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## From Connectivity to Prosperity: The Role of Telecom and AI in Public Service Delivery

Dayn Amade, Entrepreneur and Inventor,  
Tablet Comunitario

- The Spatial Computing Revolution: How XR, AI, and 5G Are Shaping Digital Experiences
- Emerging Trends in Telecom Operations Standardization for Enhanced Efficiency
- Harnessing AI for the Evolution of Radio Access Networks

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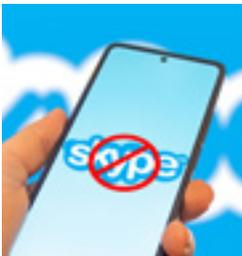
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Dayn Amade, Entrepreneur and Inventor, Tablet Comunitario

## From Connectivity to Prosperity: The Role of Telecom and AI in Public Service Delivery

The world is undergoing a profound transformation as digital technologies revolutionize societies worldwide. Nations, businesses, and communities are increasingly integrating with the digital landscape and leveraging innovative technologies such as artificial intelligence, cloud computing, big data, 5G, blockchain, and the Internet of Things (IoT). These advancements are redefining industries, unlocking new business opportunities, and addressing critical global challenges in healthcare access, economic inequality, and environmental sustainability.



**A**t the heart of this transformation is the telecommunications sector, which serves as the backbone of global communication infrastructure. The telecommunications sector plays a fundamental role in economic growth and has the potential to drive inclusive and sustainable development. By optimizing existing infrastructures, telecom companies are uniquely positioned to bridge the digital divide, promote sustainable practices, and contribute to a more equitable society.

In an era marked by rapid urbanization and digital evolution, the demand for streamlined, accessible, and efficient services is at an all-time high. Governments face significant challenges in service delivery, especially in remote or underserved regions where infrastructure is lacking. This situation presents an opportunity for governments to enhance service delivery by integrating technological advancements, ensuring seamless interaction and stronger citizen engagement.

Essential services such as energy, telecommunications, and human resources are key ingredients for societal progress. Similarly, telecommunications infrastructure is indispensable for digital services such as banking, online education, and e-commerce. However, in many regions, access to these services is severely limited by inadequate

infrastructure. These shortcomings often hinder the prosperity of individuals and local businesses, impede economic progress, perpetuate inequality, and restrict economic opportunities.

At present, providing basic services in areas without reliable electricity is challenging.

In addition to this, effective service delivery is often hampered by a lack of skilled labor in rural and underdeveloped areas, making the situation even more dire. Businesses in these regions often struggle to expand due to a shortage of skilled workers, leading to increased operational costs that prevent growth and negatively impact GDP and overall economic output. By prioritizing infrastructure development, particularly in underdeveloped areas, governments can stimulate economic growth and open new opportunities for both businesses and individuals.

Digital ecosystems hold significant transformative potential. By digitising services, barriers to access can be lowered, enabling citizens to remotely access healthcare, education, and government resources. Digital ecosystems also present new opportunities for e-commerce platforms. The widespread availability of internet connectivity and digital tools enables businesses to expand their global reach, allowing local entrepreneurs to sell goods and services on international platforms. Companies can access new clients, minimize overhead costs associated

with maintaining physical offices, and operate around the clock without geographical limitations.

In today's world, it is unacceptable for people to travel long distances to access essential services. Developing a comprehensive digital business ecosystem presents a more inclusive solution, allowing citizens to avoid logistical travel challenges. Concurrently, governments can broaden the reach of their services, e-commerce platforms can drive business growth, and network operators can leverage portable radio antennas to evaluate market potential before committing to large-scale infrastructure investments. Moreover, the integration of data insights within digital ecosystems allows governments to design targeted policies and optimize service delivery. This strategic use of data enhances the responsiveness and efficiency of public services, ensuring that they meet the evolving needs of citizens in a dynamic digital landscape. Digital services could also help governments become more transparent, reduce corruption, and ensure that public services are accessible to everyone. By understanding the needs of the population better and using data effectively, governments can create targeted policies and improve service delivery.

Nowadays, people can attend medical appointments, participate in online classes, access government services, and conduct banking transactions from the comfort of their homes. This convenience makes life more efficient



for everyone, especially in rural areas where travelling to physical service centers can be time-consuming and costly. By providing these services online, citizens can save both time and money, leading to an improved quality of life.

The shift to digital services presents governments with an opportunity to provide public services more efficiently to a wider population. This is where the concept of a "seamless government" comes into play, ensuring that governments are formally present for all citizens. In response to these needs, innovative solutions like the Seamless Service Terminal (SST) have emerged. We have rebranded the Tablet Comunitario and relaunched it under the new trademark Seamless Service Terminal (SST).

The SST, formerly known as the Tablet Comunitario, is an innovative solar-powered one-stop interactive office designed to overcome challenges related to digital and interactive integration. Established in Mozambique in 2016, its goal was to provide digital and interactive information to support social programs in rural and distant communities. To date, this program has successfully reached approximately 2 million people, delivering digital services to these rural and remote areas. SST utilises solar energy to promote sustainability and accessibility, enabling communities to benefit from

digital content despite geographical and infrastructure limitations. Its renewable energy sources can generate electricity 24/7, providing optimal power solutions. This technology not only powers portable mobile towers but also enables internet service in very remote areas through GSM and network connectivity. This initiative highlights the technology's potential to bridge the knowledge gap and promote community development in disadvantaged areas.

This solution with SST addresses complex settings and is also beneficial for urban areas in terms of decentralising services, supported by sustainable telecom infrastructure powered by renewable sources.

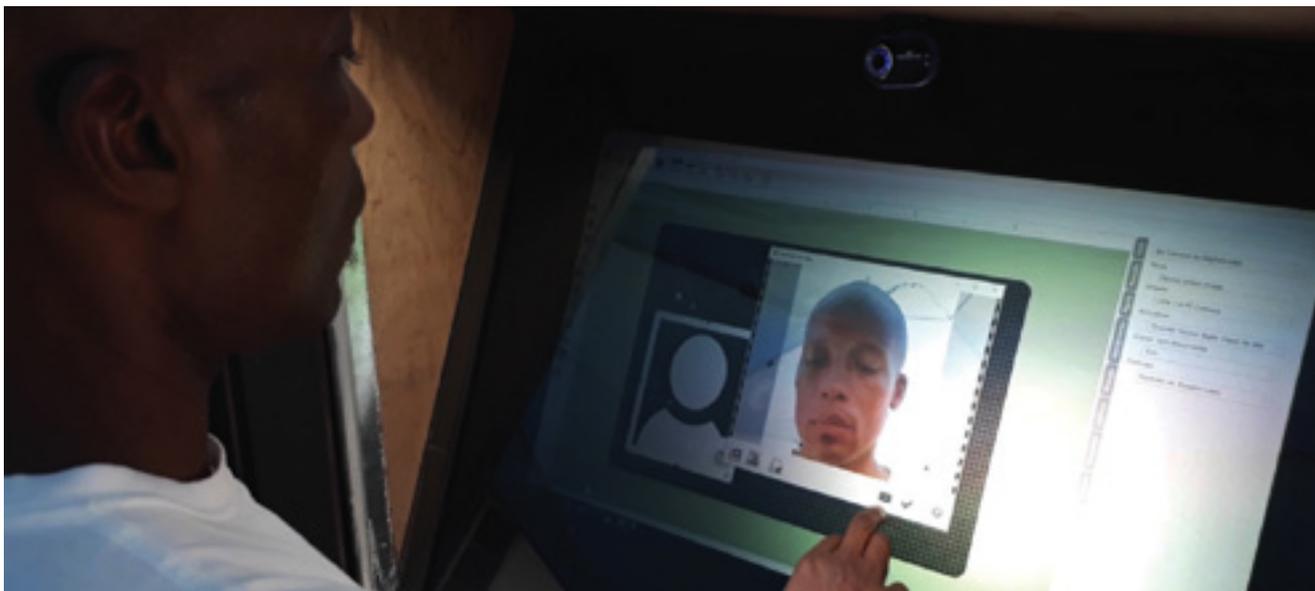
Complex settings often lack the necessary infrastructure, electricity, and human resources, making access to basic services more difficult and creating barriers to economic growth. Restriction of services results in reduced e-commerce opportunities and access points, significantly impacting business revenue and GDP.

When taking the opportunity to discuss social programs, we find that empowerment and accessibility initiatives in underserved communities are greatly enhanced by technology. These programs use educational content and telemedicine supported

by AI to address the gap in qualified human resources.

Social programs that leverage technology like SST provide significant empowerment and increase accessibility for marginalized communities. They help bridge educational gaps by offering essential learning opportunities, particularly in remote areas. The integration of telemedicine, backed by AI, represents a transformative approach to tackling healthcare challenges, especially in communities with limited access to qualified medical professionals. AI can aid in diagnosing conditions, offering remote consultations, and providing health advice, thus alleviating the shortage of skilled healthcare workers in rural or isolated settings. This ensures that individuals can receive timely medical support, even without physical access to healthcare facilities or specialists.

Together, these initiatives in education and telemedicine create a comprehensive support system that empowers individuals through knowledge while prioritizing their well-being. They help overcome geographical and infrastructural limitations, which are crucial for reducing shortcomings in both education and healthcare. Ultimately, these programs promote sustainability and contribute to the social and



economic development of remote communities.

The transition toward more independent aid management presents both challenges and opportunities for countries to reinvent themselves and discover innovative solutions to fund their social and humanitarian programs. By leveraging the potential of delivering governmental and commercial services to a broader society, countries can increase revenue and overcome challenges to subsidize part of their social and humanitarian initiatives. It is my hope that this approach aligns with the grant cooperation model and partners.

While this strategy may not completely replace traditional aid, it can significantly enhance accessibility to services, particularly in rural and underdeveloped areas. Investment in essential social and humanitarian activities can be funded through revenue generated by offering premium or value-added services. This method has the potential to reduce heavy reliance on foreign aid and promote self-sufficiency while ensuring that disadvantaged areas receive critical assistance.

In this new paradigm, innovation is key. Countries could develop a more sustainable revenue stream by integrating technologies, such as

self-service terminals (SST), into their national strategies. These integrating technologies could not only address current needs but also support long-term development goals, despite potential reductions in foreign aid.

Being a member of ITU T and ITU D offers considerable benefits, as well as the opportunity to publish technical papers at various conferences. Notably, contributions made within our associated study groups have led to plenary approvals, underscoring the impact of our engagement. These participations influence global telecommunications standards and development strategies, promoting collaboration among governments, industries, and stakeholders. In the study groups I am still involved with, we have made contributions that resulted in plenary approval.

Our latest contribution to the ITU requirements for accessible and transportable communication systems in rural and out-of-home situations has been officially approved in Geneva during the ITU standards and recommendations assembly plenary, thanks to the diligent efforts of Study Group 21. This report addresses complex environments and the specific needs of individuals with disabilities, ensuring their access to telecommunication services is prioritized. By developing these

standards, we are reinforcing our commitment to building a digital infrastructure that is inclusive and accessible for all. This initiative ensures that individuals with special needs can fully engage in the digital world, taking advantage of advancements in telecommunications, education, healthcare, and other essential services. All necessary conditions for adoption have been met, and it is now an opportune time to proceed.

In the new decentralized era, the Seamless Government (SG) concept outlines how government organizations should respond to the needs of citizens while facilitating integrated business operations and collaboration among government units. Seamless Government aims to provide high-quality, customer-focused public services in a more efficient and accessible manner. By creating a one-stop platform, it ensures that citizens and businesses can easily access services tailored to their specific needs—whether dealing with personal life events or managing business operations. This approach enhances convenience and improves government efficiency by eliminating redundant processes and maximizing the use of limited resources.

Through our work, we have introduced this concept, explored its key principles, necessary resources, and expected



outcomes, all of which are integrated into our developed Seamless Service Terminal (SST). Public sector reform and e-government have interconnected demands that are essential for one another. E-government serves as a crucial facilitator for public sector reform, as organizational transformation relies heavily on information and communication technology (ICT) for all but the simplest tasks. Conversely, successful e-government implementation requires organizations to undergo structural and process changes to effectively adopt technology. Merely digitizing government information and making it available online is insufficient. While creating a simple website for a government agency that provides static information about its structure, services, and communications may not require significant changes, Seamless Government encourages collaboration as the foundation for technology-enabled improvements in government – between public sector organizations from different levels and functional areas of government, between public and private sector organizations, and across different public administration systems.

A one-stop shop is a government agency that consolidates services from multiple public administration authorities, allowing individuals to complete various tasks in a single visit. Services are tailored to various groups, including citizens (G2C), businesses (G2B), government agencies (G2G), employees (G2E), and visitors (G2V). For example, citizens can access social security benefits (G2C), businesses

can obtain licenses to operate (G2B), government agencies can collaborate on construction plans (G2G), employees can receive training (G2E), and visitors can apply for visas (G2V). Generally, there are twelve key G2C services and eight G2B services available. While public sectors are increasingly adopting e-government, one of the major challenges is addressing the needs of those who face barriers to accessing telecommunications services, such as individuals with disabilities.

Decentralization can improve service reach by bringing services closer to communities, and solutions to guarantee accessibility are already available. Implementing strategies specific to the needs of these marginalized populations such as accessible interfaces, assistive technologies, and mobile-friendly platforms is essential. Governments can bridge these gaps by adopting inclusive technologies and approaches.

Let us imagine a scenario where citizens require basic health screenings something that many fortunate individuals can access conveniently with digital watches. For instance, Mozambique, like many African nations, is grappling with a learning crisis; according to UNESCO, 89% of children in sub-Saharan Africa cannot read and comprehend age-appropriate texts by age 10. Additionally, a report by Doctors Without Borders highlights the ongoing conflict in Cabo Delgado, Mozambique, which began in 2017 and continues to severely disrupt healthcare access. Over one million people have been displaced, and many

health facilities have been destroyed or remain non-functional. Even though there has been a decrease in violence in 2023, the situation remains unstable, with attacks impeding humanitarian efforts and healthcare services. The lack of safety and ruined infrastructure limits access to essential healthcare, particularly for individuals with chronic or urgent conditions. The rainy season exacerbates the situation, leading to outbreaks of diseases like malaria. Doctors Without Borders continue to provide support, focusing on mental health, sexual and reproductive health, and improving water and sanitation. However, access to healthcare remains limited, and Doctors Without Borders advocates for greater protection for medical staff and facilities.

Our question is: Do these individuals have to travel long distances to access basic services? Are they living in the digital era?

Today, AI has the potential to act as a virtual doctor companion, revolutionizing healthcare access. What are we waiting for? It is time to take action for digital transformation and leverage it for sustainability.

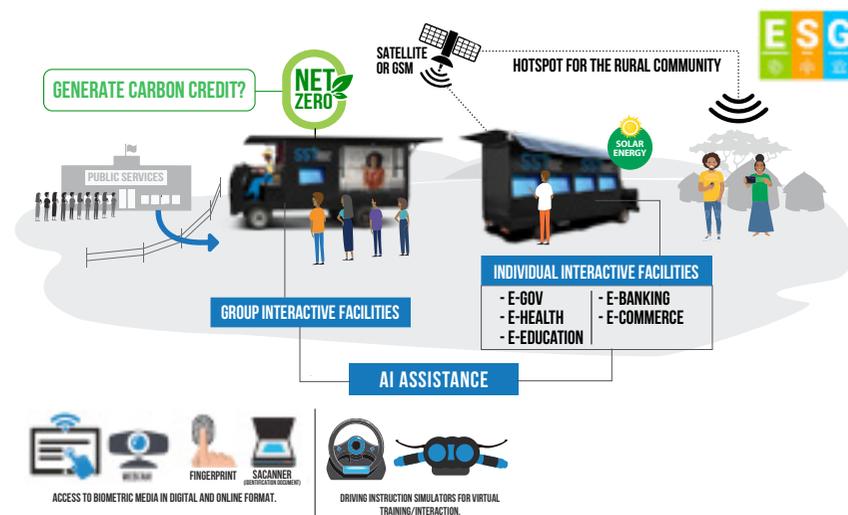
Ultimately, the key is not just to have the right solutions in place but to ensure widespread adoption of these solutions. This requires a commitment from governments, service providers, and other stakeholders to prioritize accessibility, provide proper infrastructure, and educate the public about the availability of these services. With the right focus and collaboration, we can significantly bridge the existing disparities. Partnerships and strong alliances are essential for making progress, and cooperation is crucial. For instance, in Mozambique, the initiative that engaged 2 million people with the help of both governmental and non-governmental organizations demonstrates the power of partnerships. These organizations can collaborate to ensure that digital services, such as educational content and telemedicine, reach the most underserved and rural regions. Currently, we have an on-road version designed for mobility in harsh

environments, but our goal extends to developing an amphibious version to connect islands and areas that are difficult to access. No one should be left behind; the more inclusive we are, the more we will all feel the positive impacts of digital transformation, both environmentally and economically.

Our vision for expanding the reach of our solutions is both inspiring and critical to ensuring that no community is overlooked in the digital transformation. The existing on-road version has already made a significant impact. However, our goal of evolving to an amphibious version that is capable of connecting islands and other hard-to-reach areas highlights our commitment to inclusion. The ability to connect remote areas, whether landlocked or separated by water, could guarantee that even the most geographically challenged regions can have access to critical services such as education, healthcare, and government resources. Such an approach could help remove barriers that have traditionally limited access to these services, creating a more inclusive society. One potential solution for telecom operators seeking to extend network data services is an economic assessment. By implementing our methodology, immediate deployment can be achieved, along with revenue generation to finance solid infrastructure for connectivity.

The Government of Gambia has already signed an agreement for the implementation of e-services delivery, and broad partnerships are encouraged. This represents a significant opportunity to create strong business synergies, particularly in collaboration with major technology companies across hardware, software, and telecommunications sectors, facilitating market expansions. We are fully open to exploring these opportunities.

Currently, we are focused on enhancing the proof of concept in Portugal, in collaboration with the University of Évora through a program titled RapidGov. The objective is to build upon initiatives established through various



global partnerships and expertise. Our efforts aim to revolutionize e-commerce, particularly in the context of complex delivery systems. To this end, we have developed a drone port and charging station designed to facilitate deliveries, which has the potential to substantially transform business operations.

SST's efforts have not gone unnoticed. Mobility 54, the corporate venture capital subsidiary of Toyota Tsusho Corporation and CFAO Group has recently awarded SST with the "Best Mobility Solution Award" for E services. This award recognises SST's impact and excellence in providing innovative mobility solutions. This recognition, coupled with ongoing explorations with Nokia, highlights SST's standing as a leading entity in the telecommunications sector.

In recent months, we have collaborated with Nokia on their Rural Connect initiative, an innovative solution designed to enhance connectivity in rural areas. This concept facilitates SST (Backhauling), enabling seamless mobile data and voice services on top of our current service offerings. Developed by Nokia's Mobile Networks team in the MEA region, Nokia Rural Connect is an award-winning solution that integrates mobile RAN technology with renewable energy and circularity principles, significantly reducing carbon emissions through green energy. By combining mobile connectivity with essential social

services, the Nokia Rural Connect + SST solution delivers immense value to underserved communities, promoting social and economic development. Currently, this solution is being discussed with leading CSPs across the market, with the goal of accelerating rural connectivity and inclusion.

Another important aspect of our telecommunication methodology is its environmentally friendly nature and potential to generate carbon credits. Carbon credits represent a new compensation model that can benefit the telecom industry. This encapsulated methodology relies on green energy and serves as a tool to reduce carbon emissions from citizens travelling from point to point. It can also be used as part of a digital awareness campaign encouraging users to save the planet.

By leveraging these elements, SST is transforming the telecommunications industry and crafting a future where digital services are universally accessible. Its role in bridging technological gaps signifies the dawn of a new era of inclusive growth and empowerment.

Through its forward-thinking initiatives, SST actively welcomes partnerships that align with Sustainable Development Goal 17, move towards a digitally connected world, and set a benchmark for excellence in technology and innovation. **TR**



Doreen Mokoena , cybersecurity expert

## Securing Africa's Telecoms: Insights from Doreen Mokoena

In this exclusive interview with Telecom Review, cybersecurity expert Doreen Mokoena discusses the growing challenges African telecoms face with cyber threats, regulatory hurdles, and data breaches. She shares insights on the role of AI and blockchain in enhancing data protection and offers guidance on how telecoms can maintain a balance between compliance and innovation.

**W**hat are the biggest challenges telecom operators face in ensuring data privacy and protection, and how can they address them?

African telecom companies face significant obstacles when it comes to data privacy and protection. The situation is more difficult due to persistent cybersecurity threats, insider threats, weak and uneven rules throughout the continent, and a general lack of public awareness. The situation is further complicated by government

surveillance. Consider South Africa, where strict privacy standards are established under the Protection of Personal Information Act (POPIA). However, many nations lack strong regulations or the capacity to enforce them. The Nigeria Data Protection Regulation (NDPR) attempts to protect user data in Nigeria; however, it is difficult to enforce, which allows for regular breaches.

Cybersecurity threats are significant because hackers frequently attack telecom networks to obtain private data, such as call logs and financial information. Many African telecom companies do not have the necessary cybersecurity defenses in place, making them vulnerable. A clear reminder of this occurred in 2022 when major companies, including South Africa's largest telcos, suffered serious data breaches that exposed millions of client records.

Insider threats further exacerbate the problem. Sensitive information may occasionally be misused or sold by contractors or employees who have access to it, as was the case in Kenya when Safaricom was accused of data leaks that made fraud possible. Another significant obstacle is the general lack of awareness about data protection. Telecom corporations can sell user data to advertising without explicit authorization since many individuals are unaware of how their data may be used. There have been cases of telecoms being accused of selling data without authorization, according to reports from Ghana and Uganda. These challenges highlight the urgent need for stricter data protection laws, better cybersecurity infrastructure, and greater transparency in telecom operations throughout Africa. Both companies and governments must work together to create a safer environment for everyone's data.

### How is AI transforming cybersecurity in the telecom industry, and what are some real-world applications?

It's an exciting shift as AI is changing how the telecom sector approaches cybersecurity. Fraudsters find telecom networks to be appealing targets

because they manage vast amounts of sensitive data. AI-powered security systems are standing up to the challenge to counter this. By using machine learning to analyze network traffic in real-time, these systems can identify anomalies and anticipate possible cyber threats before they occur. For example, intrusion detection systems (IDS) driven by AI can identify unusual patterns that may indicate malware or hacking efforts, allowing telecom operators to take prompt action to stop damage.

Another area where AI has had a significant impact is fraud. AI-driven fraud detection systems constantly monitor user behavior and report anything unusual in order to fight against problems like SIM swap fraud, phishing, and identity theft. AI can take immediate action with automatic incident responses when something does go wrong. It can rapidly isolate impacted network segments, reducing downtime and damage. Significant real-world achievements have already been made, such as MTN's AI-driven threat intelligence system that strengthens cybersecurity throughout its African markets and Vodafone's use of AI to lower SIM-swap fraud. By embracing AI, telecom companies can build faster, more accurate, and more proactive cybersecurity defenses, ensuring that both their infrastructure and their customers' data are better protected from a constantly evolving landscape of threats.

### **In what ways can blockchain technology enhance data security and prevent fraud in telecom networks?**

Blockchain technology is revolutionizing the telecom sector by offering decentralized, transparent identity verification and fraud prevention solutions. Its ability to prevent identity theft and SIM swap fraud is one of its most notable advantages. Telecom businesses can construct user profiles that are almost impossible to alter or falsify by using blockchain-based identity management. As a result, there is significantly less chance of sensitive accounts being accessed without authorization. By distributing data among multiple nodes instead

of storing it in a single, centralized database, blockchain improves the security of consumer data. This is why hackers find it very difficult to compromise systems and steal data.

In order to combat call and SMS fraud, including problems like caller ID spoofing and Wangiri scams, technology is also essential. Real-time call and message authentication guarantees that the content that reaches your phone is authentic. Blockchain promotes transparency in billing and roaming services. It provides a permanent record of transactions between telecom operators, which helps to prevent fraudulent charges and disputes. Companies like Telefonica are already implementing blockchain-based solutions for data privacy, and there are collaborations like that of IBM and Orange which are working together to fight against call fraud. Overall, blockchain is proving to be a game-changer, safeguarding telecom networks from cyber threats and dishonest practices.

### **How can telecom companies balance regulatory compliance with the need for innovation in data protection strategies?**

Telecom firms can balance innovative data protection techniques and regulatory compliance by viewing laws like the CCPA, NDPR, GDPR, POPIA, and CPRA not as obstacles but as opportunities to build customer trust. These businesses might welcome them as an opportunity to gain their clients' trust. They can improve security and show their dedication to data privacy by adopting a proactive, technologically astute strategy that complies with these legal standards. Data protection measures can be greatly enhanced while maintaining regulatory compliance by using cutting-edge technologies like end-to-end encryption, blockchain for identity verification, and artificial intelligence (AI) for threat detection.

Another idea is regulatory sandboxes, which are safe spaces where businesses can test out new security technology while regulators keep an eye on them. As a result, telecom companies can innovate without worrying about breaking the law. Engaging continuously

with policymakers and promote collaborations within the industry can help shape regulations that encourage both adherence and technological progress. Some telecom companies in South Africa (not sure if this is correct) have invested in blockchain technology to secure transactions, aligning with regulatory requirements. By integrating compliance into their innovation strategies, telecom companies can achieve not just regulatory approval, but also reliable cybersecurity. This approach ultimately strengthens customer trust and enhances the resilience of their businesses.

### **As cyber threats continue to evolve, how should telecom providers integrate AI and blockchain to build a more resilient security framework?**

Combining blockchain and artificial intelligence (AI) can help telecom carriers build a stronger security framework. In real time, AI-powered cybersecurity can sort through enormous volumes of network data, finding anomalous activity, possible dangers, and even automating attack response. These systems can become more intelligent over time through machine learning, which improves threat detection and lowers the likelihood of breaches. By offering a decentralized, immutable ledger for data storage and transaction verification, blockchain technology offers a unique set of benefits. This prevents data from being tampered with, helps avoid situations like SIM switch fraud, and makes it far more difficult for unauthorized users to access vital information.

Telecommunications businesses can build a strong, multi-layered protection system by combining these two potent techniques. Blockchain protects the integrity of the data they handle, while AI can swiftly recognize and respond to threats. There are already some impressive real-world applications out there, like IBM's blockchain solution that helps authenticate calls and prevent spoofing or robocalls. Combining AI and blockchain, telecom providers can stay one step ahead of cybercriminals, fortifying their data protection measures, ensuring regulatory compliance, and building trust with their customers in this increasingly digital age. 

## Egypt Unveils “Digilians” Initiative to Build Next-Gen Tech Talent



Egyptian President Abdel Fattah El-Sisi met with Prime Minister Dr. Mostafa Madbouly, Minister of Communications and Information Technology Dr. Amr Talaat, and Military Academy Director Lieutenant-General Ashraf Zahir to discuss the “Digilians” initiative.

Presidential Spokesman Ambassador Mohamed El-Shennawy stated that the initiative aims to train young Egyptians in communications, IT, and software development to support digital transformation and economic growth. Minister Talaat outlined the initiative’s focus on high-demand fields such as AI, programming, cybersecurity, and digital arts, with open registration for individuals of all backgrounds nationwide.

Applications will be submitted digitally, with registration opening

after Eid Al-Fitr. Participants will receive full residency in designated training facilities and gain practical experience through partnerships with international and local companies. The program offers advanced training tracks, including master’s degrees, targeting 5,000 trainees annually. With a budget of EGP 4 billion, it aims to boost Egypt’s digital workforce.

President El-Sisi emphasized transparency in the selection process to ensure credibility and maximize the program’s impact.

## Ghana and UNESCO Partner to Drive AI Innovation Across Key Sectors



UNESCO and Ghana have launched a groundbreaking collaboration to leverage artificial intelligence (AI) in transforming key sectors such as digital education, healthcare, agribusiness, and culture while

advancing efforts to establish a centralized data system.

During a courtesy visit to the Minister for Communication, Digital Technology, and Innovations, Hon. Samuel Nartey

George (MP), UNESCO representatives explored strategies to strengthen Ghana’s position in the AI and innovation landscape.

The discussions focused on enhancing digital education, improving access to digital healthcare, and harnessing AI-driven solutions to modernize the agribusiness sector. Hon. Sam Nartey George also underscored the need for UNESCO’s support in integrating AI technologies to revitalize Ghana’s cultural landscape, boosting creative activities and increasing revenue streams.

The Minister also reaffirmed Ghana’s commitment to consolidating national data into a centralized system, which will serve as a foundation for informed decision-making and future technological advancements. This partnership marks a significant step toward positioning Ghana as a leader in AI innovation within the African continent.

## G6 Operators Tackle Handset Affordability to Bridge Africa's Digital Gap



The Africa Group of Six (G6)—which includes Airtel, Axian Telecom, Ethio Telecom, MTN, Orange, and Vodacom—has made notable progress in expanding mobile coverage across sub-Saharan Africa. However, 60% of those in covered areas, approximately 710 million people, remain disconnected due to the high cost of mobile devices.

During Mobile World Congress 2025 in Barcelona, G6 members met with industry leaders, policymakers, and global institutions to assess progress

and reinforce their commitment to digital inclusion. Discussions primarily focused on handset affordability, identified as the main barrier to mobile adoption. The G6 has been pushing for fiscal reforms, including the expansion of a UNECA study on reducing smartphone taxes to 52 African nations.

To improve accessibility, the coalition is collaborating with the World Bank Group, the ITU, and the GSMA Handset Affordability Coalition while also advocating for regulatory policies

that ensure fair contributions from major traffic originators and satellite networks, creating a more balanced digital ecosystem.

Moving forward, the G6 will continue to advocate for the removal of sector-specific taxes on low-cost smartphones and mobile money transactions. It also plans to work with finance ministries, the World Bank, and the IMF to highlight the telecom sector's economic impact and promote investment-friendly regulations.

In line with its sustainability goals, the G6 has partnered with Mission 300, a World Bank Group and African Development Bank (AfDB) initiative, to provide electricity access to 300 million Africans by 2030. It has also released a report outlining strategies for integrating green energy solutions into telecom infrastructure, particularly in off-grid and underserved areas.

## Nigeria to Build 7,000 Telecom Towers to Bridge Connectivity Gap



The Nigerian government has announced plans to build 7,000 telecom towers across rural areas to improve connectivity. Speaking at the International Submarine Cable Resilience Summit in Abuja, Dr. Bosun Tijani, Minister of Communications, Innovation, and Digital Economy,

confirmed that the Federal Executive Council (FEC) approved the initiative as part of a broader effort to close the digital divide.

The government also plans to strengthen subsea cable systems and continue the deployment of

90,000 km of fiber-optic cables. Tijani emphasized the importance of providing quality telecom services, particularly to underserved areas, aligning with the administration's focus on digital inclusion and economic growth.

The summit, organized by Nigeria's Ministry of Communications, ITU, and ICPC, brought together global delegates who pledged to boosting subsea cable resilience through international cooperation and investment. Minister Tijani reaffirmed Nigeria's central role in shaping global efforts to protect digital infrastructure and enhance resilience.



# The Spatial Computing Revolution: How XR, AI, and 5G Are Shaping Digital Experiences

In an era where technology is rapidly evolving, spatial computing has emerged as a groundbreaking force, revolutionizing how we interact with digital environments. By integrating Extended Reality (XR), Artificial Intelligence (AI), and 5G technology, spatial computing is transforming industries, enhancing user experiences, and paving the way for a more immersive and interconnected digital world.

## **T**he Rise of Spatial Computing

Spatial computing refers to the ability to interact with digital content in a three-dimensional space. Unlike traditional computing interfaces, spatial computing leverages advanced sensors, machine learning algorithms, and real-time data processing to create immersive experiences. It blurs the lines between the physical and digital worlds, allowing users to engage with virtual objects as if they were part of their natural environment.

### **Extended Reality (XR): Bridging the Physical and Virtual Worlds**

Extended Reality (XR) encompasses Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). These technologies are the foundation of spatial computing, providing users with immersive experiences across various applications.

- **Virtual Reality (VR):** Immerses users fully in a digital environment, commonly used in gaming, training simulations, and virtual tours.
- **Augmented Reality (AR):** Overlays digital content onto the real world, enhancing experiences in retail, healthcare, and navigation.
- **Mixed Reality (MR):** Combines elements of both VR and AR, allowing users to interact with virtual objects in the physical world.

XR applications are becoming increasingly sophisticated, thanks to advancements in hardware, such as headsets and smart glasses, and software that uses AI for real-time tracking and object recognition.

### **The Role of Artificial Intelligence (AI)**

AI powers spatial computing by enhancing virtual environments with intelligence, realism, and

responsiveness. Through machine learning and computer vision, AI refines digital interactions, making them more intuitive and dynamic.

- **Natural Language Processing (NLP):** Enables voice commands and conversational interfaces within virtual environments.
- **Computer Vision:** Facilitates real-time object recognition and spatial mapping.
- **Predictive Analytics:** Personalizes user experiences by analyzing behavior and preferences.

AI-powered spatial computing applications are transforming industries like healthcare, where surgeons can perform virtual surgeries, and manufacturing, where workers can visualize complex machinery in 3D.

### **5G Connectivity: Enabling Real-Time Interactivity**

The deployment of 5G networks is a game-changer for spatial computing. With ultra-low latency, high-speed data transfer, and increased bandwidth, 5G enables seamless and real-time interaction in virtual environments.

- **Low Latency:** Reduces lag, improving the responsiveness of XR applications.
- **High Bandwidth:** Supports data-heavy applications like high-definition VR streaming and remote collaboration.
- **Edge Computing Integration:** Processes data closer to the user, improving performance and reducing latency.

5G's capabilities are particularly crucial for applications such as remote collaboration, virtual training, and smart city infrastructure, where real-time data processing is essential.

### **Transforming Industries and User Experiences**

The convergence of XR, AI, and 5G is revolutionizing various industries:

- **Healthcare:** Virtual surgeries, remote consultations, and AR-assisted diagnostics.
- **Education:** Immersive learning experiences, virtual classrooms, and interactive simulations.
- **Retail:** Virtual try-ons, personalized shopping experiences, and AR-based product displays.
- **Entertainment:** Enhanced gaming experiences, virtual concerts, and interactive storytelling.
- **Real Estate:** Virtual property tours, 3D architectural visualization, and smart home controls.

### **Challenges and Future Prospects**

While spatial computing offers immense potential, challenges remain, including hardware limitations, data privacy concerns, and the need for widespread 5G infrastructure. However, advancements in AI algorithms, improved device designs, and the global rollout of 5G networks are steadily addressing these hurdles.

Looking ahead, spatial computing is expected to play a pivotal role in the development of the metaverse—a collective virtual space where users can interact with digital content and each other in real-time. This evolution will further blur the boundaries between the physical and digital worlds, creating new opportunities for innovation and creativity.

The spatial computing revolution, driven by XR, AI, and 5G, is transforming digital experiences across industries. By enabling more immersive, interactive, and personalized environments, this technological convergence is shaping the future of work, education, and social interactions in a digitally driven world. As the ecosystem continues to evolve, the possibilities for innovation are limitless, promising a future where the digital and physical realms seamlessly coexist. **TR**



# Emerging Trends in Telecom Operations Standardization for Enhanced Efficiency

The telecommunications industry is rapidly evolving due to the increasing demand for connectivity, emerging technologies, and regulatory changes. To ensure efficiency, interoperability, and cost-effectiveness, telecom operators worldwide are adopting standardized operational frameworks. Standardization in telecom operations not only improves network performance but also facilitates seamless integration of new technologies, enhancing service delivery and customer experience.

## The Role of Standardization in Telecom Operations

Telecom operations standardization refers to the adoption of globally recognized protocols, frameworks, and best practices to ensure consistency across networks, vendors, and services. Organizations such as the International Telecommunication Union (ITU), the 3rd Generation Partnership Project (3GPP), and the European Telecommunications Standards Institute (ETSI) play a crucial role in defining these standards.

By adhering to standardized procedures, telecom operators can streamline workflows, optimize network performance, and reduce operational expenditures. These standards also promote innovation by enabling interoperability between different network components and service providers, allowing faster deployment of new technologies such as 5G, edge computing, and artificial intelligence (AI)-driven network automation.

**Key Emerging Trends in Telecom Operations Standardization [these two subtitles need to be differentiated somehow, so they don't look like two options for 1 subtitle]**

### Adoption of AI and Automation Frameworks

AI and automation are transforming telecom operations, enabling predictive maintenance, self-healing networks, and dynamic resource allocation. Standardized AI frameworks, such as those proposed by ITU's AI for Good initiative, ensure that AI solutions in telecom networks are scalable, secure, and interoperable.

Telecom operators are embracing AI-driven automation solutions for network management, customer service, and fraud detection. Standards like the ETSI Zero-touch network and Service Management (ZSM) architecture are setting the foundation for fully automated networks, reducing human intervention and improving service reliability.

### Cloud-Native Architectures and Open Standards

The shift towards cloud-native architectures is another significant trend in telecom standardization. Operators are leveraging containerized network functions (CNFs) and microservices to improve scalability and flexibility. Open standards such as the Open Radio Access Network (O-RAN) Alliance specifications promote interoperability between different vendors, reducing reliance on proprietary solutions and creating a more competitive ecosystem.

Implementing cloud-native standards allows telecom operators to efficiently manage their infrastructure, deploy new services rapidly, and optimize costs. Furthermore, the use of standardized APIs for network slicing and service orchestration enhances operational efficiency and enables seamless integration with emerging technologies.

### 5G Network Standardization and Beyond

The deployment of 5G networks has driven new standardization efforts to ensure global compatibility and efficiency. 3GPP's Release 17 and Release 18 outline key enhancements in 5G networks, including improved ultra-reliable low-latency communications (URLLC), network slicing, and energy-efficient operations.

Looking ahead, standardization efforts for 6G are already underway, focusing on AI-native networks, terahertz communication, and quantum security. Establishing consistent standards for these next-generation technologies will be crucial for seamless global adoption.

### Enhanced Cybersecurity and Data Privacy Standards

As telecom networks become increasingly complex, cybersecurity and data privacy are now top priorities. Standardized security frameworks such as the ITU-T X.805 and NIST Cybersecurity Framework provide guidelines for securing

telecom infrastructure against cyber threats.

The introduction of Zero Trust Architecture (ZTA) in telecom networks is gaining traction, ensuring that every access request is authenticated and authorized. Additionally, standardization efforts around secure software supply chains and compliance with data protection regulations such as GDPR and CCPA are shaping the future of telecom security.

### Sustainability and Green Telecom Standards

Sustainability is emerging as a critical factor in telecom operations. Organizations like the GSMA and ITU have established green telecom standards aimed at reducing carbon emissions, optimizing energy consumption, and promoting circular economy practices.

Many telecom operators are now adopting energy-efficient network technologies, including AI-powered power management and renewable energy solutions, to align with sustainability goals. Standardized approaches for e-waste management and sustainable infrastructure deployment further contribute to a greener telecom industry.

Standardization in telecom operations is essential for achieving efficiency, interoperability, and sustainability in an increasingly connected world. Emerging trends such as AI-driven automation, cloud-native architectures, enhanced cybersecurity, and sustainability initiatives are shaping the future of telecom standardization.

By adopting standardized frameworks, telecom operators can streamline their operations, reduce costs, and accelerate the deployment of innovative services. As the industry continues to evolve, ongoing collaboration between regulators, industry bodies, and service providers will have a strong influence on the next generation of telecom standards, ensuring a more efficient and resilient telecommunications landscape. **TR**

## Safaricom Enhances the M-PESA Platform with Red Hat OpenShift



Safaricom announced the adoption of Red Hat OpenShift as the foundational platform for its apps, including the popular M-PESA mobile payment system.

Safaricom currently processes over \$314 billion in transactions annually across Africa, with over 45 million subscribers and 51 million M-PESA users. By 2025, the company aims to establish itself as Africa's leading technology-driven company.

Previously, Safaricom relied on upstream Kubernetes and conventional infrastructure but encountered issues with stability and bug fixes.

To solve these problems, Safaricom adopted Red Hat OpenShift, a Kubernetes-powered hybrid cloud application platform. This platform offers enterprise-grade support and carrier-grade stability, enabling Safaricom to deploy containerized applications more efficiently.

Collaborative technical workshops and developer training were conducted with Red Hat and Copy-Cat Group to align teams on DevOps and agile methods.

In 2024, Safaricom increased its usage of Red Hat OpenShift Platform Plus by incorporating cutting-edge solutions for scalable content management, workload orchestration and cybersecurity.

The deployment of Red Hat OpenShift has transformed Safaricom's IT environment. The platform now supports 70 percent of Safaricom's tier 1 and tier 2 applications, running all containers on bare-metal infrastructure for improved control and cost efficiency. This upgrade has resulted in a higher

availability rate of 99.98 percent compared to the previous 93 percent.

With solution deployment speed doubled, cluster deployment times have dropped from two days to two hours. These changes have improved operations, teamwork, and customer experience for internal and external users.

Duncan Kabira Ndirangu, Head of IT Infrastructure at Safaricom, stated, "We are glad to have Red Hat as a strategic partner to Safaricom."

Ndirangu added, "With Red Hat's platforms and support teams, we have been able to gain performance improvements across our entire IT infrastructure."

"This has given our teams the confidence to deploy cloud-native applications, which is a significant step for us as we transition our infrastructure into a platform for business innovation, both for IT and network capabilities," he concluded.

## MTN Nigeria: Strategic Growth and Financial Recovery Initiatives



MTN Nigeria is set to accelerate its financial recovery by capitalizing on structural market demand and implementing phased tariff adjustments to boost performance. The company remains focused on sustaining growth in key

markets such as Ghana and Uganda, while addressing regulatory and macroeconomic challenges in other regions.

MTN has also refined its commercial strategies to drive sustainable

profitability within its fintech operations, particularly for MoMo PSB in Nigeria. The ongoing separation of its fintech operations into a Group Fintech structure remains a priority, aligning with Mastercard's minority investment agreement.

The company is on track to achieve its Expense Efficiency Program (EEP) target of R7-8 billion in cost savings between 2024 and 2026. With a disciplined capital allocation strategy, MTN plans to invest R30-35 billion in capital expenditures for FY 2025 to support its medium-term growth objectives.

## Ethio Telecom and Mastercard Collaborate to Enhance Digital Financial Services



Ethio Telecom and Mastercard have announced a strategic partnership to expand digital financial services across Ethiopia. During a high-level meeting, Ethio Telecom CEO Frehiwot Tamru and Mark Elliott, President of Mastercard Africa, discussed collaborative opportunities to leverage technology and broaden financial inclusion.

The partnership will focus on integrating Ethio Telecom's

telebirr mobile money platform with Mastercard's global payment ecosystem to deliver innovative digital financial services. The goal is to expand financial access, drive sustainable economic growth, and position Ethiopia as a competitive player in the global digital economy.

Frehiwot Tamru highlighted Ethio Telecom's commitment to advancing digital financial solutions, citing the company's extensive customer base and powerful infrastructure as key enablers of growth. "Our partnership with Mastercard is a significant step in unlocking new opportunities for our customers while promoting financial inclusion and digital transformation in Ethiopia," she said.

Mark Elliott echoed this sentiment, commending Ethio Telecom's rapid customer growth and the transformative potential of telebirr. "We are excited to collaborate with Ethio Telecom to expand digital payment solutions and create an inclusive financial ecosystem. This partnership aligns with Mastercard's commitment to advancing digital economies and empowering communities," he stated.

Both parties reaffirmed their dedication to accelerating the implementation of this partnership's rollout, which is expected to deliver innovative services, enhance user experiences, and contribute to Ethiopia's digital economy ambitions.

## 'WE INNOVATE' Initiative Champions Cybersecurity and Innovation for a Digital Future



In a bold move to strengthen the digital landscape, the "WE INNOVATE" initiative stands as a testament to the critical role of cybersecurity and

innovation in shaping the future. As technology advances at an unprecedented pace, safeguarding digital environments is more crucial

than ever to unlock the full potential of emerging innovations.

Focusing on cybersecurity as a powerful enabler of artificial intelligence (AI) and digital transformation, the initiative has successfully trained and graduated a new cohort of professionals from the "WE INNOVATE" Academy. This achievement highlights the commitment to creating a secure and innovative digital ecosystem.

Mohamed Nasr, CEO of Telecom Egypt, stated: "A special acknowledgment goes to the exceptional cybersecurity team whose expertise, dedication, and hard work have been instrumental in the success of this initiative. Their unwavering commitment is paving the way for a secure and resilient digital future."



# Harnessing AI for the Evolution of Radio Access Networks

The rapid evolution of telecommunications is reshaping the way networks operate, and at the heart of this transformation lies the Radio Access Network (RAN). As the demand for seamless connectivity, higher data speeds, and ultra-low latency grows, traditional methods of managing RAN infrastructure are proving inadequate. To meet these challenges, artificial intelligence (AI) is emerging as a game-changer, driving automation, efficiency, and intelligent decision-making in RAN operations.

**T**he Role of AI in Modern RANs  
AI is revolutionizing RAN by introducing intelligent automation and real-time optimization of

network resources. Traditional RAN architectures rely on static configurations and manual interventions, which can be inefficient in handling dynamic network conditions. AI-driven solutions, powered by machine learning (ML) and deep learning,

enable RAN to adapt in real-time, improving network performance and enhancing user experience.

A major application of AI in RAN is predictive analytics. AI algorithms analyze vast amounts of network data to predict potential congestion,

interference, or failures before they occur. This proactive approach helps telecom operators minimize downtime and optimize network performance, leading to improved reliability and efficiency.

### Enhancing Network Automation and Optimization

AI is driving the automation of network functions in RAN. Self-Organizing Networks (SON) powered by AI can automatically adjust parameters such as frequency allocation, power levels, and handover management without human intervention. This capability ensures that networks are continuously optimized, reducing operational costs and improving quality of service (QoS).

AI-driven RAN optimization also improves energy efficiency. By analyzing usage patterns and network load, AI can dynamically adjust power consumption, turning off idle base stations during low-traffic periods. This not only reduces energy costs but also contributes to sustainability efforts by lowering the carbon footprint of mobile networks.

### AI-Powered Dynamic Spectrum Management

Efficient spectrum management is critical for optimal network performance, especially as 5G and future wireless technologies continue to expand. AI can analyze real-time spectrum usage data and make intelligent decisions to allocate bandwidth dynamically. This allows operators to maximize spectrum efficiency, reduce interference, and improve overall network capacity.

Moreover, AI-driven cognitive radio systems can identify underutilized spectrum and enable dynamic spectrum sharing, allowing networks to adapt to changing traffic patterns. This capability is particularly beneficial in densely populated urban areas where spectrum scarcity is a pressing challenge.

### AI for RAN Security and Threat Mitigation

As RANs become increasingly complex

and software-driven, their vulnerability to cyber threats also increases. AI strengthens network security by detecting anomalies and potential attacks in real time. Machine learning models can analyze traffic patterns to identify suspicious activities such as Distributed Denial-of-Service (DDoS) attacks, rogue base stations, or unauthorized access attempts.

AI-powered security solutions can also support network slicing, a fundamental feature of 5G, by ensuring that each slice has adequate security measures in place. This helps telecom operators provide dedicated and secure network services to different industries, from healthcare to smart cities.

### The Impact on Open RAN and Future Network Architectures

AI is central to the development of Open RAN (O-RAN), an innovative approach that disaggregates traditional network elements and promotes interoperability between vendors. O-RAN relies heavily on AI-driven intelligence to optimize performance across multi-vendor environments.

By incorporating AI-based RAN Intelligent Controllers (RIC), operators can introduce advanced automation and real-time network adjustments, leading to greater flexibility and cost efficiency. This is particularly valuable in rural and underserved regions where deploying traditional RAN infrastructure can be prohibitively expensive.

### Challenges and Considerations

Despite AI's brings immense benefits to RAN, its adoption comes with challenges. One of the primary concerns is data privacy and security. AI relies on vast amounts of network data to function effectively, raising concerns about how this data is collected, stored, and used. Compliance with data protection regulations is essential for building trust in AI-powered networks.

Another challenge is the need for powerful AI training models. The

effectiveness of AI-driven RAN depends on high-quality datasets and continuous learning mechanisms. Telecom operators must invest in advanced AI training frameworks and collaborate with technology providers to refine AI algorithms for optimal performance.

Additionally, integrating AI into existing RAN infrastructure requires significant investment in computing resources and edge AI capabilities. Operators must weigh the costs and benefits to ensure a sustainable implementation strategy.

### AI-Driven RAN for 6G

AI is set to play an even more prominent role in the evolution of RAN as the industry moves towards 6G. Future networks will demand even higher levels of automation, intelligence, and adaptability, making AI an indispensable component of next-generation wireless technologies.

AI-driven RAN advancements will pave the way for hyper-intelligent networks capable of self-learning, self-optimizing, and self-healing. The integration of AI with edge computing, quantum computing, and advanced analytics will further strengthen network capabilities, enabling futuristic applications such as holographic communications, immersive extended reality (XR), and AI-powered IoT ecosystems.

AI is transforming RAN into a more efficient, resilient, and intelligent network infrastructure. By harnessing AI-driven automation, dynamic spectrum management, security enhancements, and Open RAN innovations, telecom operators can significantly improve network performance while reducing operational complexities and costs.

As AI continues to evolve, its impact on RAN will extend beyond 5G, forming the foundation of next-generation wireless networks. The future of telecommunications depends on the seamless integration of AI and RAN, driving the industry towards a smarter, more connected world. **IB**



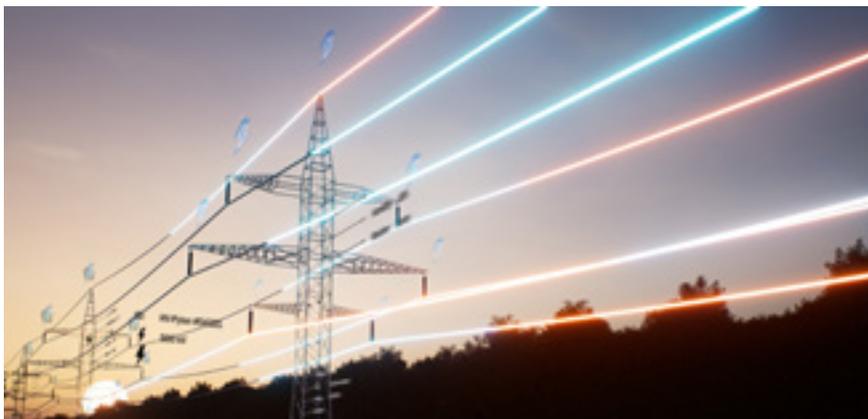
# Ensuring Uninterrupted Connectivity through Network Redundancy

In today's hyperconnected world, businesses and individuals rely heavily on digital networks for communication, commerce, and critical operations. Network outages, whether caused by cyberattacks, hardware failures, natural disasters, or human error, can lead to significant financial losses, operational disruptions, and reputational damage. To mitigate these risks, network redundancy has become an essential strategy for maintaining uninterrupted service and strengthening overall system resilience.

**U**nderstanding **Network Redundancy**  
 Network redundancy refers to the implementation of additional or backup components such as alternative network paths,

duplicate hardware, or failover systems to maintain connectivity in the event of a failure. By ensuring that critical network services can continue to operate despite disruptions, redundancy helps organizations maintain seamless operations, prevent data loss, and protect customer trust.

The primary goal of network redundancy is to eliminate single points of failure (SPOF) by providing alternative routes and backup systems that automatically take over when the primary system fails. Effective redundancy strategies incorporate multiple layers of protection, including hardware, software, and geographical distribution of infrastructure.



### Key Redundancy Strategies

1. **Multiple Network Paths:** One of the most fundamental redundancy strategies involves creating multiple network paths using diverse routes and connections. This approach, often used in Wide Area Networks (WANs) and data centers, ensures that if one link fails, traffic is automatically rerouted through an alternative path, minimizing downtime.
2. **Hardware Redundancy:** Organizations deploy duplicate network devices such as routers, switches, firewalls, and load balancers to ensure that a backup system is ready to take over in case of hardware failure. This is particularly essential for mission-critical applications that require high availability.
3. **Geographical Redundancy:** Hosting critical network infrastructure in multiple locations helps businesses prevent service disruptions caused by localized disasters such as earthquakes, floods, or power outages. Cloud computing services have made geographical redundancy more accessible by allowing companies to distribute their data and applications across multiple data centers worldwide.
4. **Failover and Load Balancing:** Failover mechanisms automatically switch operations to a backup system when a primary system encounters an issue. Load balancing distributes network traffic across multiple servers,

optimizing performance and preventing any single server from becoming overloaded.

5. **Data Redundancy and Backup Systems:** Regularly backing up critical data and maintaining copies in different locations help organizations recover quickly from failures. Implementing redundant storage solutions, such as RAID (Redundant Array of Independent Disks) configurations or cloud-based backups, ensures data integrity and availability.

### Benefits of Network Redundancy

- **Minimized Downtime:** Ensures business continuity by reducing service disruptions.
- **Enhanced Reliability:** Strengthens network resilience, reducing the impact of hardware failures or cyberattacks.
- **Improved Performance:** Load balancing improves network efficiency, leading to faster and smoother operations.
- **Disaster Recovery:** Facilitates quick recovery from natural disasters, cyber threats, or unexpected failures.
- **Customer Trust:** Guarantees seamless service delivery, promoting customer confidence and satisfaction.

### Challenges and Considerations

While network redundancy offers numerous benefits, implementing a strong redundancy strategy comes

with challenges. Cost is a major factor, as duplicating infrastructure and maintaining additional systems require significant investment. Complexity is another concern, as managing multiple network paths, failover systems, and backup resources demands skilled IT personnel and reliable monitoring tools.

Redundancy does not eliminate the need for proactive maintenance and cybersecurity measures. If backup systems are not regularly tested and updated, they may fail when needed most. Organizations must establish clear redundancy protocols, conduct routine audits, and invest in automated monitoring solutions to ensure their redundancy systems remain reliable and effective.

### The Future of Network Redundancy

With the rise of cloud computing and software-defined networking (SDN), the approach to redundancy is evolving. Cloud-based solutions offer scalable, cost-effective alternatives to traditional physical infrastructure, allowing companies to deploy virtualized failover systems that can be managed remotely.

Artificial intelligence (AI) and machine learning (ML) are also playing a growing role in network redundancy by enabling predictive analytics to detect potential failures before they occur. AI-powered monitoring systems can automatically reroute traffic, optimize resource allocation, and improve network resilience in real time.

In today's digital landscape, where connectivity is essential, ensuring uninterrupted service through network redundancy is no longer optional—it is a necessity. Organizations that invest in powerful redundancy strategies can minimize disruptions, safeguard their data, and maintain customer trust. As technology advances, embracing cloud-based solutions, AI-driven monitoring, and smart failover mechanisms will be critical for building resilient, high-availability networks for the future. 

## Kenya Boosts Digital Transformation with Malaysia and Ericsson



Kenya is strengthening its collaboration with Malaysia and technology giant Ericsson to promote innovation, attract investment in the IT sector, and accelerate the country's digital transformation.

Spearheading the initiative is the Ministry of Information, Communications, and the Digital Economy, led Cabinet Secretary William Kabogo. Kabogo hosted delegations from Malaysia and Ericsson at the ministry's Nairobi

offices to discuss strategic partnerships.

During the visit, Malaysia's High Commissioner to Kenya, Ruzaimi Mohammed, met with Kabogo to discuss strengthening bilateral relations, particularly in technological innovation and investment.

"Kenya's rapid growth in the tech industry, combined with Malaysia's expertise, creates a strategic partnership that will propel our digital transformation agenda forward," Kabogo stated.

Kenya and Malaysia already share strong technological ties. Last November, the two nations signed a memorandum of understanding (MoU) during the Malaysia-Kenya Tech Summit in Nairobi to facilitate Kenya's digital transformation. The agreement

enables Kenyan enterprises to leverage Malaysia's digital expertise while providing Malaysian firms access to Kenya's growing tech economy.

Kabogo also met with an Ericsson delegation to explore ways to enhance connectivity and accelerate digital transformation. He emphasized that a strong telecom sector is vital for unlocking new opportunities for businesses and consumers.

"As we work toward a digitally inclusive economy, partnerships with the private sector are crucial in improving lives, redefining industries, and shaping a sustainable future for all Kenyans," Kabogo noted.

With these partnerships, Kenya is positioning itself as a key player in Africa's digital revolution.

## Botswana Enters Space Race with BOTSAT-1 Launch



Botswana has successfully launched its first satellite, BOTSAT-1, marking its entry into the growing list of African nations leveraging space technology.

The satellite was sent into orbit last week aboard a SpaceX rocket in California, as Botswana currently lacks a domestic launch facility. President Duma Boko, who attended

the event, highlighted the satellite's role in supporting environmental monitoring, agriculture, disaster response, and urban planning, positioning Botswana as an emerging player in space technology.

Developed by engineers from the Botswana International University of Science and Technology, BOTSAT-1 is equipped with a hyperspectral camera and will orbit the Earth six times daily at approximately 600 km altitude, transmitting high-resolution data. A dedicated ground station has been set up to receive and store its information.

The Botswana government has also hinted at plans for a second satellite, though details remain undisclosed.

## Uganda's Parliament Supports Single-SIM Policy for Telecommunications Efficiency



In a significant legislative move, Uganda's Parliament is advocating for the implementation of a single-SIM policy that could revolutionize

the way Ugandans connect and conduct transactions. The proposed initiative will allow users to seamlessly make calls and carry out

financial transactions across multiple mobile networks, thereby reducing the existing need for multiple SIM cards.

According to recent reports, this strategic move is aimed at improving convenience for consumers by simplifying their telecommunications experience.

By eliminating the burden of juggling multiple SIM cards and devices, the single-SIM policy seeks to create a more streamlined and efficient system for users, ultimately creating greater connectivity and accessibility in communication across the nation. If implemented, this policy has the potential to transform the telecommunications landscape in Uganda, making it more user-friendly and adaptable to the needs of modern society.

## Morocco Prepares for 5G Rollout Amid Global Competition



Morocco is gearing up to launch a tender for 5G bandwidth, attracting interest from China's Huawei and leading Western firms.

Huawei, already active in Morocco through partnerships with local operators Maroc Telecom and Orange Maroc, holds a competitive

advantage over Western contenders like Nokia, Ericsson, and Oracle.

The chosen provider will face the challenge of meeting Morocco's ambitious targets: delivering 5G coverage to 25% of the population by 2026 and expanding to 70% by 2030, coinciding with the country's role as a co-host for the 2030 World Cup. The six cities hosting the tournament will enjoy full 5G coverage.

With download speeds up to 100 times faster than 4G and latency as low as 1 millisecond, 5G is expected to revolutionize Morocco's digital landscape. The country already boasts one of Africa's highest internet penetration rates at 90.7%.



# Enhancing 5G Sub-6 GHz: Improving Coverage and Performance

As 5G networks continue to expand globally, the Sub-6 GHz spectrum plays a critical role in deployment strategies, offering a balance between speed, coverage, and reliability. Unlike millimeter-wave (mmWave) frequencies, which provide ultra-high speeds but have limited range and weak penetration, Sub-6 GHz offers a more practical solution for widespread connectivity. It enables mobile operators to extend 5G services across urban, suburban, and even some rural areas while maintaining a strong connection and better indoor penetration.

**D**espite its advantages, Sub-6 GHz networks face persistent challenges such as spectrum congestion, interference, and limitations in bandwidth that can impact overall performance. As demand for high-speed connectivity grows, continuous advancements in network infrastructure and optimization techniques are essential to unlock the full potential of this spectrum.

### The Importance of Sub-6 GHz in 5G Deployment

5G technology is structured around three main frequency bands, each optimized for different needs:

- **Low-band (below 1 GHz):** Extensive coverage with moderate speed improvements over 4G LTE.
- **Mid-band (1-7 GHz, known as Sub-6 GHz):** Balance of speed and coverage, ideal for urban and suburban environments.
- **High-band (above 24 GHz, or mmWave):** Ultra-fast speeds but poor range and penetration.

Sub-6 GHz has become the backbone of many early 5G deployments worldwide. It is especially critical for operators looking to expand 5G coverage without the massive infrastructure overhaul required for mmWave. The mid-band spectrum provides the best trade-off between coverage and capacity, making it ideal for densely populated areas and indoor environments.

### Challenges Affecting 5G Sub-6 GHz Performance

Despite its advantages, Sub-6 GHz networks face several performance and coverage challenges that must be addressed for widespread 5G adoption.

#### Interference and Congestion

The mid-band spectrum is in high demand due to its balance between range and speed. However, this also leads to congestion, particularly in urban areas where multiple operators compete for limited spectrum resources.

- Signal interference from overlapping networks can degrade connection quality.
- Legacy LTE networks still operate in portions of the Sub-6 GHz range, requiring spectrum-sharing mechanisms.

Sub-6 GHz bands typically provide only 100 MHz per operator, compared to mmWave's 400+ MHz, limiting peak data rates and network capacity. This constraint limits peak data rates and overall network performance.

#### Network Load Management

As 5G adoption grows, networks must accommodate a massive increase in connected devices, from smartphones to IoT applications. Efficient network management is crucial to maintaining stable connections, especially during peak usage hours.

#### Indoor and Rural Coverage Limitations

While Sub-6 GHz signals penetrate

buildings better than mmWave, challenges remain:

- Indoor coverage may still be weak in large office buildings, shopping malls, and underground facilities.
- Rural areas with sparse infrastructure may struggle with signal reach and consistent performance.

### Strategies to Enhance 5G Sub-6 GHz Coverage and Performance

To overcome these challenges, network operators and technology providers are implementing innovative solutions to optimize Sub-6 GHz networks.

#### 1. Advanced Massive MIMO Deployment

Massive Multiple Input Multiple Output (MIMO) is a key technology for enhancing 5G performance in the mid-band spectrum. It increases network capacity by using large arrays of antennas to improve spectral efficiency.

#### Key advancements in Massive MIMO include:

- **Dynamic beamforming:** Directing signals toward users in real time to improve reception and reduce interference.
- **Higher-order MIMO configurations:** Expanding from 32T32R to 64T64R antenna arrays to boost throughput.
- **Smart antenna tuning:** Optimizing performance based on environmental conditions and user demand.

Real-world deployments of Massive MIMO, such as those by China Mobile and Verizon, have shown significant improvements in both data speeds and signal reliability.

## 2. Carrier Aggregation and Spectrum Sharing

Carrier aggregation merges multiple frequency bands, increasing available bandwidth and boosting overall network performance. Additionally, spectrum-sharing technologies like Dynamic Spectrum Sharing (DSS) help optimize spectrum use by enabling LTE and 5G to coexist within the same frequency bands.

### Benefits of carrier aggregation include:

- Improved data rates by utilizing multiple channels.
- Enhanced user experience, particularly in congested urban environments.
- Greater network resilience by dynamically allocating spectrum resources.

## 3. Network Densification with Small Cells

To fill coverage gaps and improve indoor penetration, operators are deploying small cells—compact, low-power base stations that complement traditional macro towers.

### Advantages of small cells:

- Offload traffic from congested macro networks.
- Improve coverage in high-density areas like stadiums, airports, and business districts.
- Improve signal quality in challenging indoor environments.

## 4. AI-Driven Network Optimization

Artificial intelligence (AI) and machine learning (ML) play a crucial role in optimizing 5G Sub-6 GHz networks by automating performance adjustments and predicting potential network issues.

### AI applications in network management:

- **Predictive analytics:** Identifying

congestion hotspots and adjusting resources accordingly.

- **Automated tuning:** Optimizing network parameters in real time to maintain peak performance.
- **Energy efficiency improvements:** Reducing power consumption through intelligent traffic routing.

## 5. Leveraging Edge Computing and Network Slicing

Edge computing brings computational power closer to users, reducing latency and improving the responsiveness of applications such as autonomous vehicles and industrial automation.

Network slicing further enhances efficiency by creating virtual networks tailored for different applications, ensuring optimized performance for services like remote healthcare, gaming, and smart city solutions.

### Future Prospects for 5G Sub-6 GHz Enhancement

The continuous evolution of 5G Sub-6 GHz will be driven by advancements in spectrum management, AI-driven automation, and emerging network technologies.

### Research into 6G and Hybrid Spectrum Strategies

While 5G deployment is still ongoing, early 6G research explores AI-driven network optimization and hybrid spectrum strategies that blend Sub-6 GHz with terahertz frequencies for improved efficiency.

### Satellite Integration for Extended Coverage

Satellite 5G services can complement terrestrial networks by providing connectivity in remote areas where traditional infrastructure is not feasible. Companies like SpaceX (Starlink) and OneWeb are already working on integrating satellite networks with 5G for seamless global coverage.

### Next-Generation Radio Technologies

New waveform designs and modulation techniques aim to further improve spectral efficiency, reduce

latency, and improve coverage for mid-band 5G networks. Technologies such as ultra-massive MIMO and reconfigurable intelligent surfaces (RIS) are expected to drive further performance improvements.

In conclusion, sub-6 GHz remains a cornerstone of global 5G deployment, offering a balance of speed, coverage, and reliability. However, maximizing its potential requires continuous investment in network infrastructure, intelligent spectrum management, and emerging technologies.

By adopting solutions such as Massive MIMO, carrier aggregation, AI-driven optimizations, and network densification, operators can significantly enhance the performance of Sub-6 GHz networks. As research into 6G and hybrid spectrum strategies continues, the future of wireless communication promises even greater advancements in connectivity, ensuring that 5G remains a key enabler of digital transformation worldwide. **TR**



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## Nokia Unveils Next-Gen 25G PON Modems for Lightning-Fast Home Internet



Nokia has introduced two new 25G PON fibre modems aimed at delivering ultra-fast internet speeds to households. These modems promise speeds up to 20 times faster than existing gigabit options, significantly enhancing connectivity for cloud services, gaming, and remote work applications.

According to the telecom giant, Wi-Fi 7 and 25G PON technology utilize the existing fibre networks that operators

currently employ for GPON and 10G PON. This capability allows for efficient network upgrades that optimize existing Fibre-to-the-Home (FTTH) investments.

Nokia revealed that 17 operators, including Google Fiber, Frontier, and Hong Kong Broadband, are already utilizing this technology.

The new modems are part of Nokia's expanding 25G PON product portfolio, which includes fibre access platforms for both residential and enterprise customers, along with the industry's first sealed fibre access node for cable operators.

Geert Heyninx, Nokia's general manager of broadband networks, stated, "We are investing in all next generation PON technologies including 10/25/50/100G

PON, to give operators the best option to meet their needs and their business goals. 25G PON is a proven technology that can be easily activated on our existing 10G XGS-PON solutions."

He added, "We have close to two million 25G-capable ports in the field already. These new 25G PON fibre modems provide a simple, efficient way to boost capacity and stay ahead of growing demands."

Jaimie Lenderman, a principal analyst at Omdia, commented, "To support next-gen power users, operators must build future-ready broadband networks that scale beyond 10G. As technology advances, higher-capacity solutions like 25G PON are emerging as a simple, cost-effective way to meet tomorrow's connectivity.

## Telecom Egypt Pioneers Huawei's SBC and IMS for Superior VoBB Experience



Telecom Egypt, a prominent telecommunications firm, has partnered with Huawei to lead the way in innovative technologies, a significant stride towards enhancing core network construction across Egypt. This partnership includes the largest fixed-network IMS in Africa and the lightweight SBC based on bare-metal, supporting the deployment of simplified voice core network that is energy-effective in the future. In addition, Telecom Egypt is preparing the brand new cloudified ENUM to fulfill the potential growth for VoBB in the coming years.

### Ultra Large Capacity IMS for VoBB

The collaboration between Telecom Egypt and Huawei is a significant milestone in African telecommunications, resulting

in successfully completing the largest capacity of IMS in Africa. With cloud-native and high-availability features, it served 12M VoBB subs and PBX as well. Additionally, ENUM, the function working for the routing retrieving when IMS calling, deployed along with IMS in the same virtualized platform. The latest high-performance Huawei self-produced server minimizes the footprint and power consumption required for deployment.

Regarding to the maintenance and operation, Telecom Egypt and Huawei innovate the automated orchestrator to achieve unified management with multi-tiers across infrastructure, cloudOS and IMS VNF, scheduling the computing resource for improved balanced utilization.

Eng. Mohamed Nasr, Managing Director and CEO of Telecom Egypt, emphasized the company's dedication to integrating innovative technologies consecutively to enhance the performance in core network. He highlighted how introducing Huawei IMS aligns with the company's commitment to delivering

smart connectivity and next-generation technologies that boost the digital capabilities of Telecom Egypt's customers and partners.

Telecom Egypt's infrastructure development includes highly reliable core network withstanding 10M+ fixed users in calling simultaneously. High-density blade servers reduce operational expenditures (OPEX) and minimize costs in spacing and power. While high stability provides the IMS "always online" with no service loss, improving communication quality and promoting the image of Telecom Egypt. Forming a rock-solid telco-cloud platform supports simplified deployment and horizontal expansion in flexibility.

Mr. Benjamin Hou, CEO of Huawei Egypt, highlighted this successful implementation, emphasizing continued collaboration to build a best and carrier-class reliable core network. This partnership reflects both companies' commitment to achieving more business success through groundbreaking technology and close cooperation.

## Huawei to invest €30 million in Morocco's auto manufacturing sector



Huawei Technologies and its Chinese partner, Wan'an Technology, are

investing €30 million to establish an automotive parts production base

in Morocco. Huawei will contribute €19.5 million (65% ownership), while Wan'an will invest €10.5 million (35%).

The venture aims to strengthen China's presence in Morocco's automotive industry and boost competitiveness in North African and European markets. This move aligns with Huawei's global expansion strategy amid rising trade tensions and tariffs on Chinese exports.

Experts highlight Morocco's appeal as a manufacturing hub, citing its expertise in electric vehicles, rich mineral resources, and cost-effective production environment.

## Nokia Automates Fiber Deployments with Broadband Easy



Nokia has launched Broadband Easy, a digital platform and set of services that help operators streamline and accelerate the process of deploying fiber. The digital platform gives operators full visibility and control of the entire fiber rollout process, while advanced automation and artificial intelligence.

The challenge for many operators will be rolling out fiber to the next billion homes in rural or underserved areas. Those that can digitalize the

fiber rollout process are more likely to see a better return, and, according to McKinsey, can achieve 10-to-25% savings through efficiencies in the process, automation, and AI technologies.

Nokia's Broadband Easy allows operators to digitalize the fiber deployment process, providing a modular platform that easily integrates into the existing IT stack. Operators can use Broadband Easy to centrally manage the fiber

deployment process, control the subcontractors, and mitigate risks. Additional automation features help to optimize design and field activities by real-time data exchange, certifying the fiber plant, and generating accurate inventory data. Broadband Easy also uses AI models to increase the quality of field installations, using AI to verify and accept the installation of components to control ports allocated to subscribers and provide on-site training and guidance to field technicians.

Nokia's design and rollout management services can help operators further offload their fiber rollout process. Broadband Easy supports the operators preferred outside plant vendors or subcontractors and comes pre-integrated with the Nokia Altiplano Access Controller and Nokia Design Center.



## Satellite-Cellular Integration: Enabling Seamless Global Connectivity

In today's increasingly interconnected world, the demand for uninterrupted connectivity has never been greater. While traditional cellular networks have revolutionized communication, they face inherent limitations—coverage gaps in remote and rural areas, signal disruptions due to extreme weather, and network congestion in densely populated urban centers. The integration of satellite and cellular networks is emerging as a viable solution to address these challenges, promising seamless global connectivity and ushering in a new era of communication technology.

## The Need for Satellite-Cellular Integration

Despite strong terrestrial cellular network coverage in urban and suburban areas, remote locations such as mountainous regions, deserts, and vast oceanic expanses remain underserved. Natural disasters and emergencies can also disrupt traditional infrastructure, leaving communities without access to critical communication services. Satellite communication bridges these gaps by providing coverage in areas where terrestrial networks are impractical or cost-prohibitive.

Furthermore, industries such as maritime, aviation, agriculture, and disaster response require reliable connectivity beyond the reach of cellular towers. With the rise of the Internet of Things (IoT), the need for seamless, always-on connectivity across diverse geographies is becoming a priority. The integration of satellite and cellular technologies ensures that users, regardless of location, remain connected without interruption.

### How Satellite-Cellular Integration Works

Satellite-cellular integration involves the convergence of terrestrial mobile networks with satellite communication systems. This hybrid model allows devices to switch seamlessly between satellite and cellular networks based on signal strength, location, and network availability. Key advancements in this area include:

- **Non-Terrestrial Networks (NTN):** The rise of Low Earth Orbit (LEO) satellite constellations, such as Starlink, OneWeb, and Amazon's Project Kuiper, has facilitated faster and lower-latency satellite communications, making them more compatible with terrestrial networks.
- **5G and Satellite Synergy:** 5G networks are being designed to accommodate satellite

connectivity, enabling seamless handovers between terrestrial and space-based networks.

- **Direct-to-Device (D2D) Communication:** Tech leaders like Apple and SpaceX are developing technology that allows smartphones to directly connect to satellites, eliminating the need for specialized satellite phones or equipment.

### Benefits of Satellite-Cellular Integration

1. **Expanded Coverage:** Satellite integration eliminates dead zones, ensuring connectivity even in the world's most remote locations.
2. **Enhanced Reliability:** By offering an alternative communication pathway, satellite integration reduces network failures due to infrastructure damage, congestion, or environmental disruptions.
3. **Improved Emergency Response:** First responders and disaster relief teams can stay connected during crises when terrestrial networks fail.
4. **Cost Efficiency for Operators:** Instead of building expensive infrastructure in low-population areas, telecom operators can leverage satellite networks for coverage extension.
5. **Enabling IoT and Smart Applications:** Seamless global connectivity is essential for applications such as autonomous vehicles, precision agriculture, and real-time supply chain tracking.

### Challenges and Considerations

Despite its potential, satellite-cellular integration presents several technical and regulatory challenges:

- **Latency and Bandwidth Constraints:** While Low Earth Orbit (LEO) satellites have reduced latency compared to traditional Geostationary Orbit (GEO) satellites, their

performance still lag behind that of terrestrial networks.

- **Device Compatibility:** Most consumer devices are not yet equipped to communicate directly with satellites, requiring new hardware such as custom antennas or chipsets.
- **Regulatory Hurdles:** Frequency spectrum allocation and international policies must be harmonized to prevent interference and ensure seamless operation.
- **High Deployment Costs:** Launching and maintaining satellite networks is expensive, although declining launch costs and technological advancements are making it more feasible.

### Future Outlook

The growing investments in satellite and cellular convergence indicate that this hybrid model will play a crucial role in shaping the future of global connectivity. Telecom giants and satellite providers are forming strategic partnerships, with companies like T-Mobile and SpaceX, Apple and Globalstar, and AST SpaceMobile working on direct-to-smartphone satellite services.

Additionally, the evolution of 6G networks is expected to integrate space-based connectivity more effectively, further bridging the digital divide. As technology advances, costs decrease, and regulatory frameworks evolve, satellite-cellular integration will become a mainstream solution, making sure that every corner of the planet remains connected.

Satellite-cellular integration represents a transformative leap in communication technology, providing a seamless, reliable, and inclusive connectivity experience. By overcoming geographical and infrastructural barriers, this hybrid model is set to redefine how individuals, businesses, and industries stay connected in an increasingly digital world. As adoption accelerates, the dream of a truly connected planet inches closer to reality. **TR**



# Proactive Cybersecurity: A Cost-Effective Alternative to Reactive Solutions

In an era where cyber threats are evolving at an unprecedented rate, organizations must re-evaluated their cybersecurity strategies. Traditionally, many companies have relied on a reactive approach, responding to incidents after they occur. However, this strategy often leads to significant financial and reputational damage. A proactive approach to cybersecurity, focused on prevention, early threat detection, and mitigation, has emerged as a more cost-effective and efficient solution.

**T**he Cost of Reactive Cybersecurity

A reactive cybersecurity approach addresses threats after they have already infiltrated a system. While this method has been common, its shortcomings are becoming increasingly evident. The costs associated with reactive solutions include:

**1. Financial Losses – Cyberattacks** can lead to direct financial losses through theft, ransomware payments, legal fees, and regulatory fines. The IBM Cost of a Data Breach Report 2023 found that the average global cost of a data breach reached \$4.45 million, highlighting the economic consequences of inadequate preparedness.

**2. Operational Downtime –** Recovering from an attack can take days or even weeks, leading to business disruptions, lost revenue, and reduced productivity.

**3. Reputational Damage – A** cyberattack can erode customer trust and brand reputation, leading to long-term financial setbacks. Studies show that nearly 60% of small businesses that experience a cyberattack shut down within six months after the incident.

**4. Regulatory Penalties – With** data protection regulations such as the GDPR, CCPA, and various industry-specific cybersecurity laws, companies that fail to protect user data may face severe legal consequences and fines.

These factors make it clear that reacting to threats rather than preventing them is not a sustainable strategy. Organizations must shift to a proactive approach to reduce risk and minimize financial impact.

### The Benefits of Proactive Cybersecurity

A proactive cybersecurity strategy aims to prevent attacks before they

happen by leveraging advanced technologies, continuous monitoring, and employee awareness. The advantages of a proactive approach include:

**Cost Savings on Incident Response**  
Investing in preventive measures reduces the likelihood of costly security breaches. Cybersecurity insurance premiums are also lower for companies that demonstrate strong risk management strategies.

**Reduced Downtime and Business Disruption**  
With continuous monitoring and rapid threat detection, businesses can identify vulnerabilities before they escalate, ensuring seamless operations. Proactive measures like endpoint detection and response (EDR) and security information and event management (SIEM) systems help reduce downtime.

**Stronger Regulatory Compliance**  
Governments and regulatory bodies increasingly demand that companies implement proactive security measures. A strong cybersecurity framework ensures compliance with data protection laws, avoiding fines and legal consequences.

**Enhanced Customer Trust and Brand Reputation**  
Consumers and business partners prioritize security when choosing vendors. Proactive cybersecurity not only protects sensitive data but also builds confidence and improves corporate reputation.

**Early Threat Detection with AI and Automation**  
Technologies such as artificial intelligence (AI) and machine learning can analyze large amounts of data in real-time, detecting suspicious patterns before a breach occurs. AI-driven security solutions can predict and mitigate attacks based on behavioral analytics.

**Key Components of a Proactive Cybersecurity Strategy**  
To effectively implement a proactive cybersecurity approach,

organizations must focus on several key components:

### 1. Risk Assessments and Continuous Monitoring

Regular security audits help identify vulnerabilities before they become entry points for attackers. Companies should implement real-time network monitoring solutions that detect anomalous activity early.

**2. Employee Training and Awareness**  
Human error remains a significant factor in cybersecurity incidents. Regular training on phishing awareness, password management, and secure remote work practices helps prevent breaches caused by human error and insider negligence.

**3. Zero Trust Security Model**  
A Zero Trust architecture assumes that no user or system should be trusted by default. Implementing multi-factor authentication (MFA), least privilege access, and network segmentation ensures tighter security controls.

**4. Endpoint and Cloud Security Measures**  
With the rise of remote work and cloud adoption, organizations must secure endpoints, mobile devices, and cloud environments. Tools such as endpoint Detection and Response (EDR) and Cloud Security Posture Management (CSPM) help safeguard these assets.

**5. Threat Intelligence and Predictive Analytics**  
Threat intelligence platforms collect and analyze data from global cyber threat sources, allowing organizations to anticipate and mitigate emerging risks. Predictive analytics tools help security teams stay ahead of sophisticated cyberattacks.

**6. Regular Security Patch Management**  
Outdated software and unpatched vulnerabilities are common entry points for hackers. Automated patch management ensures that security updates are deployed promptly across all systems.



### Real-World Examples of Proactive Cybersecurity Success

#### A Financial Institution's AI-Powered Security Model

A leading global bank implemented an AI-driven cybersecurity solution to analyze customer behavior in real time. By using machine learning models, the bank detected fraudulent transactions before they could impact customers, reducing financial losses by 30%.

#### A Healthcare Organization's Zero Trust Approach

A major hospital network adopted a Zero Trust security model, requiring multi-factor authentication and implementing strict access controls for sensitive patient data. This prevented unauthorized access and helped the hospital comply with HIPAA regulations.

#### A Tech Company's Employee Cybersecurity Training Program

A technology firm suffering from frequent phishing attacks launched a cybersecurity awareness program for employees. After six months,

phishing-related incidents dropped by 80%, reinforcing the importance of human factor mitigation.

### Overcoming Challenges in Implementing Proactive Security

While proactive cybersecurity offers significant benefits, organizations may face challenges when shifting away from a reactive approach. These challenges include:

#### 1. Initial Investment Costs –

Advanced security tools and infrastructure upgrades require upfront investments, but the long-term cost savings outweigh these expenses.

#### 2. Resistance to Change –

Employees and executives may be reluctant to adopt new security measures. Clear communication about the benefits of proactive security helps drive adoption.

#### 3. Skill Gaps and Talent Shortages –

The demand for cybersecurity professionals continues to rise. Organizations can bridge skill gaps by outsourcing security

operations or partnering with managed security service providers (MSSPs).

### The Future of Proactive Cybersecurity

As cyber threats become more sophisticated, reactive approaches are no longer sufficient. Investing in proactive cybersecurity strategies is a cost-effective way to protect businesses from financial losses, reputational harm, and operational disruptions. By leveraging AI, continuous monitoring, employee training, and Zero Trust frameworks, organizations can stay ahead of cybercriminals and safeguard their digital assets.

The future of cybersecurity lies in proactive prevention rather than reaction. Businesses that adopt proactive security measures today will not only enhance their resilience against cyber threats but also gain a competitive edge in an increasingly digital world. **TR**

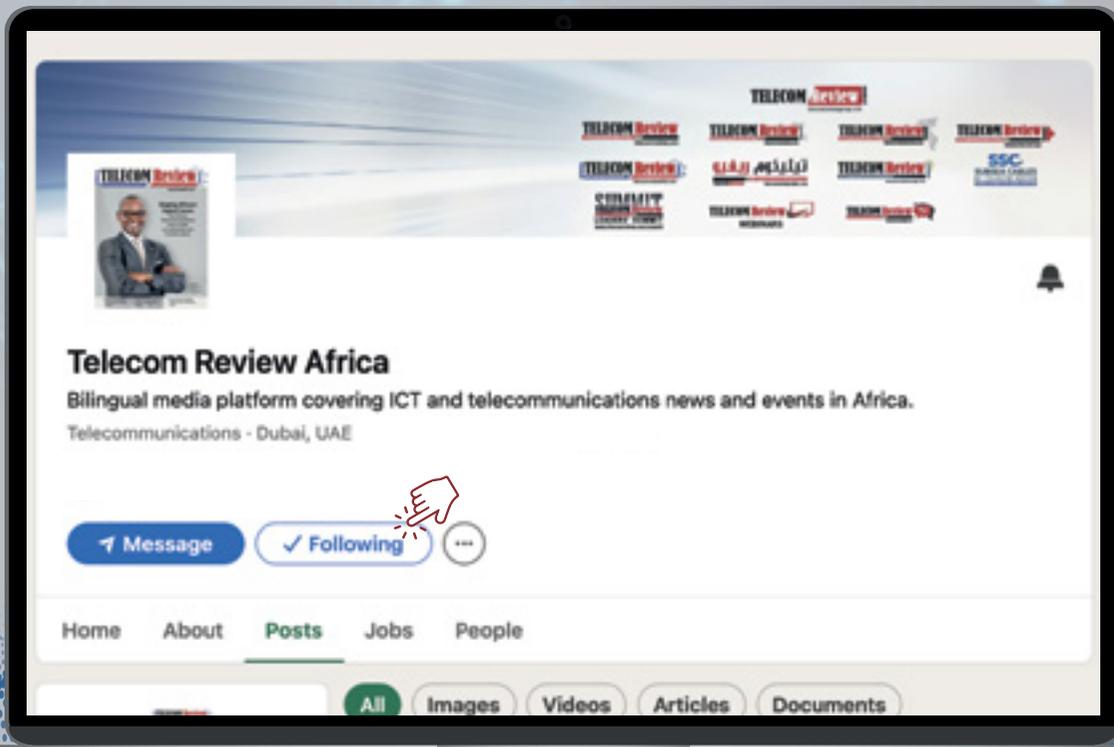


A proactive cybersecurity strategy aims to prevent attacks before they happen by leveraging advanced technologies, continuous monitoring, and employee awareness





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# Optical Distribution Networks: The Foundation of High-Speed Internet

Surging demand for high-speed internet is placing immense pressure on network infrastructure to deliver faster, more reliable, and scalable connectivity. At the heart of this revolution lies Optical Distribution Networks (ODNs), a critical component that enables the seamless transmission of data across vast distances. By leveraging fiber-optic technology, ODNs are transforming digital communication, powering everything from high-definition streaming and cloud computing to the expansion of smart cities and 5G networks.

**T**he Basics of **Optical Distribution Networks**  
An Optical Distribution Network (ODN) is a structured fiber-optic network that connects service providers directly to end-users. As a passive system, it does not require active electronic components within the

network to amplify or process signals. This passive nature significantly reduces maintenance costs and power consumption while ensuring high reliability.

ODNs serve as the backbone of modern telecommunications by using fiber-optic cables to transmit data in the form of light signals. These networks typically consist of several key components:

- **Optical Line Terminal (OLT):** Located at the central office of a service provider, the OLT is responsible for transmitting data signals to multiple endpoints.
- **Optical Splitters:** These passive devices divide a single optical signal into multiple paths, allowing service providers to connect multiple users without

laying separate fibers for each connection.

- **Optical Network Units (ONUs) or Optical Network Terminals (ONTs):** Installed at the customer's premises, these devices receive the optical signal and convert it into an electrical signal for end-user applications.
- **Fiber Cables:** These cables, often made of glass or plastic, transmit data at high speeds with minimal signal degradation.

### Advantages of ODNs in High-Speed Internet

The deployment of Optical Distribution Networks has revolutionized the way data is transmitted, offering several advantages over traditional copper-based networks:

#### 1. Unparalleled Speed and Bandwidth

ODNs provide significantly higher bandwidth compared to traditional coaxial or DSL networks, enabling ultra-fast internet speeds necessary for modern digital services. Fiber-optic cables can support gigabit-per-second (Gbps) speeds, facilitating high-definition video streaming, online gaming, and remote work applications without lag or buffering.

#### 2. Greater Reliability and Stability

Unlike copper-based networks, optical fibers resist electromagnetic interference and environmental factors such as temperature fluctuations and moisture. This makes ODNs more reliable, ensuring consistent and uninterrupted internet connectivity.

#### 3. Cost-Effective and Energy-Efficient

Passive Optical Networks (PONs), a subset of ODNs, operate without active electronic components between the central office and end-users. This reduces power consumption, operational costs, and the need for frequent maintenance, making fiber networks a sustainable solution for service providers.

#### 4. Scalability and Future-Proofing

As digital demands increase, ODNs

offer unmatched scalability. Their high bandwidth capacity ensures that networks can accommodate increasing data traffic without requiring significant infrastructure overhauls. This makes fiber-optic networks a future-proof investment for telecom operators.

### ODNs and the Expansion of 5G and Smart Cities

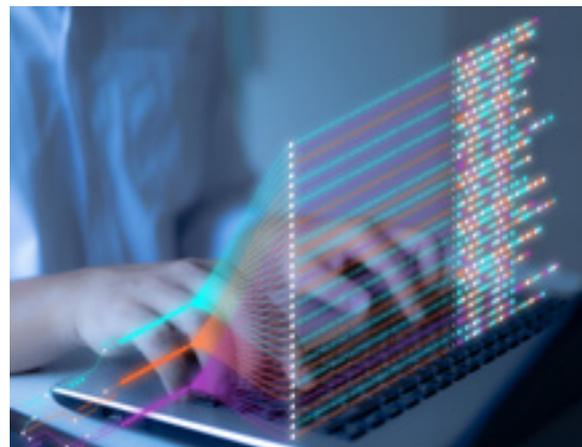
With the rollout of 5G technology and the proliferation of smart cities, ODNs play a crucial role in supporting next-generation connectivity. The high-speed and low-latency characteristics of fiber-optic networks make them the preferred choice for backhaul infrastructure in 5G deployments.

Smart cities depend on seamless connectivity to power IoT applications, intelligent transportation systems, and data-driven urban management solutions. ODNs make sure that these technologies function efficiently, enhancing the quality of life for urban residents and optimizing city operations.

### Challenges in ODN Deployment

Despite their numerous advantages, deploying Optical Distribution Networks comes with its challenges:

- **High Initial Investment:** The cost of laying fiber-optic cables and installing network components can be significant, making widespread deployment challenging, particularly in rural and underdeveloped regions.
- **Complex Installation and Infrastructure Requirements:** ODNs require careful planning, especially in densely populated areas where underground fiber deployment may be challenging due to existing utilities and infrastructure constraints.
- **Skilled Workforce Demand:** The deployment and maintenance of fiber-optic networks provide trained professionals with expertise in fiber splicing, network design, and troubleshooting.



### The Future of Optical Distribution Networks

As digital transformation accelerates across industries, the demand for high-speed, reliable, and scalable connectivity will continue to rise. The expansion of Optical Distribution Networks will play a vital role in bridging the digital divide, ensuring that both urban and rural areas benefit from reliable internet access.

Governments and private enterprises are investing heavily in fiber-optic infrastructure to meet growing data demands. Initiatives like fiber-to-the-home (FTTH) and fiber-to-the-premises (FTTP) are becoming more prevalent, bringing gigabit-speed internet directly to consumers.

Emerging innovations like Wavelength Division Multiplexing (WDM) and Next-Generation PON (NG-PON) will continue to boost ODN capacity, efficiency, and resilience.

Optical Distribution Networks are the foundation of high-speed internet, enabling the seamless connectivity required for today's digital landscape. As businesses, governments, and consumers increasingly rely on ultra-fast, reliable internet services, the expansion of ODNs will be instrumental in driving digital transformation, supporting emerging technologies, and promoting economic growth worldwide. While challenges remain in deployment and scalability, the long-term benefits of fiber-optic networks make them a cornerstone of future connectivity. 

## World Telecommunication Day: Shaping Industries

Telecom Review will host a virtual panel to explore the evolving dynamics of the telecommunications industry, aligning with the World Telecommunication and Information Society Day (WTISD) 2025 theme: Gender Equality in Digital Transformation.

**Place:** Virtual



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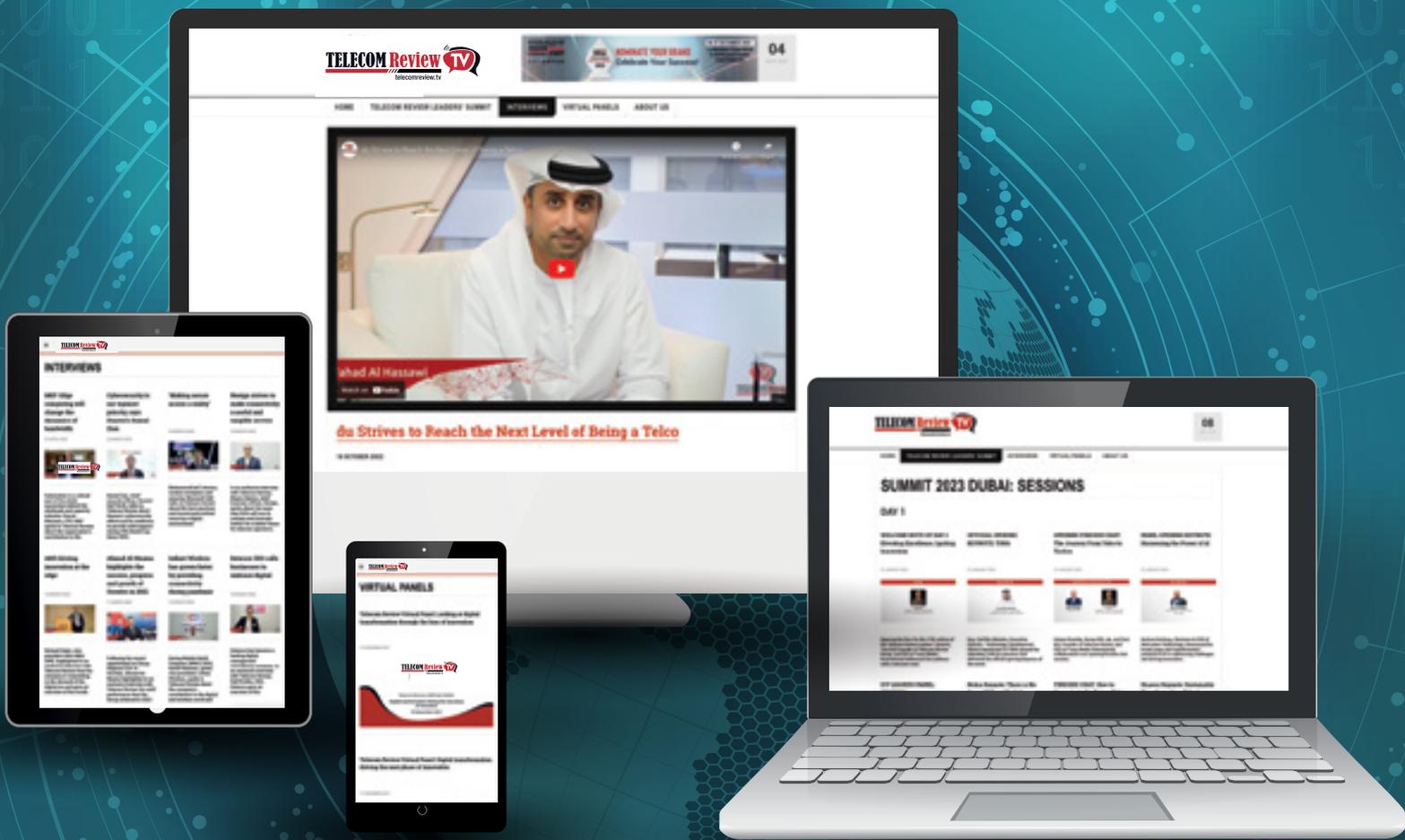
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