



Datacentre Infrastructure insight and market forecast in Nigeria

December 2016



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Executive summary

In 2015, ICT spend in Nigeria was about \$12.7 billion and is expected to grow at compound annual growth rate (CAGR) of about 7% through to 2020. The ICT landscape is in the infrastructure-build phase with significant investments in hardware and software. The services market is nascent, however it is expected to grow in the long term.

ICT in Nigeria is growing in leaps and bounds as individuals and organizations are increasingly leveraging ICT to address daily needs of communication, entertainment, education, financial transactions, and security and so on. As such, for individuals, demand for improved connectivity has increased and for businesses, demand for secured connectivity to access enterprise applications or services to improve efficiency of business process, reduce operating cost and increase overall profitability is driving ICT growth.

One ICT infrastructure that has recently driven both local and international investments in Nigeria is the Datacenter. Datacenters in Nigeria have transformed over the years and have grown to become critical IT infrastructures to enable business profitability. Datacenter infrastructure growth in the country has been driven by increased ICT market maturity, in 2015 for example, datacenter spend on hardware accounted for about 66% of total IT hardware spend and also in the same year, investments in infrastructure software accounted for about 45% of total IT software spend.

However, growth in datacenter has been limited to some verticals i.e., telecoms and IT, banking, financial services and insurance (BSFI) and Oil & Gas. There has been a sustained growth in demand for hosting and collocation services, business continuity and disaster recovery (BC/DR) and cloud service as organizations implement latest technologies to drive operations. *In 2015, total datacenter IT spend was about \$930 million i.e., servers \$65 million, storage \$40 million, networking equipment \$700 million and infrastructure software \$125m. A compound annual growth rate of 8% is expected through 2020.* Leading vendors include Cisco, HP, IBM, EMC, NetApp and so on.

Poor connectivity, lack of steady power supply, low availability of IT skill set, depreciation of the Naira (N) are all major inhibitors to the growth of datacenters in Nigeria. *In the short to medium term, we expect continued investment into datacenter roll out projects, however in the longer term, the need to run reliable and efficient datacenters will become critical and will take center stage.*

Synopsis

This report focuses on the datacenter infrastructure market in Nigeria. The insights in the report highlight the emerging datacenter trends in the country, drivers and inhibitors to investments and general adoption trends by enterprises across key verticals. The report is an

expose on the current state of the datacenter infrastructure and concludes by predicting future market trends based on user behavior and market forces.

Datacenter market overview

The maturing ICT landscape in Nigeria is driving more investments in IT infrastructure to support the growing digital economy and digital transformation agendas in organizations. The telecommunications industry, central bank regulations in the banking industry, the increased need for cyber security in the Oil & Gas industry and the increasing need for storage in the Nollywood industry all position Nigeria as a key investment location for datacenter infrastructure.

Organizations are expanding operations from server rooms to standard certified datacenter facilities to support business processes, increase agility and also improve efficiency. The banking industry for instance; driven majorly by regulations from the central bank of Nigeria (CBN) is a leader in ICT implementation in the country. The cashless economy policy by the CBN, which necessitated the need for cashless transactions has driven the growth in ATM machines, POS terminals and also mobile banking platforms. The rise in ecommerce services, pioneered by vendors like DEALDEY, KONGA and JUMAI have also driven the need to support fast and easy transactions using bank cards and POS machines and mobile applications. These disruptions in payment methods and the need for customer database synchronization across all platforms in the banking sector have been drivers for increased investment in IT solutions to enable excellent user experience.

The maturity in the Nigerian telecommunications market has also driven significant investment into IT infrastructure especially in datacenters. There are over 100 million mobile subscribers in Nigeria and a large proportion of these subscribers are trying to maximize mobile data connectivity to access online music, video and other digital content. With growing demand for mobile data services, it is imperative that operators are able to support subscribers with excellent user experience through seamless access to content. Also the availability of increased bandwidth from four international submarine cables (MTN WASC, Glo 1, MainOne cable and ACE cable) have also enabled the growth in datacenter services in Nigeria.

In 2015, total datacenter IT spend is about \$930 million i.e., servers \$65 million, storage \$40 million, networking equipment \$700 and infrastructure software \$125m. A CAGR of about 8% is expected through 2020. Investments in business continuity/disaster recovery (BC/DR) are driving a significant portion of datacenter IT spend as businesses increase online presence and also seek to guarantee limited service disruption. Datacenter investments are mainly driven by the Oil & Gas, BFSI and telecoms vertical. Government's promotion of the use of ICT through egovernment platforms is expected to increase government investments in datacenter infrastructure also.

Datacenter Market Trends in Nigeria

Datacenter availability and Trends

Nigeria is experiencing increased growth in datacenter deployments mostly in Lagos, Abuja and Port Harcourt. Highest investments into datacenter deployments have been made by 3rd party datacenter providers who offer hosted infrastructure services and public cloud offerings. In the last five years, five tier 3 datacenters have been launched in Lagos. These datacenters are owned by MTN, Globacom, MainOne, Rack center and the Computer Warehouse group. They all have solid financial backing from investors and believe the market is ready.

Recently, CBN regulations stipulated that banks needed to acquire tier 3 datacenter certification by the end of 2016, however it appears that the financial constraints for such infrastructure type is inhibiting compliance by most banks, even among leading banks in the country. Organizations in the Oil & Gas vertical have also made investments in datacenters to upgrade IT infrastructure and support business processes. Oil & Gas firms have large IT budget, therefore are able to fund such IT infrastructure deployments.

Telecommunications companies (telco) in Nigeria have at least one data center in Lagos or Abuja to support growth in customer base and increase agility. Due to past investments in datacenter by telcos, there has been about a 50% decline in investments in storage infrastructure from about \$10M in 2013 to \$5M in 2015 as most telcos have invested in building datacenter capacity. However, we expect spending in storage to relatively gain traction in 2017/2018 and this will be driven by storage refresh cycles and potential capacity expansions. We also expect compute investment to gradually gain traction during the same period. Key original equipment manufacturers (OEM) in the telco vertical for high-end storage technologies are EMC, IBM, or Huawei. For mid-range and entry level storage technology, EMC and HP are the preferred OEMs. HP is a market leader when it comes to x86 servers, while IBM is the preferred OEM for non-x86 servers.

Adoption of converged systems is yet to gain ground, although in the long term we expect a gradual migration from traditional silos to converged infrastructure. Moreover, initial investments to migrate legacy systems to converged systems, including the skills set required for such migration are inhibitors. A high percentage of datacenters in Nigeria deploy HVAC cooling systems but chiller systems are not widely implemented, basically due to cost constraints. Therefore, chiller systems have been mostly deployed by 3rd party datacenter providers that have the budget to fund such implementation.

Traditional vs Prefabricated/Modular Data center

Prefabricated/Modular Data center solutions are yet to gain traction in Nigeria because there is a general preference for the traditional brick and mortar data center construction by most enterprises. Vendors like Huawei and IBM in the last two to three years have tried to exploit the market potential of prefabricated/modular data center solutions but acceptability and adoption is still low. A major inhibitor the lack of aggressive marketing and lack of competitive value proposition to support sales pitches. Another key inhibitor is the recent growth in tier 3 datacenter vendors especially in Lagos state, that provide carrier neutral collocation, disaster recovery and cloud services. Therefore, due to economies of scale and potential cost savings, enterprises migrate their workload to these vendors instead of investing in owning a datacenter facility. Although Rack Center, one of the data center providers in Nigeria with Tier 3 certification has deployed a modularized solution.

Private cloud vs Public cloud

Generally, cloud technology is nascent in Nigeria, however we expect growth in adoption as awareness of its cost benefits and last mile connectivity in the country improves. Increased penetration of FTTx services in key cities like Lagos and Abuja will drive adoption of cloud services especially among large enterprises. In the long term we expect that cloud adoption will enable organizations transition to a more 'service oriented' and 'automated IT environment' which is expected to significantly impact decline in capital and operational expenditure (CAPEX and OPEX) on traditional IT infrastructure. Moreover, cloud adoption is expected to enable organizations build more agile IT environments.

In Nigeria, private cloud deployments are mostly implemented in environments where data needs to be accessed by different departments/line of business or from different locations, mostly in the BSFI, telecoms and Oil & Gas vertical. *Although private cloud requires greater financial investment; latency, easier access to data, scalability and flexibility to business and IT processes as well as high IT budget availability drive such implementations. Another driver of private cloud implementation is the security concerns over company data. Organizations prefer to host most mission critical applications and workloads e.g. ERP and CRM, finance applications within their own datacenter environment, while non-transactional workloads are hosted within 3rd party datacenter.*

Software as a service (SaaS) albeit a gradual maturation implementation leads public cloud adoption in Nigeria as organizations leverage the technology to cut cost on productivity tools and non-critical workloads. *Platform as a service (PaaS) and Infrastructure as a service (IaaS) are yet to gain ground in the country due to challenges related to low customer maturity, connectivity, latency concerns and high pricing.*

Datacenter Market Drivers and Inhibitors

Drivers

Enterprises focusing on efficiency and automation

Digital transformation, although in its infant stage in Nigeria is changing the business culture of organizations. Businesses are beginning to leverage new technology like cloud to redesign and implement new processes both for internal capabilities and also to manage client interfacing. Market forces of competition, consumer behavior and demand as well as technological evolution will continue to drive the growth in datacenters in Nigeria. *We expect that organizations continue to increase agility in their IT systems, improve automation and ultimately improve overall efficiency.*

ICT maturity across key verticals

The high adoption of ICT in the telecoms, Oil & Gas, BSFI has significantly driven the growth of data centers in Nigeria. Central bank's regulations in the BFSI sector has been a key driver for investments in datacenters and disaster recovery sites especially in Lagos and Abuja. Nigerian banks are reluctant to host data in 3rd party datacenters within the country due to security concerns, therefore there is preference for building in-house datacenter infrastructures while outsourcing hosting non critical services such as emails to 3rd party providers. The CBN's cashless policy has also been a key driver in investments in datacenters. The increasing growth in adoption of mobile voice and data services is forcing the telcos to invest in datacenter solutions as storage requirements per user grows with service utilization. Telcos like MTN, MainOne and Globacom have also invested in tier-3 datacenters to provide colocation, hosting and cloud services to businesses around the country.

ICT market size and opportunity

Nigeria is relatively one of the most matured ICT markets in Africa and in 2015 was the second largest market in terms of spend (\$12.7 billion), behind South Africa. The market opportunities are limitless both in consumer and business segment. For example, since the turn of the millennium, the mobile voice penetration in Nigeria has risen from less than 1% to about over 100%, from a fixed line provider (NITEL), Nigeria now has five mobile network operators (MNO) i.e. (MTN, Globacom, Airtel, Etisalat and NTEL) and several internet service providers (ISP) providing both voice and data services.

In the consumer segment, a growing youth population with huge appetite for data intensive services, declining mobile data tariff, availability of affordable smartphones and increased investment by telcos in advanced mobile data networks i.e. 3.5G and 4G have driven the growth of the ICT market in Nigeria. Telcos have therefore, upgraded network and IT infrastructure to cope with rising demand for services, create excellent user experience, launch new products and services and also cope with rising subscriber base.

For businesses, the need to increase efficiency, improve productivity and also reduces cost has driven the adoption of latest technology such as machine to machine (M2M), unified communication and collaboration (UC&C), enterprise mobility, cloud and data center services. *The ICT market in Nigeria has created new opportunities across all sectors and also increased investments especially from multinational telcos, IT service providers, OEMs and system integrators.*

Increasing market competition

Competition between telcos and IT service providers have also been a key driver for the growth in datacenter investments in Nigeria. Cut throat competition to gain market share in providing cloud and datacenter services to especially large enterprises have driven investments, such that there are presently five tier 3 datacenters in Nigeria. Key ICT providers like MTN, Globacom, Rack Centre, MainOne etc all have significantly invested in datacenter infrastructure in Lagos and Abuja to meet rising demand for hosting and collocation services.

Inhibitors

High cost of foreign exchange

The recent economic downturn has negatively impacted ICT spend across all verticals. The ICT market in Nigeria is significantly dependent on importation of IT hardware and software, hence the yearlong currency depreciation has affected the purchasing power of most organizations and even government. Low oil prices and declining federal reserves have in no small measure contributed to the increase in exchange rate between the Naira and the Dollar. This time last year (2015), official exchange from the central bank of Nigeria (CBN) was about \$1 = N180, however today as at the time of writing this report, the official exchange rate is about \$1 = N305. Lack of availability of foreign exchange from official sources like the banks and bureau de change have forced organizations to patronize black market forex providers who sell at high prices aiming to leverage the high demand against low supply. As at the time of writing this report parallel market rate is about \$1 = N470. The high forex rates driven by low availability of forex from official sources have limited investment to into ICT infrastructure across the country.

Poor Connectivity

Poor quality of service has been a plague in Nigeria's telecommunication industry. *Although there has been significant progress made in both mobile voice and data penetration rates yet the quality of service to support mission critical services have been less than adequate.* A number have factors ranging from last mile connectivity, vandalization of telecom infrastructure, lack of public power supply have all contributed one way or the other to the poor quality of service experienced by subscribers and businesses in the country.

For instance, Nigeria has under-developed fixed line infrastructure, therefore, last mile connectivity is predominantly wireless through microwave radios. These equipment have demerits which are even amplified when used as backhaul transmission in network

architecture. Firstly, capacity is limited and secondly microwave radios operate on line of sight technology which is affected by path loss that can lead to poor user experience.

Over the years, Telcos and ISPs have invested in building their own fiber networks in key cities across the country, however due to the high capital investments needed to deploy FTTx services, which results in high prices for the services, limited organizations are able to afford fiber connections. Although with the Nigerian Communication Commission (NCC) awarding infraCo licenses to service providers to build fiber networks across seven geographical zones of Nigeria i.e. (Lagos, South West, South East, South South, North West, North East and North Central), we expect pricing of fiber connections to decline as penetration increases. Lagos and North Central have been awarded to MainOne and IHS respectively. We expect other licenses to be awarded by 2017

Vandalization and theft of telecom equipment have also contributed to the poor quality of service experience in the country. There have been series of events of vandalization of fiber cables by disgruntled youths or by heavy machine operators during road construction and also theft of generators from base station sites. These cumulatively contribute to network outages and disruptions. The NCC needs to work closely with the National Assembly to expedite passing the Telecom Infrastructure Bill which is targeted to criminalize vandalism of telecoms infrastructure in Nigeria.

Shortage in ICT expertise

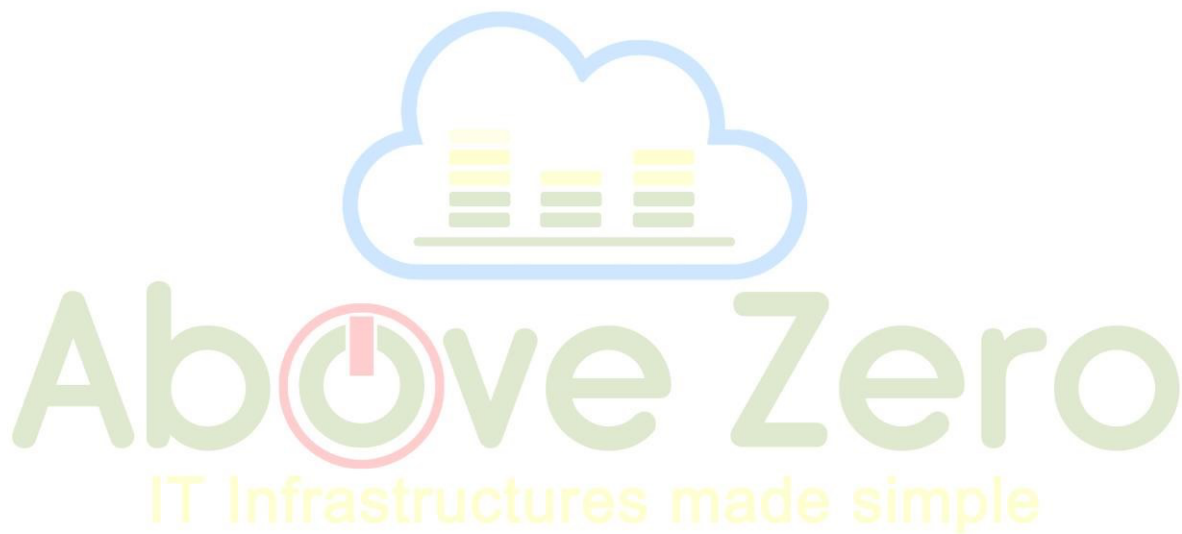
Generally, across the country, there is limited supply of experienced ICT human capital both for telco and IT services. Most skilled human resource are located in Lagos and Abuja and are in limited supply. *This also negatively impacts the bottom lines of service providers as they have to either invest in hiring expatriates or run internal training and vendor certifications to develop ICT skills of staff.*

Lack of reliable power supply

The power supply challenge in Nigeria cannot be overemphasized, the country is practically a fuel/diesel driven economy as all businesses in the country depend heavily on petrol and diesel generators to run operations. Over reliance on alternative source of power significantly contributes to the high cost doing business in Nigeria as maintenance cost increase year on year. Telcos and IT service providers, depend to a large extent on diesel generators to run infrastructure such as base stations and IT equipment therefore huge investment is needed to maintain operational expenditure which negatively impacts overall profitability of providing ICT services. Lack of reliable public power supply limits and inhibits investment into the ICT sector due to profitability concerns. *There have been recent investments into green sources of energy by some ICT providers, however these solutions are not widely adopted.*

Low nationwide ICT maturity

Except for cities like Lagos, Abuja and Port Harcourt, ICT maturity across Nigeria is generally low. Location of most organizations headquarters, the seat of government and the Oil & Gas vertical have been key drivers to high adoption and maturity of ICT in Lagos, Abuja and PH respectively. Other states trail in ICT maturity due to factors like illiteracy, low awareness and lack of ICT budget from state governments. *The National broadband policy aimed at increasing broadband penetration to about 30% across the country by 2018 is expected to drive awareness and increase ICT maturity across the country.*



Future Datacenter trends in Nigeria

Investment into datacenter infrastructure is expected to increase in the short to medium term, however in the long term focus will shift to the need to run an efficient and reliable infrastructure by avoiding wastages especially in cooling and power. *The trend in running effective systems will be a key differentiator for profitability among enterprises. At the moment cooling system accounts for between 50% of a data center's entire energy intake and in most cases energy is wasted due to over cooling, lack of proper air management systems and redundancy. Therefore, we expect that enterprises start to focus on running efficient systems to drive down operating expenditure.*

Also as the market evolves, we expect an increase in deployments of Software Defined Network (SDN) technologies in datacenter environments, which will be driven by the need for enterprises to respond quickly to market dynamics and accelerate time to launch new services. There will be increased implementation of high-performance and scalable datacenter network solutions that will maximize network programmability, agility, and automation.

Lastly, we expect investments into future ready infrastructure such that organizations start to invest to achieve scalability, flexibility and convergence. We expect the BFSI vertical to lead in this adoption trend. We expect flash drives to emerge as the main storage component within converged systems, while increased adoption of converged systems will drive software-defined environments in the long term.



Conclusion

The IT market in Nigeria is developing beyond the infancy stage as organizations increase implementation of IT in day to day business routines for both internal processes and for business transactions. However, market maturity is a long term prospect, therefore we expect steady growth in spend on IT hardware and software applications. At the moment the most matured verticals in the country with respect to IT adoption and implementation are the Oil & Gas, telecommunication and BSFI, we expect these verticals to lead the growth in IT generally across the all verticals.

Furthermore, we expect these verticals to lead with more investments in the long term as businesses seek to expand services or increase capacity to accommodate growing workload requirements. *Growth in datacenter investments will be driven by private cloud investments in the short to medium term while we expect that as connectivity improves and confidence in 3rd party datacenter providers grows, we begin to experience increased implementation of hybrid cloud solutions.*

Although, at the moment there is a decline in government expenditure driven by decline in government revenue in 2015 and 2016, it is expected that government spend on IT infrastructure and services gains traction again from 2017 upwards, as government revenue stabilizes. *We expect investment in datacenter infrastructure to support various e-government initiatives across the nation and synchronization of government database from all government agencies. This present Nigerian government is also driving a diversification agenda to decrease the nation's dependence on crude oil revenue, one of its top vertical of focus is ICT. Therefore, we expect this diversification initiative to lead government's (national and regional) investment in IT infrastructure and ICT empowerment schemes across the country.*

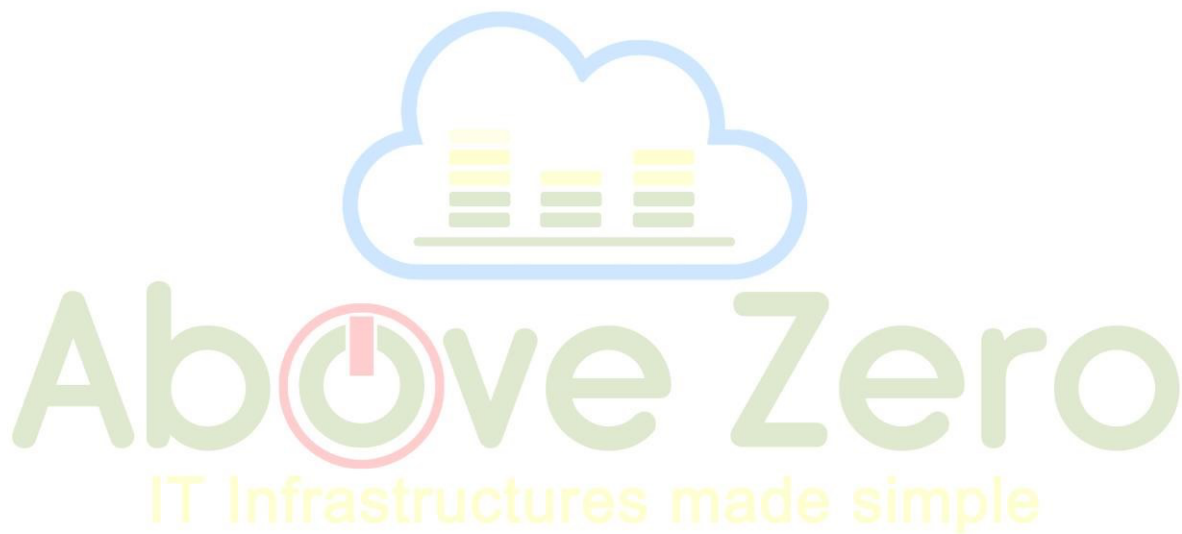
As the Nigerian ICT market matures, we also expect big data analytics to drive increased investments into datacenter services as the need for creating customized and unique experiences increases especially in verticals such as FMCG, ecommerce, BFSI and telecoms. Forces of competition will compel businesses to strive for differentiation in a price sensitive market like Nigeria.

There is a cultural lack of trust in 3rd party data center providers, therefore we also expect growth in the adoption of prefabricated /modular data centers. Huge investment is needed to build traditional datacenters or expand as the case maybe will drive this trend. Adoption of prefabricated /modular data centers is relatively low in the country, therefore OEMs need to focus on value proposition and not the technology. A key approach to driving interest in conversations around prefabricated /modular data centers is to share global successful case studies of well established brands.

Cisco, HP, Huawei, EMC, NetApp, IBM and so on will continue to be leading datacenter OEMs in the country as they have become trusted brands, have in-country offices and have been able to

create relationships with key clients across all verticals. Power will also continue to remain a major inhibitor to datacenter growth in Nigeria, however we expect this challenge to drive growth in green power solutions. Power & energy ecosystem players that seize the first mover advantage will lead the value chain in the long term.

As the telecoms market in Nigeria approaches maturity, with declining profit margins on connectivity solutions, IT services are expected to be the next frontier of growth, with datacenters playing a lead role in service implementation.



Appendix 1: Methodology

This report was developed by drawing on the existing local and international research from Above Zero Limited. The report was also written using secondary information obtained from online sources, including websites of news channels, technology vendors, IT magazines and international authorities and also primary research insights from leading CIOs across verticals in Nigeria i.e. (BFSI, telecoms and IT, Oil & Gas, FMCG, government, education and health. The report aimed at giving a complete view of the datacenter infrastructure landscape in Nigeria.

Appendix 2: Abbreviations

Automated Teller Machine: ATM

Banking, Financial services and Insurance: BFSI

Business Continuity/Disaster Recovery: BC/DR

Capital Expenditure: CAPEX

Central Bank of Nigeria: CBN

Chief Information Officer: CIO

Compound Annual Growth Rate: CAGR

Fast Moving Consumer Goods: FMCG

Fiber to The (Home, Office, etc.): FTTx

Information Technologies: IT

Information and Communications Technologies: ICT

Infrastructure as a service: IaaS

Internet Service Provider: ISP

Machine to Machine: M2M

Mobile Network Operators: MNO

Nigerian Communication Commission: NCC

Operational Expenditure: OPEX

Original Equipment Manufacturer: OEM

Point of Sale: POS

Platform as a service: PaaS



Software as a service: SaaS

Unified Communication and Collaboration: UC&C

