

# The science of connecting Africa

**Africa**  
DataCentres

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**NETFLIX**



Where do internet exchanges fit in with data centres, and why are they important?

How are data centres providing access to entertainment?

How are end users benefiting from colocation data centres?

How do data centres support the cloud?

How does it all work?

Connected technology is becoming even more critical to our business and personal lives each year, as cloud applications and services, social media, e-commerce, streaming content, and gaming are all enjoying significant growth year after year. Research from Data Reportal says the world's population is around 7.93 billion, a number that the United Nations says grows by about 1% each year. Today, some 5.32 billion of the world's population uses a mobile phone, and 5 billion people around the world use the internet social media use continues to grow too, with global users reaching 4.65 billion in April this year and 326 million of these users joined social media between April 2021 and April 2022, equalling a growth of almost 900,000 new users every day. In Africa, Statista reveals the number of social media users is rising continuously too, amounting to more than 384 million as of this year.

The World Bank and African Development Bank report there are about 650 million mobile users in Africa, and GSMA predicts that the continent will have another 120 million mobile subscribers by 2025.

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From these statistics, it's easy to see why the demand for data centres is skyrocketing too, as these facilities are the enablers of the digital enterprise. Healthcare, finance, manufacturing, technology, and retail organisations process massive volumes of information daily, and as such, data centres are critical to running their operations. These facilities are where vast amounts of data are collected, stored, processed, and distributed, and they are responsible for the backup and recovery of this data, hosting websites and e-mails, as well as collaboration services. They also are the infrastructure behind cloud storage applications, movie streaming, e-commerce transactions, and online gaming communities.

Moreover, data centres are at the heart of connecting communication networks to enable users and platforms to access information remotely, and as such, they are building on-ramps to, and between, a wide range of providers to enable a slew of cloud services and solutions to be accessible to users. Where once data centres were large storage rooms, they have evolved into a complex intersection of connections for data use and sharing.



## Internet exchange points

While data centres can be likened to the foundation of the internet, internet exchange points (IXs or IXPs) can be viewed as the glue that holds the bricks of the internet together. An IXP is an actual, physical location as well as the infrastructure that is used for networks to exchange internet traffic. Most major cities in developed nations have an internet exchange because as data travels across the internet, it is continually being re-routed and re-directed between a wide variety of networks.

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Frequently, traffic on one network needs to switch onto a different network which is owned and controlled by another party, and IXPs enable this type of data transfer through a process called “peering,” which enabled networks to hand off customer traffic between each other’s networks without the expense of having to pay a third party to carry it across the internet for them.

Without IXs, traffic switching from one network to another one would need to rely on intermediary networks, also known as transit providers, to transport the data from source to destination, which would result in significant latency. There would also be fewer routes for data to travel, meaning the ability to switch with ease onto whichever network will be fastest at the time would be compromised. If there were issues with the transit provider’s network, such as a surge in traffic, slow connections, packet loss, or suchlike, the network making use of the transit provider would be unable to do anything about it. Peering through internet exchanges eliminates all these potential issues by adjusting routing to avoid any segments of the network that might be problematic. It also keeps traffic as local as possible, which enhances performance and ensures faster connections between networks, which in turn, allows for high-speed data transfer, lower latency, increased bandwidth and improved fault tolerance.

Ultimately, IXPs are entities whose roles are focused on bringing content closer to business and consumer customers. At its most basic level, an IXP ensures local Internet traffic is kept within local network infrastructures, bringing costs down and making sure content gets to users more quickly. As the demand for everything digital grows, so does the popularity of interconnection, which is why IXPs are redefining the data centre through hubs of network peers. In essence, an IXP is a collaboration between different internet service providers (ISPs) to share infrastructure that streamlines traffic for users within that data centre. In this way, data doesn’t need to travel to other regions or countries to get from one network to another, making content delivery far more efficient, reliable, and fast, reducing latency and operating costs for all involved, including the end user.

Content providers and operators of content delivery networks around the world are pushing service providers to connect to internet exchanges to move their content around more rapidly. IXs and content providers often take up space together in colocation data centres, which ensures that local traffic remains local, something that is becoming increasingly important in today’s stringent regulatory environment that is forcing organisations to be compliant when it comes to data residency and sovereignty. Moreover, peering brings content closer to the eyeballs, providing access to each other’s customers using their networks, and it reduces transit costs. This movement towards keeping content



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distribution local is also leading to significant network advantages, such as dynamic bandwidth on demand, and the ability to provision bandwidth in a matter of minutes or seconds. IX deployments need a network architecture that can provide immediate analytics for network optimisation, to drive faster service creation, content delivery and better customer experience by combining the ability for massive scale with the intelligence of routing. Internet exchanges play a crucial role in keeping traffic local, controlling costs and driving a mutual approach to peering, always putting the customer at the front of everything they do. “

## IXPs and colocation

There is a clear and mutually beneficial relationship between IXPs and colocation data centres. The majority of IXPs these days have points in colocation facilities in the city in which they are located. This offers colocation customers immediate, cost-effective access to global connectivity at one, single connection point, removing the need for expensive WAN links. In addition, colocation data centres, also house a range of major network service providers (NSPs), content delivery networks (CDNs), as well as managed service providers (MSPs) which can connect with each other to move their data as quickly, efficiently, and cheaply as possible.

Being 100% vendor- and carrier-neutral, Africa Data Centres supports several independent, member-run IXPs at its interconnected colocation data centres, enabling its tenants to seamlessly exchange traffic and boost performance in a mutually advantageous connectivity ecosystem.

Colocation facilities provide the racks, electricity, cooling, and network connections that on-premises data centres do, as well as both cyber and physical security, to guarantee that only authorised personnel have access to the facilities, and with that, the data housed in them. These data centres also provide the operational foundation from which internet service providers or ISPs were able to grow. ISPs are key to making the Internet available to smaller entities, as well as individuals who want to have a presence on the Internet, such as a Web site or similar. This is because while large corporates can afford the enormous expense involved in establishing a direct connection to the infrastructure that the Internet is made up of, smaller businesses could not. Certain ISPs had their own data centres, but a fair number of them did not, and rather bought their hardware, which they then collocated in an independent data centre facility. As the Internet grew, so did ISPs and data centres

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followed suit. Because this worked out to be so cost-effective and beneficial, organisations that were spending vast sums on hardware that they housed in a remote data centre realised they didn't need to spend hundreds of thousands or even millions to buy and support computer hardware that was not core to their business. They also realised that it was possible to only pay for the computing power they needed when they needed it - and cloud computing began to go mainstream.

The technology that made this cloud-driven, 'everything-as-a-service' world possible, is virtualisation. In the context of the data centre, virtualisation is the process that created today's modern facilities that are highly scalable, available and secure. This enabled tenants in colocation facilities to increase IT agility and create a seamless foundation to manage both private and public cloud services as well as traditional on-premises infrastructure.

Similarly, once the power of virtualisation orchestration came to data centres, virtual machines could be created using automation scripts, and then application orchestration technologies such as Kubernetes could be added in, to enable businesses to use these facilities to create large-scale, highly distributed applications on-demand, which in essence, is the modern cloud, which is becoming the heart of modern application architecture. Again, none of this is possible without the data centre, as the cloud is powered by thousands of data centres distributed across the globe. Data centres are playing a critical role in the data economy, and as the world moves more and more to the internet, users and businesses depend on rapid access to information. The nearer an organisation is to a data centre, the higher and faster the performance of its services is.

## Content providers

Another area in which colocation facilities benefit businesses is by playing host to content providers. The entertainment media has evolved dramatically over the last twenty years. Physical storage mediums including cassette and video tapes and DVDs have all been digitised to bring on-demand, streaming access to movies, TV shows, music, video games, sporting events and concerts. This evolution has forever altered the way users consume content and entertainment, offering almost instant access to a constantly growing range of media platforms. At the vanguard of this transformation stood Netflix, the first company to offer on-demand access to a library of television shows, documentaries and movies. The service quickly grew in popularity, putting many traditional



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home movie and video game rental services out of business when they did not react to the digital transformation of entertainment rapidly enough. Today, Netflix has a wide range of competitors, including Amazon Prime Video, Hulu, Disney+, Showmax and more.

Digital entertainment has become an enormous business. Three years ago, 2.6 billion people worldwide watched digital videos, a number that is expected to surpass 3.1 billion by next year. Similarly, the music and gaming industries have also been transformed, as games and music are available instantly and on-demand through Spotify and Apple Music. The days of sitting by the radio waiting for a favourite song to come on are long gone. Today, music is available on-demand through services such as Spotify, Amazon Music and Apple Music, and games through Stadia, Amazon Luna, Xbox Game Pass, Nvidia GeForce Now and others. Even live sporting events and concerts can be streamed on any internet-enabled device and watched on the go.

However, digital entertainment still needs to be delivered, and the sheer volume of media created and stored by digital entertainment is overwhelming, as is the ability to deliver all of this high-res, high-density content across an internet infrastructure that was not built to support the quantity and complexity of all this data being generated. The ever-increasing number of devices used to stream digital media content is also adding to the vast amount of internet traffic, as billions of people around

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the world use their smartphones and other devices to consume digital content on the fly. However, regardless of how digital content is accessed, the amount of time it takes to reach the end user is key. Consumers are far more likely to abandon video content when it takes more than a couple of seconds to load, because today's consumers have much higher expectations, and they want their content delivered instantly, without any failures or delays.

Here again, the data centre is crucial, as these facilities are the foundation of every seamless, high-performing streaming experience. By providing the space, compute power and interconnectivity, data centres store and help distribute digital content while making sure its performance, reliability and security are all the best they can be. Moreover, data centres give content delivery networks, ISPs, content providers and more, centralised locations to enhance the streaming experience for their customers.

Data centres do this, by providing the physical space to house digitised content, or CDNs and other entities in the entertainment market. Colocation facilities can rapidly and simply scale current space to enable growth, helping businesses in every industry to grow their footprints, as they need to. Moreover, by housing content or delivery networks in a data centre with the widest range interconnections - ISPs, home fibre providers, and IXPs, entertainment providers and other enterprises dramatically reduce the distance that content needs to travel, which brings which lowers latency and greatly enhances the user experience. The facilities are also designed with a wide range of physical and cyber security measures to ensure the safety and availability of the data they store, process and deliver. This includes perimeter fencing, biometrics, card readers, 24x7x365 patrolling guards, video surveillance, cyber security solutions, and compliance with all top security standards.

Digital, entertainment content delivery, in a wide range of forms, is only set to skyrocket in the next few years. Data centres today, give them a central hub to effectively store and deliver their services to consumers across an ever-increasing number of connected devices. Irrespective of the type of digital entertainment or how it is accessed, the data centre is working behind the scenes, making sure it is delivered reliably and instantly.

In the past few years, it has become apparent that businesses across the board are learning from the leaders in the industry. It has become clear that a sustainable competitive advantage no longer arises from providing a good product or solution, and doing it first, as these elements are static. Rather than being good at one particular service or product, businesses have learned to be adaptable, and



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good at learning how to do new things. Businesses that are ahead of the curve, have learned to read change and adapt to it rapidly. They have learned to experiment and iterate quickly and often, to be directionally accurate rather than exactly wrong, and to do this with their business models, strategies and processes too. They have also learned that a great part of success is due to smooth, personalised customer experiences, which depend on faster load times, bringing entertainment closer to the viewer, or apps closer to the user, all of which depend heavily on the data centre. Another lesson companies have learned from the culture of innovation, is to deliver this constantly, even in the smallest ways. Being able to pinpoint a single “one-of-a-kind” element in their solution that could amaze their customers, will help them to thrive, now and into the future.

When it comes to peering communities, colocation supports create long-term value relationships with various communities and peers connected to platforms such as PeeringDB, marketplaces and Networking Operating Groups. Being connected to the pan-African peering community and other partners is crucial for colocation facilities. As more and more ISPs, hyperscale businesses, carriers, cloud-managed services organisations and financial services make their home in these facilities, the data centres can offer all partners and providers a platform to network and interact with each other.

## African challenges

However, despite all the potential benefits, connecting Africa is not without its challenges. For many years it paid overseas carriers to exchange intra-continental traffic on its behalf, which was not only costly but inefficient. For example, recently established IXPs might experience low traffic volumes, due to slow or staggered growth, and incumbent operators might resist connecting to the IXP for fear they might lose traffic through peering. There is also a lack of both general infrastructures, as well as a technical understanding of how IXPs operate. In the case of the former, many emerging Internet economies experience challenges in terms of broadband terrestrial infrastructure (including fibre and copper) that cover availability, costs, as well as the quality of services. For the latter, the lack of technical skills and expertise needed to set up an IXP is also a concern. Moreover, current regulatory standards and policies can hamper IXP growth while inhibiting competition on the already limited broadband infrastructure. Similarly, there are not enough incentives and initiatives by both the public and private sectors to encourage newcomers into the market.



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African ISPs and content providers experience challenges too. Firstly, network security, as ISPs have to invest significantly in terms of time and resources to connect their networks. Customer churn is also an issue, as competition in the market makes building customer loyalty more difficult, and subscriptions drop. At the end of the day, good customer experience takes time and money, as ISPs and content providers need to keep abreast with market technologies, policies and regulations, as well as more demanding and fickle customers.

It is important to understand the market you in, what data eco systems are available and which will fit for purpose – especially when entering the African regions.

The key take away here is harnessing the power of science to create connections in Africa.

## | The African dream

There is a real opportunity for businesses and citizens alike when it comes to connecting Africa. Unlike the rest of the world which has ageing populations, Africa's population is getting younger, and it is hungry for all things digital. This generation of citizens wants to do things differently than their parents did. They are energetic and innovative, and all have smartphones which are like having mini supercomputers in their pocket, and they are eager to use them, to truly participate in the digital economy.

One thing is very clear - Africa is on the cusp of a technology-led evolution and has a real opportunity to catapult itself ahead when it comes to harnessing the power of technology and taking full advantage of the latest best practices and trends, without having to experience the growing pains and stumbling blocks its international counterparts had to experience.