

DATA CENTERS IN NIGERIA: INFRASTRUCTURE, REGULATION, AND ITS SIGNIFICANT ROLE IN DIGITAL TRANSFORMATION

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ABSTRACT

As Nigeria experiences rapid growth in the telecommunications sector, the demand for robust data infrastructure has become increasingly critical. Data centers now serve as the backbone of this digital expansion, enabling the storage, processing, and secure exchange of data across industries. This article examines the operation of data centers in Nigeria, beginning with an overview of their core functions and infrastructure and outlines the globally recognized tier classification system (Tier I to Tier IV), which measures reliability and uptime. The article also delves into the regulatory landscape, including licensing requirements and data protection mandates. Through this analysis, the article highlights the strategic role of data centers in Nigeria's digital transformation journey and their importance in building a resilient, scalable, and secure digital ecosystem.

1. Introduction - What is a Data Center?

A data center is a specialized facility used to store and manage large volumes of data and applications for businesses and organizations.¹ It consists of spaces that house computing and networking equipment used to collect, process, store and distribute data and applications. Servers, storage systems, routers and firewalls operate alongside cooling systems, backup power supplies and physical security controls.² Data centers are regarded as the backbone of the modern digital world, every email sent, video streamed, or online payment processed travels through one or more data centers. Without them, modern digital services would not exist.

To understand how data centers come into play in everyday life, consider what happens when you send an email using Gmail. The moment you hit "send," your message travels through your internet connection to Google's nearest data center which is a massive, secure facility filled with servers and high-speed networking equipment. Think of it as a digital post office, except instead of sorting letters, it processes and routes tiny packets of data. Inside the data center, your email is received, scanned for spam or viruses, stored securely, and prepared for delivery. If the recipient also uses Gmail, the message might simply move from one server rack to another within the same facility. If they use a different email provider, the email is sent over the internet backbone to that provider's data center. Throughout this process, the facility's backup power systems, cooling equipment, and security controls ensure your email is processed quickly and reliably often in just milliseconds. Without data centers, routine digital activities like sending emails, streaming videos, or making online payments simply would not be possible.



¹ <https://www.landapp.com/post/what-are-data-centers-and-how-do-they-work#:~:text=What%20is%20a%20Data%20Center,%2C%20security%2C%20and%20energy%20efficiency>

² <https://www.fortinet.com/resources/cyberglossary/datacenter#:~:text=Top%205%20Components%20of%20a%20Data%20Center&text=The%20essential%20components%20of%20any,with%20a%20lot%20more%20memory>

² <https://www.fortinet.com/resources/cyberglossary/datacenter#:~:text=Top%205%20Components%20of%20a%20Data%20Center&text=The%20essential%20components%20of%20any,with%20a%20lot%20more%20memory>

2. Types Of Data Centers

Data centers can be classified by ownership and operational model:

a. Colocation Data Centers: These are data centers that lease space and core infrastructure (power, connectivity, cooling and security) to businesses that install and manage their own servers and Information Technology (IT) equipment. This model offers shared resources and economies of scale.

b. Enterprise (on-site) Data Centers: These are built and operated by companies on their premises for exclusive use. They offer full control but require substantial capital expenditure on infrastructure and maintenance.

c. Hyperscale Data Centers: These are large-scale facilities that provide massive, scalable computing and storage capacity for cloud and high-volume workloads. They are engineered for extreme scalability and optimized network connectivity.

d. Cloud Data Centers: These are off-premises facilities operated by a cloud services provider allowing organizations to access computing resources on demand without maintaining their own physical infrastructure. This model is attractive to small and medium-sized enterprises that lack the capital to build on-site centers.

3. Data Center Tier Classification:

Data center tiers are categorized from Tier I to Tier IV. Each tier is defined by the infrastructure levels based on redundancy, availability, and ease of maintenance. Each successive tier enhances the capabilities of the previous one, with higher tiers providing increased reliability and uptime.

a. Tier I – Basic Capacity: These facilities provide the basic capacity level required to support IT for an office. It requires an uninterruptible power supply (UPS) for power outages, sags, and spikes, an area for IT systems, dedicated cooling equipment that runs outside office hours, and an engine generator for power outages.³ This infrastructure utilizes a single distribution path for the environment and only provides the power and cooling capacity to support the data center at full IT load.⁴ A Tier 1 facility protects against human error but offers limited protection against unexpected failures or outages and will have to shut down completely for maintenance, resulting in about 28.8 hours of downtime annually.⁵ It is the most basic level and has no redundancy.

b. Tier II - Redundant capacity: These centers add redundant components by reducing downtime to roughly 22 hours, offers improved protection against physical events and provide maintenance/safety against disruptions through equipment like cooling systems, energy generators and storage, fuel tanks, and pumps.⁶ Just like the tier I it has one distribution path.

³<https://www.fortinet.com/resources/cyberglossary/datacenter#:~:text=Top%205%20Components%20of%20a%20Data%20Center&text=The%20essential%20components%20of%20any,with%20a%20lot%20more%20memory>

⁴ <https://www.coresite.com/blog/breaking-down-data-center-tiers-classifications>

⁵ What is a Data Center? Meaning, Definition, Operations & Types | Fortinet

c. Tier III - Concurrently maintainable: These centers utilize multiple distribution paths to ensure there are no interruptions if one path is unavailable. This level of redundancy offers concurrent maintainability, meaning that each critical component or distribution path can be shut down for planned maintenance without affecting the IT environment.⁷ It is more suited for larger businesses.

d. Tier IV - Fault tolerant: These centers feature independent, physically isolated systems that create redundant capacity components and distribution paths. This ensures that planned or unplanned disruptions will not affect the facility and IT operations. All IT equipment in a Tier IV facility must have fault-tolerant power design, and the building requires continuous cooling, so the environment remains stable.⁸ A Tier IV data center is typically suitable for enterprise corporations.

4. Regulatory Framework

Due to the nature of data centers, they are subject to various regulations. These are:

a. Licensing and Permits: Regulatory approvals for construction, operations, and specialized services (e.g., telecommunications) must be obtained from agencies like the Nigerian Communications Commission (NCC) or National Information Technology Development Agency (NITDA).

b. Data Protection and Privacy: Due to the nature of their activity which involves collection/processing of data, Data Centers are subject to the provisions of the Nigerian Data Protection Act 2023 (NDPA) and the General Application and Implementation Directive 2025 (GAID) which require data to be processed in a lawful, fair and transparent manner and provide adequate organizational and technical security measures.

c. Environmental Regulations: Compliance with the Environmental Impact Assessment Act is mandatory. Data centers must mitigate environmental risks, including energy efficiency and carbon footprint.

d. Energy Regulations: Data centers require a stable power supply. Compliance with laws and regulations like the Electricity Act 2023 and state-specific electricity laws and regulations affect access to grid power and off-grid solutions.



⁶ ibid

⁷ <https://www.coresite.com/blog/breaking-down-data-center-tiers-classifications>

⁸ <https://www.fortinet.com/resources/cyberglossary/datacenter#:~:text=Top%205%20Components%20of%20a%20Data%20Center&text=The%20essential%20components%20of%20any,with%20a%20lot%20more%20memory>

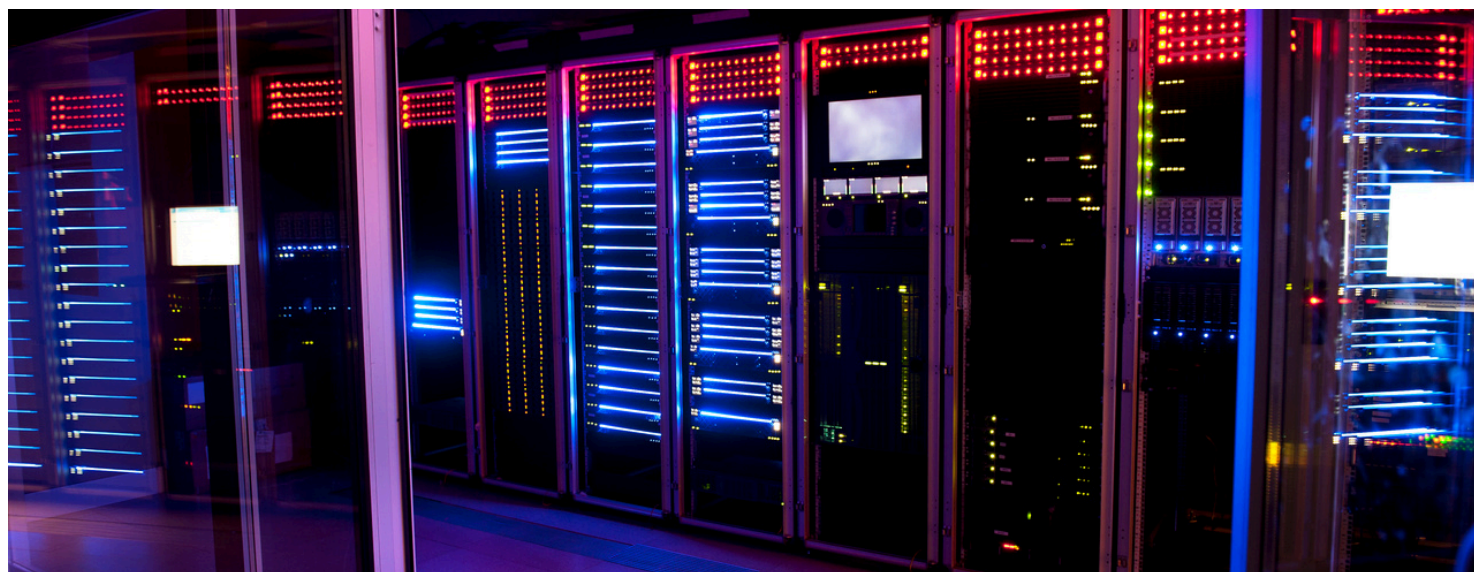
5. Significance of Data Centers in Nigeria

Well-developed data centers are critical for Nigeria's technological advancement. They enable faster communication, lower latency and improved digital services, providing the infrastructure necessary to support fintech, e-commerce, telemedicine and AI applications. However, Nigeria currently accounts for only about 10 % of Africa's total data-center capacity.⁹ Existing facilities—such as Rack Centre, MDXi (MainOne) and Galaxy Backbone—are primarily concentrated in Lagos and Abuja and have limited capacity compared with international counterparts. As a result, many organisations rely on foreign data centers, raising data-sovereignty concerns, increasing latency and elevating costs.¹⁰ Building more local data centers would promote data sovereignty, reduce service delays and stimulate economic growth.

Government support is crucial to address infrastructure deficits. Unreliable power supply and inadequate broadband infrastructure remain significant challenges. Public-private partnerships, investments in national fiber networks and improvements in electricity generation and distribution will be necessary to attract investment and expand local data-center capacity. Expanding and upgrading data centers will help Nigeria become a digital hub in West Africa and unlock opportunities in AI, IoT and other emerging technologies.

6. Conclusion

The establishment and operation of data centers in Nigeria play a critical role in supporting the country's digital transformation and economic growth. They provide the infrastructure that supports everyday digital services, enable high-performance computing and foster the development of emerging technologies. While Nigeria has made progress, its current data-center capacity remains limited, leading many organisations to host data abroad. By investing in domestic data centers, adhering to regulatory requirements and improving national infrastructure, Nigeria can reduce latency, ensure data sovereignty, attract investment and position itself as a leading data hub in Africa.



⁹ High-performance data centres: The bedrock of national and Nigerian AI development - The Nation Newspaper

¹⁰ ibid

Babalakin & Co. is a firm with broad experience on the subject of Telecommunications and all matters encompassing it. If you have any questions or would like information on the issues discussed, please contact:



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