solar 'gigawatt club' of countries with at least 1GW of installed solar power capacity, according to a 2021 report from the Africa Solar Industry Association. Morocco is working towards the 1GW target, with its 1200ha, 580MW Noor Ouarzazate Solar Complex – the world's largest concentrated solar power facility. In West Africa, solar capture and storage projects are making progress in resolving the limited storage capacity of the region's grids.

Africa is also an emerging leader in microgrid capacity – grid-connected, on-site energy generation or storage plants that can help DCs lower power bills by saving on peak demand costs. Colocation and enterprise operators are adopting renewable energy sources to power DCs.

ADCA and other organisations are working to establish an energy-efficiency code of conduct, drawing inspiration from the European Commission's best-practice guidelines for DC energy efficiency. The guidelines recommend a modular rather than monolithic DC design to

Mobile technology mix in sub-Saharan Africa, 2017-25F (% of total connections)



limit excess provisioning of space, power and cooling. They also include guidance on energy-efficient equipment and airflow management to reduce the need for cooling. In future, advanced building information modelling will allow for taller building designs and direct-liquid cooling systems that focus air movement on servers alone rather than entire buildings.

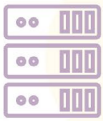
Water consumption is another area of concern. Cooling systems in older facilities consume up to 30% of total DC energy demand, but until today the industry has largely focused on reducing power consumption, in part because of the use of PUE ratios as an indicator of DC sustainability. Operators in Africa have an opportunity to spearhead a global drive to include water source and use metrics in their reporting and promote the wider use of water recycling in data facilities.

Artificial intelligence (AI) is emerging as a key element of DC development. AI is integral to improving energy efficiency, as machine learning can build a picture of likely spikes in IT loads and energy consumption, and help cooling systems adapt to lower PUE. In some systems cooling sensors communicate in real time with cooling management systems to achieve greater efficiency.

For predictive maintenance, AI allows DC operators to foresee system faults and component failures. Sensors can listen for unwanted vibrations or sounds in IT equipment, flagging potential failures. Algorithms can also help balance server workload, which in turn reduces system stress and the risk of data outages. Machine learning can also assist in tightening cybersecurity, as well as analysing regular inflows and outflows of data, detecting aberrations that suggest the presence of malware or attempts at hacking. ■

Impact of AI on DC operations

Improves security
AI-based cybersecurity can screen and analyse incoming and outgoing data, detect malware and implement behavioural analytics to protect data



Optimises servers
AI-powered analysis can help distribute workload across various servers

Monitors equipment
AI uses pattern-based learning to identify equipment defects

Reduces downtime
AI can monitor server performance, network congestion and disk utilisation to detect and predict data outages

Conserves energy
AI can learn and analyse operations to identify and remedy sources of energy inefficiency, reducing overall consumption

Stephen Beard,
partner, global headquarters GB,
Knight Frank

Data centres are a growing investment opportunity in Africa

Africa currently boasts just 140,000 square metres of data centre space, the same as Switzerland. However, rapid digitisation and the rollout of 4G and 5G infrastructure across the continent means this is set to grow by 50% over the next five years.

Traditionally, data centres have been clustered in a select few geographies at existing peering points, or internet exchange points. These locations have been in the US (Virginia), Europe (London, Paris, Amsterdam, Frankfurt, and Dublin) and Asia Pacific (Tokyo, Hong Kong, and Singapore).

However, as technology and content has become more complex, the quantity of data required has increased to a level where the existing model is no longer viable. As a result, cloud-based service providers are now looking to be closer to population centres, which will enable them to deliver more sophisticated services in a timelier manner and reduce transit costs.

Further, as Guy Willner, CEO of data centre operator IXcellerate notes, adoption of data sovereignty in countries such as Nigeria and Morocco mean that new data centres will need to be built in these places.

Supply gap

Africa remains underserved for data centre provision. Live IT power in markets such as Dublin and London stand at 795.8MW and 728.25MW, but in Africa this figure is significantly lower with leading markets such as Johannesburg and Nairobi recording a total live IT power of 54.9MW and 19.04MW respectively, according to DC Byte.

There are clear opportunities for the development of not just retail and wholesale colocation, but also built-to-suit hyperscale data centres in the tier one markets. This will help to narrow capacity gaps and enable the market to keep up with increasing – and increasingly complex – demand at both individual and state level.

To house these data centres, a range of different types of real estate provision will be required. Depending on the type of demand, this could mean build-to-suit industrial units, repurposed industrial or office units or even build-to-lease data centre real estate.

Demographics

With a population of 1.3 billion people, the continent has over recent years provided an opportunity for the rapid and accelerating deployment of technology into a young and dynamic populace.

Africa currently accounts for less than 1% of total available global data centre capacity, according to Xalam Analytics, despite being home to approximately 17% of the world's population. However, with the continent's urban population set to grow by 60% by 2050, characterised by an increasing technology talent pool and an emerging middle class, the demand for data centres is set to increase.

From a supply standpoint, the southern African region continues to be the most well served, accounting for 54% of data centre space across Africa. But with at least half of Africa's growing population expected to have

internet access by 2030, according to GSMA, and legislation encouraging data localisation, the potential for data centres in Africa is set to continue growing exponentially.

Connectivity

Recent progress in fibre optic connectivity offers Africa the ability to leapfrog other continents in establishing a world-class system of network infrastructure. Geographically, cities such as Mombasa in Kenya are incredibly well located on sub-sea fibre links offering a gateway to Asia and, as such, see a large amount of internet traffic working through them.

Currently much of Africa's data content is driven through Marseille rather than being domiciled on the continent, limiting those operators who need to offer premium latency (data transfer) speeds to their customers. However, the commencement of Google's Equiano project, an underwater cable connecting west Africa to Europe and Facebook's 2Africa, a 37,000km sub-sea cable that will circumnavigate the continent and connect it with Europe and the Middle East, clearly shows how the tide is changing.

Green energy

Data centres consume a vast amount of power. This is especially the case in Africa, due to the added cooling requirements. In Europe for example, the requirement is 99.99% of uptime power at a minimum.

Unreliability in Africa's grid network is therefore considered the main stumbling block to investment by international data centre operators. However, the unfolding revolution in Africa's market for renewable energy is set to create new opportunities. Between 2010 and 2017 the average cost of producing solar energy fell by 73%, and by 22% for onshore wind power, according to the International Renewable Energy Agency. Renewable energy is set to spur growth and ensure accessibility even in the most remote regions across Africa, while achieving the sustainability goals of the cloud computing powerhouses such as Microsoft and Google.

Competitive capital

As the proliferation of smartphones and mass adoption of business software on the continent leads to soaring demand for data centres to power technology, international investors, including private, institutional, and sovereign capital, are increasingly keen to win lucrative investment deals.

By way of example, see the recent US$250 million investment by private equity firm Actis. Further, in 2019, Berkshire Partners acquired a stake in Teraco Data Environments, which owns Africa's largest data centre and powers much of the cloud computing in South Africa, with the aim of doubling capacity from 30MW to 60MW in the next few years.

Liquid Telecom's Africa Data Centres, which has earmarked US$1 billion for expansion across Nigeria, Ghana and further into Egypt and Morocco, also recorded an influx in investor interest including US$300 million from the US government's International Development Finance Corporation.

Growing competition between emerging powers such as China and countries with longer-standing economic ties with Africa, such as the US, UK, and France, is anticipated to open this sector further to more lucrative investments, with Chinese capital expected to debut in the sector in the near future. ■

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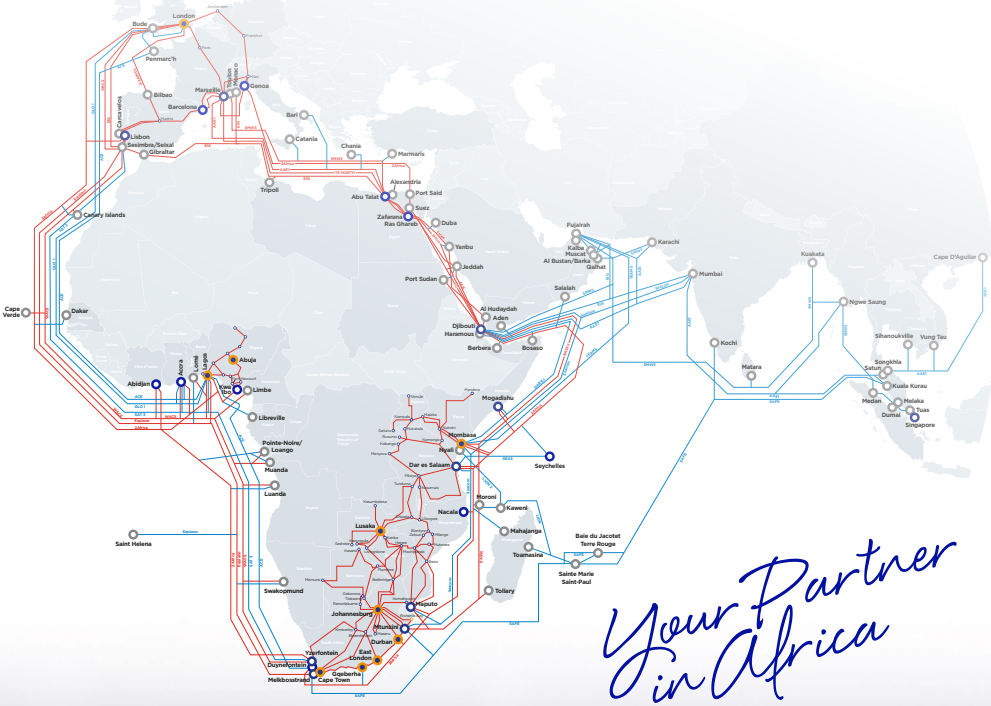
Africa's Digital Backbone



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Amy Saunders,
editor, African Wireless Communications Yearbook

Data centre sustainability

Data centres have become a vital installation in the MNO playbook in recent years, providing centralised locations for data storage, processing, and dissemination. With data volumes growing exponentially because of the rise in data and voice traffic across the world as mobile adoption increases, combined with the upcoming 5G and IoT deployments, data centres have become essential to keep things ticking over.

In the third quarter of 2021, almost 78 exabytes of data traffic passed through telecommunications networks globally, up from 55 exabytes in the same quarter of 2020. Global mobile voice traffic remained static year on year at 0.23 exabytes in the third quarter of 2021, according to Statista. As a result, African MNOs are investing heavily in data centres to keep up with demand brought about by digital transformation.

Delivering vital services

For MNOs, data centres are expected to help operation teams with simplified and automated data management that improves operational efficiency while cutting costs. Meanwhile, their customers are set to benefit from lower latency and higher quality services – a win-win for everyone.

With the rise of 5G, providers must transform their infrastructure to meet new requirements like high data rates, ultra-low latency, and massive machine-type communications. Incorporating cloud-native architecture into telecommunications data centre design is the key to enabling new services made possible by 5G that are application driven, agile, and mobile. This provides the best experience for the end user and optimizes and reduces bandwidth occupancy on the network transport side.

This technology presents an opportunity to provide services that maximize revenue opportunities with Opex savings. It helps deliver converged broadband and multi-access edge computing. This will result in an improvement of service velocity, agility, and operational efficiency that service providers can pass on to their consumer and business customers.

Recognising the opportunities offered by data centre technology, Africa's MNOs have adopted their use faster than anticipated; a fantastic development for those in the value chain but one that raises questions about sustainability.

Indeed, it's been estimated that data centres consume as much as 3% of global power consumption, which is just one reason why sustainability has become a key target for all those in the value chain. Many data centre operators and MNOs have committed to becoming climate neutral by 2030, and as of July 2022, 74 data centre operators and 23 associations have signed up to the Climate Neutral Data Centre Pact, which requires increased energy efficiency; clean energy; water efficiency; circular economy; circular energy.

One of the biggest challenges in attaining a climate neutral data centre environment is legacy data centre technology. Data centres built a decade or more ago consume huge amounts of energy and will require heavy investment and retrofit activities in the years to come for decarbonisation. This has been recognised by the Climate Neutral Data Centre

Pact, which holds new and legacy data centres to different timeline requirements.

However, this isn't a huge problem for Africa, where most data centres are modern constructs with environmentally friendly designs. Further, for the many upcoming data centres on the continent, there are several features that can be incorporated from the planning stages to produce a greener installation. Immersion cooling, the application of artificial intelligence for workload management, and sourcing renewable materials for construction are just the tip of the iceberg. As well as proving positive for the environment, these green initiatives lower Opex for the lifetime of the data centre.

Indeed, many new ideas are coming into play, and vendors that can help source renewable energy, lower power usage effectiveness, and provide for greater building efficiency can expect to gain business in the years to come.

Energy efficiency is key

Data centres on the African continent face challenges unique from much of the world, including a hot, humid environment which requires more energy to cool and dry than those in Europe. Meanwhile, energy consumption accounts for around 20-30% of the total cost of ownership, a great deal of which is required for cooling measures. Thus, energy efficiency is key for both sustainability and financial reasons.

The Africa Data Centres Association (ADCA) reports that the average African data centre power usage efficiency ratio (PUE) is just 1.5, significantly lower than the global average of 1.58. One of the reasons for this better-than-expected score is that most of Africa's facilities are modern and more efficient, a positive result from being late joining the digital revolution.

Looking to ensure African data centres continue to improve on their environmental credentials, the ADCA has outlined the following plan for sustainability:

- Continued adoption of latest technology for new data centre construction
- Creation of an African Code of Conduct utilising the process of continuous improvement through, planning, and monitoring
- Promotion of the use of on-site renewable energies like solar, wind, water, hydrogen
- Development of a 'Keep it African' Label to ensure the maximum usage of construction materials and hardware are sourced from the continent
- Avoid the mistakes made in the past by global data centres lacking climate awareness
- Power supply is challenging in parts of Africa and varies widely from country to country. South Africa, for example, has faced heavy power disruptions throughout the year, causing chaos for MNOs and other enterprises relying on continuous connectivity.

The ADCA and the Climate Neutral Data Centre Pact have both highlighted the fact that renewable energy has a huge role to play in the African data centre market. Adoption of renewables varies widely across the continent, although the International Renewable Energy Agency (IRENA) states that solar is now the fastest-growing renewable energy source in Africa, with an increasing number of countries working to increase their solar capacities beyond 1GW. Northern and Southern Africa lead in renewable projects but countries across sub-Saharan Africa also have major renewable projects in the works. In Kenya, some 90% of

electricity is generated from renewable sources, but in South Africa, most power comes from thermal power stations.

Several governments are adding more renewable energy production to meet the increased requirements from data centre operators in Africa. Morocco commissioned the 300MW Boujdour wind farm, part of an 850MW integrated wind energy project in August 2021, while in South Africa, Eskom plans to invest US$7 billion for renewable energy for the next nine years.

On-site power supply has been highlighted as a key factor in obtaining reliable energy for data centres. Accordingly, diesel generators are frequently found at African data centres for backup during grid outages to ensure continued operations for customers; however, these come with a high cost, both financial and environmental. The delivery of on-site renewable energy is particularly challenging due to the compact form factors of most data centres, which limit the number of solar panels that can be installed. Signing long-term power purchase agreements with renewable power providers could make a huge impact on data centre sustainability, as well as the local grid; however, regulations on this vary across the continent.

Building a greener environment

The African data centre market is in its infancy; however, demand is booming as the digital revolution takes hold, particularly among MNOs as the race to 5G unfolds across the continent. Indeed, the African market is seeing some of the fastest growth in internet use and availability in the world due to a combination of factors including increased availability and a fast-growing population with a high proportion of young people.

With huge growth in mobile phone ownership driving mobile voice and data volumes, and IoT and smart cities coming to fruition, we can expect to continue to see investments in cable, fibre and data centres boom for the foreseeable future.

This is corroborated by Arizton Advisory and Intelligence, which reports that the African data centre market is expected to expand at a compound annual growth rate of 12.73% to US$5.4 billion over 2021-2027, significantly above global averages. The market is expected to comprise 1,355,000 square feet of floor area and 267MW of capacity by 2027. Research And Markets reports that Africa has more than nine data centres that have each added 30,000 square feet of white floor area or more in 2021.

South Africa is the leading country in terms of investment at more than 50% in 2021, followed by Kenya, Nigeria, Egypt, and Ethiopia. South Africa can expect to see its market expand at a CAGR of 11.15% over 2022-2027 to US$3.23 billion. The physical market size is expected to reach 555,000 square feet of floor areas and 103MW of capacity by 2027, while colocation market revenue should hit US$540 million.

But what does this mean for sustainability? Green initiatives and strategies will play a huge role to ensure that Africa doesn't contribute disproportionately to climate change. Global and local standards can help here, however, good intentions only go so far. Real action is needed across the entire ecosystem - from MNO, to service provider, through to the data centre owner, to consumer – to strive for and demand truly sustainable technologies, for the good of their wallet, and indeed the good of the world. ■

Dr Ayotunde Coker,
chief executive officer, Open Access Data Centres

It's been an exciting year for me having taken up the role of CEO for Open Access Data Centres (OADC) in June. I was appointed to lead OADC initiatives that will play a major role in accelerating Africa's digital transformation. We are investing up to $500 million in a pan-African network of Tier III-certified data centre facilities. We are also rolling out a unique core-to-edge open-access data centre ecosystem based on delivering a combination of hyperscale, regional and OADC edge data centres. We have constructed over 30 data centres in the last 12 months, built an expert team, and created a strongly differentiated brand and client proposition.

Looking at trends this year, we rapidly recognised clients' desire for a truly high-quality service and delivery experience. We also identified the gap in the African market for deployment of non-core data centres to outlying locations. To date, Africa has largely either offered core data centres – often distant and implying significant data transmission costs – or left clients to construct and operate their own facilities. There is a need for deployment of a core-to-edge data centre architecture that supports organisations in outsourcing IT infrastructure whilst at the same time democratising the cloud by moving the network edge closer to the point of content generation and consumption.

We saw a clear opportunity for deployment of converged open digital infrastructure to speed Africa's digital transformation – getting away from islands of connectivity and democratising the cloud by taking it closer to the point of content generation and consumption.

Deploying smaller data centres into a much wider range of locations across a country enables extension of the cloud edge. Not only does this deliver managed, power-secure facilities supporting colocation and disaster recovery services for local businesses, it also means improved latency for new time-sensitive applications and business services, offers transmission cost savings through pre-processing of data at the edge, and supports network extension by 5G operators, regional broadband providers, ISPs, and value-added service providers.

Going forward, we will focus on completing the construction of our first-phase deployments, whilst continuing to evaluate and pursue further opportunities. We will ensure that we deliver operational and service excellence to every client and will continue to develop a healthy pipeline of sales opportunities, enhance our service portfolio with a range of value-added services and extend our core-to-edge proposition to new markets. ■

Looking ahead: Data centre demand in Africa continues to grow rapidly. Our challenge is to attract an increasing proportion of that growth into our facilities. By the end of 2022, we will have successfully established our initial footprint of 35 data centres located across South Africa and Nigeria. As well as launching our core-to-edge architecture into Nigeria early in 2023, we also plan to extend our coverage into new markets, starting with the DRC in the first half of 2023.

We are excited by the opportunities presented by African markets and are looking forward to delighting clients with our transformational service experience.

Ranjith Cherickel,
CEO, iColo Data Centers

We're still very excited by the long-term growth potential in our market, as a result we continue to invest and build our digital infrastructure.

We have expanded our Nairobi campus to 3,400 square metres to accommodate a large teleport for customers. We have also since commenced construction on our largest carrier-neutral data centre so far in Nairobi which will have an additional 3,500 racks.

We completed the construction of our MBA2 data centre in our Mombasa campus in Nyali which was specifically designed for cable landings.

We have also opened our first new campus in Maputo which is now servicing customers. It is a 10,000 square metre campus with the first phase of 80 racks now open for customers and the second phase in development.

Predicting the long-term demand remains a challenge in these markets and building just-in-time capacity for that demand.

"Predicting the long-term demand remains a challenge in these markets and building just-in-time capacity for that demand."

"Most African markets deserve a carrier neutral DC that is committed to building an open access model. Satellite teleports in addition to the growing DC market is a great addition to help increase internet penetration in Kenya and Africa as a whole due to the remoteness of certain locations."

Most African markets deserve a carrier neutral DC that is committed to building an open access model. Satellite teleports in addition to the growing DC market is a great addition to help increase internet penetration in Kenya and Africa as a whole due to the remoteness of certain locations.

The last layer of connectivity will be the satellite providers of which we have built a large facility within our data centres to handle the demand. The internet consumption per person in Kenya has significantly increased to an average of about 3Gb per person, per month in the last few years further pushing cloud adoption by the CDNs in the market. ■

Looking ahead: Going forward, we continue to expand in Kenya and other emerging markets in Africa to meet the growing internet demand. We do expect a cooling in the global markets for digital infrastructure however the long-term trends in Africa remain robust and our intention is to continue building towards those long-term goals.

Jasper Lankhorst,
group CEO, Rack Centre

The shortages of quantitative and qualitative carrier neutral data centre capacity have led to a huge attraction of foreign investors in the African digital infrastructure space. In 2020 and 2021, four major pan-continental data centre deals and investment commitments totalling US$2 billion were concluded.

We operate a pan-African data centre platform, which we founded in 2020 after taking a majority stake in Rack Centre, the best-connected carrier & cloud neutral facility in West Africa. In the past year our business in Lagos, Nigeria has been thriving with a solid operational foundation laid by the local team in the past 10 years, bolstered by an explosion in demand from connectivity providers, enterprises and international content and cloud service providers.

We've doubled capacity of our existing data centre facility in Lagos, up to 1.5MW and broke ground on our campus expansion plans. We will deliver a second data centre in Lagos, a hyperscale ready facility consisting of 12MW. This new facility will be ready for deployment in late 2023.

In June, our commitment to reducing our carbon footprint was sealed by the International Finance Corporation (IFC) EDGE certification, making our new Lagos facility the first Green Certified Data Centre in Africa, Europe and the Middle East! Expansion plans into additional African markets are well under way. We have completed our data centre campus design for Nairobi, Kenya and there is more to come.

There are many challenges in the African data centre industry including power, access to talents and cost of business. Consistent power supply remains challenging due to the of access to reliable and renewable sources. The competition for talents remains fierce and our industry is suffering from a brain drain, with mass emigration overseas of talented and skilled individuals looking for a higher standard of living. Operating and investment cost are also under pressure, as we see increases in power and equipment costs due to the Russia-Ukraine war and global supply chain issues.

The African market presents unlimited emerging opportunities; the trick is to pick the right ones and go for it. Optimists like to describe Africa as the 'world's last frontier' of lucrative business opportunities, but you've got to make some key adjustments as lots of things are changing and developing.

The increase in submarine cable investment and fibre connectivity will attract more data centre investments supporting the evolution of cloud ecosystems. This has led to the development of hyperscale data centres, which have existed in South Africa since 2016 and are now being built in North, East and West Africa. ■

Looking ahead: Our strategy is based on Africa's digital transformation which is a long-term play. We are lucky that our shareholders have an aligned view on the industry. Digital transformation is a key driving force for innovation and sustainable growth that can ensure the 4th industrial revolution transforms Africa into a global powerhouse.

I see a bright future ahead in terms of growth for the whole digital infrastructure industry, especially since we are all investing in bringing Africa online!

Pierre Havenga,
managing director, Vertiv, Africa

The The African IT market has grown at pace throughout 2022, driven by increased connectivity, digitalisation, and the entrance of international colocation providers. Heightened demand from enterprise customers (edge solutions) has also contributed to the growth.

According to Arizton, around US$20 billion will be spent procuring IT infrastructure for data centres in Africa between 2022-2027. Adopting cloud, big data, and IoT will increase the deployment of high-end applications and the need for more efficient systems.

Challenges such as a lack of infrastructure, foreign currency availability and a shortage of skills in Africa has created operational complexities. However, these challenges also bring opportunities.

Vertiv is focused on enhancing customer experience, which includes identifying more of our products that can be locally manufactured or assembled, bringing us closer to our customers. This will help to reduce logistics-related risk and facilitate better supply chain management.

We are also working to bridge the gap between local and global skill sets, from consultant to executive, to identify where we need to help and how we can increase skill levels to service larger projects whilst ensuring global standards are met. This is critical to the success of our future growth model, which includes supporting the region from our key hubs with our partner network.

Part of this skills development drive is the launch of our internship program. Currently around 98% of African Vertiv employees are from Africa. We want to continue to invest in local resources with a strong focus on diversity. It is important that we transfer our global experience and technology knowhow to Africa to enable best of breed technology deployment in this market.

We are also working on developing the right services model to drive growth of the distribution business in the region. There are a lot of new projects underway, and we want to ensure that we can install, maintain, and provide the right level of aftersales service.

As a part of our services and growth drive, we have introduced several training programs offering certification training for Approved Vertiv Service Providers (ASPs). This provides our ASPs and data centre experts with first-hand experience of our products and gives users a chance to really understand Vertiv's diverse range of critical infrastructure solutions. In addition to the products' physical availability, Vertiv provides training on its large-scale modular data centres, power, and cooling solutions through virtual reality. ■

Looking ahead: According to Turner & Townsend, the Africa data centre market is expected to reach US$3 billion by 2025, growing at a compound annual rate of over 12%. We expect that the expansion of global players in the African market will continue at a rapid pace for many years, helping to facilitate the increase in data traffic and reduce latency. Digitisation will continue at a high rate and increased connectivity will drive demand for data management.

We are excited about the growth opportunities and Vertiv's positioning in the market to ensure 'fit for purpose' solutions and in country support to assist in driving the digitisation of Africa. We will continue to invest in the region with local presence, partner networks, skills development, and improved services. We have a dedicated management team tasked with increasing our presence in Africa to support all future projects.

Robert Mullins,
CEO, Raxio

2022 has been a busy year for us. Our facility UG1 in Uganda celebrated its first anniversary since being commissioned having provided a much-needed environment to improve continuity and developing a hub that allows businesses to interconnect with each other. We also saw significant progress with construction in our second facility ET1 in Ethiopia, set to be commissioned in the first half of 2023.

We also announced our entrance into Tanzania, the second largest telecoms market in East Africa, with a growing demand for content and data processing which has become an important centerpiece of our growing portfolio. It reinforces our commitment to our strategy to deliver the vital digital infrastructure needed on the African continent and is set to be commissioned in 2024.

We also broke ground on the construction of facilities in Mozambique, the DRC and Ivory Coast, taking our presence in Africa to six countries.

"Access to stable, mission critical environments in these countries is more important now than ever before and we are looking forward to supporting their digital growth with our internal teams, alongside experienced local and regional technical partners specialised in design, engineering, and construction."

As you can probably tell, we have made notable progress against our strategic goals in 2022, driving growth across our markets and expanding into new territories. To support this rapid expansion, we have hired teams of local professionals to manage our data centre facilities across the business. This currently consists of a team of 47 employees, based across seven countries, representing 13 different nationalities, reflecting our Africa-wide focus.

The overarching challenge we had to address was the ongoing issue of COVID-19. A relatable and shared unprecedented pressure amongst our peers, which saw a knock on effect on well-oiled global supply chains, due to successive lock downs and restrictions.

The pandemic accelerated the technology industry to make a rapid shift to digital solutions, resulting in an overwhelming demand for electrical and mechanical equipment, placing an ever-bigger strain on the supply chain, in order for businesses to get the necessary materials in order to meet deadlines and what could be achieved.

However, we have seen digital connectivity in the region grow and the demand for services increase. The positive take aways from this has been the drive to innovate around environmental and sustainable solutions in our designs. We are in the position to be able to offer industry leading technology solutions that have the ability to accommodate the highest power density racks whilst operating at the lowest power usage effectiveness ratio (PUE) in the region.

The locations of our data centres provide ideal operating environments, prime access to connectivity and power infrastructure, and the opportunity to supply our sites largely from renewable energy sources, allowing us to further our ambitious ESG goals.

Access to stable, mission critical environments in these countries is more important now than ever before and we are looking forward to supporting their digital growth with our internal teams, alongside experienced local and regional technical partners specialised in design, engineering, and construction.

These new data centres will not only provide a critical and missing part of these countries' digital infrastructure, but will also facilitate internet traffic amongst content providers locally and internationally, making the internet experience faster, more resilient, and more affordable for all digital users.

Mobile network operators, ISPs and carriers will be able to interconnect to each other and their customers, reducing the cost of access to content across the country at a time when new submarine cables will also be providing Mozambique with enhanced international connectivity.

We have seen a trend of digital transformation in this region, as consumption of digital content, most likely resulting from COVID-19, and the economy being largely driven by the services sector and a thriving middle-class.

"Mobile network operators, ISPs and carriers will be able to interconnect to each other and their customers, reducing the cost of access to content across the country at a time when new submarine cables will also be providing Mozambique with enhanced international connectivity."

With new connectivity solutions arriving and the continued evolution of the digital ecosystem in the region, we will continue to build facilities across a wider geographic footprint to meet the demand from SMEs to hyperscale content delivery networks. ■

Looking ahead: In 2023 we plan to continue to expand digital connectivity across Africa, building more facilities in the markets in which we already have a presence, alongside new markets. We will also be developing and building hubs that develop the digital ecosystem which will bring together connectivity providers, financial services providers, mobile network operators, ISPs and CDNs.

As Africa's digital landscape transforms as customers start to adopt digital services, there will be a need for the establishment and modernization of infrastructure to grow rapidly. The arrival of new submarine and terrestrial networks mean that connectivity is also undergoing a transformation, driving demand, enabling mobile network operators, ISPs, and carriers to interconnect with each other and their customers.

As consumption of data and local content in both the consumer and enterprise segments will increase significantly, the necessary digital infrastructure is needed to be delivered to support this. These new data centres will not only provide a critical and missing part of these countries' digital infrastructure, but it will also facilitate internet traffic amongst content providers locally and internationally, making the internet experience faster, more resilient, and more affordable for all digital users. Resulting in the creation of new jobs, opportunities to do business and make the world a much smaller place.

Iyer Sivakumar,
sales manager for Africa, Siemon

Our Africa business has been growing steadily and this year has experienced sizable growth, particularly in the finance and banking, enterprise LAN and data centre markets. We are strongly positioned to keep growing as a key structured cabling infrastructure provider in the region. Our distributors have re-energized post-pandemic, and we have signed a new distributor in South Africa which will give us a sizable market share.

Enterprise and colocation data centres gained phenomenal growth. We have achieved top market share mainly because of our technical support, our data centre design services offering, and an innovative product set which can effectively solve the needs of any type of data centre. We also have sound system integration partners across the region and strong distribution channels.

We have seen an increased need for the correct specification of data centre design across Africa. Particularly for new projects, it is important that the data centre infrastructure is designed from the ground up to ensure performance, reliability, uptime, and scalability. At the same time, network speed and long-term costs must be taken into consideration. Our data centre design expertise and our approach ensure that cabling infrastructure is specified for optimum support of switching, server, and storage technologies. It also guarantees resiliency, allowing a facility to be upscaled if demand increases, supporting both current and future operational needs.

The provision of sufficient amounts of power as well as the efficient use of available power remain critical. We have seen an increase in the production and use of renewable power via solar power plants and increased focus on energy efficiency and the deployment of products and technologies that support a more efficient usage of power.

There have been several challenges over the past 12 months including currency devaluation, availability of foreign exchange, the China lockdown, and political instability. Slow decision-making processes have also been challenging. Because of the reorganization of certain governments where elections were scheduled, government projects slowed.

Our business strategy will focus on sustainable growth. We are looking to expand our customer base in the enterprise, hyperscale and colocation data centre markets as well as in the intelligent building market. Developing the South African market is one of our key goals. It's a mature market and provides us with great potential to grow. ■

Looking ahead: End users adopting new technologies such as 5G or WiFi 7 is encouraging the move to higher data speeds which means that data centre infrastructure must be upgraded to 400 Gigabit Ethernet speeds in the near future.

We are also seeing a rise in modular data centres. Due to the lack of power availability in Africa, deploying modular facilities means that they can be moved to locations where power is available.

With our portfolio of advanced data centre solutions, Siemon is well positioned to support these developments. Our innovative LightVerse™ high-density fibre optic cabling system for example improves fibre network performance, manageability, scalability, and flexibility in data centre and LAN environments. LightVerse enclosures and panels allow for easier and quick rollouts and moves, adds and changes. LightVerse modules and adapter plates combine with Siemon's plug and play trunks, traditional LC duplex and LC BladePatch® fibre jumpers to deliver a complete end-to-end ecosystem that unlocks the potential of high-density fibre installations.

Wouter van Hulten,
CEO, PAIX Data Centres

In the past 12 months we have continued to interconnect our customers. We see further growth in the markets we operate in: Ghana and Kenya. In both locations, more networks are now connected. In our interconnection datacentres, we help clients generate new sources of revenue, reduce latency, improve performance, and assist to work with their business partners more efficiently.

We've been searching for land in various countries and are looking for new colleagues to join the PAIX team and build the organisation to deliver PAIX services across Africa.

Urban planning is an enormous challenge for Africa's fast-growing cities. Those exceeding 5 million inhabitants without a central planning department end up with all the challenges of cities that have too many cars on the road and lacking public infrastructure. As a result, finding suitable land is an issue for all types of businesses, including data centre development.

Once you find a suitable location, construction is the next challenge. Importing equipment onto the continent isn't always easy, in part because of the taxes that are applied differently in different markets. You sometimes encounter administrative bodies who are keen to monetize their position, which is of course a big no-no.

On the road ahead, we see further regulation of the sector as a big stumbling block. The more licenses that are required to operate a data centre, the less likely it is that a market will develop a successful industry. Governments can look at the Nordic countries to learn what policies and regulations might work.

Looking at emerging opportunities, with more metro and submarine fibre becoming available, cities are 'unlocked.' Now we need more mobile networks and terrestrial networks, to interconnect the various communication systems.

The tech market continues to go from strength to strength, with more venture capital and private equity becoming available. Now we need to make sure that all this data can circulate on the continent. In the broader market, in markets where fibre is readily available, we see recognition that cloud- and carrier-neutral data centres are central to delivering high speed and high-performance internet services.

Most network operators recognize that it's difficult to be both a network operator and a data centre player, because you cannot own a network and be carrier neutral at the same time. We will continue to see networks and real-estate as separate developments, closely working with investors who are aligned. ■

Looking ahead: A whole new young generation is growing up on the continent, keen to learn and explore and they have the chance to participate in a growing industry, or one of the industries that is powered by the digital economy. There are many exciting new opportunities ahead. We see our interconnection hubs at the heart of the digital economy, enabling communities of interest to develop, and thus creating ecosystems where talent and opportunity meet.

PAIX Data Centres will continue to invest in the African continent, develop our existing markets and expand into new territories. With our investor base from across the continent – Africa50 has as shareholders 29 countries, 2 central banks, and the African Development Bank, a few committed private investors, along with debt funding from the Dutch Good Growth Fund – our ambition is to be present across the African continent, and beyond. PAIX is the heart of Africa's digital economy.

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Our sites

Colocation

Connectivity

News & Insights

Open Access Data Centres (OADC) has been established to transform the provision of data centre services in Africa. As a WIOCC Group company, it leverages strong existing relationships with clients in Africa and well-established delivery capabilities across the continent, together with the proven and long-standing data centre expertise of the OADC Executive team.

The company is implementing a world-class, pan-African, carrier-neutral data centre footprint that will deliver an unparalleled client experience offering expert assistance and support, partnership in tailoring bespoke solutions and leading-edge information systems to support client business decision-making.

OADC is deploying its open-access, Tier III core data centres at major cable landing locations and in key business hubs throughout Africa.

OADC EDGE data centres are being deployed into smaller locations, serving the ongoing need to support service providers in extending network reach and the growing requirement for content storage, processing and delivery at the network edge.

OADC is an environmentally responsible company and as such is pursuing a wide range of environmental and management accreditations.

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About Rack Centre

Colocation service

Connectivity ecosystem

Whitepapers

Rack Centre is the best-connected Carrier and Cloud neutral Tier III constructed facility certified data centre in Africa. Established in 2012, the company focuses solely on providing best-in-class data centre colocation services and free interconnection between carriers and customers. Knowing this gives customers a technically superior, physically more secure, and lower-cost environment for their information systems.

The Carrier and Cloud neutrality advantage allows customers to manage traffic to get better value, lower latency, and higher resilience and creates an open market for partnerships between customers, networks, cloud and content providers, the Internet Exchange Point of Nigeria, and managed service providers.

Rack Centre's clientele includes 57+ telecommunication carriers, Internet Service Providers (ISPs), global Tier 1 networks, and pan Africa international carriers, including direct connections to all five undersea cables serving the South Atlantic Coast of Africa including Equiano, 2Africa and every country on the Atlantic coast of Africa.

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Network

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WIOCC is the leading player in the deployment of carrier-scale, future-proofed network infrastructure into Africa. We have the flexibility and scale to meet the ever-growing demand for reliable, high-speed capacity throughout Africa, driven by end consumers, enterprise users and the ecosystem that supports them.

Our policy of continual investment in our network to create Africa's first, truly hyperscale network infrastructure means ongoing investment for growth, ensuring our readiness to meet the future data volume demands of end users throughout Africa.

Operating exclusively as a wholesaler, we have revolutionised the delivery of high-capacity connectivity between Africa and the rest of the world. Widely recognised as Africa's carriers' carrier, we offer carriers, content providers, cloud operators, ISPs and mobile operators reliable, seamless, high-capacity connectivity between more than 30 African countries and key global financial and commercial centres.

Our focus on building and maintaining strong, long-term relationships with each client enables us to develop bespoke solutions that meet their current requirements and have the capability to match future demands for growth, extra resilience and geographical expansion.

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Mining

Fleet management

Public Safety

Agriculture

Mobile Mark is a leading supplier of innovative, high performance antennas to wireless companies across the globe. We've been in the wireless industry for over 30 years and have our roots in the early Cellular trials. We have grown and evolved over the years, along with the industry. Today, we benefit from enhanced design capabilities and expanded production capacity – along with a greater understanding of new and emerging markets – all of which have allowed us to become one of the best antenna developers in our field. Our customers have been our partners throughout the years. We believe in taking the time to understand our customers' individual needs. Through close consultation with clients, we are able to deliver innovative, tailored solutions that meet specific antenna requirements. Rapid prototyping capabilities allow us to take our designs from concept to reality in an extremely short time span, and to verify the performance of the antenna. Mobile Mark antennas are used in many sectors of the wireless industry. Here are just a few examples:

- Emergency services
- Commercial fleet management
- Public transport & bus management
- Smart cities & smart highways
- Remote monitoring & surveillance
- Mining & exploration
- Asset tracking & RFID