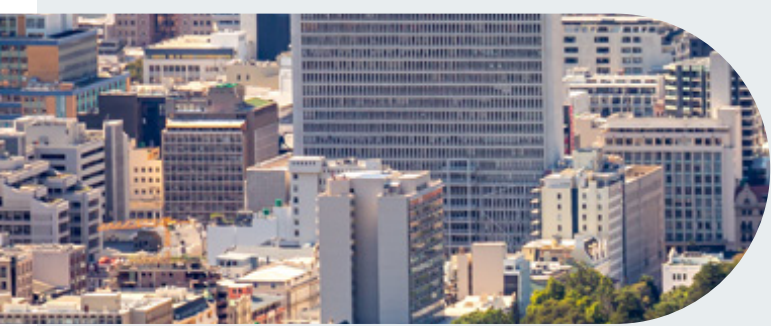




Africa Interconnection Report 2023

The year of the 'big change' for the region's data centre and cloud ecosystem



Research by


balancing act
TELECOMS, INTERNET AND BROADCAST IN AFRICA
AN ASSOCIATION OF COMPANIES OF BALANCING ACT

Sponsored by

 **consoleconnect**

Contents

Introduction	2	3. Drivers of cloud adoption	
<hr/>		3.1 Overview	28
Methodology	3	3.2 Scale at will	30
<hr/>		3.3 Ease of use	31
Executive Summary	5	3.4 Cost savings and efficiencies	32
<hr/>		3.5 Access anywhere	34
1. Update on the data centre and cloud landscape		3.6 Missing arguments	35
1.1 The year of the big roll-out	7	3.7 Drawbacks cited by cloud users	36
1.2 Regional hubs	9	<hr/>	
1.3 Cloud presence expansion – still slow progress	10	4. Taking the workforce “off prem”	
1.4 Green energy – climate change and lower costs	12	4.1 Overview	38
1.5 Growth factors -Things holding it back and pushing it forward	13	4.2 Covid-19 as the catalyst	39
<hr/>		4.3 Home bandwidth issues	40
2. The enterprise view of cloud services		4.4 Other issues	41
2.1 Different types of cloud users	16	<hr/>	
2.2 Barriers to cloud use in Sub-Saharan Africa	20	5. New network considerations	
2.2.1 Overview	20	5.1 Cloud connectivity	43
2.2.2 Connectivity still a key issue	21	5.2 The move to Network-as-a-Service	44
2.2.3 Skills shortage	23	5.3 Console Connect in Sub-Saharan Africa	45
2.2.4 Lack of understanding	24		
2.2.5 Data sovereignty	25		

Introduction

2022/2023 has seen a step-change in the development of the data centre and cloud supply-side for Sub-Saharan Africa increase at an accelerated pace. Unprecedented levels of investment in carrier-neutral data centres were announced last year and this year has seen a big part of that investment realised.

In its continuing mission to understand the pace of development, Console Connect has commissioned a third edition of Africa Interconnection Report from consultancy firm Balancing Act. The company has spoken to a wide range of data centre providers, carriers and those offering cloud services.

The key points from the data centre and cloud landscape are as follows:

- The extraordinary scale of investment in carrier-neutral data centres identified in the second edition of the African Interconnection Report is converting into operating data centres across Africa.
- The majority of capacity is still in South Africa but larger data centres are now being built outside it (for example, in Kenya), changing supply dynamics.
- The number of Sub-Saharan African countries with access to a carrier-neutral data centre have gone from 16 in 2021/2022 to 24 in 2022/2023. Taken together, Nigeria, South Africa and Kenya have both the most installed and planned capacity.
- Cloud expansion from the hyperscalers remains slow. New providers (including Ali Baba and Tencent Cloud) have either come into the market or expanded their presence but most activity is still focused on South Africa.

This third edition updates the data centre and cloud landscape in Sub-Saharan Africa (section 1) and uses the survey of enterprise customers (section 2) carried out last year to emphasise the demand-side of the equation. All of the opportunities and challenges identified by this survey are almost unchanged.

We would like to thank all those people who gave generously of their time during the course of this research and hope that the many insights provided are fully reflected in this report.





Methodology

The methodology for this second edition of African Interconnection Report has two parts: firstly, the update of the supply-side (data centres and cloud services) and secondly, a new focus on the demand-side (users of cloud services).

For the supply-side landscape, interviews were conducted with: all of the major carrier-neutral data centre operators in Sub-Saharan Africa and both the international hyperscalers and local cloud service providers. Balancing Act spoke to just over 50 companies providing data centre and connectivity services for the supply-side update of the report.

For this second edition, Balancing Act felt it was important to focus on those using or dealing with delivery of cloud services to users: in other words, look at demand rather than supply in terms of how people are using cloud services and what they say about them. For whilst the investment in Sub-Saharan data centres is impressive, the 'proof of the pudding' will be in whether companies use the cloud services they host.

Over 100 companies and organisations were interviewed, combining a short, fixed framework questionnaire with a longer conversation to reveal qualitative insights.

Those interviewed provide a mix of larger regional and multi-country companies, smaller online providers, carriers and cloud service providers.

Whilst there is a focus on multi-geography companies and larger markets (South Africa, Nigeria and Kenya) the survey also looks at other countries from medium-size economies like Ghana to places like Central African Republic to establish a cloud 'state of play'.

The sample includes organisations in Fintech, banking, automotive, logistics, transport, advertising and market research, energy, broadcast, international NGOs, hospitality, health, education, music and video streaming, legal, betting, cosmetics, construction, recruitment, retail and chemicals.



Glossary

Some common industry terms used throughout the report:

“On Prem”: On-premises software is installed and runs on computers on the premises of the person or organisation using the software, rather than at a remote facility.

Cloud native: This has two meanings. Firstly, it is software designed to take advantage of the distributed computing offered by the cloud delivery model. Cloud native apps are designed and built to exploit the scale, elasticity, resiliency, and flexibility the cloud provides. Secondly, it describes companies or organisations that started with all their apps on cloud.

Containers (Kubernetes): Kubernetes, also known as K8s, is an open-source system for automating deployment, scaling, and management of containerised applications. It groups containers that make up an application into logical units for easy management and discovery.

Edge computing: It is a distributed computing paradigm that brings computation and data storage closer to the sources of data. This is expected to improve response times and save bandwidth.

FTTH/FTTX: Fibre-To-The-Home and Fibre-To-The-X, meaning other premises like offices and hotels and/or making fibre accessible to those premises.

Hybrid: This describes both an organisation or company that has either a mix of “On Prem” and cloud or a mixture of different types or providers of cloud services.

Hyperscalers: This term stems from hyperscale computing, which is an agile method of processing data. Depending on data traffic, scale can quickly go up or down. Hyperscalers have taken this computing method and applied it to data centres and the cloud to accommodate fluctuating demand.



Executive Summary



- Somewhere between US\$5-6 billion will be invested in carrier neutral data centres in Africa over the next 3-5 years. This inflow of investment has both consolidated the carrier-neutral data centre sector and internationalised it. Three of the big players who have come to the continent – Digital Realty, Equinix and Vantage – all have international networks of data centres across the globe.
- The number of existing carrier neutral data centres has increased from 20 to 50 and the number planned from 15 to 68. However, whilst South Africa has now exceeded the 100 MW milestone, other countries are either in the tens or single figures.
- The arrival of Google's Equiano cable and the A2Africa cable is accelerating two things: the availability of considerable amounts of new bandwidth capacity at what is promised to be lower prices and the roll-out of carrier neutral data centres in new countries. These two things are linked as those behind both cables favour a more open approach to the sale of bandwidth and the building of carrier-neutral data centre ecosystems. In addition, more capacity is being delivered by the Metis and Peace cables.
- Whilst the amount publicly committed to the building of carrier neutral data centres has ramped up considerably since the first edition of this report, parallel investment in the delivery of new cloud services has not seemed to follow. It may be that the Covid-19 pandemic has delayed it.
- Of the top five barriers identified by survey respondents, three are about bandwidth: its cost, reliability and speed. The other two key barriers are lack of knowledge and skills and low levels of management awareness and understanding. This emphasis is reinforced in section 4 with some of the difficulties mentioned in providing domestic internet connections for home working.
- The five key arguments for cloud services that enterprise users in this survey found compelling were: the combination of scaling at will and therefore speed of response; the ease of setting up services (from scratch) and the wide range of 'off-the-shelf' tools to be able to do it; the need for efficiencies and wanting cost-savings; access from anywhere on different devices; and affordability of these services.
- The result of Covid-19 lockdowns has been a massive push to move company activities online and into the cloud and for more employees to familiarise themselves with working using the internet. All bandwidth providers we have spoken to over the last two years report considerable increases in the amount of bandwidth used by both companies and individuals.
- This catalyst has had to face two challenges. The first of these had nothing to do with technology but was about employees having to change their behaviours. The second challenge was delivering home connectivity in some (but not all) countries.

1. Covid-19 and the **year of the “big change”**

An update on Sub-Saharan Africa's data centre and cloud landscape





1.1 The year of the big roll-out

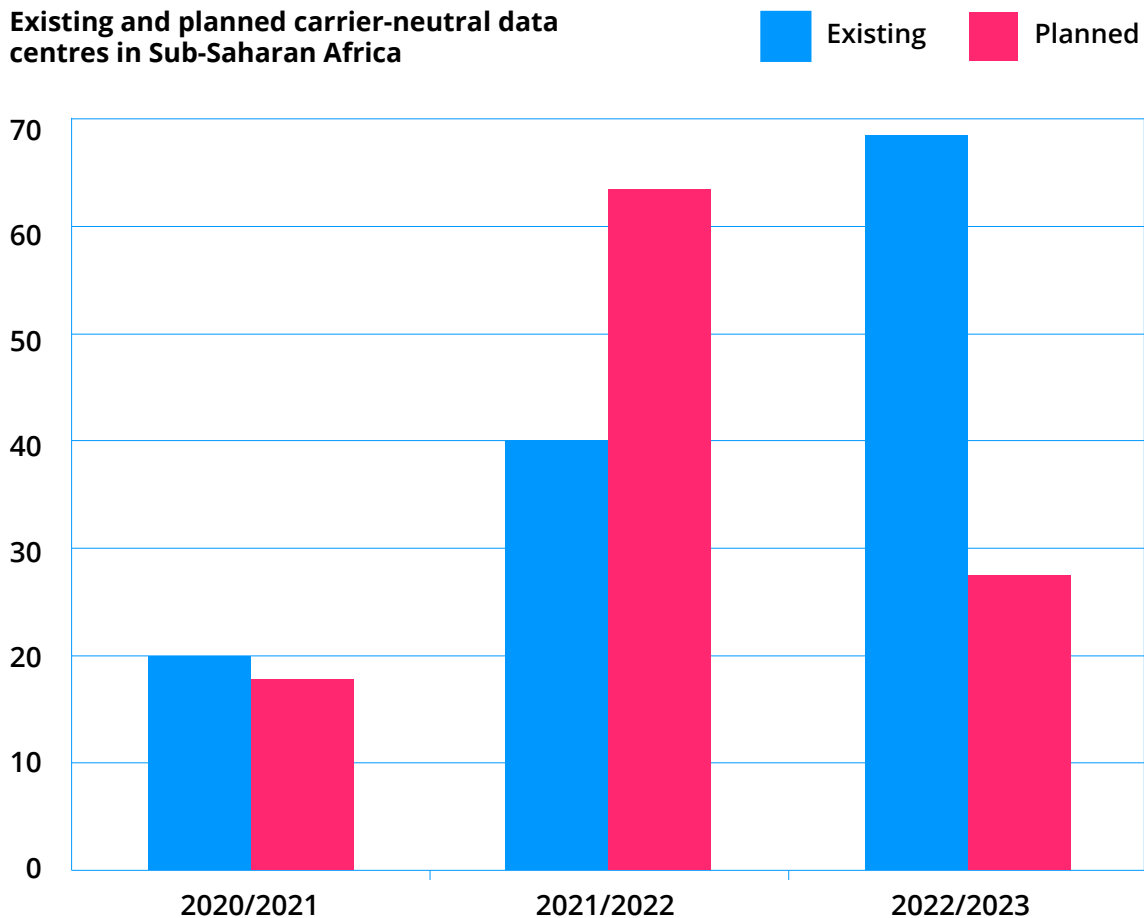
In the last edition of Africa Interconnection Report, Balancing Act identified around US\$6 billion of announced investment in data centres. In descending order, these commitments were as follows: Vantage (US\$1 billion), Africa Data Centres (US\$500 million), WIOCC's Open Access Data Centres (US\$500 million) and Colo West (US\$259 million).

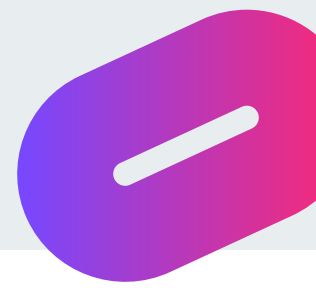
The table below shows the pattern of growth of over three years, with number of opened carrier-neutral data centres. The quantity opened in a year has gone up from 20 new ones to 27. However, some of these openings have been with a modest 1-1.5MW, pushing the full development of larger capacities into the future.

Not surprisingly, most of the built capacity is in the top ten Sub-Saharan countries by GDP. Based on IMF data these are in descending order: Nigeria, South Africa, Ethiopia, Kenya, Angola, Tanzania, Cote d'Ivoire, Ghana, DRC and Uganda.

45 out of 67 existing data centres are in these top 10 countries and also 20 out of the 27 planned data centres. The civil war in Sudan means that there has been no infrastructure progress there since April 2023.

Existing and planned carrier-neutral data centres in Sub-Saharan Africa





The drop in planned data centres is partly because a number of them have now been built but also because a slightly tougher definition has been adopted for planned projects. So in the planned column for this report we have tried to exclude broad generic plans and only include those where location, land and design is underway. Also, for the larger players more speculative plans remain confidential.

One major player announced with much fanfare that it was opening in a particular country in spring 2023 but there has been little sign yet of the build taking place. As one industry player said: "These kinds of announcements are very dangerous for the reputation of the industry." This does not mean that more ambitious plans are not being worked on. In the medium to long term, PAIX wants to expand to 28 Sub-Saharan African countries. Another has plans for more countries once it has established its presence in its first country.

The number of carrier-neutral data centres operating is only part of the story. South Africa still has well over 90% of the installed capacity in the region. But it will be interesting to see when IX Africa's potential 18 MW – designed to attract hyperscalers - is complete, whether the supply dynamic changes. In a sign of the times for South Africa, Digital Parks is developing a new site in Midrand for entry-level enterprise customers. This type of demand has been growing because of power outage issues for enterprises with 'on premises' facilities.

As the number of built data centres grows, there are increasingly geographic clusters of them to increase effective interconnection. For example, in Midrand there will be four data centres of some scale (including Africa Data Centres, NTT, Digital Realty and another planned facility) all within 2 kilometres of each other. Not surprisingly, they are all sited

between the edges of the Johannesburg and Tshwane power grids. Landing stations are also providing another of these kinds of geographic 'pulls'. PAIX's Senegal site is 1.2 kilometres from the 2Africa landing station and close to the ACE cable landing station. As one industry player said: "It's important that data centres are close to each other but also have diverse sources of both power and connectivity."

The number of countries that now have access to a carrier-neutral data centre has gone from 16 in 2020/2021 to 24 in 2022/2023. It should be noted that the capacity in a number of these countries is very small, with one having only 80 racks. Again, taken together, Nigeria, South Africa and Kenya have most of the installed capacity. The contrast in installed capacity between Kenya (53 million people) and Tanzania (63.6 million) based on population is instructive.

In the overall data centre landscape, there continues to be a steady stream of externally financed Government data centres and these may face maintenance issues once the contractors leave. Mobile operators have been very circumspect about whether they will take part in creating their own data centres. Orange is still talking about doing its own data centres where it makes financial sense. Interestingly, Airtel has its own, partly separately financed data centre company in India, Nxtra, a JV between Airtel and Carlyle Group. It already operates 120 data centres in India. It has announced plans to "also serve the APAC and the Middle East region because the scale that we have in India is not present in these regions."¹ Will it bring this offer to Sub-Saharan Africa in the medium term?

¹ <https://www.lightreading.com/services/india-s-airtel-nxtra-to-double-capacity-by-2025-to-increase-market-share>

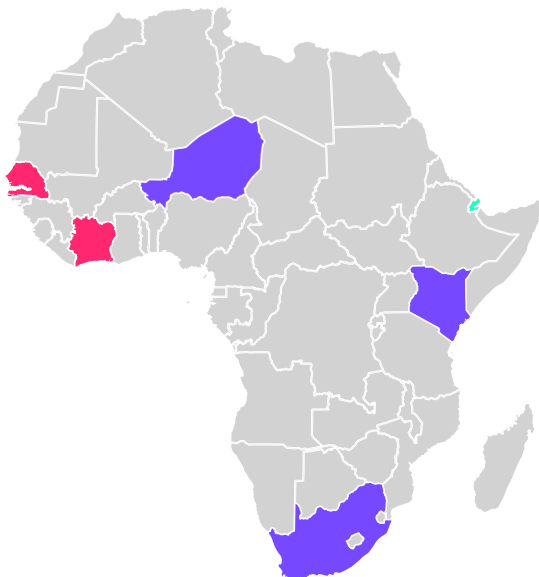


1.2 Regional hubs

This inflow of investment has both consolidated and expanded. There are now three clear regional hubs, in descending order: South Africa (19 existing and planned), Nigeria (14 existing and planned) and Kenya (9 existing and planned). The contrast between Nigeria and Kenya's positions is illuminating. Kenya is a much smaller economy but has a much stronger pattern of regional connectivity. This means it has access to the East African Community's 300 million population.

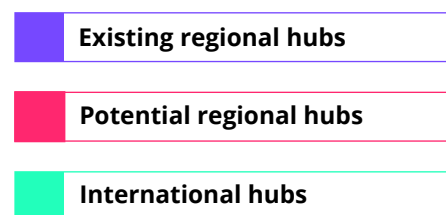
By contrast, the investment in Nigeria is almost entirely about the scale of its domestic economy rather than its current terrestrial connections to its neighbours. However, with falling international subsea cable prices it can effectively service a great deal of West Africa along the coast.

Map indicating potential regional hubs



Nevertheless, South Africa remains dominant. According to Telegeography: "Intra-Africa capacity within sub-Saharan Africa being serviced from South Africa has exploded between 2016 and 2022, with compound growth of over 50% per annum, with South Africa entrenching its position as the content hub for Africa. Teraco is serving 26 African countries, and as the demand for reliable and scalable digital infrastructure continues to surge, we remain committed to supporting these providers in expanding their presence across the region," said Michele McCann, Head of Platforms at Teraco.

Therefore, does there remain potential for other regional hubs? The possibilities are fewer and the view taken must be more pessimistic. As noted above, Sudan is in a civil war and Ethiopia has only narrowly avoided one. The more peaceful Djibouti can play a more regional role if it chooses to. In a logical world, Francophone Africa would be serviced from neighbouring countries but it has always been different. So if there is a potential regional hub for Francophone Africa, it remains either Côte d'Ivoire or Senegal.



Source: Balancing Act



1.3 Cloud presence expansion – still slow progress

The expansion of cloud services outside South Africa into the rest of Sub-Saharan Africa is still best summed up by the Nigerian phrase ‘soon come’. In the last report, it was Covid-19 that accounted for the delay and this year it feels like the major ripples from ChatGPT, AI and machine learning have diverted hyperscaler attention away from the continent.

As PAIX told us: “It’s still five years behind with a lot of the players still studying it. But part of the issue may be perception that they can service the rest of Sub-Saharan Africa from South Africa. There’s still a lot of cloud providers in South Africa who think West Africa can be part of the Southern Africa region.”

Equinix reports that: “We are constantly in discussion with our customers, including

the hyperscalers, about their expanding country footprints and this is a major factor in determining our expansion strategy. We are seeing interest from hyperscalers in working with us in Sub-Saharan Africa.”

Africa IX has strong hopes of attracting major hyperscaler presence: “We want to get the hyperscalers to come to Kenya. We are not there yet. There are no service availability zones. It will start in 2024. The lack of availability of a large-scale data centre has held them back.” Raxio also named next year as the date: “Yes, we are in active discussions with several of them. We expect first presence in our data centres during the course of 2024.”

On the demand side, the SoftwareOne 2023 cloud report said that the cloud computing market in South Africa will have a projected compound annual growth rate (CAGR) of 22.5% between 2022 to 2027.

Summary of recent hyperscaler activities in Sub-Saharan Africa:

Microsoft: It is offering cloud regions in Cape Town and Johannesburg from its enterprise-grade servers in those locations. It also has a significant presence in one of Lagos’ major data centres. Microsoft has a small presence in Angola in Angonap (10-12 racks) for Office365 but no cloud presence. Liquid Intelligent Technologies has partnered with wingu.africa to introduce the second Azure Hyperconverged Infrastructure (HCI) stack, after rolling out it out in Zambia.



AWS: The AWS Africa (Cape Town) region is operating an offering of 132 of AWS’s extensive list of services. It has opened a local office in Lagos but not yet rolled out its services from there. It has also been running a Get Certified Sub-Saharan Africa Challenge.



Huawei Cloud: A Gartner report named Huawei as the number three cloud player in South Africa and it has publicised the achievement of 30,000 concurrent users at UNISA, writing exams at the same time. It has built a significant base of public service customers but also has attracted private sector users.



Google Cloud: In October 2022, Nitin Gajria, Managing Director, Google Sub-Saharan Africa wrote in a company blog that South Africa would be its first cloud region on the continent. There are rumours of a forthcoming announcement but nothing confirmed. Meanwhile it has been working, providing services in a number of countries. Google's head of communications and public affairs for Africa, Dorothy Ooko, told Semafor Africa the company is hiring engineers, designers and researchers to work in its product development center in Nairobi which was announced in April 2022 and is the company's first center of its kind in Africa.

Other: Both Alibaba Cloud (with BCX) and Tencent Cloud have announced that they will have their services available in South Africa. IBM Cloud and Oracle Cloud also have South Africa as cloud region. IBM has publicised its work with continental banks (like Ecobank) on hybrid cloud.

On a wider front, it's worth noting that Akami – which has a wide number of points of presence across Sub-Saharan Africa – has purchased Linode which offers both cloud and caching services.



1.4 Green energy – climate change and lower costs

Kenyan President Ruto's Climate Summit in Nairobi in September 2023 signalled that African Governments are making the lowering of the continent's carbon footprint a political goal. This sets a broader policy framework for the industry but also pragmatically, it needs to find ways of lowering energy costs as a business objective.

Given that the estimated capital costs of meeting Sub-Saharan Africa's overall energy costs runs into billions of dollars, Table 2 below shows that current commitments are rather modest. For example, Kenya's Lake Turkana Wind Project cost US\$680 million to build. Serious commitments largely tail off after the first three countries. Gabon, which is not among the top 10 countries by GDP, has committed US\$179 million but currently has no carrier neutral data centre.

Committed renewable energy investment for Top 10 Sub-Saharan African countries by GDP only

South Africa:	US\$573 million
Cote d'Ivoire:	US\$282 million
Nigeria:	US\$280 million
Kenya	US\$191 million
Ghana	US\$79 million

In terms of renewable energy, Kenya is the current leader with 93% of its energy (see table on next column) from renewable sources, including geothermal, hydroelectric and wind. One Kenyan data centre operator has even modified its generators to use bio-diesel. The attractions of Kenyan green power are two-fold: they are well on their way to meeting

energy climate change objectives and in the longer-run power prices should stay lower compared to other sources. Furthermore, Kenya is sufficiently close to parts of the Middle East (with the necessary fibre connections) to take on certain processing tasks with high operational overheads. At lesser level, 61% of Ghana's power (in 2021) came from geothermal and many African countries have unexploited geothermal power sources.

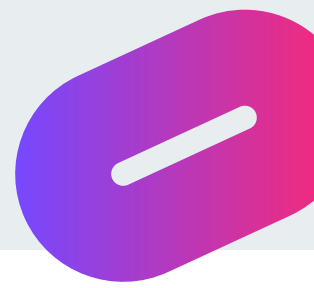
Renewable energy as a percentage of total energy for Top 10 Sub-Saharan African countries by GDP only (High performers only)

Ethiopia	100%
DRC	98.9%
Uganda	97.7%
Kenya	93%
Angola	71.9%

Finally, the table below shows the countries that already have significant installed wind capacity:

South Africa:	US\$573 million
Cote d'Ivoire:	US\$282 million
Nigeria:	US\$280 million
Kenya	US\$191 million
Ghana	US\$79 million

Increasingly, data centres will need to look to sourcing renewable energy both as a necessary business objective and a desirable policy outcome.



1.5 Growth factors - Things holding it back and pushing it forward

For the next annual round of growth, there are a number of drag factors but also some potentially very exciting positives.

Negatives

Four drag factors held over from previous years are: the global lack of cloud-related skills, the continuing lack of clarity in many countries over data sovereignty, continuing monopoly practices for connectivity to data centres and for many countries, the lack of multiple national, international and regional connections to provide redundancy for cable cuts.

The big uncertainty are the economic prospects for Sub-Saharan African countries. For many African countries (Angola and Nigeria are two of the larger examples), current and future economic problems translate into currency issues. Buying a cloud service in US dollars when a national currency is weakening will be a disincentive to making an enterprise cloud transition. It also means that build costs can be higher than first anticipated. Local operators in the more vulnerable economies will delay expansion.

South Africa is no exception. The Business Confidence Index is still going the wrong way and there is still not enough economic growth. Again, as one operator told us, this has a delaying effect on cloud transition investment: "Companies

are postponing decisions with long-term implications. But there have been companies that have been forced into cloud adoption by their competitors after delaying for over 5 years. There's also political uncertainty with elections only one year away."

South Africa is also lumbering under the burden of its energy provision failures, which have led to the current pattern of outages. The Government has promised that the position will improve by the end of 2024 but there is still some scepticism in the industry. This has led some data centre operators to have their own quite aggressive plans for self-generation capacity.

The skills and capacity of many countries' construction industries has been tested by the scale of the roll-out of data centres. One data centre company currently has six sites under construction. Announced dates are often missed. As one frustrated data centre operator said: "The construction industry in Africa needs help and to learn discipline. It has slowed down the pace of expansion and will affect future plans."

In some places, negatives have become positives. One hyperscaler was looking to expand into Kenya but was baulking at the 30% local ownership requirement. However, this obligation was removed in July 2023.



Positives

The industry is maturing. South Africa's Teraco is now 15 years old and the two original data centres in Nigeria (MDX-I and Rack Centre) are over 10 years old. Recently, Teraco celebrated the 10th anniversary of NAPAfrica, the continent's largest internet exchange point (IXP). In 2014, NAPAfrica had 77 members and reached 1Gbps in traffic volumes. Today, NAPAfrica has grown to become the continent's largest IXP and the seventh globally by number of member connections, with peering throughput of almost 3Tbps and more than 560 members. Increasingly, data centres are opening IXPs, MDX-I (Lagos) and PAIX (Ghana) are among the announcements.

With the arrival of the Equiano and 2Africa international cables, the cost of international connectivity will continue to come down for Sub-Saharan African countries. These price falls are accompanied by much less dramatic falls in domestic connectivity and there are in-country network blind spots and lack of sufficient back-up capacity in some countries. A significant amount of the two new international fibre cables' capacity has already been sold and any hyperscaler presences outside South Africa will drive further high levels of growth. So the question when will the next international cable projects start to be planned?

However, carriers are still making significant regional and in-country investments. For example, MTN's Bayobab is developing three east to west fibre cables. Liquid Intelligent Technologies announced the launch of two new fully redundant terrestrial routes – Kenya to

Ethiopia and Zambia to Malawi. For countries like DRC and Ethiopia, data centre build-out and network expansion has gone hand-in-hand. DRC has two data centres currently being built and Ethiopia has two existing facilities and a further one planned.

In a move that may set a pattern for the future, PAIX is opening a data centre in Kigali (2MW) at the request of one of its customers in Africa Innovation City, which is also being invested in by its key shareholder Africa 50.

There are two areas of activity – edge computing and AI and machine learning – that will drive future growth. One data centre operator has emphasised edge computing and this will increase the need for capacity closer to its customers.

But the real bombshell has been the arrival of ChatGPT which has seemed to push the AI discussion forward in all senses. Many Africa enterprises will be looking at how to use the range of AI and machine learning tools available and will require more data centre capacity to do it: banks are the obvious early customers.

In a sign of the times, Cassava Technologies announced a partnership with Atlas AI, "an Artificial Intelligence (AI) analytics platform, aimed at maximising the positive impact of connectivity and digital services across Africa, using data-driven insights to accelerate digital transformation and economic growth."

2. The enterprise view of cloud services





2.1 Different types of cloud users

The survey sample reflects the three main choices available to enterprise users: 'on prem', hybrid (a mixture of 'on prem' and cloud) and cloud use. Placing companies in these categories is based on them having major operational activities in the cloud (for example, ERP or CRM) and not simply on them making use of cloud support services like Dropbox and Zoom.

Cloud migration status of survey respondents



Majority of operations in the cloud (60%)

Hybrid (21%)

Majority still on premises (19%)

The survey aimed to try and understand how Sub-Saharan African users of enterprise cloud services see them and therefore the majority of those in the sample fell into the majority cloud use category. However, those still with the majority 'on prem' and hybrid user form a significant minority of the sample.

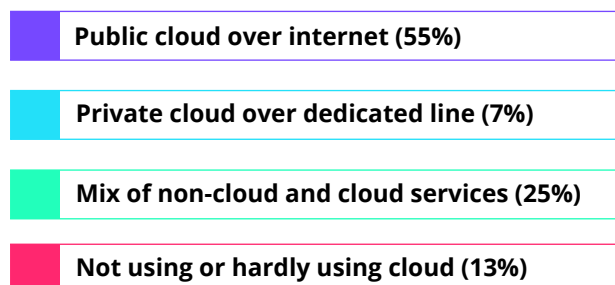
As section 4 on homeworking highlights Covid-19 lockdowns provided an external dynamic for moving operations to the cloud and the number of hybrid users in the market has undoubtedly increased. Getting from hybrid to majority cloud use is difficult even for those companies in the vanguard of these changes.

A local cloud services provider in the continent's most developed cloud market observed: "Financial services companies are often stuck in the 'hybrid movie', keeping both 'on prem' and cloud. They can't work out where the value is and are hoping someone else will give them the answer. There's a fear of the unknown and you hedge your bets on everything. The IT guys don't understand it well enough to cost it and the business guys just think an international cloud provider's services just work from the start."



Most of the discussion in this report is about users of the public cloud but among survey respondents, as the pie chart below shows, there is a minority using a private cloud over a dedicated line.

How survey respondents are accessing the cloud



The overwhelming majority of survey respondents said that they had some form of cloud strategy but those simply expressing interest in cloud services were excluded from this category (roughly 20% of all respondents).

2.1.1 Cost, quality and trust worriers

The African tech environment contains a number of risks for those who might contemplate moving to cloud services. Enterprise bandwidth is sold at a premium even in the context of what are often high prices by global comparison in some, less

competitive countries. As a result, installing redundant connections for cloud services increases the price for the user significantly even in competitive markets. Even though a premium is paid for enterprise connection, the reality in many countries is that significant periods of downtime are accepted.

For the local owner or IT Manager the risks of illegal access to the company's data are ever-present and in their perception, being able to see where data is actually stored and physically accessed provides a level of comfort.

Even though the majority of 'data break-ins' are either made 'on prem' or externally because of inadequate cyber-protection, there is a sense in which these companies like to be able to see the server that their data is stored.

A private health provider in Uganda, whilst wanting to move to the cloud himself, acknowledged this mind-set: "People are not yet secure with cloud services. They feel more secure with on premises."

Likewise, a telco in Zimbabwe emphasises the same point: "We don't use it that much. Most of our applications are hosted on site in our own data centre."

The cost of the cloud services themselves still is seen as too high, particularly if payments have to be made in an international currency like the US dollar.

One interviewee told us it feared that the 'offer' prices for cloud services were designed to be low to hook companies into a position that they could not get out of once a transition had been made.

"We have our own platform and store our content in our own premises. Some people prefer to see racks they can touch.

A broadcast services provider in South Africa



What a music streamer in Kenya told us captures this position: “No, we don’t have a cloud strategy or a plan for cloud. The cost element is still too high.”

Nevertheless, it still might begin the journey in a small way: “We might move more data-based services like customer notification and advertising analytics but I’m not sure we’ll move our core system.”

2.1.2 The “legacy trap”

A major argument for using cloud services is that it allows those spending on CAPEX to support ‘on prem’ services to transition to a monthly OPEX sum.

But it follows that the greater the level of recent investment already made, the harder it is to get the financial arguments to work. As a result, even companies that have committed themselves to move to the cloud may take a number of years to get started on the process.

There is a “legacy trap” that makes it difficult for companies that have started with their own software apps and ‘on-prem’ hardware.

“The last time we looked at ‘lift and shift’ it was going to be too costly. We would need to modernise the apps and consider a larger cloud deployment. It was many magnitudes more expensive. On the basis of features and functionality, it would have worked but cost was the biggest factor.”

An automotive services provider in South Africa

2.1.3 On a journey

For large or medium-sized enterprises making the transition to cloud services, most interviewees describe it as being on a journey. Often they start by taking some activity that can be moved relatively easily like interactions with customers to provide customer self-service. Wary senior management and IT Managers may insist on ‘testing’ the viability of cloud services in this way.

The lack of a local cloud presence has deterred some. A bank in South Africa delayed the move for precisely this reason: “A lot of our cloud transition has only taken place in the last two years because there has been a lot of waiting for a local cloud presence.”

Often the first steps can be taken in the smallest of ways. A South African construction company described how it converted one director: “The Director’s secretary would put his message into email as a written response. We gave him an iPhone because he needed it to see his grandchildren’s pictures on Facebook...He then asked us to put email on his phone and he has become ‘mobile first’ because it’s the only thing he needs in the office or on-site. High levels of tech innovation are driven by things like that.”

A South African bank told us that it needed to establish trust levels, both operationally and financially: “We have had a few good successes and that means trust levels are up...Substituting OPEX for CAPEX is a very different mind-set.”

This cautious approach to the transition often has a good logic. A chemicals company in South Africa was very clear: “I don’t want to be the pioneer. I want other people to go through the pain so I’m going to wait and see with the other implementations.”

It was something also a local cloud provider in Kenya had observed: “There’s still the traditional way of doing things. The natural instinct is for

Managers and IT guys to say ‘let’s go and buy



a server,' particularly among the smaller guys. There's more awareness among the larger enterprises. But a lot of enterprises are still trading carefully. They're testing using an app and are not cloud-ready yet. A lot comes down to whether the apps are cloud ready. "

"Bigger app vendors dictate the pace of change. Companies like Microsoft are moving customers to cloud versions of their most popular software."

A local cloud provider in Kenya

Another external driver for the transition to cloud is foreign ownership of companies. An energy company in Nigeria told us: "The initiatives for cloud are coming from the centre, the corporate offices in (Europe)."

The contrast between local owners and international companies is also emphasised in an insight from a local cloud provider in Kenya: "The education of the private sector is not very high. They are not aware of cloud possibilities. I was once asked: why are you shifting to the cloud? With the current infrastructure a lot of companies are on the cloud just for administration purposes...We get a lot of customers who are foreign companies who have opened a local entity. It's easier to provide services to them. They're less worried by cloud than local companies. They already have cloud experience."

The companies that make a successful transition journey have largely gone through the education process required to understand what can be achieved.

According to an agricultural supplier in South Africa: "Initially it was difficult to explain to the CFOs and Financial Managers that we were not going to buy servers any more. But once we got past that it got a lot easier and now they prefer not having CAPEX."

2.1.4 Cloud natives

For start-ups, company founders start with a clean sheet and almost all the arguments favour the use of cloud services. They can scale their costs to the level of activity they have.

They can test different product options without making the same level of developer investment. They can stay both lean in staffing terms and agile in how they respond to the market.

Despite the considerable scale of investment being made in African start-ups, there is still a tendency to see them as largely marginal to how traditional companies operate. It would be a mistake to underestimate their pioneering role in creating new digital ways of doing business, particularly in the financial services space.

A local cloud provider in Kenya reinforced this point: "The Fintechs who develop their own apps are the early adopters."

Local B2C start-ups like Little in East Africa and international start-ups like Jumia and Uber are highly visible. But there is also a number of interesting B2B start-ups like Trade Depot and Twiga Foods who are automating ordering and sales processes to the informal retail sector.

These are all companies that started as cloud natives and their main decisions are about which providers they use in the future. One health start-up summarised how it saw its cloud future: "We plan to continue using cloud. As we grow, might look at a multi-cloud strategy."



2.2 Barriers to cloud use in Sub-Saharan Africa

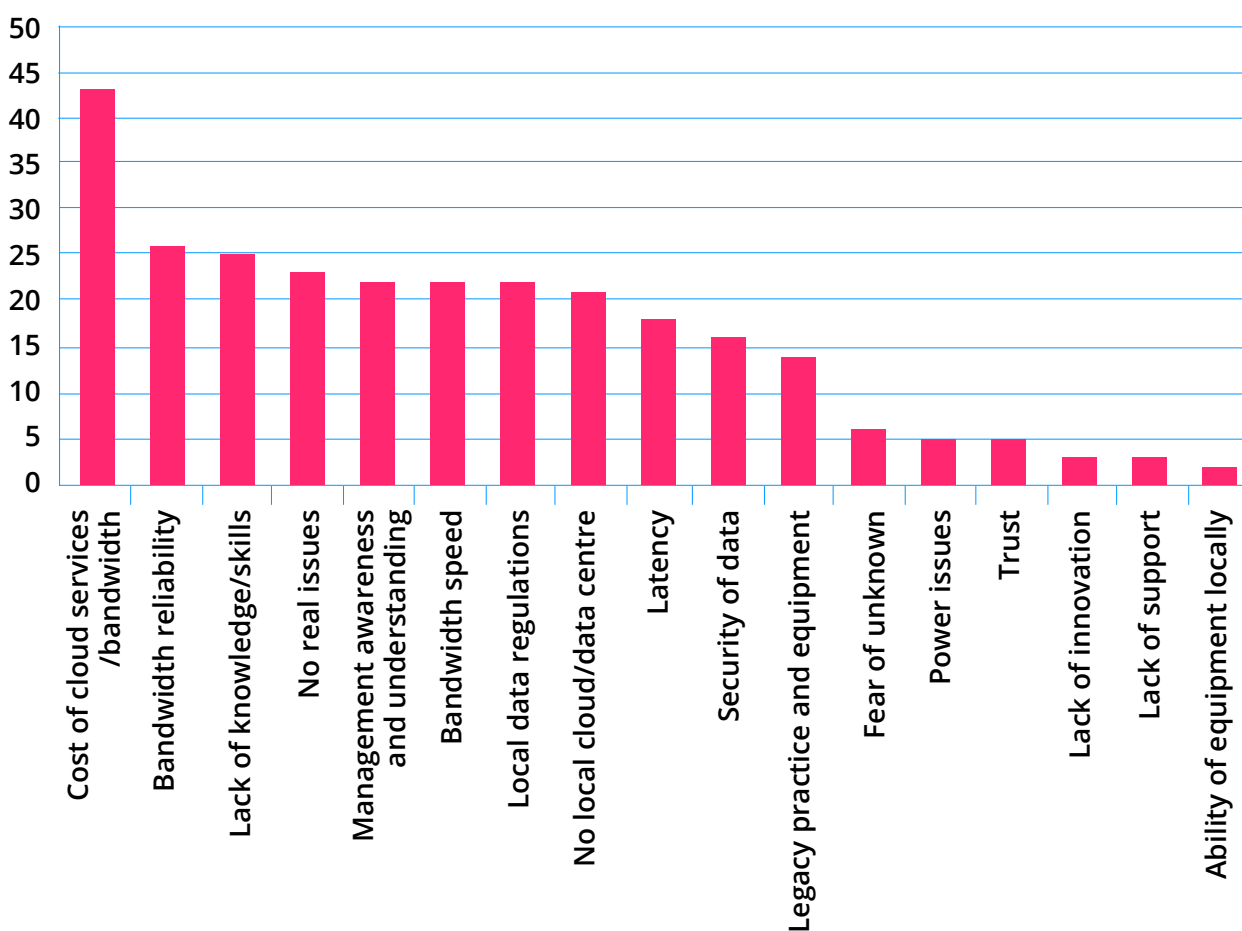
2.2.1 Overview

The chart below summarises the barriers to cloud service use in Sub-Saharan Africa mentioned by both users and non-users. Of the top five barriers (excluding those with no real issues), three are about bandwidth: its cost, reliability and speed.

The other two key barriers are lack of knowledge and skills and low levels of management awareness and understanding.

This emphasis is reinforced in section 4 with some of the difficulties mentioned in providing domestic internet connections for home working. All of the barriers shown below are explored in greater detail in the following sections of the report.

Barriers to cloud adoption according to survey respondents





2.2.2 Connectivity still a key issue

In countries where there is still a relatively high level of network unreliability, the cost of cloud services is tied up with providing sufficient redundancy to avoid outages. As one IT executive at an energy company in Nigeria put it: “A key barrier is connectivity to the cloud. We’ve largely overcome it using different paths. But this comes at a lot of cost and we have to see how to review prices downwards.”

A significant number of those surveyed (40%) still see cloud services in themselves as expensive for a number of reasons including: services being charged in international currencies; the costs of making the transition; not being of a sufficient scale to go the cloud route on particular apps; and finally, once the opening discount offers were over, there is sometimes a financial premium to operating cloud services. However, those companies (like Fintechs) that started as “cloud natives” were much less likely to feel prices were too high.

One of the biggest hurdles in cost terms is making the transition to cloud services. If a company simply does a “lift and shift” – in other words simply puts its existing processes into a cloud form – it may get very little cost advantage. The challenge is to rework processes to create financial savings (for example, customer self-servicing) but this process has to be carried out in a context where management understanding is low and the skills required are at a premium (see 2.2.3 on P22).

A comment by an online bank in South Africa captures the “lift and shift” dilemma well: “If you just ‘lift and shift’ (the international cloud provider) gets a terrific financial advantage from you.”

Similarly, if the company making the cloud transition only does so a small bit at a time over a long period, again potential cost-savings will be lost.

Many medium-sized African companies run to a financial cycle that makes it hard to make a financial argument for carrying out a cloud transition. As one IT Manager for an agricultural supplier in Nigeria said: “I wanted to put all our data on the cloud but it costs more. We work to a short-term plan.”

A number of companies interviewed had made cost-saving using cloud services but they tended to get them over a 3-5 year period.

There is also an issue around the size of the company in terms of the costs of particular software. A cosmetics company in South Africa wanted to use CRM/ERM software “but as a small company (over 30 employees) we can’t quite justify it yet. Maybe in 1-2 years’ time.”

Latency has improved considerably, particularly in Kenya, but continues to be an issue elsewhere.

“We feel most latency issues in Nigeria but most of the time it’s not bad. We negotiated with the providers to get direct routes to Singapore and Europe. It’s faster to Singapore as there are bottlenecks into Europe.”

A large international NGO operating in several African countries

In some countries, the monopoly provision of wholesale bandwidth and power issues undermines the cloud services business case.

As a local cloud services provider in Cameroon put it: “The cost of bandwidth is still too high and access is affected too often by power cuts.”

According to one global agency, Francophone Africa has many connectivity issues: “There are so many countries where the infrastructure is not there in capital cities.”



According to a home energy provider: "There's an issue with the reliability of mobile networks. From time to time, we see a drop off in one network or another. There are connectivity challenges in Nigeria and DRC. There's some impact from latency because Sub-Saharan Africa is not an AWS region. If this was a bigger issue, we'd have to look for someone with a data centre presence on the continent."

The cost of ensuring redundancy and not getting the advertised speeds adds a significant cost premium.

As a broadcaster and streamer in Nigeria told us: "We buy a lot of bandwidth and we only get 50% of the speed we buy and there's some redundancy in case of cable cuts. If you have Naira, there are private companies that will take care of you but you really pay for it...We have a

lot of advanced editing software on the cloud... The main barriers to cloud use are power supply and connectivity. We have to over-compensate by investing in redundant pipes because we can't have outages. I could not live without the cloud and FTP software."

But even in South Africa there are still places where bandwidth is of a lower quality or non-existent.

"Bandwidth is still an issue, particularly with smaller towns...There are big mining companies that have very little infrastructure and almost everything is 'on prem'."

A cloud systems integrator





2.2.3 Skills shortage

With an increasing number of companies making the transition to cloud services globally, there is a skills shortage that will probably last for several years in Sub-Saharan Africa.

A payment services provider operating in several African countries told us: "Getting the right skills is a challenge specific to South Africa and the whole of Sub-Saharan Africa, especially the deep skills like architecture and design. You won't find someone with 10 years' experience. These skills are very portable. For example, if you're experienced with AWS, you can get a job anywhere in the world."

An online marketing services provider saw its biggest barrier to operating as a company shifting: "Once our biggest barrier was capital. Now it's the need to find the talents. There is a skills gap globally."

This competitive pressure on cloud skills is having a very real impact on companies' competitiveness and the labour market they operate in.

"We have problems with funding these skills. Since 2020, a quarter to a third of the workforce has been lost, leaving for US jobs. People want 100% remote working and the company is not offering that."

A large retailer in South Africa

The cost of these skills (often charged in international currencies) are causing real transition blockages.

A South African-based online education services providing operating in several countries emphasised this point: "The arrival of (one international cloud provider's) data centre has

substantially inflated talent costs and it has not yet converted into an increase in the talent pool."

But this is not just a problem in South Africa but one felt across all of the major markets in Sub-Saharan Africa.

As a mobile money service provider in DRC noted: "There is a lack of skills and we're obliged to invest in team training in India and Dubai. It took two years to get the team ready."

The same problem of creating a skilled team was highlighted by a video streamer working in Nigeria: "Local expertise is growing fast but the skills are changing very rapidly. There's not a lot of experts and it's difficult to maintain a team."

Often there is an overall unwillingness to pay for IT skills as an ISP in Tanzania highlighted: "More than half the companies we deal with do not have a competent IT person. But there is an unwillingness to pay for these skills. It's a cost they will balk at."

For larger companies, the position has perhaps already begun to improve.

According to a retail company in South Africa: "Initially there were a lot of sub-optimal design decisions and a lack of appropriate skills. If I had to make the transition now, a lot of knowledge exists. It was not that common back then."

2.2.4 Lack of understanding

All of the cloud services providers – whether local or international – spoke of the need for customer education. Multinational companies will often have started a cloud transition in Europe or the USA and are driving that transition in the countries of Sub-Saharan Africa. The same is not always true of regional African companies or large and medium-sized companies operating in a single market.



A comment by an e-commerce provider operating in several countries but based in East Africa highlights this point: “We have tended to be ahead of our partners and suppliers...We feel like we’re educating clients and partners all the time.” In the case of this company, the task of educating clients is taking place in markets where there is both some baseline knowledge and availability of cloud services but people don’t know how to get cloud services in some markets or even what they are.

“The biggest issue is trust. Customers don’t trust cloud services. There’s a need for sensitisation and the big international cloud players have to come in and do it. The banks want everything in country which makes it hard to sell (an international cloud player).”

An ISP in Uganda

Companies often did not understand the benefits of cloud services and thus far cloud service providers may not have fully explained to them what the benefits were for them. Even in South Africa, one of the markets with probably the highest levels of awareness, a medium-sized cosmetics company said: “It’s about conveying the benefits to potential users. There’s currently a lack of knowledge.”

At a more detailed level interviewees were often quick to point out that IT managers and staff with “on prem” skills were often not going to have the skillset for a cloud transition and indeed feared that would put their jobs in jeopardy. As one local cloud systems integrator in South Africa observed: “The existing IT department only has ‘on prem’ skills.”

“Fear is the biggest barrier and people always make emotive decisions.”

A large legal company in South Africa





This fear is often about what happens to those with redundant skills. A local cloud services provider in Nigeria asked the question at the front of IT Managers' minds in this position: "The top barrier is resistance to change. What do I do with my people?"

Fear over a lack of trust reinforces the status quo but often creates a false sense of security as a local cloud provider in Nigeria told us: "I'm handing my data over to you so there's a trust issue. With encryption, you can be on any platform and I can't see it. You're vulnerable 'on prem'. 70% of intrusions are done internally... Some IT managers are more traditional. They want an on/off switch. There's a resistance to change."

These 'skills gatekeepers' often become the problem rather than the solution. Managers in this position will often lack the confidence to make a decision: "If you don't understand cloud, it's difficult to go with the change. It's difficult for 'old school execs' if your team are doing things you never did yourself."

A local cloud services provider in Nigeria told us: "There's often a consultant who controls the systems. The company managers don't know what to do with it. It's a black box."

"Some IT teams – particularly in financial services, see it as a threat. Others see it as an opportunity. It's about 50/50."

A cloud services and security provider in Nigeria

If the savings from cloud are not made in 12-24 months, there may need to be an overhaul of company processes (involving more than just those responsible for IT) to achieve those savings and it may also require online innovation.

To achieve this, it is imperative that explaining the cloud business case is made at all levels of a company. Embarking on what may be a 5-10 year journey in a major company will require sign-off from senior management and the board.

2.2.5 Data sovereignty

Cloud transition comes with a relatively new set of regulatory requirements. The easiest piece of this regulatory framework to understand is the European Union's General Data Protection Regulations.

This requires: the consent of subjects for data processing; anonymising collected data to protect privacy; providing data breach notifications; safely handling the transfer of data across border; requiring certain companies to appoint a data protection officer to oversee GDPR compliance.

Because a large number of multinational companies are based or operate in Europe this has had the effect of 'exporting' many of these requirements to other countries.

This kind of legislation is now increasingly being implemented in major Sub-Saharan Africa markets and the uncertainty associated with it and differences between legislation in different jurisdictions has the capacity to become a barrier to cloud business in particular and business in general. Much of the talk about Edge Computing is a reflection of the likely future requirement that data be hosted locally.

The uncertainty about the impact of legislation reinforces the need to work "up to a standard" as an international NGO believed: "If you're using international cloud providers and they're only in South Africa, this could become an issue if localisation is implemented. We do everything to GDPR standards."

The IT Manager of an international hospitality company operating in Nigeria said: "A major barrier is government policy and GDPR. NDPR is the version in Nigeria and it's a lot like GDPR... As a company, we have a data centre in (a European country) and that's our jurisdiction for data storage."



But the situation is not always clear cut. A digital services agency in Francophone Africa asked its regulator where it should host its cloud services and was told to use a local data centre. But when it responded that there was no local data centre available, the regulator understood the position and allowed it to use one outside the country.

The issue is most acute for multi-country operators.

“A big issue is data sovereignty and data crossing borders. Can we store data outside the countries we operate in? Many of the countries in Africa are not large enough for the international cloud providers to offer local data centre facilities in.”

A multi-country payment services provider

The position is far from clear. As one local cloud provider observed: “All the banks have got a presence outside the country on one of the international cloud providers...There are 15 digital banks in Nigeria. Data is not local.”

Companies and countries have different requirements. A Fintech in South Africa said: “One of the banks we work with insisted the data was held in Europe to comply with EU data sovereignty regulations.”

The cost overhead for understanding the position increases, the more countries you enter as a multi-country home energy provider said: “Local data legislation means there’s always a big review with legal teams (when we go into a new country.”

A logistics provider also highlighted the complications raised by entering new markets: “Currently we operate just in Kenya but next year we will become a regional provider. We will need to look out for data policy and data residency. It will become much more important.”

In Mozambique, as often elsewhere in Sub-Saharan Africa, the absence of a local presence from international cloud providers excludes their use.

A regional bank highlighted this issue: “In Mozambique data must stay within the borders of the country so (one of the international cloud providers) is not an option and things must remain ‘on premises’.”

Regulators may not realise the barriers they are creating. According to a regional bank with a presence in Zambia: “There are two pieces of legislation stopping us from hosting and processing data outside Zambia. The regulation is not pro-cloud.”

“Data from any company is really sensitive. People can take over your server through the police and courts. South Africa is more secure and it’s easy to deploy a server there. For us security is important and cloud is something that will protect us.”

An online betting company in Ghana

3. Drivers of cloud adoption





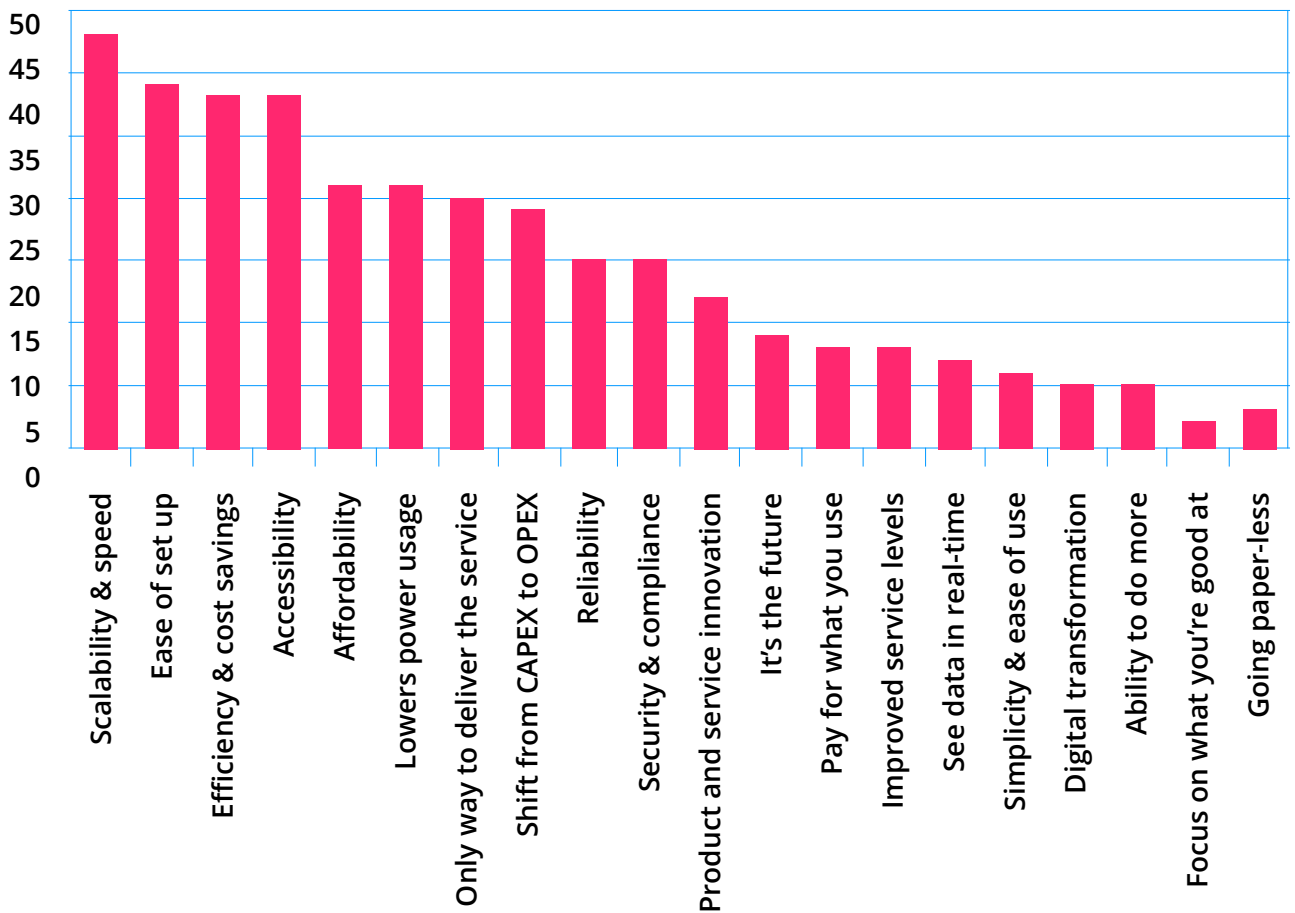
“It’s pretty seamless and easier than ‘on prem’ and much cheaper. People would be keen to move to cloud service providers...There’s been a shift in attitudes to CAPEX and OPEX. It’s more like light and water: you pay as you use it.”

Online car sales service, South Africa

3.1 Overview

The five key arguments for cloud services that enterprise users in this survey found compelling were: the combination of scaling at will and therefore speed of response; the ease of setting up services (from scratch) and the wide range of ‘off-the-shelf’ tools to be able to do it; the need for efficiencies and wanting cost-savings; access from anywhere on different devices; and affordability of these services.

Factors driving cloud adoption according to survey respondents





However, many of these top five arguments were put forward by enterprises that either had 3-5 years' experience of using cloud services and/or were companies that had started with cloud services and had no legacy attitudes and equipment to deal with.

For those not using cloud services, the more sceptical cost arguments presented in the previous section on barriers are in stark contrast to the more positive arguments of more experienced users.

Finally, using cloud services is almost certainly a key part of the African digital transformation journey, particularly for organisations that have extensive B2C relationships like for example, banks and ride hailing companies.

Digital transformation is a rhetorical position that is widely accepted but actual progress is much slower for many of the reasons identified in section 2 (see P15).

Crucially, it requires innovation in enterprise processes and very few of those interviewed mentioned innovation as a key driver for cloud services. Likewise, seeing data in real-time or near real-time was not widely mentioned and these absences are discussed in section 3.7 (see P35).

In the following sections, we dig deeper into the key drivers: cost savings and efficiencies and affordability.





3.2 Scale at will

In IT terms, companies and organisations plan for future growth and if “on premises” that future capacity will rest idle until the future growth happens.

Indeed, if the planned growth is a miscalculation then the company is paying for unused IT capacity.

“We had hoped to reach a higher volume and without cloud services, this would have meant a higher investment in architecture for growth. Now we’re starting to grow quite quickly and we’re using a lot of cloud tools to deliver and deploy, as well as for security.”

A home energy provider

There is often a level of ‘on prem wastage’ that probably goes unnoticed. A local cloud services provider in Nigeria gave the example of the only bank in Nigeria that still retains its own data centre: “There are huge costs associated with building a data centre in your office. It is using just 12 out of 15 racks. It’s a huge waste of money.”

This “switch-it-on, switch-it-off” approach both handles dealing with a high volume of changing services and offers considerable flexibility in reshaping services to react to the tactical demands of the market.

A South African bank’s view gives a good sense of both the pressure in the company to deliver and the sheer complexity of its offer: “For us to deliver at pace and at scale we had to move out of our own data centre...Another outage pushed us to do it...We have over 400 micro-services.”

Cloud services enable a company to rework online services, both to test them and to respond to what competitors are doing. As a South African Fintech put it: “It makes our products very flexible. You can switch them on and off and raise and lower cover levels. And we can provide ‘white label’ services to other providers.”

However, these arguments are less convincing to companies that have long-standing, face-to-face B2B relationships with customers and who have fears about the security of online financial transactions. You cannot easily have face-to-face relationships with several hundred thousand retail customers but you can with tens of business customers.





3.3 Ease of use

Although understanding what can be done with cloud services and re-engineering business processes may need people who have 'in-demand' skills, operating things like databases in the cloud may actually simplify operations and lower the demand for other skills.

As a payment services provider operating in several African countries put it: "Managed databases on the cloud lowers the need for really skilled database administrators. It's complex 'on prem' but just a click on the cloud." And as one Kenyan bandwidth provider observed: "There will be a disruption of existing IT jobs and processes...Cloud democratises the IT space. Anyone can configure their space."

One of the challenges for an 'on prem' IT Manager is managing the upgrading of software. This can be particularly challenging for multi-location companies where different software versions are used in different locations.

"Before we had multiple software updates across different geographic footprints. Now apps are upgraded once centrally: we're on the same system with the same versions."

An international logistics company in Nigeria

Even making changes at long distance does not become a major issue. As a multi-location construction company based in South Africa put it: "We moved our assets from Slough to London and did it virtually from over here (in South Africa) over the weekend. We were able to move to newer equipment and stacks." Those with probably the most well-defined view of how this ease of use deals with the complexity of what they are offering are often maturing start-ups that started with a clear view of their business from the beginning.

An online logistics services provider operating in multiple countries knows how all the pieces fit together strategically: "We're a mobile first company and we're conscious of the amount and efficiency of mobile data. Our app is designed to be offline first and so that small glitches won't disrupt it. The best stack for this is (one international cloud provider's mobile stack) and it's then sent to (another mobile service provider's stack) to be processed...Containers allow you to abstract by regions. Why build your own API gateway when someone else has?"





3.4 Cost savings, efficiencies and affordability

Those wanting to move to cloud services often find it hard to create short-term savings, within 1-2 years.

Even mature companies that were once 'start-ups' struggle to make the financial business case for moving from an 'on prem' legacy approach.

Multinational companies that have been around for decades can often afford to take a longer-term view of the business case. But even local companies can find cost-savings and efficiencies if they look for them.

Often it is case of what you're measuring when making the business case. The limitations of Total-Cost-of-Ownership (TCO) were highlighted by several of those surveyed.

"You can create efficiencies of between 18-45%. TCO has two limitations in terms of calculation. Firstly, it doesn't factor in risk and risk mitigation and secondly, it doesn't address strategic efficiency. Most organisations have bloated project portfolios. How does a project move an organisation's strategic impact?"

A large legal company in South Africa

One regional bank operating across multiple locations made the transition to cloud services on the basis that it would at least have the same cost level as 'on prem': "We're not going to cloud to save costs but we hope it will be a by-product. We're already seeing a 30% reduction in direct costs and a reduction in headcount."

But outside of South Africa, these longer-term or wider calculations are much less compelling: those in other markets want the financial cost savings to be delivered in the short-term through the shift from CAPEX to OPEX.

So for example a local cloud services provider told us: "The top advantage of cloud seen by customers is cost savings. They expect it to be cheaper and to get rid of CAPEX."

However, getting company-wide buy-in for changing business processes (with or without cloud services) is a much more complex and sometimes lengthy task than simply getting 'sign-off' to update 'on-prem' hardware.

With a medium to large company, the journey of going from "lift-and-shift" of existing software assets to re-engineering those existing assets, to the ability to add new assets, may take 5-10 years. For the hesitant company that starts with a 'pilot lift-and-shift' of part of its operations, this might take even longer.

But long though this transition might be for some, there are still savings at the end of the process. As an agricultural supplier in South Africa told us: "We've had significant savings over a 10-year period. Anything more than 6% is worth looking at and it's certainly been much more than that. One major saving in the first three years was the licensing benefit, the OS cost."

The company that started 'cloud native' has inbuilt cost savings that are much harder for companies with legacy IT teams to deliver.



“The main argument for cloud is our ability to keep the team supporting the stack extremely light. We can keep the costs extremely low and we couldn’t do that if we had our own infrastructure.”

A Fintech in South Africa

Many times those surveyed in legacy organisations either spoke of their fears for their own team’s jobs or their insecurity about their lack of knowledge of how cloud operated.

A lack of enthusiasm in the IT team itself would certainly make any senior executive hesitate to push for a decision to make the transition to cloud services. 20% of those interviewed did not believe that there would be savings from using cloud services in the short to medium term.





3.5 Access anywhere

As the next section shows, the impact of Covid-19 has emphasized the need for companies to move from rather modest ideas around “Bring-Your-Own-Device” to a software access strategy that allows both its employees and often its customers to access business processes from any device anywhere.

For the founder of an online hospitality service provider this is the heart of the argument for cloud services: “Generally, it’s the ability to access from anywhere and on any device.”

Those who might make the move to cloud services find this argument persuasive in the light of Covid-19.

“I would like to have a digital strategy where all services are moved to the cloud. It would give more power and resources and easy access for people working from home.”

A private health provider in Uganda

If connectivity problems could be overcome, this might also include the rural facilities it operates: “The biggest challenge is clinics up country. We’re currently implementing a back-up ISP to try and resolve the issue of connectivity.”

A whole business process cloud service allows both employees and customers to access different parts of the same business process. An online logistics provider in Nigeria collects information about where its customers’ vehicles are: “Externally, customers have a dashboard from where they can access information that is stored on the cloud. Devices in the field send data to the back end where it is processed and sent to their dashboards.”

INNOVATION USING CLOUD

- Examples of innovation using cloud identified by the survey:
- Using IoT for data collection from trucks and freezer facilities in Nigeria.
- A bank creating an API marketplace to extend its reach to a wider range of users.
- A retail chain harvesting sales data in 15 minute intervals and using it to create tactical sales offers.
- A health service provider that can scan X-rays and send them from less well serviced locations to medical specialists for assessment.



3.6 Missing arguments for cloud services

There were three missing arguments for using cloud services that were not specified by many users:

- **Use of data:** Almost no survey respondents raised any of the following: making use of and presenting company data in a more usable way; using data to make tactical product changes, data mining existing data sets and using 'machine learning' or Artificial Intelligence to improve processes. International cloud service providers all have tools that will address these issues.
- **Innovation:** Many respondents have started companies in the last 5-10 years and have done so to provide an innovative way of delivering services. These include those providing online services for hospitality, logistics, financial services, automotive, energy and streaming. However, only a handful of the more established companies talked about how their company is innovating using cloud services.
- **Digital transformation:** For these more established companies, digital transformation is something that they might see as important but it is much less clear what in practical terms it means for their organisation. There also remain a significant number of companies outside South Africa that are either saying directly or acting in a way that implies digital transformation is "not for Africa." Or as an energy company in Nigeria put it: "Digital transformation or not, it comes down to cost."

The lack of discussion of these arguments reflects a somewhat conservative approach to making the transition to cloud services. This might either be characterised as "lift and shift" where a company simply replicates its existing

software assets in cloud form or a hybrid approach where a part of business processes is transferred to the cloud, leaving some part of them 'on prem'.

However, savings – whether long-term or short-term – come through making the business more responsive, easier to understand and ultimately (in context) more digital.

For as an online bank reflected: "We started by moving 80% of the bank to (one of the international cloud providers)... It was lift and shift and was super expensive with zero cloud optimisations. When the bank was switched on I winced, as a tear built up when I saw the bill." But in eight months it had managed to halve its bill, whilst adding 0.5 million customers.

Even an industry as 'physical' and traditional as construction can benefit from thinking about how to innovate but it can be both challenging and rewarding as one company in South Africa told us: "If you don't automate it to death, you'll struggle...We work with drones and 3D printing, cutting edge technologies that challenge us."



3.7 Drawbacks cited by cloud users

Using cloud services is not without issues and those wanting to make the transition should be aware of them. A minority of survey respondents raised four main issues and they are worth acknowledging as they can be avoided.

On a 'pay-per-use' basis, some users get to the end of the month and have 'bill shock': "Initially we had a huge financial bill. Just under a year later we had a large number of customers and we managed to halve our bill by understanding how to work in the cloud. A lot of these things take time to polish as you go. Different apps behave differently in the cloud."

As one large enterprise user noted: "Cost management with AWS and Azure is almost a full-time job."

"The product managers of cloud providers launch new products rather than new features. Understanding everything is a challenge."

A multi-country payment services provider

For any business but particularly consumer businesses, relying on the cloud that is powered by the internet, there is a political risk from Government shutdowns.

As one ride hailing company put it: "There was an election in Uganda and they switched off the internet. Customers were not able to use our service because everything is on the cloud. It was off for a couple of days."

Shifting to the cloud has many ways of making a company's life easier but it still involves keeping up with the developments of the cloud products themselves.

A streaming company founder relied on his IT staff to keep him ahead of what was available but sometimes found the choices overwhelming. Such a wealth of choice holds the danger of companies not making a decision. An online automotive services company in South Africa warned: "There's so much choice. The danger is being overwhelmed by a plethora of solutions, leading to 'analysis paralysis'."

Finally, a cloud integrator in South Africa warned that: "Getting everything into the cloud is not as easy as you think." The point he was particularly emphasising was that the shift to cloud raises many different issues for companies with legacy assets.

"It's a big ask for many companies to move a lot to the cloud. It appears to be more expensive. You're paying for racks and power. These are expensive pills to swallow."

A cloud services provider in South Africa

4. Taking the workforce 'off prem' cloud: Covid-19 and home working





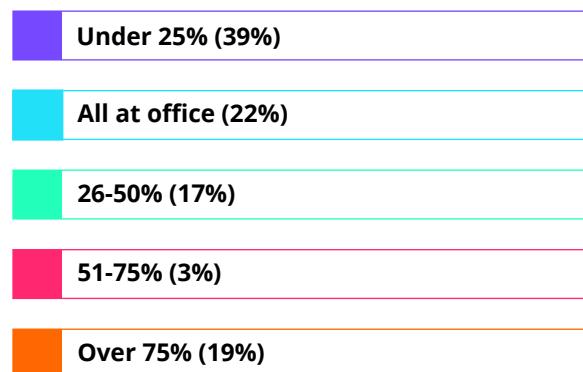
“Covid has been a very big enablement for cloud. If we had not moved to the cloud, it would have been very tough. Even without Covid, the other driver has been that anyone can work from anywhere.”

An energy company in Nigeria

The biggest challenge for some companies was connectivity that is examined in greater detail in section 4.3 (see P39).

The pie chart below shows the estimated percentage of employees that survey respondents said were working at home at the time they were interviewed.

Percentage of employees working from home according to survey respondents



4.1 Overview

Covid-19 has affected Sub-Saharan African countries in very different ways: some like South Africa have been widely affected and had lengthy lockdowns, whilst others had relatively short lockdowns and apparently low levels of infections. Nevertheless, whatever the length of lockdowns all of those interviewed worked in countries that have experienced them.

However, with the end of lockdowns the majority of companies interviewed have gone back to having all or most of their employees in the office (see pie chart). Outside of South Africa, managers still adhere closely to the idea that they need to be able to see their employees to be convinced that they are working. But being in the office also suits certain types of people who like socialising with their colleagues.

A significant proportion of the newer online companies and cloud providers had already adopted ‘distributed’ or ‘home working’ before Covid-19 struck. Some maintain a small office space where employees can go for meetings. This kind of ‘home working’ is obviously easier for those dealing almost entirely with digital products, services and processes. Company developers are often home working, whereas sales colleagues may well be in the office.



4.2 Covid-19: The catalyst

The result of lockdowns has been a massive push to move company activities online and into the cloud and for more employees to familiarize themselves with working using the internet.

All bandwidth providers we have spoken to over the last two years report considerable increases in the amount of bandwidth used by both companies and individuals.

This catalyst has had to face two challenges. The first of these had nothing to do with technology but was about employees having to change their behaviours. The second challenge was delivering home connectivity in some (but not all) countries.

As a multi-country payment services provider put it: "Covid has become a catalyst that has forced homeworking through our local teams... They now see the value to use it more often." One international NGO emphasized that it was not technology that was the main barrier: "People are the main barriers."

On the second challenge, connectivity, most providers have risen to it and made improvements to their networks.

"One of the positive sides of Covid is that the networks strengthened their capacity and it is now usually good. I was moderating a conference online in Burundi (from Uganda) and it was good all morning."

A multi-location recruitment company based in Uganda

Overall, Covid educated managers about the relationship between 'equipment' and the internet, emphasising the importance of the latter.

An international NGO with multiple locations on the continent said: "Mobile connections at home were a bit of an issue as they were slightly more expensive and this was more of an issue than the internet connections themselves... Covid made managers understand you don't have to have equipment in some locations. internet connectivity is now the critical part."

The key issue going forward is whether companies that adapted their work practices will see the need to continue now the worst of the crisis is over. A local cloud provider in Kenya spoke sceptically: "Only 10-20% of companies have had real change. The SMEs are doing what they were doing before. The companies that have adapted and seen their businesses grow have been e-commerce and logistics."

Going forward, the issue will still be: does it make sense to do everything online or are there occasions when face-to-face is essential?

An agricultural supplier in South Africa acknowledged the tremendous steps forward the company had made, whilst knowing that certain things still required being there in person: "We'd been trying for five years to get people to use video conferencing and it had never caught on. Suddenly it's the way to work online. It makes a massive impact on use of time. But there's a small number of people, and I'm one them, where if there's a serious contract discussion, I'd prefer to do it over a table."



4.3 Home bandwidth issues

Getting employees connected at home raised a whole new set of issues for companies working from home.

In most countries there is now a level of reliability and costs keep coming down to make connections in the business areas of the capital city. But home access – particularly fixed fibre – is much more ‘spotty’ and is often only available in the more affluent areas.

The response from a fibre provider in Zimbabwe highlights this divide between the ‘haves’ and the ‘have-nots’ but the percentage that still had challenges was relatively low: “For our employees, we had some good (home) connections. There were unstable ones and where we could, we got people on to better ones. We considered satellite connections. About 10% of the home connections still had challenges...However, there is a push by businesses and individuals to get online.”

Mobile broadband connections that seem perfectly adequate for personal use stand up less well to scrutiny when an unbroken service is required.

“The reliability of connectivity from home remains a challenge. You need three connectivity solutions to work from morning to close of business.”

An energy company in Nigeria

Indeed, as a home energy company found, in Rwanda in particular, employees were keen to get back to faster and more reliable office connections: “People are keen to come into the office (in Rwanda). It’s a function of connectivity. It was a real challenge in most people’s homes. We bought 3G/4G dongles but with the amount trying to connect in lockdown in Kigali, it was a poor service because the network was overloaded. People are keen to come into the office and have great connectivity.”

But for countries like Kenya and South Africa these home access issues are much less of an issue. An online mass transport services provider in Kenya felt that it was almost not a problem: “Kenya’s internet is getting quite reliable. It’s not an issue to buy online access.”

The problem of delivering home connectivity remains both a significant challenge and a market opportunity. For as one regional cloud services provider commented: “Bandwidth and latency challenges are more of an issue when it comes to working from home. The home premises are not equipped for it in some countries.”

Companies were often able to deliver home connectivity for their employees but some failed to invest in training to make them effective. An ISP in Ghana said: “One big problem from working from home was that companies didn’t actually invest in training them how to use computers from home. Now the awareness and skills have happened.”





4.4 Other issues

The majority of companies will probably end up with some form of hybrid working and it has encouraged even quite traditional organisations to become more flexible.

For example, a regional bank that operates in multiple countries has not completely gone back to work: "There's no directive to go back to the office. There's a move to a hybrid model and there's a lot of internal work happening around that."

Home working and even a level of hybrid working will put pressure on management to reduce the company's real estate footprint. A South African bank is doing just that: "Buildings have been empty for the last 18 months. We're downsizing both offices and branches. We have all the tools to support us at home."

Covid has also pushed innovation in a number of different directions. The best example we heard was of a ride hailing company based in Kenya that has expanded to become almost a 'super app': "Initially it was just ride-hailing and then Covid came. We started selling food, drinks and grocery deliveries on the same app. You can also book a doctor and order a Covid test from home. Now there's movie tickets and payments and it's more like a super app."



5. New **network considerations** for businesses





5.1 Cloud connectivity

Along with ongoing investment in data centre infrastructure, the arrival of more cloud providers in Sub-Saharan Africa presents new opportunities for businesses to host their data locally.

As this report highlights, cloud adoption looks likely to accelerate across the region in the coming years. But as businesses migrate more of their mission-critical workloads and applications to the cloud, now is the time to reevaluate their existing network architecture.

Many businesses in Sub-Saharan Africa today still access their cloud services via the public internet.

Although this may appear convenient and affordable, it does not meet increasingly stringent requirements around security and performance when moving data and workloads between cloud services and the people and applications that require them.

Secure connectivity over the public internet cannot be ensured meaning private information could be compromised. Businesses accessing sensitive information in the cloud over the public internet are more at risk from cyberattacks, and secure HTTPS internet connections are not a guarantee for complete privacy.

When it comes to cloud connectivity, more businesses are looking at dedicated, private connections between parties, such as between a business and a network and/or cloud provider.

By avoiding the public internet, network traffic is better protected against threats such as cyberattacks. In many cases private connectivity will be necessary to comply with stringent regulatory requirements, such as those in the finance sector.

One way businesses in Africa can connect their WAN to the cloud is to purchase private cloud ports directly from their cloud service provider.

Each cloud provider offers its own direct connectivity, and of course, each is slightly different in application.

For example, AWS Direct Connect is the system for linking an internal enterprise network to an AWS Direct Connect location over a standard Ethernet cable. For Microsoft, direct connectivity to the Azure public cloud is carried out through Azure ExpressRoute, which establishes connections to Microsoft cloud services, such as Microsoft Azure and specific SaaS packages such as Microsoft 365.

A Dedicated Interconnect is needed to privately connect to Google Cloud, which requires a business to physically meet Google's network in a colocation facility to reach their VPC networks.

Ultimately, using private cloud port services can provide better performance and security than the public internet because the connections are private, direct, and managed by the provider, making them less vulnerable to BGP hijacking or other security risks.

But this can also introduce additional network complexity and cost.



5.2 The move to Network-as-a-Service

The emergence of Network-as-a-Service (NaaS) platforms, such as Console Connect, provides businesses in Africa with new options for their cloud and data centre connectivity.

Thanks to advancements in Defined Networking (SDN) and Network Functions Virtualization (NFV), it is possible for businesses to access private, high-performance networks in real-time and on-demand.

A NaaS platform helps businesses with their cloud journey in the following ways:

- **Reduced complexity:** The NaaS model offloads ownership of the network infrastructure to the provider, along with maintenance and monitoring of all the hardware and software. This removes the burden of technical debt from the organisation as well as the need to have specialist skills in-house.
- **Increased uptime:** Service Level Agreements (SLAs) are created with network providers to guarantee levels of availability, uptime, and

response for addressing network issues. Enterprises can end up with an overlapping patchwork of SLAs from different providers that apply to different parts of their WAN. Using a NaaS platform, businesses can consolidate the number of providers and thus the differentiation between SLAs.

- **Enhanced security:** With NaaS, service providers can offer more granular control to protect and secure sensitive data, applications, and resources.
- **Cost efficiency:** NaaS is a shift from capex to opex, helping organisations save money previously required to buy and maintain hardware. More granular cost control is possible since capacity may be added, lowered, and shifted throughout the network as needed. Direct connections to the cloud also significantly reduce e-gress charges.
- **Greater choice:** Rather than being locked in with a single cloud provider, a NaaS platform can provide direct connectivity options to different cloud providers across multiple geographies.





5.3 Console Connect in Sub-Saharan Africa

What makes the Console Connect platform different is the underlying network infrastructure, which is owned and operated by PCCW Global. The network offers extensive reach across the east and west coast of Africa

Using the Console Connect platform, businesses in Africa can self-provision private network connections to major cloud providers and data centres inside and outside of the region.

Console Connect's footprint in the region has grown alongside the arrival of more cloud providers. Today the platform provides instant direct connections to the AWS Africa region, located in Cape Town, as well Oracle Cloud's new cloud region in Johannesburg.

The platform can also directly connect businesses to 120+ cloud regions and zones across Europe, North America and Asia, where it is integrated with all major cloud platforms, including Google Cloud, Microsoft Azure, IBM Cloud, Huawei, Tencent and more.

Console Connect is available in a growing number of data centre locations across the continent, including South Africa, Kenya, Nigeria, Tanzania, Mozambique, Uganda, Ghana, Ivory Coast, Djibouti and Senegal. Through our partnership with NAPAfrica, there is also the opportunity to peer locally in South Africa via the platform.

A range of services are available on-demand through the platform, including:

- IP transit: On-demand business internet access delivered via our leading IP Tier 1 network
- Remote peering: Connect and peer with many of the world's leading Internet Exchanges.
- Data centre interconnection: Metro, regional and international Layer 2 and Layer 3 connectivity between 900+ data centres in 50+ countries worldwide.
- Global IoT connectivity: SIM/eSIM management across 180+ countries worldwide.





www.consoleconnect.com
sales@consoleconnect.com



www.balancingact-africa.com
info@balancingact-africa.com