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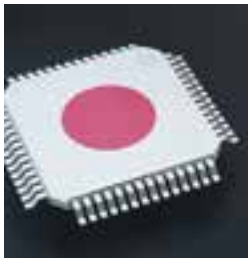

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Provided in cooperation with AFP, the global news agency

Published by

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Printing
Al Nisr Publishing LLC

Year 19 | Issue 212

The ICT Industry's Premier Gathering: Get Ready for the 18th Telecom Review Leaders' Summit!

Set for another memorable gathering in December 2024, get ready to capture, connect and collaborate with global industry leaders within the conference halls and demo area of the 18th Telecom Review Leaders' Summit.

Across two days—December 10-11, 2024—we will be celebrating innovation, charting the course for tomorrow's connectivity, and defining the future of telecommunications. As the industry's foremost gathering of visionaries, trailblazers, and game-changers, the Telecom Review Leaders' Summit is more than just a meeting of minds; it's a powerhouse of ideas, insights, and inspiration.

Diverse, Rich Content

Join us as we dive into the heart of technological evolution, with key focus areas involving telecom leaders, 5G-Advanced, artificial intelligence (AI), digital transformation, green technology, fintech, cybersecurity, data protection and regulation, and cloud innovation.

C-level executives and government associates will discuss their strategies for staying abreast of rapid technological advancements and continuously adapting to industry evolution. They will also share insights on maintaining competitiveness in the dynamic market landscape.

The Summit will also explore the emergence of 5.5G technology and how it is ushering in new opportunities and challenges for telecom companies. These include innovative use cases amidst technical and infrastructure-centric hurdles.

Artificial intelligence will also be a key topic, whereby we will shed light on how telecom companies are leveraging AI technologies to improve customer service, optimize network performance, and develop new products and services that enhance the customer's experience.

The speakers will also delve into the challenges and opportunities of living in the digital age, including strategies for monetizing digital transformation. Attendees will learn about the initiatives telecom companies are employing to leverage the digital transformation trend, offering a diverse range of digital services and experiences. Furthermore, the speakers will explore effective monetization strategies aimed at driving revenue growth in this rapidly evolving landscape.

The topic of green technology and sustainability will be discussed in depth. Speakers will focus on the activities related to integrating green technology and sustainability practices into telcos' operations and will explore the business strategies they're utilizing to reduce their environmental impact.

Another significant item on the agenda will focus on the entry of telecommunications companies into the fintech sector. We'll explore the expansion of fintech services among telcos and how they utilize their established infrastructure and customer base to provide offerings like

mobile payments, digital wallets, and various financial products.

Additionally, developments in the cloud industry and the role of hyperscalers will be highlighted. Attendees will gain insights into the latest cloud computing solutions and how hyperscale cloud providers contribute to network agility, scalability, and efficiency. This enables telecommunication companies to offer innovative services and applications to their customers.

Furthermore, sessions focusing on cybersecurity, data protection and regulatory frameworks will be held to illuminate how, and why, telecom companies are highly prioritizing cybersecurity measures. This includes safeguarding telcos' networks, systems, and customer data against cyber threats and attacks. Attendees will gain insights into the importance of adhering to stringent data protection regulations and compliance standards to uphold customer privacy and meet legal requirements concerning data collection, storage, and usage.

Building on the success of the 17th edition, the upcoming Telecom Review Leaders' Summit is targeting over 600 attendees from the vast ICT ecosystem, including government authorities, C-level executives, notable stakeholders and other globally-recognized individuals, located across all corners of the globe.

Toni Eid, Founder of Telecom Review Group and CEO of Trace Media International, said, "Celebrating the triumph of collaboration and innovation at the Telecom Review Leaders' Summit, which brings together ICT leaders and influential bodies globally, is a testament to our industry's progress and vision. As we reflect on our success over the years, we are energized as we approach the 18th edition in 2024. We anticipate making even greater strides towards empowering the future of telecommunications."

The 2024 agenda will be distributed across two days, with keynotes and panel sessions running from morning until afternoon. Representing companies from all over the world and renowned speakers will grace the stage to share their expertise and latest insights.

Furthermore, the Telecom Review Leaders' Summit provides a friendly, yet high-level, networking environment for industry peers, offering opportunities for partners and other interested parties to showcase their best-in-class products and offerings.

Telecom Review Excellence Awards: Nominations Now Open

During the second day of the event, the prestigious Telecom Review Excellence Awards ceremony will be held, whereby Telecom Review Group will be acknowledging this year's outstanding achievements in corporate innovation and performance, as well as recognizing the individual capabilities and contributions of influential global players.

With the nomination process already in place, Jeff Seal, Chief Awards Officer for the Telecom Review Group, stated, "The Telecom Review Awards recognize the best-of-the-best in our industry and are anxiously anticipated every year. We look forward to some new and exciting nominations again this year."

An esteemed panel of industry experts will review all nominations and the winners will be announced during the gala dinner at the Telecom Review Leaders' Summit on December 11, 2024.

The ceremony shall serve as a distinguished forum, transcending mere celebration to become an esteemed convocation of excellence, wherein luminaries, thought leaders, and trailblazers from the niche of Information and Communication Technology (ICT) converge. This convergence not only heralds the pinnacle of achievement but also fosters unparalleled networking prospects, enriching the collaborative endeavors and visionary initiatives within the domain.

Why Nominate?

The Telecom Review Excellence Awards celebrates leaders, innovators, and change-makers across the ICT sector. The awards are a testament to outstanding contributions in the areas of technological advancement, network performance, customer service, sustainability, and leadership. Winning these awards serves as a mark of distinction, acknowledging the hard work and dedication that drives the industry forward.

Nominations are accepted across a range of categories that encompass various facets of the ICT industry. This ensures that every segment is recognized for its unique contributions and innovations.

Check out the full list of categories: https://www.telecomreview.com/summit/excellence-awards/award-categories

The nomination period is open until October 30. This gives ample time for participants to prepare their submissions and highlight their achievements over the past year.

Submitting a nomination will only take a few steps:

1. **Visit the Official Website:** Access the Telecom Review Excellence Awards nomination page.
2. **Fill out the Form:** Complete all the required details, particularly the appropriate category for your nomination (corporate or individual) and your region (Global, Middle East, Africa, Americas, Asia, or Europe).
3. **Proceed to Payment:** Every nomination is subject to fees and can be paid via card payment or bank transfer.

Get Involved

If you or your organization have made significant strides in the ICT industry in 2024, now is the time to showcase your achievements. The Telecom Review Excellence Awards is your chance to gain industry recognition and celebrate your successes with peers and leaders from around the world.

For more information and to submit your nominations, visit the Telecom Review Excellence Awards nomination page or contact awards@telecomreview.com.

Don't miss out on this opportunity to be recognized as an ICT leader. Submit your nomination before October 30!

With only five months to go, mark your calendars and get ready to connect with fellow industry leaders, exchange ideas, and drive innovation forward. Reserve your seat soon and gain exclusive access at the Telecom Review Leaders' Summit!

For all information related to the event, visit www.telecomreview.com/summit. TR

Rashid Aljneibi, Head of CX Technology and Operations, e& enterprise

Leadership Perspective: Transforming Citizen Experience Through GenAI and Innovative Solutions

In an increasingly digital world, government CX leaders face the challenge of transforming citizen experience (CX) to meet evolving expectations. As governments aim to provide zero bureaucracy services characterized by efficiency, reliability, and personalization, GenAI emerges as a powerful tool.

Rashid Aljneibi, Head of CX Technology and Operations at e& enterprise, outlined strategic perspectives, illustrating how CX leaders can leverage innovative solutions such as GenAI-enabled Cloud Contact Center as a Service (CCaaS) to revolutionize public service delivery.

Government CX leaders often face multiple challenges, including talent constraints, data silos, and the growing complexity of citizens' needs. GenAI can help address these challenges by automating routine tasks, enabling data integration, and providing insights into citizen behavior and preferences. This facilitates a more responsive and personalized service delivery.

The UAE: A Model of CX Governance

The UAE has been a leader in integrating AI into public services, focusing on improving citizen experiences through various governance initiatives. This strategy is guided by six design

principles: hyper-personalization, simplicity, inclusivity, agility, efficiency, and automation. According to a KPMG report, these initiatives have led to significant improvements in service delivery and citizen satisfaction. The study highlighted the importance of a robust GenAI infrastructure and strategic implementation to achieve these outcomes.

Creating a frictionless citizen experience using GenAI-powered cloud-based contact center (CCaaS) solutions can enhance operations and involves several key steps:

1. **Vision and Communication:** Clear communication of the vision and benefits of CX transformation is crucial to gain stakeholder buy-in and ensure a unified approach.
2. **Designing End-to-End Customer Journeys:** Understanding and mapping out the entire customer journey helps identify pain points and areas for improvement.
3. **Understanding Drivers of Satisfaction:** Identifying what drives citizen satisfaction allows for targeted improvements that have the most significant impact.
4. **Simplicity, Reliability, Consistency:** Ensuring that services are simple, reliable, and consistent builds trust and enhances the overall experience.
5. **Change Management:** Taking change management seriously ensures that new processes and technologies are adopted effectively and sustainably.

By providing deep insights into customer interactions and enabling more personalized and effective responses, public service entities can deliver superior customer experiences.

Cloud-based contact center solutions offer features such as self-service, intelligent virtual assistants, real-time agent assistance, knowledge management tools, and real-time interaction analysis. These tools empower government agencies to respond to citizen needs more efficiently and effectively, creating a seamless and satisfying experience.

GenAI-Enabled Solutions in Action

The transformative potential of GenAI extends beyond the public sector, impacting not just government services but also the corporate landscape. Two exemplary cases of successful GenAI integrations in the UAE's private sector demonstrate the power of these solutions in the property development industry.

A leading Dubai-based property developer has implemented GenAI-driven chatbots and virtual assistants to handle a significant portion of customer inquiries. This automation has resulted in quicker response times and higher customer satisfaction, while also reducing operational costs. The success of these GenAI tools demonstrates their potential in streamlining public services and improving citizen interactions.

Another UAE-based property developer focused on creating smart communities illustrates the transformative power of AI. By embedding AI into their developments, they have enhanced connectivity and responsiveness within their communities. From smart home systems to GenAI-enabled community management, their initiatives offer a glimpse into the future of residential living, where GenAI enhances every aspect of daily life.

Strategic Imperatives for GenAI Integration

Several strategic imperatives must guide the sector's collective efforts to ensure responsible and successful GenAI adoption. Firstly, investing in a robust GenAI infrastructure is crucial. This entails building a strong foundation by acquiring cutting-edge technology and recruiting skilled personnel who can develop, manage, and maintain these sophisticated systems effectively. After all, a powerful tool requires the right hands to unlock its full potential.

Building this foundation is just the beginning. Entities must also prioritize the safety and security of the data entrusted to them. Ensuring data privacy and security is paramount. Implementing robust data privacy and security measures builds public trust and ensures compliance with regulatory standards in both the public and private sectors.

Furthermore, fostering public-private partnerships holds immense value. Collaboration between the public and private sectors can accelerate GenAI adoption. These partnerships bring together resources, expertise, and innovation, driving forward GenAI initiatives more effectively. By working together, governments and corporations can leverage each other's strengths to develop and implement GenAI solutions that benefit everyone.

Finally, continuous training and development are essential for success. As GenAI technology evolves rapidly, so too must the workforce's skills and knowledge. Providing ongoing training programs for public service employees and corporate personnel alike will ensure they are equipped to maximize the benefits of GenAI implementation.

By prioritizing these strategic imperatives, we can ensure that GenAI is harnessed responsibly and ethically across both government and corporate settings, ultimately leading to a more efficient, innovative, and prosperous future.

GenAI's Transformative Potential

Looking ahead, the future of GenAI in public services is bright and holds the potential to revolutionize how entities interact with, and serve, citizens. By addressing current challenges and adhering to strategic imperatives, stakeholders can unlock GenAI's full potential. This will not only improve service delivery but also enhance the overall citizen experience, making interactions with public services more efficient, personalized, and satisfying.

The power of GenAI to transform public services, create frictionless citizen experiences, and make them more responsive and efficient is immense. As demonstrated by the UAE's initiatives and the practical examples of the country's largest property developers, GenAI can significantly enhance the way citizens receive public services. As digital transformation leaders, it is our responsibility to embrace this technology, address the associated challenges, and strategically implement GenAI to create a better future for all. TR

APIs: Forging Global Connectivity and 5G Monetization

Application Programming Interfaces (APIs) have emerged as essential digital connectors for modern enterprises, fueling innovation and enhancing the capabilities of their operations, products and services critical for both local and global business growth strategies.

APIs allow enterprises to integrate their functionalities, services, business processes, competencies and resources into a digital framework that can be consistently leveraged through software.

The introduction of APIs has contributed immensely to the acceleration of the digital transformation journey. Diverse industries, including retail, healthcare, education, and finance are growing their customer bases by exposing their services as APIs.

Moreover, APIs enable innovation by allowing the composition of APIs from different providers, adding new business benefits and opportunities that stand to contribute to emerging technologies such as the Internet of Things (IoT), blockchain technologies, wearable technologies, and so on.

Timeous Integration

As expected, the telecommunication sector stands to gain advantageous strides through the adoption of APIs, particularly in light of the rapid uptake of artificial intelligence–backed service offerings across business sectors and industries.

Globally, over 80% of market survey participants are aware of generative AI (GenAI), with a quarter actively using it. Younger individuals under 35 have displayed higher engagement and interest, with 86% being aware of the topic and 32% actively using it. In comparison, only 80% of those over 35 are aware of the topic, and just 20% use it.

The UAE demonstrates more robust engagement and nuanced sentiments

towards GenAI. In the UAE, 91% of consumers are aware of GenAI and 34% utilize these technologies. A recent Gartner survey revealed that 83% of TSPs have started deploying GenAI within their organizations. According to Gartner, over 80% of independent software vendors are expected to integrate GenAI capabilities into their enterprise applications by 2026.

Additionally, market analysts note that technology service providers (TSPs) leading the way in GenAI adoption will drive increased demand for APIs supporting LLM- and GenAI-enabled solutions. As TSPs assist enterprise customers in advancing their GenAI capabilities, they will need to move faster than ever to meet this growing demand.

Digital Enablers

Operators can leverage 5G capabilities for network APIs to support developers in creating new use cases for consumers, enterprises and industrial customers. For instance, Nokia's Network Exposure Function (NEF) helps operators provide developers with access to its 5G network capabilities. These capabilities include precise device location, enhanced notifications based on connectivity status, edge discovery, and more, which collectively enhance the developers' capacity to build new applications and drive new service APIs for the industry.

Moreover, Nokia's Network as Code platform and developer portal brings together networks, systems integrators and software developers into a unified ecosystem that provides developers with a simple way to integrate advanced 5G capabilities into their applications, bypassing the need to navigate the complexity of the underlying network technologies.

Similarly, Ericsson's Exposure Server enables Communication Service Providers (CSPs) to add value within the edge ecosystem for application developers, system integrators, public cloud providers, and device OEMs. It supports APIs and API harmonization across both 4G and 5G networks.

Leading 5G equipment manufacturer, Huawei, has been a long-time proponent of API-based digital transformation in the telecom industry. The company has been collaborating with strategic partners such as the GSMA to streamline the API processes worldwide. It notes that to be profitable, CSPs need to identify APIs that can add value by enabling new applications and services and exposing them to the developer community. Bundling them into different business models and offering them at the right price are notable features to bear in mind.

MEF, a leading industry association focusing on network, cloud, and technology providers, has introduced a suite of new APIs aimed at empowering enterprise digital transformation. Over 23 companies, including giants like AT&T and Verizon, have integrated LSO Sonata APIs into their operations, showcasing the widespread adoption and implementation of API-driven solutions in the telecom sector.

Netcracker's Digital Satellite Solution is another testament to leveraging APIs, utilizing a robust API Management Platform that supports MEF LSO and TM Forum Open APIs. This platform streamlines ecosystem integration across various domains and enables automated Network-as-a-Service (NaaS) engagements, demonstrating how APIs facilitate agile and efficient service delivery.

Additionally, NexNet Solutions is pioneering data monetization services through open APIs, highlighting how telecom companies are innovating and generating revenue by opening up their platforms to broader ecosystem participation.

Some of the domains where telcos can leverage API capabilities include:

- Integration IoT Devices
- Mobile Gaming
- In-App Payments
- Identity Aggregation
- Access to Legacy Systems
- Network Monitoring and Control
- Speed on Demand, Speed Tiers, and Low Latency
- Remote Monitoring and Control
- Rich Communication Services (RCS)

A Forward-Looking Agenda

Adopting the appropriate API monetization strategies can increase developers' utilization of the exposed APIs, enabling API providers (enterprises) to expand beyond their current business models and tap into new market segments. CSPs are drawn to standardized APIs because the cost of proprietary APIs is too high. Moreover, standardization is slow and current offerings do not represent the newest, most innovative ideas due to this imbalance.

"Standardization of APIs and aggregation across telcos will be crucial to scaling the network API opportunity. Alongside the development of their direct models for API monetization—to drive initial developer engagement and adoption of network APIs—telcos must work towards a more federated approach with their peers and technology partners/aggregators," noted Amy Cameron, Research Director at STL Partners.

GSMA's Open Gateway initiative provides a transformative platform for the telecoms industry to design and deliver services in an API economy. It provides a framework of common network APIs designed to provide universal access to operator networks for developers and cloud providers to enhance and deploy services rapidly across operator networks.

APIs unlock numerous opportunities for the telecom industry to utilize its vast data pool to better serve enterprise businesses. However, there have been significant instances where nefarious actors have managed to exploit the API stage to break into the system. Hence, API security must factor prominently into telcos' growth strategies. As the 5G revolution continues to evolve, APIs promise much-needed network monetization opportunities for the telcos.

"Our collective job for 2024 is to nurture and grow this opportunity and provide ubiquitous access to enterprise developers and cloud providers, so they can do what they do best, which is launch game-changing new services that can maximize the benefits of 5G networks," opines Mats Granryd, Director-General at GSMA. TR

5G RedCap: Transforming the Future of IoT

The number of Internet of Things (IoT) devices worldwide is projected to nearly double, increasing from 15.9 billion in 2023 to over 32.1 billion by 2030.

A study from ReTHINK Research forecasts that reduced capability (RedCap) will surpass 4G networks as the dominant cellular IoT platform between 2032 and 2033. This advancement heralds the 5G RedCap revolution, which will enhance global interaction and usher in the next wave of IoT evolution.

IoT stands at the forefront of innovation, delivering enriched solutions that transform interaction with the world around us. From smart homes to intelligent cities, IoT devices are reshaping our environment. IoT, however, is yet to reach its full potential and its evolution is far from over. The advent of 5G technology is set to elevate IoT, bringing the connected world to new heights.

5G RedCap and its Applications

RedCap combines the power of 5G with edge computing to establish a dynamic and robust IoT ecosystem. In addition to enhancing existing applications, RedCap is designed to facilitate the creation of new devices with lower costs, reduced complexity, smaller sizing, and a longer battery life. This tailored approach meets the specific requirements of less intensive applications effectively.

Essentially, 5G RedCap will bridge the gap between 4G and 5G, paving the way for the enhancement of IoT applications. This strategic technology will help expand the 5G ecosystem and enable more devices to connect to 5G networks, marking a paradigm shift in how IoT devices connect and communicate.

RedCap ensures strong wireless connectivity, seamless mobility and

facilitates the development of use cases such as wearable devices (including smartwatches, industrial wireless sensors, low-end augmented reality (AR) and virtual reality (VR) glasses, video surveillance, and more). These wearables are equipped with sensors and processors that collect and transmit data. They have lower data rate requirements than eMBB use cases and do not require tight latency-like, time-critical communication devices.

Specifically, 5G RedCap offers lower latency, ensuring faster response times for substantial time sensitive IoT applications like industrial automation. Additionally, significantly higher data rates are supported, making the technology ideal for security applications such as video surveillance.

In smart cities, the deployment of interconnected infrastructure can be facilitated by this advancement, enabling real-time monitoring of traffic flow, energy consumption, and environmental conditions.

Furthermore, 5G RedCap leverages a network of distributed nodes to offload processing tasks from centralized data centers, reducing latency and improving reliability. It utilizes a decentralized architecture that distributes computing resources closer to the network edge, making it ideal for latency-sensitive applications including autonomous vehicles and industrial automation.

5G RedCap Challenges

While IoT has presented vast possibilities and enhanced our way of life, certain challenges come with it. Since 5G RedCap is yet to maximize its maturity, the technology is prone to vulnerabilities.

The pouring demand for reliable, high-speed connectivity has skyrocketed and traditional networks, like 4G LTE, struggle to keep pace with the exponential progress of IoT devices. This concern has slowed down IoT application innovations, hindering the seamless integration of devices.

With its capabilities and widespread adoption, experts should be cognizant of addressing data privacy and security concerns. As more devices connect to the network, the risk of cyberattacks becomes higher. Security should be the utmost priority to gain the public's trust, especially when building this type of connected technology.

Moreover, not all IoT devices are compatible with each other, resulting in interoperability issues, thus, standards should be established to ensure seamless integration with the existing IoT infrastructure.

This requires a significant investment in infrastructure and technology upgrades, however, its benefits are projected to compensate for the costs.

On the other hand, these connectivity challenges are poised to be resolved by 5G technology. Its promise of ultra-fast speeds, low latency, and massive device connectivity, has the potential to revolutionize the IoT landscape.

Advancing IoT with 5G RedCap

As 5G RedCap continues to advance, the future of the IoT ecosystem is promising. With its unparalleled speed, reliability, and resilience, it has the potential to lead us into a new era of innovation, transforming the way we live, work, and interact with the world around us.

It represents a quantum leap forward in the IoT landscape, offering a glimpse of the future where every device is seamlessly interconnected, and every interaction is instantaneously enabled.

5G RedCap technology is making significant strides in advancing the Internet of Things (IoT) landscape across various regions and industries. In the Middle East, stc's live network trials have demonstrated the successful integration of RedCap devices alongside regular 5G devices, showcasing their capability to access networks and share resources seamlessly. This represents a pivotal development in reshaping IoT applications by offering expansive coverage using a single base station, enhancing connectivity efficiency.

Additionally, Nokia and du have concluded successful RedCap trials in the UAE, marking a milestone in the region's adoption of 5G-Advanced technologies. These trials validate RedCap's potential to support diverse IoT applications, laying the groundwork for enhanced industrial automation and smart city initiatives.

Huawei's initiatives in the Middle East emphasize the strategic importance of 5G-A, including advancements in RedCap and PIoT. Evidently, operators are gearing up for commercialization in 2024, driven by a vision for robust connectivity and innovative use cases that leverage RedCap's capabilities.

Furthermore, MediaTek's efforts in driving 5G and RedCap adoption in the Middle East and Africa (MEA) underscore the region's readiness to embrace futuristic technologies. Ericsson's RedCap technology is set to support a wide range of devices, from low-end augmented reality wearables to industrial sensors and smart grids, further expanding the potential applications of 5G in diverse sectors.

Overall, these developments highlight how 5G RedCap is not only enhancing connectivity and efficiency in IoT deployments but also paving the way for transformative advancements across industries in the MEA region and beyond.

Final Thoughts

From smart homes, to connected cars, to telecommunications, to healthcare, RedCap-powered IoT devices are poised to revolutionize every aspect of our lives, ushering in a future where connectivity knows no bounds.

By 2030, 5G RedCap will generate 61.3% of all cellular IoT revenue, fundamentally bridging the gap. It is poised to provide more capacity, effectiveness, adaptability, and increased system efficiency over LTE, expediting the Industry 4.0 revolution.

Building upon the foundation of previous network generations, the potential that 5G RedCap holds is undeniably limitless, spanning various industries and sectors, including telecommunications. TR

Redefining Data Connectivity and Security in 2024

The modern data exchange taking place in telecom networks today will require innovative observability mechanisms for effective practices, notes the International Telecommunication Union (ITU). This is particularly important in the context of 5G network monetization strategies, whether it be FWA, private or public networks. Analyzing data sets to gain insights into customer requirements is becoming increasingly critical for service providers to optimize their offerings.

Similarly, governments across the globe are advancing their digital transformation agenda as part of their plan to improve services provided to citizens and simplify digital services procedures. The new systems are expected to ease backlogs at outlets and achieve greater fairness in the distribution of services to citizens and businesses.

Moreover, organizations are increasingly adopting cloud technologies to drive innovation and efficiency. At the same time, they are battling cyber risks, including unauthorized data access, backdoors, and financial exploitation. Additionally, there is a data exposure risk due to the insecure use of both managed and unmanaged AI-based productivity tools.

Interestingly, with the rise of emerging technologies, the commercial proposition around 5G use cases now extends to robots, drones, and remote support, as well as mobile security, which has become an important differentiator in an increasingly artificial intelligence-driven ICT ecosystem.

The Deluge of Synthetic Data

The advancement of generative AI (GenAI) models that use machine learning (ML) to generate content based on the user's prompt has accelerated the explosion of synthetic data. In 2021, NVIDIA, a world leader in AI computing, predicted that by 2030, there will be more synthetic data than real data in AI models.

Hence, the internet is witnessing an explosion of fabricated, nonsensical information, as well as mis- and disinformation. Additionally, AI models often exacerbate social negative stereotypes, making these issues even more prevalent online.

Unfortunately, AI engineers training their AI models for various platforms are utilizing diverse data sets that don't necessarily provide the outcomes expected from genuine and relevant data sets. This highlights the need for responsible AI development. For example, deploying AI in healthcare without ensuring data authenticity and privacy could lead to unwanted disclosure of sensitive patient information, causing substantial ethical dilemmas and legal issues.

Separating Husk from Grain

Obtaining real-world datasets for AI/ML model development and testing for network function virtualization (NFV) use cases is extremely difficult for a telco. This difficulty arises due to the nature of business—stringent policies and rules that the telecom companies must observe. According to the ITU, even the infrastructure metrics, which may not include any sensitive information, are very difficult to obtain from the real-world NFV environments.

According to Security Magazine's research, data privacy concerns rank first among 65% of organizations' top generative AI concerns.

By leveraging the most advanced large language models (LLMs), combined with proprietary layout-awareness models, Retrieval-Augmented Generation (RAG), vector databases, and no-code end-to-end workflow orchestration tools, organizations are now able to convert unstructured data into structured formats. This approach automates workflows and generates insights without the need for coding.

The core objective of embedding intelligence into any system or business process to drive transformational outcomes, such as automating end-to-end, mission-critical business processes rests upon the accuracy of the used data sets.

To that end, in an effort to develop safer AI processes, the ITU, the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC) recently announced a unified framework for AI standards development, highlighting the push to translate AI governance principles into practical, actionable standards.

Additionally, a multistakeholder initiative comprising the Content Authenticity Initiative (CAI), the Coalition for Content Provenance and Authenticity (C2PA), the Internet Engineering Task Force (IETF), the IEC, the ISO, and the ITU has also been introduced to support coordinated standards development for AI watermarking, multimedia authenticity, and deepfake detection.

High-Performance Networking and Stringent Security

In today's increasingly hybrid work environment, the security and networking parameters should maintain equal emphasis. According to industry analysts, security often overshadows the networking aspect in most secure access service edge (SASE) solutions.

In an ideal world, network users should have the privilege of enjoying a positive experience along with robust security measures in place. Hence, an effective SASE solution must integrate these elements seamlessly, supporting today's hybrid workforce culture demands. Organizations need to move quickly and adopt the 'distributed workforce' networking model. The model is renowned for providing lightweight, adaptable networking solutions within enterprises. This model replicates a seamless user experience while eliminating the complex network infrastructure traditionally found in corporate office settings.

“The core objective of embedding intelligence into any system or business process to drive transformational outcomes rests upon the accuracy of the used data sets”

Similarly, cybersecurity is particularly important in financial technology, digital health, digital infrastructure and intelligent transport systems where private, sensitive data can be compromised. For instance, self-driving cars require communication with the transport infrastructure. Therefore, designers and manufacturers of these vehicles must implement necessary precautions to prevent their systems from being compromised by hackers. Should these precautions not be taken, hackers could potentially attempt to take control of the vehicle to cause accidents or manipulate traffic lights to disrupt traffic flow, among other risks.

Global and Regional Data Connectivity and Security Ascension

Several companies and initiatives are actively redefining data connectivity and security in the current landscape. At the Telecom Review Leaders' Summit 2023, Yasser Alsaied, VP IoT at AWS, emphasized Amazon's commitment to user privacy by employing differentiated approaches. For example, AI processes such as ChatGPT handle encrypted data within individual accounts, ensuring stringent security and privacy measures.

In 2021, Sparkle significantly bolstered Panama's data connectivity capabilities, positioning the country as a regional hub. Qualcomm has also advanced data security through its latest Wi-Fi security standards, enhancing protections for wireless networks. Back in 2018, TIM's Sparkle launched a comprehensive suite of security services tailored for signaling connectivity, addressing critical security needs in telecommunications.

More recently, in response to the challenges posed by the return of one million pilgrims in 2022, stc expanded its infrastructure with additional communication towers and over 1,942 Wi-Fi access points. This expansion significantly increased network coverage and capacity, supporting seamless connectivity during peak times.

Elsewhere, e& and Cato Networks boosted next-generation connectivity and Secure Access Service Edge (SASE) capabilities with their SmartHub solutions. In collaboration with Nokia, e& UAE has addressed connectivity and security solutions tailored for hyperscalers, ensuring robust network performance and protection.

Moreover, Zain KSA's Al-Sadhan highlighted the company's commitment to driving digitalization through localized technology, sustainability, and top-notch cloud security at LEAP24. Furthermore, Fortinet has integrated 5G technology with AI-powered security solutions, offering advanced protection against evolving cyber threats in telecommunications.

These initiatives underscore a concerted effort across the industry to redefine data connectivity and security standards, ensuring resilience and innovation in an increasingly interconnected world.

A Futuristic Outlook

In digital transformation, datafication—the act of quantifying previously qualitative information—allows companies to optimize services based on user behavior, creating a win-win for both parties. However, in most economies, the unavailability of big data presents a challenge in the deployment of AI data analysis capabilities, which, in turn, hinders the efficient enforcement of cybercrime laws.

For example, the UAE has positioned itself as a leader in an AI-driven world by developing a national AI and data strategy. This strategy involves extensive consultation with multiple stakeholders, including the public sector, government institutions, universities, and other entities. Together, they are exploring opportunities and addressing challenges related to AI to foster innovation and development in the country.

The consortium regularly engages in discussions which tackle AI transparency, liabilities, accountability, justification and compensation for AI decision-making, keeping pace with the rapid deployment of this technology across economic sectors.

Experts have stressed the importance of national AI and big data policies covering issues such as data access and sharing, data protection, and the use and management of open data.

Regulations should be innovative and agile, leveraging public-private partnerships to establish clear and robust national policies and legal frameworks. These frameworks are crucial for regulating opt-in and opt-out data policies, data mining, access, use, reuse, transfer, and dissemination. They empower citizens to better understand and control their personal data, safeguard against cyber-attacks, and facilitate access to non-personal information.

The future visibility achieved through these practices appears relevant and logical in the current technological landscape. TR

> In today's hybrid workforce culture, organizations need to move quickly and adopt the 'distributed workforce' networking model

TDRA Inks MoU with ITU as Strategic Partner for I-CoDI

The Telecommunications and Digital Government Regulatory Authority (TDRA) has signed a memorandum of understanding (MoU) with the International Telecommunication Union (ITU) as a strategic partner of the International Center of Digital Innovation (I-CoDI).

Through this distinguished partnership, TDRA will share its leading expertise in the field of digital innovation with each of the ITU's regional offices by hosting and providing specialized training courses.

This initiative aims to enhance international cooperation and knowledge exchange, which contributes to supporting digital development and innovation on a global level.

Established in 2020 with support from the TDRA, and in partnership with the ITU, the I-CoDI was created to offer a supportive environment for ITU members. Its focus revolves around building the capacities of global stakeholders by bringing together partners, regulators, and policymakers. The overarching goal is to equip them with new skills and flexible methods to enhance connectivity and accelerate digital transformation.

In 2022, the TDRA pledged to invest AED 5 million (over USD 1.3 million) to support the I-CoDI initiative. This investment includes hosting the I-CoDI Regional Hub for Arab States and supporting the ITU Regional Office for the Arab States in providing training and workshops. Through this investment, the TDRA aims to empower Member States in the region and encourage them to advance their digital transformation strategies.

1.7 Billion 5G Subscriptions Achieved in Q1 2024, Strong Momentum in MEA

"5G is an innovation platform for driving digital transformations of businesses and society," said Fredrik Jejdling, Executive Vice President and Head of Business Area Networks, Ericsson. With this in mind, the deployment of 5G is still ongoing, and is far from complete.

Based on the latest Ericsson's Mobility Report (June 2024), there is a robust uptake of 5G subscriptions worldwide, anticipating the addition of nearly 600 million new 5G subscriptions in 2024.

During the first quarter alone, 160 million 5G subscriptions were added, exceeding a total of 1.7 billion. This meets the previous projection, which indicated a 1.5 billion 5G subscription total by 2024.

Expected to become the dominant mobile access technology by subscription in 2028, 5G mobile subscriptions are set to reach nearly 5.6 billion in 2029.

There has been a slight adjustment in regional 5G penetration compared to last year. It is projected that North America will maintain the highest 5G penetration in 2029 at 90%, followed closely by the Gulf Cooperation Council (GCC) at 89%.

By the end of 2023, 5G subscription penetration peaked at 59% in North America, with GCC countries recording a rate of 34%.

MEA Region and GCC Countries

According to the latest Ericsson Mobility Report, the MEA region's telecom industry continues to demonstrate stability and growth despite economic challenges in several countries. Overall, subscriptions are projected to rise 2% annually between 2023 and 2029.

Smartphone subscriptions are forecasted to display similar growth, reaching 750 million in 2029. 5G will experience the highest subscription growth—rising 51% annually during the period with increasing network coverage and availability of affordable 5G-capable smartphones.

GCC countries have displayed high mobile penetration and urbanization as well as strong consumer purchasing power, making it a highly developed market. In fact, Kuwait, Saudi Arabia, and Bahrain are among the top ten countries with the most mobile data usage.

A major trend emerging in the region is the transformation of service providers from "telcos" to "techcos" which is predicted to result in a double-digit increase in revenues as entities explore novel avenues to expand their operations and diversify their revenue streams.

Focusing on de-layering network elements and offering digital services, prominent players such as etisalat by e& and du are offering factory network automation, AI, IoT, fintech, and content services, among others.

Service providers remain steadfast in diversifying their offerings, opting to curb the influence of increased mobile penetration with services such as mobile financial services.

Additionally, fixed wireless access (FWA) connections are forecast to exhibit strong growth in the MEA region, as service providers seek to monetize their 5G networks and connect areas with limited fiber access.

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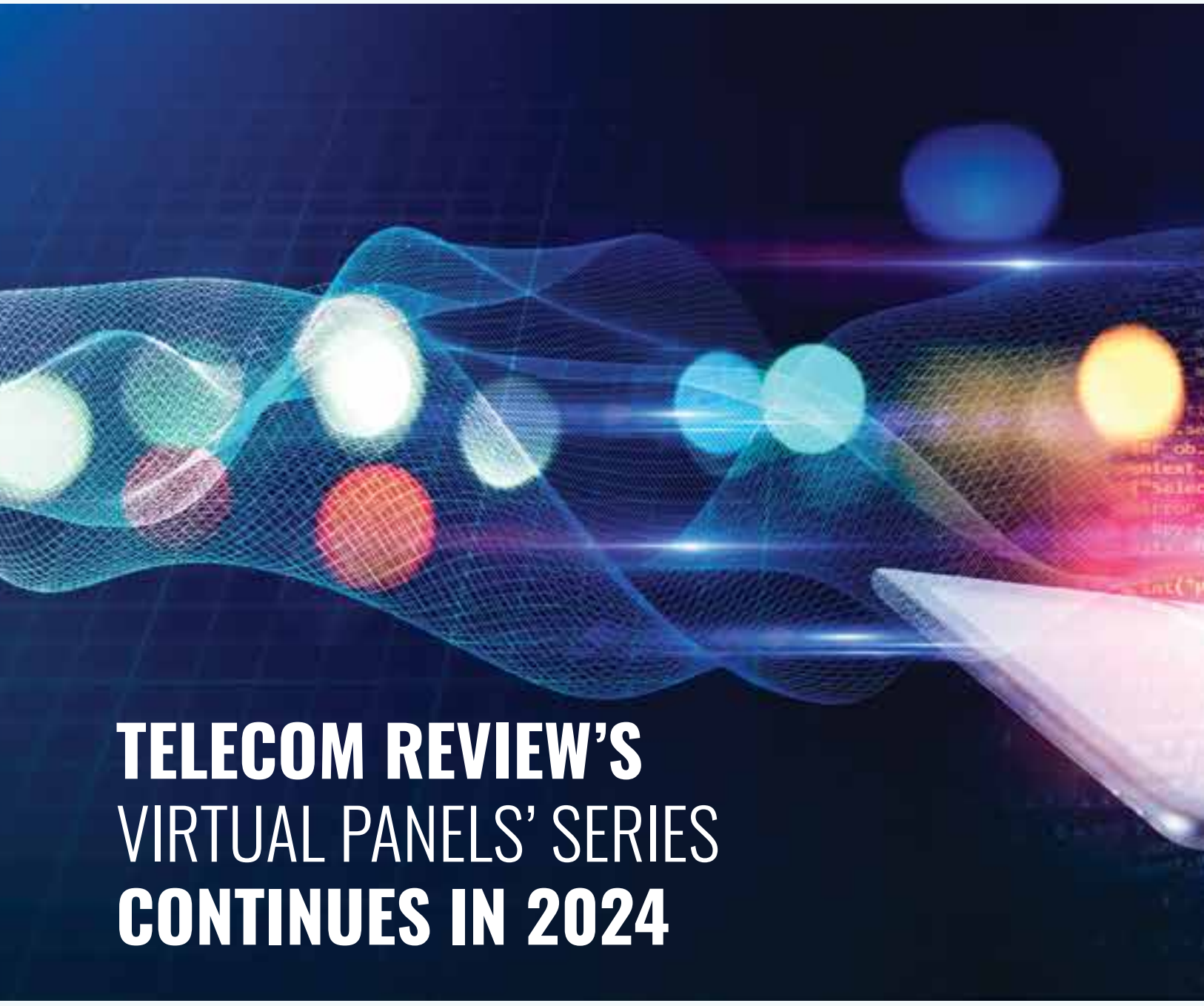

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Small but Mighty: The New Wave of Language Models

The choice between large and small models ultimately depends on specific needs and resource constraints. Small language models (SLMs) might have fewer parameters than their larger counterparts, but their capabilities to be trained and fine-tuned for specific tasks should not be underestimated.

Small Language Models: The Key to Scalable and Accessible AI

Large language models (LLMs) are highly sophisticated and effective due to their extensive parameters and complex structures. However, they require significant computational resources and are typically deployed in large-scale computing environments. In contrast, small language models (SLMs) offer efficiency and simplicity. They are more versatile, operating effectively on various devices.

SLMs are designed for simpler tasks, making them accessible and easier to use for organizations with limited resources. These models also offer potential solutions for regulated industries and sectors that require high-quality results while keeping data on-premises. With advancements, SLMs are expected to become more prevalent on smartphones and other devices operating at the edge, without needing cloud connectivity.
These applications encompass various scenarios such as integration into car computers, offline PCs, traffic systems, smart sensors within factory premises, remote cameras, and environmental monitoring devices. By retaining data locally within the device, users can minimize latency and ensure maximum privacy.

The offline capability of SLMs opens new possibilities for AI applications in areas previously inaccessible. For example, in rural areas without cell service, a mechanic working on a car can use an SLM with visual capability to take a picture of a damaged engine part and receive immediate recommendations on repair procedures.

While LLMs remain the gold standard for complex tasks due to their substantial computing requirements, SLMs are becoming an attractive option for smaller enterprises with tighter budgets. These streamlined versions of LLMs are more practical for on-site implementation or use on smaller devices.

Small language models offer an additional advantage in terms of interpretability and transparency. While LLMs are often criticized for their opacity, appearing as "black boxes" due to their complexity, smaller models are more conducive to analysis and explanation. This characteristic enables researchers and developers to gain deeper insights into the decision-making processes of these models.

Furthermore, fine-tuning and meticulous data preparation play crucial roles in harnessing the effectiveness of small language models. By carefully selecting and preparing datasets, we can train these models to excel in specific domains, resulting in the generation of accurate, relevant, and high-quality outputs. This approach unlocks a plethora of potential applications across diverse industries, ranging from content creation and translation to customer support and personalized marketing.

Where to Use SLMs?

Small language models (SLMs) are often used in applications where memory or processing power is limited, such as mobile devices, embedded systems, or edge computing environments. Despite their smaller size, these models can still exhibit impressive capabilities in tasks like text generation, sentiment analysis, text classification, and more.

While they may not match the performance of larger and more complex models like GPT-3, small language models strike a balance between efficiency and effectiveness, making them suitable for a wide range of practical NLP applications in resource-constrained environments.

Small language models can be beneficial in various ICT use cases, especially in scenarios where computational resources are limited or where real-time processing is required. Here are several ICT use cases that can benefit from small language models:

1. **Chatbots and Virtual Assistants:** Small language models can power chatbots and virtual assistants, enabling natural language understanding and response generation in real-time. These models can efficiently handle user queries, provide information, and perform tasks such as scheduling appointments or answering FAQs.
2. **Text Classification:** Small language models can be used for text classification tasks, such as sentiment analysis, spam detection, and topic classification. These models can quickly analyze text data and categorize it into different classes or categories, allowing for efficient organization and processing of large volumes of textual information.
3. **Document Summarization:** Small language models can be employed for document summarization, where they can automatically generate concise summaries of lengthy documents or articles. This can be useful in scenarios where users need to quickly extract key information from large amounts of text, such as in news aggregation platforms or document management systems.

Small language models offer an additional advantage in terms of interpretability and transparency

4. **Language Translation:** Small language models can support language translation services, enabling the automatic translation of text between different languages. These models can be deployed in applications such as language translation apps, multilingual customer support systems, and global communication platforms, facilitating cross-language communication and collaboration.
5. **Keyword Extraction and Named Entity Recognition:** Small language models can assist in keyword extraction and named entity recognition tasks, where they can identify names of people, organizations, or locations, from text data. This can be valuable in applications such as information retrieval, content indexing, and data analysis.
6. **Smart IoT Devices:** Small language models can be integrated into smart Internet of Things (IoT) devices to enable natural language interaction and voice commands. These models can process user queries and commands locally on the device, reducing the need for continuous internet connectivity and enhancing privacy and security.
7. **Personalized Recommendations:** Small language models can power personalized recommendation systems, where they can analyze user preferences and behavior to provide tailored recommendations for products, services, or content. These models can enhance user engagement and satisfaction by delivering relevant and personalized recommendations in real-time.

Overall, small language models offer a lightweight and efficient solution for various ICT use cases, enabling natural language understanding and processing in resource-constrained environments.

A Promising Future for SLMs

In March 2024, Amazon Web Services (AWS) announced that a leading South Korean artificial intelligence (AI) startup had launched its flagship SOLAR MINI Small Language Model (SLM) on its platform. This versatile model is designed for multiple language tasks in Korean and English (Thai and Japanese coming soon), including understanding, summarizing, translating, and predicting new content.

Other SLMs of note include DistilBERT, a lighter and faster version of Google's BERT (Bidirectional Encoder Representations Transformer), the pioneering deep learning NLP AI model introduced back in 2018; Orca 2, developed by Microsoft by fine-tuning Meta's LLaMA 2 by using synthetic data; GPT-Neo and GPT-J, designed by EleutherAI to be smaller and open source versions of OpenAI's GPT model; and Phi-2, another innovative model from Microsoft that is optimized for efficient training and adaptability.

Taking these into consideration, as well as the key advantages and potential of SLMs, this technology is evidently bound to be the next hit in the ongoing AI revolution. SLMs can be deployed on a variety of devices, including smartphones, tablets, and edge devices, making advanced NLP capabilities accessible to more users and applications. Lower computational requirements will also mean reduced costs for deployment and operation, making SLMs affordable for small businesses and startups.

Moreover, reduced power consumption makes SLMs ideal for battery-powered devices and sustainability-conscious applications.

By processing data locally, SLMs can help businesses comply with data protection regulations such as GDPR, which restrict the transfer of personal data across borders.

SLMs can be fine-tuned for specific industries or applications, providing more relevant and accurate results for tasks such as legal document analysis, medical diagnostics, or customer service. Smaller models can also be updated and iterated upon more quickly, allowing for rapid adaptation to new data and emerging trends.

Furthermore, SLMs are well-suited for integration with Internet of Things (IoT) devices, enabling intelligent processing at the edge and supporting smart home, healthcare, and industrial applications. These can also enhance user experiences in AR and VR environments by enabling natural language interactions and real-time data processing.

Conclusion

As language models continue to advance in versatility and capability, prioritizing smaller models appears to offer the most promising path forward. As SLM technology progresses, its applications will likely play an increasingly crucial role in tailoring AI models to meet the diverse needs of modern industries, ultimately enhancing operational efficiency, refining customer experiences, and fostering innovation. TR

> Small language models can be beneficial in various ICT use cases, especially in scenarios where computational resources are limited or where real-time processing is required

Telcos' Role in the Global Space Industry

The first practical concept of satellite communication was proposed by 27-year-old British Royal Air Force officer, Arthur C. Clarke, in a paper entitled "Extra-Terrestrial Relays: Can Rocket Stations Give World-wide Radio Coverage?" and was published in the October 1945 issue of Wireless World, according to Britannica.

Clarke envisioned a satellite positioned 35,786 km (22,236 miles) above Earth's surface that would remain in a fixed position relative to a point on Earth. This position, now known as the "geostationary orbit," is ideal for satellite communications. It allows ground antennas to be directed at the satellite continuously, 24 hours a day, without needing to track its movement.

However, no single type of satellite network type can meet the unique and disparate needs of each satellite application. As such, multi-orbit satellite connectivity has emerged as the next innovation in the burgeoning satellite communications industry.

Today's mobile operators must navigate a tough competitive market to remain profitable and relevant. One of the most challenging limitations

that operators face is the reach of their network coverage, including seamless service delivery to all their customers. As such, technologically advanced satellites, lower costs and easing adoption policies present many opportunities for telecom operators to integrate satellite services into their portfolios.

Satellite internet is a wireless network that covers satellite dishes in space and on Earth. It connects people in remote locations worldwide and provides access to up-to-date information. Satellite internet is accessed via high-speed network connectivity provided by satellites circling the Earth. It is faster than standard internet service and distinct from land-based broadband services such as digital subscriber line (DSL) and cable. Satellite communication provides a land-based interface with voice, video, and information that can be accessed anywhere on the planet.

5G Goes to Space

The telecom industry is enthusiastic about placing 5G in orbit to expand global connectivity and enhance communication capabilities. As such, traditional cellular mobile operators and their satellite counterparts, along with technology vendors and equipment manufacturers are aligning their strategies with space-enabled connectivity as an alternative to terrestrial networks.

In addition, the inclusion of non-terrestrial networks (NTN) in 3GPP's Release 17 standards has provided distinct options for satellite 5G connectivity. These options include whether the satellite payload comes equipped with gNodeB/base station functionality or is used solely as a repeater to connect with user equipment. The regenerative or transparent options for 5G satellites each present their pros and cons which operators must consider carefully as part of their broader NTN 5G strategies.

Telcos are playing a pivotal role in the rapidly evolving global space industry, expanding their reach beyond traditional telecommunications into the realms of satellite communication and space exploration. Omantel's foray into the space industry exemplifies this trend, signaling a shift toward leveraging space technology for broader connectivity initiatives. Meanwhile, SpaceX's Starlink satellites are revolutionizing communication by enabling direct texting from Earth, showcasing the transformative potential of satellite networks in bridging global communication gaps.

Moreover, telcos are actively contributing to space exploration efforts, as seen with NASA's collaboration with the UAE on the Lunar Gateway Station project. This partnership highlights the collaborative nature of space endeavors, where telcos are instrumental in providing essential communication infrastructure for ambitious space missions. Additionally, initiatives like the SCIT GROUP's investment in global connectivity and space communication underscore the growing importance of space-based technologies in shaping the future of telecommunications.

Furthermore, advancements in space communication technology, such as AST SpaceMobile's successful space-based voice call to unmodified smartphones, demonstrates the tangible progress made in bringing space-based services to everyday consumers. Companies like e& and E-Space are pushing boundaries by developing sustainable low Earth orbit (LEO) networks to support advanced global IoT applications, showcasing telcos' commitment to driving innovation and connectivity in the space industry. As telcos continue to invest in and collaborate on space initiatives, they are poised to play an increasingly integral role in shaping the future of space exploration and communication on a global scale.

Benefits and Challenges

Satellite 5G connectivity offers a range of exciting new possibilities for telcos in terms of operational and cost-saving efficiencies, however, satellite 5G connectivity faces challenges compared to traditional terrestrial 5G connectivity.

One particular area where non-terrestrial 5G solutions hit a roadblock

is with testing. The high cost and risks associated with launching satellites into space means that testing needs to be extremely exhaustive.

Once in orbit, factors such as orbital speed, distance from Earth, and other dynamics come into play. These factors influence the satellite's ability to maintain its designated position and perform its intended functions effectively. The sheer complexity of considering the physical layer of 5G for non-terrestrial applications presents a unique set of challenges when compared to terrestrial networks. However, having said that, the radio channel itself may be simpler in a non-terrestrial environment when compared to terrestrial 5G. It is free from reflections and typically operates with a single-input and single-output (SISO) configuration.

Testing the 5G physical layer for non-terrestrial applications is a critical and indispensable step in creating a robust and reliable satellite solution. While the radio channel may be simpler in some respects, the wide variability of parameters, high link delays and specific requirements for PRACH formats presents formidable challenges.

Hence, it becomes imperative for telcos to invest in exploring the capabilities of SATCOM architecture and the benefits and challenges they bring before they decide on selecting the best option for deployment.

Fostering Economic Growth

5G connectivity can bring further economic growth to remote locations and drive higher speeds in rural areas, reducing the divide between urban and rural areas. Satellite communication technology, which requires minimal terrestrial infrastructure, makes it an ideal technology to connect remote and underserved regions globally.

At the end of November 2023, 23 mobile operators in nine markets across MENA had launched commercial 5G services. With 5G adoption surpassing 20% in six of these countries (Bahrain, Israel, Kuwait, Qatar, Saudi Arabia and UAE), the focus is shifting towards 5G monetization as operators seek returns on significant strategic investments.

The satellite industry's star player—the low Earth orbit (LEO) satellite—is at the forefront of advancing worldwide communication and fostering economic expansion. It is becoming an integral component in the infrastructure for bridging the digital divide, enabling advanced real-time data applications, fostering collaborative innovation and strengthening economic resilience across industries such as aerospace and defense, telecom, agriculture, and oil and gas, and so on.

Paving the Way for a 5G Satellite Future

According to the GSMA, six operators in the MENA region have already rolled out 5G SA networks, contributing to 15% of the global total of 5G SA networks. 5G SA deployments have been concentrated in the GCC (Gulf Cooperation Council) states, specifically Bahrain, Kuwait, Saudi Arabia and the UAE. The next stage of 5G SA expansion will include Oman and Qatar. Additionally, the technology is making inroads beyond the GCC states, extending its reach to other regions. 5G SA brings a host of new capabilities that will be crucial to monetizing 5G investments, including improved support for network slicing.

Aligned with the telecom industry's 5G monetization goals, the global satellite internet market size was valued at USD 8,231.47 million in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 13.6% from 2023 to 2030. Governments across the globe have been investing in satellite broadband technology to provide broadband services in every region of their nations. They are relying on cutting-edge technology to connect rural areas to the broadband network, ensuring that even remote communities have access to high-speed internet.

As providers of digital connectivity, telcos uphold the responsibility of shaping the socio-economic landscape of the region. Recently, telco operators in the GCC and Middle East region have been providing various VSAT services to their customers. Moreover, the introduction of advanced networking infrastructure, enabled by SATCOM services, will act as a catalyst for accelerating the digital transformation journey in the region, specifically in sectors such as commercial maritime, commercial airlines, government and defense, oil and gas, among others.

Despite setbacks such as the scarcity of commercial testing equipment, which further compounds the complexity of space 5G deployment, telcos are determined to bring solutions to market as the satellite internet market matures. The successful and efficient future of 5G satellite technology in the region will hinge on telcos' ability to navigate these challenges and deliver on their promises. TR

> Technologically advanced satellites, lower costs and easing adoption policies hold many opportunities for telecom operators to integrate satellite services into their portfolios

Unlocking Cloud Security: How CIEM Practices Safeguard Telcos

Cloud environments can be likened to high-tech fortresses, each housing valuable treasures in multiple rooms with restricted access areas. Within this digital stronghold, employees assume distinct roles, mirroring their counterparts in a physical fortress, and are granted specific access permissions based on their job responsibilities.

Cloud Infrastructure and Entitlement Management (CIEM) practices act as the fortress' security protocols, ensuring that only authorized individuals have access to sensitive areas of the cloud environment while safeguarding valuable assets from potential threats.

According to Gartner projections, 75% of cloud security failures will result from inadequate management of identity, access, and privileges. To combat this, CIEM—an automated cloud security and cloud governance practice—can be implemented to help enterprises effectively and securely manage access to their cloud environments.

By integrating robust infrastructure management with precise entitlement controls, they can optimize their use of cloud resources while maintaining strong security and compliance postures.

Key Benefits for Multi-Cloud Environment

The core elements of CIEM include entitlement visibility, rightsizing permissions, advanced analytics, and compliance. The primary objective is to enhance security by ensuring least-privilege access across various cloud resources and providers.

Gartner unveiled that over 80% of organizations utilize two or more public cloud providers. Each provider has a unique approach to identity and access management (IAM) security, characterized by specific roles, permission models, tools, and terminology.

Due to the lack of native integration among different cloud environments, managing identities and entitlements often becomes a resource-intensive, time-consuming, and error-prone task.

For smaller organizations, relying on native cloud provider services for assessing identity roles and policies might suffice. However, larger organizations, with extensive cloud resources and intricate deployments,

could gain advantages from CIEM tools. These tools assess identity relationships and policies, identify potential attack vectors and excessive privileges, and address issues promptly upon discovery.

More importantly, CIEM allows multi-cloud visibility into entitlements to gain a complete view of identities, net effective cloud permissions, policies and access risks across multi-cloud environments.

Gartner's research indicates that over 95% of IaaS accounts utilize less than 3% of their assigned entitlements. Companies often harbor dormant identities from ex-employees or outdated proof-of-concept (PoC) labs. Hence, CIEM solutions can help in continuously monitoring access activity, detecting obsolete identities, and adjusting permissions accordingly.

How Telcos Can Enhance Their CIEM Practices

To reinforce CIEM practices to protect the cloud environment for telcos, a multi-faceted approach is needed. This involves leveraging advanced security practices, automation, and continuous monitoring tailored to the complex and interconnected nature of telco operations.

> The core elements of CIEM include entitlement visibility, rightsizing permissions, advanced analytics, and compliance

Telcos often have intricate networks and numerous service endpoints. Thus, custom policies should account for this complexity and automate provisioning across various cloud and on-premises environments.

Given the sensitive nature of telecommunications data, telcos should also emphasize compliance with regulations like CIS benchmarks, ISO/IEC 27001, and NIST standards.

An important principle to follow is 'trust no one by default, verify everything.' By adopting a zero-trust security model, telcos are encouraged to implement Multi-Factor Authentication (MFA) for all access to cloud services; use Identity Federation to unify identity management across on-premises and cloud environments; and enforce least privilege access to minimize exposure by granting only necessary permissions.

To simplify the management of user permissions through roles, a robust Role-Based Access Control (RBAC) can be implemented; and to ensure timely and accurate assignment of access, telcos can automate access provisioning and de-provisioning using Identity and Access Management (IAM) tools and self-service access requests.

Moreover, it is essential to integrate CIEM with Security Information and Event Management (SIEM) to enhance visibility and response capabilities through integrated monitoring. Deploying Incident Response Playbooks for CIEM-related incidents will ensure quick and effective mitigation.

Due to the vast network of telcos, limiting the spread of potential breaches is also a must. Immediate actions to use Virtual Private Clouds (VPCs) and Network Access Control Lists (NACLs) to segment cloud environments could similarly be beneficial.

Additionally, implementing micro-segmentation with software-defined networking (SDN) to enforce fine-grained controls within the cloud can also be implemented.

In parallel, to continuously monitor and analyze cloud activity for anomalies,

Cloud Security Posture Management (CSPM) tools can assist in monitoring configurations and compliance.

For operational scalability, DevOps integration is crucial to ensure CIEM practices align with agile deployment methodologies and can scale with the telco's growth and technological advancements.

Final Thought

CIEM is specifically designed to bolster security within cloud ecosystems by implementing least privilege access controls. This approach not only reduces the attack surface but also aids in meeting compliance standards in the intricate and dynamic landscape of cloud-based infrastructures.

Its emphasis on granular and smart access control not only enhances security but also strengthens compliance endeavors, rendering it a vital component of cloud security strategies.

In essence, CIEM practices act as a cornerstone for organizations navigating the complexities of increased digitalization and the adoption of multi-cloud environments, providing the necessary security, efficiency, compliance, and adaptability to support their digital transformation efforts.

Notably, CIEM solutions seamlessly integrate with major cloud providers such as AWS, Microsoft, and Google, however, it is important to prioritize those that also support multi-cloud and hybrid cloud environments to achieve broader compatibility. TR

CIEM is specifically designed to bolster security within cloud ecosystems by implementing least privilege access controls

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du to Launch Hyperscale Cloud and Sovereign AI Services in the UAE

du, commercially rebranded from Emirates Integrated Telecommunications Company (EITC), will deploy Oracle Alloy to offer hyperscale cloud and sovereign AI services for the government and public sector entities in the UAE, specifically focusing on Dubai and the Northern Emirates.

The signing ceremony took place during the AI Retreat, a premier gathering held under the patronage of H.H Sheikh Hamdan bin Muhammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Executive Council of Dubai, and was attended by decision makers, industry leaders, AI experts from government and private sectors and global tech giants to discuss strategies, challenges and opportunities presented by AI both locally and globally.

Commenting on this recent partnership, Fahad Al Hassawi, CEO of du, said, "The UAE is one of the fastest-growing cloud services markets in the world, and public sector entities in the UAE are rapidly embracing the benefits of the cloud, including added agility, efficiency, security, and access to the latest digital technologies such as AI and machine learning (ML). The deployment of Oracle Alloy is a major step in our evolution into a cloud services market, complementing our wide portfolio of managed services with comprehensive public cloud capabilities that enable us to respond nimbly to the transformation demands of our customers."

du: First Local Hyperscale Cloud Provider

Oracle Alloy is a complete cloud infrastructure platform that enables Oracle partners to become cloud providers. Utilizing this platform, du can provide more than 100 Oracle Cloud Infrastructure (OCI) services together with its own value-added cloud services and applications. This will enable du to become the first local hyperscale cloud provider to offer a comprehensive set of cloud services branded under its portfolio.

The services will be customized to meet the specific needs of the UAE markets and industry verticals, while ensuring alignment with the UAE regulatory requirements. du will also leverage Oracle Alloy to accelerate its internal digital transformation strategy and ensure the full modernization of its internal IT and engineering ecosystem.

Global First: stc Group Implements Nokia's AI-Powered MantaRay SON on Live Network

For the first time, globally, stc Group (stc) has deployed an AI-powered operations system on its network using Nokia's MantaRay Self-Organizing Network (SON), an AI-powered operations system that automates network optimization.

Nokia's MantaRay SON is an industry-leading network optimization and automation platform that uses self-configuring AI-powered modules to boost network performance and efficiency. MantaRay SON offers modules that can be built and deployed for specific software applications to address unique operational challenges.

Expressing satisfaction with the project, Mikko Lavanti, Head of MEA at Nokia stated, "Through our collaboration with stc Group, Nokia is transforming telecoms network infrastructure with the integration of artificial intelligence. Our MantaRay Cognitive SON solution, equipped with sophisticated AI algorithms, represents a quantum leap in network optimization—a global first in its deployment by stc Group. This AI-driven innovation has redefined standards for network performance, ensuring robust and consistent service for customers even during peak usage periods."

AI Solution Utilized During Hajj

The MantaRay SON solution was utilized for the first time on stc's network infrastructure during the Hajj season, enabling over one million pilgrims to stay seamlessly connected. Similarly, this marked Nokia's first-ever successful deployment of the cognitive, AI-powered module on a live network.

stc Group worked with Nokia to design the bespoke algorithm for Hajj, allowing for autonomous network optimization in 15-minute intervals.

stc's network showed significant enhancements as a result of the customized AI-powered MantaRay SON system. Over 10,000 actions were processed during the live network implementation, which indicated an increased utilization rate of approximately 30% on loaded cells and 10% average improvement on user throughput. Despite traffic increasing by 40%, stc's network successfully maintained consistent connectivity. This successful operation reduced manual work, improved network quality, and paved the way for the future of AI automation in telecommunications infrastructure.

Zain KSA Hits Record Data and 5G Usage During Hajj 1445 AH

Zain KSA, the leading digital services provider in Saudi Arabia, has announced record-high milestones in data usage, internet speed, and international roaming on its network during the Hajj season of 1445 AH.

This achievement underscores Zain KSA's pioneering role in delivering a cutting-edge digital experience as the first telecommunications operator to provide full 5G coverage across the holy sites with over 1,100 deployed 5G towers.

Zain KSA has demonstrated significant growth metrics with an impressive 86% increase in 5G network users and a robust 45% rise in 5G data traffic. Moreover, the operator has recorded a 79% surge in overall data traffic and a 325% enhancement in data transmission capacity. Additionally, international roaming data grew by 72%.

These results align with a notable surge in demand for international roaming and high-speed data usage during the Hajj season. This has created an enhanced communication experience for visitors, significantly improving the success of the Hajj season. It has also elevated visitors' spiritual journey, contributing to the strategic goals of Saudi Vision 2030's Pilgrim Experience Program, which endeavors to provide high-quality facilities and advanced infrastructure, thus, ensuring guests can seamlessly access the latest digital services.

Zain KSA: A 5G Leader
Zain KSA has trailblazed 5G technologies by launching the largest 5G network in the Middle East, Europe, and Africa and the third-largest globally.

It has further demonstrated its leadership by pioneering the world's first zero-emissions 5G network as part of its commitment to leveraging technology for sustainable development and environmental empowerment. In tandem, the telco has championed innovative solutions and next-gen applications that redefine the digital landscape.

Moreover, as part of a comprehensive plan to expand its 5G infrastructure and enhance its digital services ecosystem, Zain KSA recently announced a SAR 1.6 billion investment.

Es'hailSat Enhances its Capabilities with DataMiner's AI-Driven Operations

In a significant move that underscores Qatar's growing prominence in the space industry, Es'hailSat, the national satellite company, has announced the integration of new DataMiner services into its operations, building on its years-long partnership with Skyline Communications.

This strategic expansion aims to empower Es'hailSat to monitor and manage their satellite operations with unparalleled efficiency and precision.

Next-Level Collaboration: Automation and AI
Es'hailSat has been at the forefront of Qatar's space initiatives since its inception, playing a pivotal role in delivering advanced satellite services.

Central to this success is Es'hailSat's partnership with Skyline Communications and its DataMiner digital transformation software platform.

DataMiner empowers Es'hailSat with a comprehensive overview of their satellite operations, including uplink, downlink, video encoding, and decoding processes, presenting critical data on a single, intuitive interface for streamlined operations.

Now, taking their collaboration to the next level, Es'hailSat has introduced DataMiner's automation and AI-assisted capabilities to optimize their operational workflows.

According to Yassine Bihi, Teleport Director at Es'hailSat, DataMiner's advanced capabilities, such as the AI-driven Augmented Operations, "help us proactively monitor our infrastructure and services, ensuring seamless connectivity and allowing us to preemptively address operational challenges, while automation enables us to optimize our operational workflows and maintain the highest standards of service delivery."

"At Skyline Communications, we are honored to support Es'hailSat in their mission to advance Qatar's space presence," said Pramod Gupta, Sales Director EMEA & APAC at Skyline Communications. "DataMiner's robust capabilities enable Es'hailSat to achieve operational excellence and deliver unparalleled satellite services to customers worldwide. And because of the unique, unprecedented vendor- and technology-agnostic nature of DataMiner, Es'hailSat can not only manage its services end-to-end, but also be assured to leverage the platform for many years to come, irrespective of the changes in the ever faster evolving technology landscape."

Zain Kuwait Enhances Customer Service with PACI's Cutting-Edge GIS Data

Kuwait's Public Authority for Civil Information (PACI) and Zain Kuwait (Zain) announced the signing of a collaboration agreement that will integrate PACI's Geographic Information Systems (GIS) portal and 'Kuwait Finder' services with Zain's systems. This will significantly improve the telco's customer service efficiency across multiple levels.

Strategic Public-Private Partnership
Zain Kuwait CEO, Nawaf Hisham Al-Gharabally, expressed his excitement regarding the collaboration with PACI, calling it a successful example of a strategic partnership between the public and private sectors. He noted that PACI's GIS data would significantly enhance Zain's Business Intelligence systems, improving service levels for Kuwait's largest customer base.

Zain plans to use PACI's geographical data and detailed 3D models for network planning projects, which will improve customer experience and operational efficiency due to PACI's comprehensive scans of all areas in Kuwait.

Al-Gharabally affirmed Zain's commitment to leveraging strategic partnerships with major public and private sector organizations to achieve full digital transformation and enhance the company's service offerings.
The telco strives to exceed customer expectations and deliver world-class services to the biggest family of subscribers in Kuwait.

Enhancing Services with Processed Data
PACI Acting General Manager, Mansour Al Mithin, welcomed Zain to the list of organizations benefiting from PACI's GIS services, which are provided to over 300 government and private organizations in Kuwait. The GIS portal offers capabilities and data that can be integrated with each organization's systems, enhancing the services they provide to their customers and users.

Al Mithin explained that PACI provides access to processed data through the GIS portal, which is compiled and updated via various projects such as spatial photography/videography, drone scanning, and other initiatives aimed at creating an advanced, highly accurate foundational map to serve Kuwait's developmental projects and empower the nation's business sector.

He emphasized the importance of these projects in supporting PACI's digital transformation efforts, particularly those related to logging building addresses. This has positively impacted the 'Kuwait Finder' app's data, strengthening the trust of its 2.5 million users and over 50 organizations that have integrated the app's interface into their own platforms, which now includes Zain.

Azerconnect Group Officially Joins Vodafone Partner Markets

Azerconnect Group has officially been welcomed into the Vodafone Partner Markets family. The partnership intends to leverage Azerconnect's expertise in Azerbaijan's ICT and high-tech sectors and converge this expertise with Vodafone's global skillset, innovation, and scale.

Azerconnect Group is a key player in Azerbaijan's ICT and high-technology industries, while Vodafone Group is a leading European and African telecoms company. The partnership agreement was signed by Johannes Hummer, Regional Head of Middle East, Africa, Caucasus and Central Asia, Vodafone Group; and Emil Masimov, Chief Executive Officer, Azerconnect Group.

"Azerconnect Group is the largest ICT company in Azerbaijan with a proven track record of success. As a Vodafone partner market, we can leverage Vodafone's extensive global telecoms expertise. I am confident that this collaboration will significantly accelerate the sustainable development of Azerbaijan's ICT sector," commented Masimov.

The partner market agreement will enable Azerconnect Group to accelerate development in crucial areas such as digitization, security operations centers, network technologies and commercial services.

Remarking on this feat, Petr Dvořák, CEO of Vodafone Partner Markets, added, "Azerconnect Group is an innovative company and a leader within Azerbaijan. My team look[s] forward to working with them to bring our experience in telecoms and business technology to develop the quality of service available to their customers as part of the partner markets family."

Vodafone is set to enter into a partnership with the Azerconnect Group, aiming to achieve significant cost savings and enhance value creation. This collaboration is expected to streamline operations, reduce expenses, and improve overall efficiency for both companies.

Through shared expertise and resources, Vodafone and Azerconnect Group will work together to develop innovative solutions that can drive growth and deliver better services to their customers.

Emerging Commercial Prospects for Telcos

From AI-driven automation to blockchain-supported systems, the enterprise business landscape is rapidly evolving. Furthermore, emerging cutting-edge technologies promise to support entrepreneurial possibilities through groundbreaking solutions for various industry challenges.

As such, the ICT industry is poised to benefit from these transformative business activities fueled by the acceleration of digital solutions. The Global Mobile Economy Development Report 2024 released by GSMA Intelligence shows that by the end of 2023, the number of global mobile users exceeded 5.4 billion. Moreover, the mobile ecosystem supported 16 million jobs directly and 12 million jobs indirectly.

Telecom companies are at the forefront of exploring the commercial opportunities within the digital economy landscape. Defending market share in traditional communications and capturing growth in adjacent services is now a common strategy and a challenge for major operators.

Global Interconnection Opportunities

Global interconnectivity has presented new opportunities for advancements in technology, communication, and digital business opportunities. Acting as an ICT bridge between the Middle East, Asia, and Europe, e& recently partnered with Cato Networks to establish a new Point-of-Presence (PoP) at the global technology group's SmartHub Data Centre.

As one of the UAE's premier carrier-neutral data facilities, e&'s SmartHub will serve as a crucial platform for Cato Networks' business customers, enabling them to access enhanced interconnectivity and Secure Access Service Edge (SASE) technology. The SmartHub offers a community-based ecosystem with reliable caching servers and edge nodes and serves internet users, hyperscalers, content delivery networks (CDNs), video streaming and gaming platforms, and financial services providers.

Similarly, Salam announced a strategic partnership with the Global Cloud Xchange (GCX) to inaugurate the Saudi Transit Corridor. This new venture is set to revolutionize connectivity between Asia and Europe, showcasing a significant leap in global telecommunications infrastructure.

The corridor will provide diverse, hybrid subsea and terrestrial connectivity routes, leveraging both Salam's extensive terrestrial network across Saudi Arabia and GCX's robust multiple cable systems.

Harnessing APIs

As network operators seek ways to remain profitable in a fiercely competitive telecom market, network application programming interfaces (APIs) can serve as the platform for telcos to drive 5G monetization from their network investments. However, telcos will need to work well together to build the market by creating a solid supply of fully-interoperable APIs and generating global demand and momentum.

Moreover, 'Open APIs' are gaining interest among service providers. This initiative provides a flexible integration among operations and management systems, making it easier to collaborate across multiple providers and third parties.

Network APIs allow enterprises to tap into 5G capabilities to limit fraud, guarantee bandwidth for mission-critical applications, and enable real-time interactions and insights. To that end, Nokia's API offering, Network as Code, and developer portal enables application developers and communication service providers (CSPs) to expedite the development of software applications for diverse enterprise, industrial, and consumer scenarios. Moreover, this platform facilitates the monetization of 5G and 4G network assets beyond simple connectivity.

Nokia's Network as Code platform is based on a revenue-share model between developers, CSPs, and Nokia as the platform provider.

Internet of Things

In an era where technological advancements are rapidly reshaping our world, telcos hold the potential to take advantage of Internet of Things (IoT) solutions. The convergence of IT systems with operational technology systems opens a range of new industrial IoT use cases. Growing demands from emerging use cases like mobility and Industry 4.0 are fueling enterprise needs for solutions that can effectively connect and manage a rapidly expanding array of devices and sensors.

However, despite its potential, IoT is still in its infancy stages of development. Industry experts estimate that as 5G and security technologies mature, coupled with the growing demand for mobility, IoT has the potential to scale up significantly. This growth will likely be facilitated by B2B operators implementing selective vertical approaches and fostering ecosystems conducive to IoT expansion.

With global trends emphasizing sustainable and autonomous operations, the future of IoT technology is proving to be dynamic and promising.

The world is experiencing a significant transformation and IoT will play a crucial role in this transformation. The future will be based on various innovative technologies such as IoT cybersecurity, air monitoring systems, artificial intelligence (AI), natural disaster predictions, smart farming, healthcare, smart cities and other next-gen experiences for users. Furthermore, advancements in the glasses-free 3D industry promise to provide an unparalleled visual experience.

Hybrid Cloud Solutions

Network operators can empower customers with hybrid cloud solutions that blend technological advances with business insights to create strategies that support their broader business objectives. Moreover, CSPs can collaborate with industry partners to streamlining network Infrastructure across multiple platforms, improve DNS reliability in cloud-native settings, reducing latency and enhancing network reliability by integrating a robust DNS solution across multi-cloud environments, including AWS and Microsoft Azure, and so on.

For instance, du is supporting the Commercial Bank of Dubai's (CBD) hybrid cloud journey by hosting the HPE GreenLake platform at its hyper-connected, Tier III Certified data centers, ensuring reliable connectivity and network security services.

Broadcast Industry

The broadcast industry is currently witnessing a significant demand for new broadcasting technologies such as IPTV, web TV, high-definition television, and pay-per-view. The demand for enriched video experiences is expected to pave the way for broadcasters across the region.

The live production and broadcast landscape is undergoing significant changes. Consumers' demand for better-quality video and audio has driven rapid upgrades in broadcast equipment and technology. With content now produced in 4K, live-production technology must evolve in order to ensure enhanced viewing quality. Technological advancements have pushed broadcasters to offer ultra-high definition (UHD) output, fueling market growth.

In Conclusion

With over 300 commercial 5G networks already deployed globally and advancements continuing, the transition from 5G to 5G-Advanced is poised to revolutionize network capabilities and user experiences. 5G laid the groundwork for faster speeds and more reliable connections and 5G-Advanced is set to push these boundaries further, offering significant enhancements in terms of network efficiency, coverage, and performance.

For operators, a significant opportunity lies in delivering tailored network capabilities through edge computing, private networks, and slicing to cater to diverse industries. However, implementing these advancements can be time-consuming as the technology reaches optimal maturity.

Notably, industry watchers point out that the competition between telcos and ICT companies will be intense. However, if the enterprise opportunity materializes at scale, all players, including operators, could become equitable partners of the growing revenue. TR

Deep Dive: The Potential of Underwater Wireless Communication Networks

In today's interconnected world, seamless data transmission is essential for communication, navigation, emergency response, research, and commercial operations. This necessity extends beyond mere overland structures, culminating beneath the ocean's surface.

In 2024, underwater wireless communication networks (UWCNs) are gaining traction. While wireless communication is ubiquitous in terrestrial applications, the emerging market for UWCNs is rapidly expanding.

Astute Analytica projects that this market will soar to an impressive USD 21.06 billion by 2032, propelled by increasing demands for real-time data in marine environments.

Advancements in acoustic and optical communication technologies are driving the evolution of underwater networks. These technologies are enhancing connectivity, increasing data transfer speeds, and improving the overall reliability of underwater communications.

As these technologies evolve, they promise to revolutionize how data is transmitted and utilized beneath the waves, presenting new horizons for underwater exploration and industry.

Navigating the Depths

Underwater wireless communication networks (UWCNs) are increasingly integral to modern marine technology. These networks consist of sensors and autonomous underwater vehicles (AUVs) that interact, coordinate, and share information.

In recent years, UWCNs have revolutionized a range of applications, including those prevalent in coastal surveillance and environmental research, oil-rig maintenance, AUV operations, and water quality monitoring. They have also been instrumental in connecting submarines to land.

Unlike their terrestrial counterparts, which rely on radio waves, UWCNs

primarily use acoustic waves. Acoustic communication is favored underwater due to its low absorption, making it suitable for transmitting data over medium ranges. However, this structure comes with limitations.

Acoustic technology typically supports data rates of tens of thousands of kilobits per second for distances up to a kilometer, and less than a thousand kilobits per second for distances up to 100 kilometers. The relatively slow speed of sound in water—approximately 1500 meters per second—results in high latency, making real-time communication and synchronization a challenge.

This latency hampers applications that require instantaneous, high-data-rate communication. In response, optical communication offers an alternative that is capable of achieving high data rates. Yet, it is also constrained by the underwater environment's high multi-scattering and absorption, limiting the effective distance between the transmitter and receiver. These physical challenges mean that optical methods work best for short-range communication.

Both acoustic and optical communication technologies have distinct advantages and limitations, and ongoing research and development (R&D) is required to overcome these obstacles and enhance the capabilities of underwater networks for a multitude of critical use cases.

While cellular technology cannot be directly applied underwater due to the physical differences in propagation media, its principles, methodologies, and innovations provide a valuable foundation for advancing UWCNs. By leveraging these technologies, UWCNs can achieve better performance, robustness, and efficiency, addressing the unique challenges of underwater communication.

Hybrid Communication Systems

The underwater acoustic communication market is set to grow significantly, reaching USD 9.2 billion by 2031, driven by increased defense spending and the demand for reliable communication systems in naval operations.

It has also been proven that optical wireless communication can enable high-speed data transmission rates of up to 10 Gbps, presenting new possibilities for data-intensive applications.

With recent advancements in UWCNs, the development of hybrid communication systems combine the two methods to improve performance. For instance, systems that use both acoustic and optical communication can balance long-range connectivity with high-speed data transfer.

These hybrid systems can switch between methods based on the underwater conditions and the specific needs of the communication task, enhancing reliability and efficiency.

Adaptive Modulation and Coding

To cope with the challenging underwater environment, researchers have developed advanced modulation and coding techniques. These systems can adapt their transmission methods in real time, adjusting to changing conditions like water turbulence or obstacles.

For example, Orthogonal Frequency Division Multiplexing (OFDM) has been optimized for underwater use. This aids in the navigation of complex and often noisy underwater channels, thereby improving data rates and communication reliability.

Nevertheless, wireless communication for underwater robots remains a significant challenge, as standard radio frequencies used on land do not effectively propagate through water.

In February 2024, the Autonomous Robotics Research Center (ARRC) at Abu Dhabi's Technology Innovation Institute (TII) achieved breakthroughs by introducing the Universal Underwater Software Defined Modem (UniSDM) and a network management framework for automatic network slicing (ANS).

The UniSDM offers a flexible communication architecture utilizing sound, magnetic induction, light, and radio waves. Meanwhile, the ANS framework efficiently allocates communication resources within underwater networks, enhancing data sharing and connectivity based on real-time network conditions.

Use of AI and Machine Learning

Artificial Intelligence (AI) and machine learning (ML) technologies significantly contribute to making UWCNs smarter and more efficient. AI can predict underwater channel conditions and optimize communication parameters accordingly, which helps in maintaining reliable connections even in fluctuating environments.

Moreover, AI algorithms can manage network routing and resource allocation dynamically, improving the overall performance and energy efficiency of underwater networks.

In a 2023 scientific report, a comparative analysis of intelligent optimization algorithms highlighted the enhanced effectiveness of the chemical reaction optimization (CRO) algorithm for optimizing node deployment in underwater wireless sensor networks (UWSNs).

The enhanced CRO algorithm surpassed traditional ones upon demonstrating an average coverage rate of 95.66%. This indicates that by integrating robot collaboration technology, the enhanced CRO algorithm has the potential to greatly improve UWSN coverage through optimal node deployment.

Innovative Network Architectures

In addition, innovative network architectures are enhancing the flexibility and robustness of UWCNs. One such architecture is the Delay-Tolerant Network (DTN), which stores and forwards data, enabling communication even when connections are intermittent. This makes it particularly useful for deep-sea explorations.

Additionally, Software-Defined Networking (SDN) principles are being applied to underwater networks to enable centralized control and dynamic adjustments, allowing the network

to reconfigure itself based on current conditions and requirements.

In this regard, an ultra-low-power underwater networking system has been developed by MIT researchers to transmit signals across kilometers. This technology is anticipated to benefit aquaculture, hurricane prediction, and climate change modeling, thereby boosting growth in the underwater wireless communication market.

Integration with Internet of Things (IoT)

The concept of the Underwater Internet of Things (UIoT) is gaining traction. This involves integrating smart sensors and devices underwater that can communicate and share data, much like IoT devices on land.

These systems can perform local data processing through edge computing, which reduces the need for constant data transmission and saves energy. This integration is crucial for applications like environmental monitoring and underwater infrastructure inspection.

One scenario that could support UIoT is the collaboration between Wsense and Alcatel Submarine Networks (ASN), announced in January 2024. This partnership aims to develop the next generation of underwater wireless communication systems.

The collaboration will utilize WSense's underwater communication technology and ASN's network to establish telecoms networks underwater.

In the long run, this project aims to enable real-time remote monitoring, enhance disaster prediction capabilities, and support surveillance and naval operations for coastal security.

Enhanced AUV Communication

Due to their capacity to operate independently of direct human control, Autonomous Underwater Vehicles (AUVs) have become indispensable in defense, oil and gas exploration, and oceanographic research.

Advancements in communication technologies are improving the coordination and control of AUVs when it comes to data exchange, remote operation, and enabling collaborative missions between multiple vehicles. New algorithms allow multiple AUVs to work together, sharing data and coordinating their movements to accomplish complex tasks.

Furthermore, Remotely Operated Vehicles (ROVs) are extensively utilized in environmental research, exploration, and maintenance tasks. As they advance towards greater autonomy, there is an increasing demand for robust, real-time data transmission capabilities.

Innovations such as self-organizing networks of AUVs can also adapt to changing conditions and mission requirements, making them highly effective for tasks like search and rescue or large-scale mapping.

Field Deployments and Testing

Real-world deployments and extensive field trials are crucial for validating these advancements. By testing UWCNs in various underwater environments like oceans, lakes, and rivers, researchers can gather practical insights into how these networks perform in actual conditions.

These trials help refine the technology, ensuring it can reliably support applications ranging from scientific research to military surveillance and environmental monitoring.

In 2024, researchers developed an all-light communication network enabling seamless connectivity across space, air, and underwater environments.

Led by Yongjin Wang, the team highlighted its potential in oceans and lakes for ecological data collection, linking sensors with surface buoys. This network facilitates wireless data transmission over water surfaces and long-distance links between cities, extending internet connectivity via modems.

"In today's world, data transmission is critical for communication, navigation, emergency response, research and commercial activities," reiterated research team leader, Yongjin Wang.

Moreover, in 2022, researchers at the University of Washington introduced AquaApp, an innovative solution that strives to enhance diver safety during underwater exploration. This app utilizes underwater acoustics to transmit messages effectively. Importantly, AquaApp leverages existing smartphones and smartwatches without requiring additional hardware, making it accessible for divers using current market technology.

Similarly, L3Harris's CUUUWi allows mobile phones and SatCom users to connect with users or platforms beyond ground-level surfaces, supporting critical communications within submarines, which rely on secure transmissions during high-speed and deep operations. TR

While wireless communication is ubiquitous in terrestrial applications, the emerging market for UWCNs is rapidly expanding

Open Source, Open Horizons: Ground Stations Bring Space Closer to Earth

Amidst the remarkable endeavor of constructing and launching satellites, a critical challenge has emerged: satellite monitoring. Ground stations (GSs) stand sentinel, ready to tackle this task, serving as vital conduits for communication with satellites. Positioned strategically, these stations bridge the gap between the terrestrial realm and the devices orbiting Earth several kilometers above, ensuring uninterrupted communication.

The key to effective satellite monitoring lies in extending communication time and coverage as comprehensively as possible. This necessitates the establishment of a network of ground stations that are strategically positioned to maximize communication opportunities with satellites as they traverse the skies.

To begin with, it's imperative to understand the important purposes of a satellite-ground station network:

- **Access to Satellite Data**: Ground station networks enable access to data from orbiting satellites. This data is crucial for various applications such as weather forecasting, environmental monitoring, disaster management, and scientific research.
- Enhanced Coverage and Redundancy: Having a network of ground stations distributed across different geographic locations enhances coverage and ensures redundancy. Satellites pass over different parts of the world at different times, so a network of ground stations increases the chances of capturing satellite data regardless of the satellite's orbit.
- **Community Involvement and Collaboration:** Ground station networks often involve communities of enthusiasts, hobbyists, researchers, and educational institutions. These networks foster collaboration, knowledge sharing, and skill development within the community. They also provide opportunities for educational outreach and STEM engagement.
- **Cost-Effective Solutions:** By leveraging open-source software and hardware, ground station networks can offer cost-effective solutions for satellite communication. This affordability makes satellite data more accessible to a broader range of users, including those with limited financial resources.
- **Support for New and Emerging Satellite Technologies:** Ground station networks can support the testing and validation of new satellite technologies, including small satellites (CubeSats) and emerging communication protocols. By providing a platform for experimentation and innovation, these networks contribute to the advancement of satellite technology.

While the Middle East may not have as extensive a network of ground stations as some other regions, there are initiatives and organizations working on satellite-ground station projects in the region.

The United Arab Emirates (UAE) has been actively investing in space exploration and satellite technology.

The UAE Space Agency has been involved in various space initiatives, including the development of ground stations to support their satellite missions, such as the Mars Mission, "Hope Probe."

Meanwhile, Kuwait has been actively investing in space technology, particularly satellite projects. The nation marked a milestone with its first Kuwait National Satellite project, which involved launching a 2U nanosatellite called Kuwait Sat-1 aboard a SpaceX Falcon 9 rocket in January 2023. Prior to this, in June 2021, the educational CubeSat QMR-KWT was launched into Sun Synchronous Orbit (SSO) at an altitude of 525 km. The command-and-control ground station for QMR-KWT is situated in Dubai, UAE, where telemetry data from the satellite is received.

Universities and research institutions in the Middle East, such as those in Qatar, Saudi Arabia, and the UAE, often engage in research collaborations and educational programs focused on space technology, including ground station networks.

Open-Source Ground Station Networks

To facilitate remote operations of multiple ground stations, a global management interface or network is often required. Creating such infrastructure can be challenging, costly, and time-consuming. Universities and small businesses often focus primarily on satellite development rather than the development and management of a ground station network. Therefore, having an existing, financially accessible infrastructure is ideal.

Examples of open-source projects providing such infrastructure include SatNOGS and TinyGS. These non-profit projects are characterized by their accessibility and suitability for educational, research, non-profit experimental, and amateur work. Both SatNOGS and TinyGS are among the largest open-source ground station networks, offering easy and low-cost alternatives for communication between Earth and satellites, particularly those in low Earth orbit (LEO). They are designed for tracking, receiving, and decoding satellite signals, aiming to democratize access to space by providing a decentralized infrastructure.

In addition to being accessible and straightforward, these projects thrive on an active and collaborative community that provides support and encourages participation from all interested individuals. Open-source initiatives like SatNOGS and TinyGS empower users to build their own ground stations inexpensively and easily, integrate them into a global network, and receive data from satellites listed in their databases. This infrastructure also enables satellite developers to add their satellites to the project databases and utilize the network to receive data from their satellites.

Considering this, SatNOGS-COMMS presents a versatile telecommunications solution tailored for nano-satellites and CubeSats. It facilitates operations across UHF and S-band frequencies, ensuring seamless integration with the SatNOGS Network.

Many CubeSats and nano-satellites have utilized open-source ground stations for communication and data downlink. While detailed information on every mission may not always be readily available, here are some noteworthy examples:

- **QB50 Project:** The QB50 project, led by the von Karman Institute for Fluid Dynamics in Belgium, aimed to deploy a network of 50 CubeSats for studying the thermosphere. The project utilized a network of ground stations, some of which were based on open-source designs, to communicate with the CubeSats. These ground stations were contributed by various institutions and enthusiasts around the world.
- **UPSat:** UPSat, Greece's first nanosatellite, was developed by the University of Patras in collaboration with the Libre Space Foundation. The Libre Space Foundation is known for its open-source approach to satellite communication, and UPSat utilized open-source ground station software and hardware developed by the foundation.
- **PocketQube Satellites:** PocketQube satellites, smaller variants of CubeSats, have also benefited from open-source ground stations. The PocketQube community has developed open-source ground station designs and software, enabling PocketQube operators to establish communication links with their satellites using affordable and accessible solutions.
- **AMSAT CubeSats**: AMSAT (Radio Amateur Satellite Corporation) has developed multiple CubeSats for amateur radio communication, some of which have utilized open-source ground stations operated by amateur radio enthusiasts around the world. These ground stations enable communication with the CubeSats using amateur radio frequencies.

Driving Innovation: Continuous Improvement in Ground Station Technology

The rise of open-source satellite ground stations transforms SatCom and ICT by making satellite communication more accessible, reliable, innovative, and collaborative, while also enhancing educational opportunities and improving global connectivity.

These open-source ground stations will foster global collaboration, creating a network where users from around the world can contribute to and benefit from shared resources. This also enhances the coverage and reliability of satellite communications, ensuring consistent data reception from satellites.

Moreover, educational institutions leverage these open-source solutions to offer hands-on learning experiences, better preparing students for careers in the space industry. The open-source nature also drives innovation, as users continuously improve and expand the capabilities of ground station technology.

In essence, open-source satellite ground stations are democratizing space access, reducing costs, fostering global collaboration, enhancing education, and spurring technological innovation. TR

Nokia Acquires Infinera for USD 2.3 Billion, Strengthening Optical Network Leadership

Nokia and Infinera have announced a definitive agreement under which Nokia will acquire Infinera in a transaction valuing the company at an enterprise value of USD 2.3 billion.

Nokia and Infinera anticipate that together, they will enhance scale and profitability, accelerating the development of new products and solutions for customers.

Financial and Strategic Merit

Commenting on this strategic investment, Pekka Lundmark, President and CEO of Nokia, said, "We believe now is the right time to take a compelling inorganic step to further expand Nokia's scale in optical networks. The combined businesses have a strong strategic fit given their highly complementary customer, geographic and technology profiles."

The transaction aligns with Nokia's strategy to enhance its technological leadership in optical networks and expand its reach to webscale customers—the fastest-growing market segment.

As a result, Nokia expects this acquisition to accelerate its journey toward a double-digit operating margin in its Optical Networks business and aims to achieve EUR 200 million in net comparable operating profit synergies by 2027. The deal could also yield a return on invested capital (RoIC) well above Nokia's weighted average cost of capital (WACC).

In tandem with the recent sale of Submarine Networks, this deal reshapes Nokia's Network Infrastructure into three pillars: Fixed Networks, IP Networks, and Optical Networks. The vendor is aiming to achieve mid-single digit organic growth in its Network Infrastructure and an improved operating margin in the mid-to-high teens.

Sharing his remarks on the acquisition, Federico Guillén, President of Network Infrastructure at Nokia, stated, "This acquisition will further strengthen the optical pillar of our business, expand our growth opportunities across all our target customer segments, and improve our operating margin. I am extremely pleased that we are bringing together these two talented and dedicated teams. Separately, we have long respected each other as competitors. Together, we find the logic of combination irresistible."

Similarly, Infinera's investors will also benefit from investing in a global leader in optical networking solutions.

Expressing his excitement regarding the value of this combination, David Heard, CEO of Infinera, added, "We believe Nokia is an excellent partner and together we will have greater scale and deeper resources to set the pace of innovation and address rapidly changing customer needs at a time when optics are more important than ever—across telecom networks, inter-data center applications, and now, inside the data center."

Ericsson's Patrick Johansson Steps in as SVP, New Head of Market Area MEA

Effective as of August, 1, 2024, Patrick Johansson will become a member of Ericsson's Executive Team (reporting to the CEO) as its new Head of Market Area Middle East & Africa (MMEA) and Senior Vice President. He will be based in Riyadh, Saudi Arabia.

Johansson, who is currently the Head of Business Control and Operations at Ericsson's Business Area Cloud Software and Services, will replace Fadi Pharaon whose decision to leave Ericsson was announced in May 2024.

Commenting on his new role, Johansson said, "I am honored and thrilled to be offered this opportunity. Ericsson is at the epicenter of the latest technology trends where networks are the foundation when businesses and societies digitalize. We are leading the industry by providing fully programmable, high-performance networks where capabilities can be exposed through network APIs. I am very much looking forward to meeting customers and partners and working with my colleagues within Market Area Middle East and Africa creating outstanding customer value."

Since joining Ericsson in 1997, Johansson's background spans multiple business areas and market areas including the likes of Sweden, Korea, India, Austria, China and Vietnam. His previous work experience includes roles as Global Head of Sales and Commercial Management for Business Area Networks, Head of Customer Unit Korea as well as several executive finance and business roles.

Börje Ekholm, President and CEO of Ericsson, added, "Patrick has [an] extensive understanding of our technology and business strategy which are two crucial and contributing factors to continue securing our leading industry position. I'm very pleased that he has accepted this role and look forward to having him on the executive team."

Beta Launch: MYCOM OSI Brings EAA GenAie to the Forefront of CSP Decision-Making

MYCOM OSI, a leading independent provider of network assurance and service experience assurance solutions to some of the world's largest communications service providers (CSPs), has announced the beta release of EAA GenAie, a generative AI application enabling data-driven decision-making for business executives and operations engineers.

Built on the award-winning EAA platform and use-case proven in some of the world's largest and most complex Tier-1 CSP networks, GenAie is engineered to enhance business and operational decision-making by converting complex data into clear, actionable insights.

Notably, GenAie supports strategic initiatives and long-term planning for CSPs by providing a comprehensive analysis with a complete view and correlation of network data across multiple dimensions.

Mounir Ladki, President and CTO at MYCOM OSI, said, "The EAA GenAie is an essential application enabling business transformation for CSPs. It enables data-driven decision-making for executives, with an objective to democratize access to network, service and customer insights for the CSP's NOC, SOC, CRM and B2B organizations. With the GenAie beta release, we have taken a big step forward in creating 'Network Expert LLMs' for telco business scenarios."

The EAA GenAie application utilizes MYCOM OSI's award-winning EAA platform and applications to consolidate network domains, normalize data, and apply automation and intelligence.

By extracting and correlating data based on network capacity, utilization, infrastructure, and customer experience metrics, it provides a comprehensive overview and analysis of the network's gross performance.

GenAie also provides stakeholders and users with a holistic view of the entity's network operations using a comprehensive approach that leverages natural language prompting to correlate data on capacity planning and expansion data, traffic analysis, network performance, incident data, and device performance metrics.

As a result, CSPs can proactively identify trends, anticipate service and capacity needs, and optimize infrastructure investments, ultimately catalyzing a cascade effect that reduces the cost of operations and enhances the customer's experience.

Unifonic's Regional Expansion: New Office Opens in Egypt

Unifonic, the leading conversational AI platform and SaaS (Software as a Service) provider in the MENA region, has opened its new office in Egypt, marking a crucial milestone in its regional expansion journey. Having proudly operated in Egypt since 2008, this investment reaffirms Unifonic's ongoing efforts to enhance customer satisfaction by facilitating local support and innovative solutions.

The newly inaugurated state-of-the-art facility will house over 40 professionals and demonstrates the company's ongoing commitment to delivering best-in-class solutions with a local market presence. This expansion marks a pivotal leap in the tech player's ambitious vision to become a world leader in software solutions, while elevating the regional tech landscape. The new office is poised to promote collaboration and innovation, advancing excellence both regionally and internationally.

The inaugural ceremony was elevated with the esteemed presence of Hossam Heiba, the President of the General Authority for Investment and Free Zones (GAFI). His presence underscores the strategic significance of this expansion, while reinforcing Unifonic's robust relationship with local authorities and the regional business community.

Ahmed Hamdan, CEO and Founder of Unifonic said, "The launch of Unifonic's new office in Egypt is a testament to our long-standing commitment and strategic vision for regional expansion. Having been integral to the Egyptian market since 2008, this move reinforces our dedication to driving economic development and excellence within Egypt's dynamic business environment."

Elaborating on the reasoning behind the expansion, Hamdan added, "The new office, located in Cairo Festival City, will house a team of experts committed to pioneering excellence and innovation. The expansion was motivated by the rising demand for our services as well as the region's favorable economic landscape. By collaborating closely with our partners, clients, and the local community, we aim to foster mutual growth and enduring success."

With a strong foothold in Egypt, Unifonic leverages its extensive market experience to transform the regional landscape and build enduring relationships with clients across diverse industries. The company's commitment to growth is guided by a robust expansion strategy and a long-term vision for success.

Rajesh Chandiramani to Head Comviva as New CEO

Comviva, the global leader in customer experience and data monetization solutions, has announced that Rajesh Chandiramani will be its new CEO and Whole-time Director, effective from the 1st of June 2024. The timing of this leadership transition coincides with Comviva's significant milestone of completing 25 years in business. As the company marks this achievement, it reaffirms its commitment to advancing as a global leader in intelligent software platforms, embarking on a journey characterized by innovation and excellence.

Chandiramani steps into this pivotal role following the retirement of Manoranjan 'Mao' Mohapatra, who concluded his remarkable tenure with the company at the end of May 2024. Following his retirement, Mao will continue to serve on the Comviva Board as a Non-Executive Director.

Chandiramani has demonstrated an impressive track record over three decades, which is evident in his leadership in spearheading businesses and initiatives across a spectrum of organizations. Before joining Comviva, Chandiramani held senior leadership roles at Tech Mahindra, where he served as the Business Unit Head for strategic markets spanning the UK, Europe, Middle East, Africa, the Asia Pacific, Japan, and India within the communications, media and entertainment (CME) Vertical. His leadership extended to steering the Global Digital Business, where he oversaw transformative initiatives in cloud, data and analytics, artificial intelligence (AI), cybersecurity, and blockchain technologies for Tech Mahindra.

Chandiramani's strategic acumen also propelled growth as he led the Strategic Business Unit of APAC Enterprise business, driving significant expansion across various sectors. Notably, his five-year tenure as the head of the European sector for Tech Mahindra played a transformative role in enhancing enterprise and telecom businesses across European countries, solidifying his reputation as a visionary leader.

Welcoming Chandiramani, Atul Soneja, Chairman of the Board at Comviva, said, "Rajesh's appointment as CEO marks a strategic transition for Comviva, reflecting our commitment to sustained growth and innovation. With his extensive experience and visionary leadership, we are confident in his ability to steer Comviva towards new heights. Under his guidance, we look forward to further strengthening our position as a global leader in customer experience and data monetization solutions, delivering unparalleled value to our clients and stakeholders."

Infobip Launches Operations and Data Center in Saudi Arabia

Infobip, a global cloud communications platform, has launched its operations in the Kingdom of Saudi Arabia (KSA). This significant milestone reflects Infobip's commitment to expanding its presence in the Middle East and strengthening its infrastructure to better serve clients in KSA and neighbouring countries.

Infobip has also launched its first data center in KSA to host and process data within the country, while notably, and crucially, falling in line with international data security standards. The data center in Riyadh is expected to support businesses, create numerous job opportunities, and contribute to the local economy. It offers scalability and reliability and aims to meet the evolving needs of businesses across various industries.

To ensure further compliance with the KSA market requirements, Infobip is obtaining all the necessary licenses and certificates for successful operation, including the SMS license that the company received recently.

Amsal Kapetanović, Infobip Country Manager KSA, said, "The launch of Infobip's operations in Saudi Arabia is a testament to our dedication to investing in the local market and enhancing our capabilities to serve our clients better. As the world's most connected communications platform, we provide a broad range of capabilities at scale. These include our omnichannel communications, contact center, chatbot, customer engagement and customer data platforms as well as our identity and security solutions."

Pioneering Symbiotic Digital Transformation

Infobip's operations in Saudi Arabia include a range of advanced communication solutions designed to enhance customer engagement and streamline business processes. The company offers omnichannel communication services, including SMS, email, voice, and chat apps, tailored to meet the needs of local businesses.

By fostering local partnerships and driving digital transformation, Infobip aims to impact the Saudi Arabia's technology landscape.

"We are excited about the opportunities that this expansion brings to our clients in Saudi Arabia and the broader Middle East. It underscores our commitment to providing reliable, secure, and high-performance communication solutions that connect businesses with their customers," said Zeid Shubailat, Director at Infobip.

Shifting Gears: The Dawn of Smart, Connected Cars

Cars are transforming from mere machines bolstered by horsepower into sophisticated, tech-savvy mobile devices; and as automotive technology advances, vehicles are evolving into connected, software-driven machines, mirroring the rise of smartphones over the past decade.

This shift is set to disrupt the entire mobility landscape, from how cars are designed and sold to the ways in which we interact with them on the road. Holding the potential for in-vehicle apps, over-the-air updates, and data-driven services, the car of the future will be evaluated equally based on the technology inside alongside its metal shell. This revolution holds vast opportunities alongside oscillating challenges, as the auto and tech industries converge in unprecedented ways.

A Connected Car

A connected vehicle refers to a car that harnesses internet connectivity to exchange data with both internal and external devices, predominantly via mobile data networks. This connection enables real-time access to diverse services, immersing the car into the digital landscape.

The emergence of contemporary connected cars began in the early years of the current decade. Since then, the majority of vehicles on the road have provided drivers and passengers with the ability to shop online, stream music and videos, access detailed traffic information, and utilize advanced assisted driving technologies.

According to McKinsey, it is projected that by 2030, approximately 95% of newly sold vehicles worldwide will be connected, a significant increase from the current rate of around 50%. Among these connected vehicles, approximately 45% will feature intermediate and advanced connectivity, offering features such as personalized digital service profiles, integrated ecosystems and platforms, multisensory interactions for all occupants, and intelligent decision-making capabilities.

Personalization in Motion

Consider how the mobile phone's platform model has created "always-on" connectivity, supporting continuously evolving services while gathering insights on user interactions. Similarly, envision the fully connected car of the future as an open and adaptable hardware platform capable of running various software that is able to deliver a wide range of on-board and off-board services.

A hallmark of smartphones is their ability to offer personalized experiences. Cars are now mirroring this trend, featuring customizable infotainment systems, driver profiles, and intelligent assistants. These functionalities adjust to individual preferences, providing tailored navigation routes and music playlists, and personalized climate settings.

As connected cars evolve, their in-car experience is becoming as unique and personalized as using a smartphone. They can perform almost any function available on our smartphones today and more, offering comprehensive solutions for connected living at the touch of a button.

Integrating with a person's digital lifestyle is increasingly crucial for customers. Consider the seamless and portable user experience facilitated by connectivity and software technology, allowing a person's digital life to seamlessly transition from "at-home" to "in-vehicle".

For OEMs, this represents a pivotal moment, which is set to redefine the user experience. It's an opportunity to integrate the external desires of drivers and passengers with their in-car requirements, fostering strong connections and loyalty throughout their transportation journey.

Navigating the Connected Living Ecosystem

A groundbreaking study entitled "Car as a Connected Living Ecosystem" by MarketsandMarkets (MnM) predicts that the market will soar to an astounding USD 1.5 trillion by 2035, translating into

a potential revenue stream of USD 1,600 per vehicle per year for manufacturers. This expansive market encompasses cars capable of providing cost-effective digital insurance, autonomous navigation, and energy management, among other services.

The growth of the car as a connected living ecosystem market is propelled by factors such as technological advancements, increased connectivity levels among automotive OEMs, and evolving customer perceptions and service expectations.

Customers, particularly Gen Z consumers and those willing to pay a premium for advanced connectivity, anticipate a range of connected features, including enhanced safety measures, remote vehicle functionalities, security features, seamless car-home integration, and services for electric vehicles (EVs) and energy management.

The Golden Opportunity for Automakers

In the pursuit for new avenues of revenue, automotive manufacturers are aggressively targeting the connected car market. Once primarily data generators for fleet management and safety, connected cars have now become a lucrative opportunity for automakers, promising continuous revenue streams throughout the vehicle's lifetime.

The digital connected living services market is projected to offer customers annual subscriptions totaling USD 1,600 by 2035, with in-car connectivity taking the lead. However, the critical challenge lies in striking a delicate balance between subscription costs and customer willingness to pay.

According to a McKinsey survey, over 50% of respondents expressed interest in purchasing bundled comfort and autonomous driving features. Additionally, infotainment and performance features have piqued resounding interest and, notably, are often preferred with a one-time payment method.

The automotive ecosystem is undergoing a significant expansion, with tech giants, telecom providers, and various digital service firms joining the fray. This convergence echoes the transformative impact witnessed during the smartphone revolution, showcasing a collaborative effort among diverse stakeholders to shape a dynamic and thriving ecosystem in the automotive industry.

Automotive and ICT Converge

Cellular technology is transforming automobiles into devices that can be seamlessly integrated into the broader world, akin to the functionality of smartphones.

To integrate the connected car into our lives, collaboration between the automotive and telecommunications industries is essential. From telecommunication service providers and equipment manufacturers to car manufacturers, suppliers, map providers, and road operators, all must be involved.

Several notable developments involving telcos in the realm of connected cars exemplify this collaboration. In February 2024, Cisco and TELUS unveiled enhanced 5G features across North America, with a focus on leveraging IoT applications in various industries, notably in the realm of connected vehicles. TELUS has since set its sights on integrating more than 1.5 million standalone 5G (5G SA) cars into the Cisco IoT Control Center over the next few years, commencing in 2024.

This network infrastructure will support drive testing by a major North American automotive manufacturer's 5G connected car, laying the groundwork for enhanced customer experiences and revenue opportunities for carmakers.

The automotive industry is rapidly embracing cloud technologies to enhance the integration between cars and telecommunications. Notably, in 2022, the BMW Group collaborated with AWS to develop innovative cloud solutions that harness the data potential of future vehicle generations. Meanwhile, Huawei and GAC joined forces to create a futuristic smart SUV and an entirely electrified lineup of vehicles, aiming to implement these endeavors by 2025.

Additionally, in 2018, Qualcomm and Ford pledged to accelerate the development of connected cars by converging Qualcomm's expertise in communication technologies with Ford's automotive prowess, paving the way for seamless connectivity, over-the-air updates, and enhanced safety features.

In May 2024, du introduced its innovative plug-and-play product, Smart Car, acting as a 4G Wi-Fi hotspot in vehicles and offering real-time access to vehicle data through a user-friendly app.

Likewise, in June 2023, Verizon Business introduced the Connected Car by Verizon service for specific BMW models in the US, which offers voice, data, and unlimited Wi-Fi hotspot connectivity directly within the vehicle.

Moreover, in 2021, stc collaborated with Cubic Telecom to facilitate the entry of carmakers into Saudi Arabia with in-car connected software, simplifying the delivery and management of advanced in-car services.

With driver demands and technological advancements driving the connected car market forward, both the automobile and ICT sectors are committed to creating enticing consumer experiences. At the heart of this transformation lies 5G technology, promising faster data speeds, reduced latency, and seamless connectivity, enabling advanced features such as real-time navigation, enhanced safety systems, and immersive in-car entertainment.

Conclusion

As cars continue to integrate more advanced technologies and connectivity, they are indeed becoming the new smartphones. This transformation not only encompasses adding more gadgets and screens to vehicles but also involves fundamentally reimagining the role of the car in our daily routines. The implications are vast, promising a future where transportation is smarter, safer, more personalized, and deeply integrated into the digital fabric of our world.

The journey of connected cars morphing into a new smartphone variation is a testament to the relentless pace of innovation and the boundless potential of technology in reshaping experience. TR

Into the Fast Lane: US 5G Booms with Enhanced Mid-Band Spectrum

5G performance in the United States is on the rise as additional mid-band spectrum becomes available.

According to Ookla's Speedtest Intelligence data, the release of more mid-band spectrum has led to improved 5G performance and positively influenced consumer sentiment toward 5G networks. All three national wireless providers – Verizon, T-Mobile and AT&T – have seen benefits.

"This sends a clear message to the FCC and other regulators, of the benefits of allocating additional spectrum for cellular use, as advocated for by industry bodies such as the CTIA, CCA and GSMA," stated Ookla.

Impact of Mid-Band Spectrum to 5G Progress

Leveraging additional mid-band spectrum deployments initiated in March 2024, T-Mobile reported a median 5G download speed of 287.14 Mbps in the same month, surpassing Verizon's 224.67 Mbps and AT&T's 145.36 Mbps.

T-Mobile has maintained its performance lead by advancing to a 5G Standalone (SA) architecture and testing six-carrier aggregation.

Since August of 2023, with Verizon securing full access to the 5G C-band spectrum, this helped increase its median 5G performance from 133.56 Mbps in June 2023 to 215.57 Mbps in December 2023.

Verizon and AT&T have gained significant advantages from the early clearing of C-band spectrum by satellite providers. This spectrum, acquired through Auction 107 in February 2021, has bolstered their network capabilities.

In January 2022, AT&T also acquired additional 3.45 GHz licenses made available through Auction 110.

To date, capacity gains from additional spectrum are being directed almost universally to boost 5G download performance, in part because 5G-NR TDD radios are being used in both 2.5 GHz and 3.5 GHz bands.

Sparkle and Telecom Namibia Partner to Boost Namibia's Digital Connectivity

Sparkle, the first international service provider in Italy and among the top global operators, and Telecom Namibia, the national telecommunications operator, have signed an agreement for provision of capacity services on the Equiano subsea cable connecting Portugal to South Africa, with the common objective of accelerating Namibia's digital transformation journey.

Wholly owned by the Government of the Republic of Namibia, Telecom Namibia runs the largest digital telecommunication network in the country, serving more than 619,000 customers with a wide portfolio that includes voice, text, data, and video solutions.

In an exclusive agreement, Sparkle will provide Telecom Namibia with capacity services on the Equiano submarine cable, thus ensuring a diversified, low latency route between Africa and Europe, supporting Namibia's digital development and the growing demand for data from neighboring countries.

This partnership offers a diversified, high-capacity route for data transmission, reducing latency and enhancing network resilience, thus ensuring uninterrupted service continuity also in the event of outages on the SAT-3 and WACS cables. The resulting high-speed connectivity will empower businesses and government institutions to accelerate digital transformation initiatives, fostering economic growth and propelling Namibia towards a knowledge-based economy.

Telcos Boost Stakes Amid Network Shake-Up

The situation with Malaysian 5G wholesale operator, Digital Nasional Bhd (DNB), changed recently when four telco investors agreed to take slightly larger stakes in the company until August.

DNB announced that Maxis, U Mobile, YTL, and CelcomDigi's Infranation have agreed to each take a 16.3% share in the operator, totaling 65.1% collectively.

Originally, the plan was for these telcos, along with Telekom Malaysia (TM), to each hold a 14% stake, accumulating 70% collectively. However, TM couldn't complete its agreement until August, consequently, DNB gave the other four telcos higher stakes provisionally. The Ministry of Finance (MOF) owns the remaining 34.9% stake in DNB, along with a Special Share for a specific period. This change is a precaution should TM's shareholders reject the agreement.

TM has until August 21, 2024, to finalize the process. If TM's shareholders approve, everything will revert back to the original plan with the five telcos owning 70% and the MOF holding the remaining 30%. As per the agreement, each telco will purchase 100,000 shares in DNB at MYR 1 per share and provide MYR 233.3 million (USD 49.2 million) in shareholder advances.

Maxis, U Mobile, YTL, and CelcomDigi now have a month to decide if they will remain stakeholders in DNB or join Malaysia's planned second 5G network. The entities have the option to leave DNB to participate in the second network without being required to take an equity stake, and all four telcos have expressed interest in joining this endeavor.

India's Second 5G Spectrum Auction Yields Disappointing USD 1.35 Billion Outcome

India's Department of Telecommunication (DoT) concluded its second 5G spectrum auction with disappointing outcomes, selling 141.4 MHz of spectrum for USD 1.35 billion, marking the third-lowest auction result since 2010, following the lowest proceeds collected in 2013 and the second lowest a year earlier.

Jyotiraditya Scindia, the Minister of Communications, emphasized that the 2024 spectrum auction formed part of an ongoing allocation process known for its transparency, robustness, and progressive nature, in a statement following the auction's conclusion.

"Telecom service providers have acquired spectrum not only for the continuity of service but also for expanding their services. However, the volume is limited because a large portion of the required spectrum was auctioned last year [2022]," said a DoT spokesperson.

The auction commenced on June 25 and wrapped up the following day following seven rounds of bidding. Interestingly, no bids were placed for spectrum in the 800 MHz, 2300 MHz, 3300 MHz, and 26 GHz bands. Out of the total 533.6 MHz of airwaves up for sale, telecom firms acquired 141.4 MHz, equivalent to 26.5% of the available spectrum. Reportedly, the unsold spectrum will be auctioned again next time.

ITU and WATRA's Landmark Partnership to Enhance ICT Infrastructure Mapping in West Africa

In a groundbreaking initiative, the International Telecommunication Union (ITU) and the West Africa Telecommunications Regulators Assembly (WATRA) have announced a joint declaration aimed at bolstering collaboration on ICT infrastructure mapping across West Africa.

This strategic partnership is poised to drive substantial improvements in connectivity and socio-economic development throughout the region. Both organizations underscored the critical importance of comprehensive ICT infrastructure data and mapping in formulating effective infrastructure strategies. These data and maps are essential for connecting unserved and underserved communities, with Geospatial Information Systems (GIS) playing a pivotal role in planning investments and making informed decisions.

Through this collaboration, ITU and WATRA aim to leverage their respective initiatives and projects, avoiding duplication of efforts and reducing costs. By harmonizing procedures for high-quality infrastructure mapping, the partnership will expedite efforts to connect communities to the digital economy.

The joint declaration outlines several areas of cooperation, including joint advocacy, capacity building, and implementing ITU recommendations on geospatial information. Specific activities will encompass technical assistance, enhanced network planning, data analytics for decision-making, regional integration, and advocacy for transparency.

Paraguay and the United States Will Strengthen Cooperation in Connectivity and Cybersecurity

In a meeting with Nathaniel C. Fick, Itinerant Ambassador of the United States for Cyberspace and Digital Policy, a significant investment was confirmed that will mark a milestone in Paraguay's digital connectivity and security.

The United States will allocate US$3 million for the implementation of satellite internet in rural areas, an important step to bring connectivity to previously underserved regions and reduce the digital divide.

Additionally, US$3.1 million will be allocated to strengthen the cybersecurity of the Paraguayan armed forces, a vital component in protecting strategic infrastructure and national defense.

President Peña also highlighted the joint commitment to train Paraguayan professionals in building a secure and reliable digital ecosystem.

In collaboration with the Taiwan-Paraguay Polytechnic University, a group of students will be sent to a regional cybersecurity competition, funded by the United States, as part of efforts to promote local talent in this strategic field.

Regarding this cooperation, MITIC Minister Gustavo Villate commented that they will exchange experiences and best practices to enhance connectivity development, along with potential donations and other details.

"The United States is providing support in terms of connectivity; we are working together to determine where these equipment installations will take place," explained the minister.

Fueling Digital Growth: Telecom Sector Boosts Canada's GDP by $80 Billion in 2023

In a report commissioned by the Canadian Telecommunications Association (CTA), the telecommunications sector's contribution is highlighted, proving how it remains pivotal to the Canadian economy.

Economic Impact
The telecom sector alone boosted the Canadian GDP by $80.8 billion in 2023, marking a growth of over 5% from nearly $75 billion in 2022. Moreover, the sector supported nearly 782,000 jobs across various industries.

Looking forward, PwC projects that the telecom industry could add an additional $112 billion to Canada's GDP by 2035. This growth is expected to stimulate a resurgence in Canadian productivity by enabling digital transformation across the economy.

Enhanced connectivity, including advancements like 5G, is anticipated to play a crucial role in achieving these economic benefits, and will further empower individuals and businesses to participate in the digital economy.

"Canada's telecom sector is integral to our country's economic growth and digital future. By continually upgrading our networks and extending services to underserved areas, our industry is fostering greater economic opportunity, inclusivity and productivity," said Robert Ghiz, President and CEO of the Canadian Telecommunications Association. "To sustain and enhance these contributions and ensure we can keep building a robust digital future for all Canadians, it is essential that we have a stable regulatory environment that encourages continued investment."

By 2023, 99.7% of Canadians had access to mobile wireless network coverage, while 93.5% of Canadian homes and businesses enjoyed broadband internet access.

ETNO Calls for EU Telecom Policy Overhaul to Improve Connectivity

ETNO, the organization representing Europe's top telecom operators, is calling on the new European leadership to promptly enact significant changes to telecom and competition policies. The entity has emphasized the need to enhance the connectivity ecosystem.

In its feedback based on the European Commission's consultation regarding the White Paper titled, "How to Master Europe's Digital Infrastructure Needs?", ETNO reaffirmed that connectivity is vital for ensuring Europe's economic competitiveness and security. ETNO stressed the importance of well-crafted regulations that encourage investment and foster innovation.

Europe, despite being one of the most digitized economies and societies worldwide, has seen a significant decline in its share of global revenue in the ICT market over the past decade. In 2013, the EU held 21.8% of the market, but by 2022, this share had plummeted to 11.3%, while the US's share rose from 26.8% to 36%, as confirmed by the European Union. This decline reflects Europe's lag behind global competitors in terms of innovation and investment in the connectivity sector.

The EU must align its industrial policy goals with sufficient funding and strategic planning. Enhancing the efficiency and coordination of various funding programs is essential. Moreover, there should be increased targeted funding for distributed and AI-ready cloud infrastructure, Open RAN technology, and subsea cables.

Asia's Telecom Leaders Embrace Open Gateway Initiative

CEOs of major Asian telecom operators, Axiata and Globe Telecom, have expressed support for the progress made with the GSMA Open Gateway initiative while also advocating for deeper cross-operator collaboration within the industry.

During the opening ceremony at MWC Shanghai 2024, a keynote entitled "Future First with Open Gateway" was presented by GSMA Director-General, Mats Granryd.

Contributing to the discourse, Hans Wijayasuriya, CEO, Telecommunications & Group EVP, Axiata Group, underscored the critical role of collaboration in driving the success of the Open Gateway project. He emphasized Axiata's strategy, which encompasses collaborating with three other operators in Indonesia to collectively introduce a range of Applications Programming Interface (API) services, and advocated for the continued enhancement and scaling of this approach.

"It's important to paint a global industry perspective, almost like a federation, where we implement a global lattice of telco APIs; so you can plug in anywhere in the world," he stated.

He added that telcos should prioritize collaboration and foster a new model of coopetition instead of engaging in competitive battles akin to those seen in consumer internet sectors. Failure to do so could lead to disintermediation, value erosion, and the rapid loss of a significant USD 300 billion market opportunity.

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