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Beyond Telecoms and Internet,

ZAIN KSA INVESTS IN FINTECH AND E-SPORTS

Eng. Sultan Bin Abdulaziz AlDeghaither, CEO, Zain KSA

5G and Public Cloud: Telcos Paradise

Driving Tech Value: Digital Adoption Across Five Leading Sectors

Global Data Center Industry Outlook 2022-2023


Huawei Cloud
Everything as a Service
HUAWEI


HUAWEI

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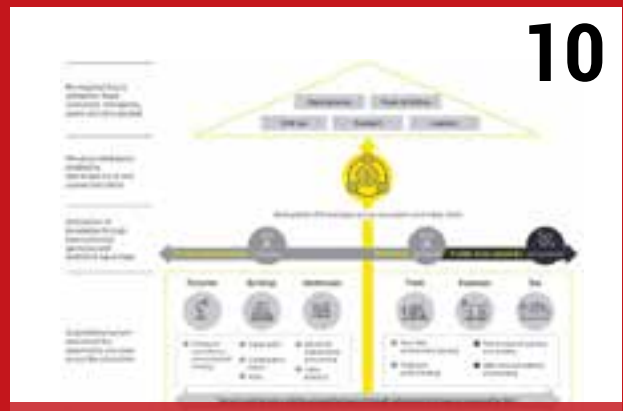

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News
Provided in cooperation with AFP, the global news agency

Published by
tracemedia Ltd.
www.tracemedia.info

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Printing
United Printing and Publishing

Year 17 | Issue 192

Toni Eid,
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Another Year, Another Success

Year after year, the Telecom Review Leaders' Summit grows substantially, and year after year, the Summit introduces new features, showcasing the rapid changes within our industry.

This year's Summit was spread over two days — following the CXO meeting of the ITU, which we proudly hosted on December 6 — and offered more networking opportunities to our partners and attendees, as well as, undoubtedly, more rich content and engaging programming to all.

The Summit highlighted a variety of new and exciting topics, such as data centers and the role of clouds in the future of technology, measuring 5G performance to date and the impact of Artificial Intelligence on network performance. And with the goal of diversification in the industry, we tackled global issues and solutions such as the Asian gap toward connecting people as well as the regulations in the Middle East. The Summit presented speakers from over 40 countries.

As a testament to Telecom Review Group's commitment to empowering women in ICT, a session entitled "Women in ICT" was organized on December 8 — a full panel of amazing women contributors which was moderated by a leading female expert in ICT.

As always, the event concluded with the much-anticipated awards ceremony. This year, we celebrated another record number of nominations received, showcasing the industry's interest in honoring its brands and achievements for these prestigious excellence awards. In addition, the Leader Merit Awards garnered the enthusiasm of all potential recipients, including Global industry leaders, from telecom operators and vendors to nonprofit organizations.

We celebrated an amazing Summit this year, together with hundreds of onsite attendees and thousands online. Stay tuned for more details on the 17th edition.

Eng. Sultan Bin Abdulaziz AlDeghaither, CEO, Zain KSA

Beyond Telecoms and Internet, Zain KSA Invests in Fintech and e-Sports

Over the past few years, Zain KSA has pursued a qualitative investment strategy to achieve three main objectives: deepen innovation and modernization in the national telecommunications sector; promote the best user experience through a bundle of integrated digital solutions and services; and maximize the use of advanced infrastructure to enhance the growth and development of emerging digital sectors.

Based on 5G technology and with many outstanding achievements in its portfolio, the company's trajectory has been characterized by an upward performance on the financial and operational levels, aspiring to foster and apply advanced governance and financial efficiency standards, boost the quality of services, and deliver value to customers and investors.

To this end, Zain KSA's CEO, Eng. Sultan bin Abdulaziz AlDeghaither, stated that the company's strategic direction has immensely contributed to cementing its pivotal role in fulfilling a comprehensive digital transformation process and evolving the ICT sector in the Kingdom. It has also attracted the development of the technology sector to reinforce its presence in the Kingdom and support the implementation of Saudi Vision 2030 objectives.

With every achievement, we hear about Zain KSA's contribution to achieving the Saudi Vision 2030 objectives. How can you relate this to your strategic direction?

Saudi Vision 2030 charts the course for the Kingdom's economic and social growth. In addition to being a source of pride for us as Saudis and an embodiment of our ambitions and aspirations, it is a compass for our business and investments. Therefore, we at Zain KSA are committed to supporting the efforts of our wise leadership to achieve the goals of Saudi Vision 2030 for comprehensive digital transformation. As a national company, we confirm our unwavering commitment to influence a digital, knowledge-based economy and a smart society, to develop and diversify economic growth and enable a prosperous and healthy lifestyle, thus increasing the Kingdom's rankings at all levels. From a broader perspective, our strategy and innovative services and solutions support Saudi Vision 2030's three pillars: a vibrant society, a thriving economy, and an ambitious nation. At Zain KSA, we have been playing an active role in supporting Saudi Vision 2030; here, I would like to give a few examples which illustrate our contributions to this vital national endeavor. Under the Thriving Economy theme, we are committed to raising the localization of the ICT sector and the contribution of women in leadership positions in one of the Kingdom's vital non-oil GDP sectors. We created a series of initiatives, such as the Evolve Program and Women in Tech initiative, to hire, train, mentor and empower our local young women and men and equip them with the best environment where they can thrive. We support the Kingdom's economic diversification growth with our contributions. We launched Tamam, the Kingdom's first microfinance Fintech, which is aligned with the Kingdom's Financial Sector Development Program. As for the Vibrant Society theme, we are working to improve the quality and accessibility of digital services to

we are proud to be guided by our Saudi leadership's aspirations and vision in all that we do

enhance a fulfilling life and provide entertainment options that align with our national values and culture. We develop our digital services to support all of life's needs, especially those related to healthcare and social welfare. Under the Ambitious Nation theme, we are proud to be guided by our Saudi leadership's aspirations and vision in all that we do. Our ambitious national responsibility pushes us to contribute to the Kingdom's transformation into a global, competitive ICT hub. We strive to be environmentally sustainable, as part of our company's strategy, and I am confident that we are serving our nation, our people and our leadership.

You mentioned that Saudi Vision 2030 is a compass for your business and investments. Give us an overview of the most prominent titles under the direction of "Zain KSA"?

Today, Zain KSA has become more than just a telecom company. It is the digital solution provider of choice for individuals and the business sector and a reliable partner of the Kingdom's Giga projects. Our directions are rooted in expanding our quality investments to stimulate an integrated digital infrastructure and develop 5G technology and its applications in the Kingdom. In the past, our perseverance to achieve this has been highly evident. Today, we crown our technical capabilities through enabling individuals, the business sector and government agencies by providing one of the most technologically advanced 5G networks in the region. This has formed a strong foundation for offering a variety of future digital applications and solutions, as well as advanced cloud computing services through Zain Cloud. As a pioneering digital solutions provider, especially at the fintech level, we launched Tamam Financing. Tamam is the first company to be issued a license for micro-financing in the Kingdom from the Saudi Central Bank (SAMA).

This is in addition to our commitment to developing the gaming and entertainment sectors in the Kingdom through PLAYHERA MENA, our gaming joint venture.

We hear a lot about of Tamam and PLAYHERA MENA; what drives telecoms to venture into sectors unrelated to their main area of specialization?

Through our vision and based on quality investments in innovation and technology, we have aspired to build an integrated ecosystem that combines telecommunications, digital solutions and services; thankfully, we have succeeded. This is evident in our company's contribution to the transformation of the local ICT sector. In addition, our corporate strategy has made it a point to tap into thriving adjacent markets such as Fintech, Cloud Computing, Gaming and more.

> Through our vision and based on quality investments in innovation and technology, we have aspired to build an integrated ecosystem that combines telecommunications, digital solutions and services

> By 2030, Fintech players will be contributing SR 13.3 billion to our nation's GDP and 18,000 Fintech jobs

Financial Technology is the future of the global financial sector, and the Kingdom aspires to become a world leader in Fintech by 2030. In 2021, global fintech investments stood at $210 billion, of which EMEA recorded $77.4 billion. In fact, it is forecasted that by 2030, Fintech players will be contributing SR 13.3 billion to our nation's GDP and 18,000 Fintech jobs. Zain KSA's strategy has enabled us to anticipate this surge in demand for Fintech solutions and align with the goals of Vision 2030, resulting in our launch of Tamam Financing Company, the first platform for consumer microfinancing that provides an unparalleled financially inclusive digital experience for our young women and men.

Another sector that aligns with our business that is also witnessing unprecedented growth is gaming and e-sports. It is projected that by 2023, annual global gaming revenue will exceed $200 billion. In 2021, the MENA region generated $6.3 billion in revenues with 100 million gamers. Saudi Arabia is growing into a gaming hub, with a market of $1 billion in 2021, and that is expected to reach $6.8 billion by 2030. Once again, Zain KSA was poised to tap into this demand and leverage our expertise and assets. In 2022, we partnered with PLAYHERA to establish PLAYHERA MENA, ensuring a suitable environment for innovators and content creators that nurtures talents and attracts professional gamers.

We expanded our partnership with NVIDIA, the leading provider of cloud gaming solutions, across more regional markets. Subscribers of regional telecom operators can access the GeForce NOW cloud game library from Zain KSA and enjoy the most powerful cloud gaming features.

Through our investment in the fintech and gaming sectors, we open new horizons for innovation and quality

services to effectively contribute to the digital society in the Kingdom, providing users from all segments with great experiences and solutions.

With the increasing global interest in improving environmental sustainability, how does Zain KSA view corporate sustainability, and what value if any does it offer?

At Zain KSA, we believe that contributing to the socioeconomic development of the Kingdom creates value for all, given that economic growth and sustainability go hand-in-hand, and since its inception, Corporate Sustainability has been a key driver within Zain KSA.

We developed our Corporate Sustainability strategy around four pillars set to achieve meaningful connectivity at the level of Environmental, Social and Corporate Governance (ESG) and that are focused on 11 UN SDGs. The four pillars are Climate change, Social Business, Inclusion and Youth Empowerment.

We continue to focus on reducing and offsetting carbon emissions — with our strategic ambition to become Net Zero by 2050 — through using energy-efficient equipment, the deployment of renewable energy solutions, the engagement process with our suppliers and partners and the implementation of a proper waste management system, including recycling devices to reduce e-waste. Zain ranked highest among telecom operators in the Middle East and Africa in the category of tackling climate change on the Carbon Disclosure Project (CDP) global index, where we achieved an (A-) rating for Management Scope.

As for inclusion, we launched the Women in Tech initiative to provide training programs for women in the technology sector. The initiative helps women studying STEM fields (Science, Technology, Engineering and mathematics) to be included in the workforce.

Another cornerstone of our Corporate Sustainability strategy is Youth Empowerment, where we have focused our efforts on training and empowering the youth segment of society. Starting with supporting children who enjoy science and technology, we launched several strategic partnerships and engagements with leading causes such as the NGO Youth Empowerment (Mentor Saudi) ThinkTech initiative, the Saudi Electronic Sports Federation and the National Olympiad for Scientific Creativity, in addition to launching the Evolve Program this year to empower young Saudi women and men, where a number of fresh graduates have joined a one-year program that will provide them with workplace training and skill development opportunities. TR

The Dawn of Pervasive Intelligence

The future of human-industrial enterprise will be pervasively intelligent and emerge through a massively distributed digital connectivity and cloud fabric that will transform our economy and society.

When considering how emerging technologies can usher in the dawn of pervasive intelligence, we have to examine what our world will look like over the next decade and reflect on some critical considerations for economic growth and societal well-being:

- By 2030, the world will enter the 6G era, blending cyber-physical and cyber-life or human systems, a phase we call "pervasive intelligence."
- This "network of networks" ecosystem will remove silos, augmenting enterprises and people to be more productive, resilient, sustainable and creative.
- To achieve transformative benefits, enterprises across sectors must prepare for a multiyear journey and develop the right business models, use cases and tech architectures in line with ecosystem partners.

Essential Vision

Businesses are starting to evaluate the opportunities presented by what we call a cloud-integrated 5G+ digital fabric. It is an architectural shift and a multi-tech constellation that integrates distributed cloud and artificial intelligence (AI) systems with multi-access networks to enable a connected edge with new applications and services.

This is a precursor for an emerging phase that EY calls pervasive intelligence — an era of human-industrial augmentation in which an integrated connectivity and compute fabric allows data to be created, shared and acted on without being constrained by the boundaries of individual enterprises, sectors or geographies. Pervasive intelligence will be an ubiquitous, ecosystem-driven capability that improves productivity and efficiency, thus raising growth and reducing environmental impact to achieve global optimizations at scale.

Pervasive intelligence will power economies, globally and locally, and drive sector convergence across the value chain. For example, digital twins will allow simultaneous localization and mapping of data to create perfect 3D models, providing insight into not just the physical characteristics of an object but its context, meaning and function. As a result, employees, enterprises and their ecosystem partners should be far more knowledgeable, productive and efficient. The human workforce will have access to new levels of real-time insights, augmenting their physical and cognitive capabilities.

The architecture offers distributed, zero-trust capabilities that will become the foundation of Web 3.0, optimizing and scaling future metaverses through high-performance, cloud-integrated networks that are decentralized in nature, ubiquitous, reliable and secure.

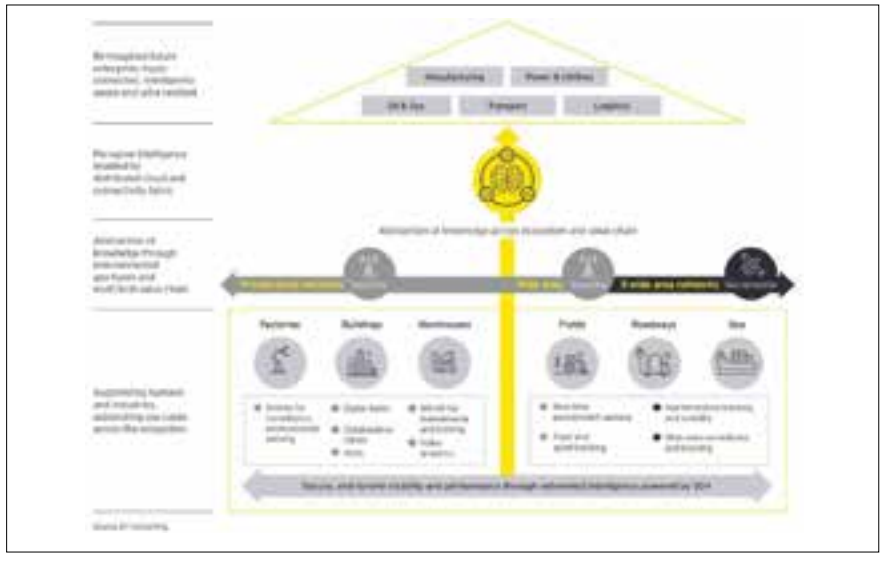

Figure: Future of Human-Industrial Operation

An Intelligent Start
To realize this vision, networking and computing capabilities such as distributed edge clouds, enterprise private networks, AI and robotics must come together in a secure manner and be offered as the platform that we call 5G+.

This will democratize access to frontier capabilities and augment the reach, creativity and impact of technology to industries and people through a layered architecture with the potential to enable a thriving enterprise application marketplace which makes it possible for companies to fully leverage the potential of 5G+ networks through open application programming interfaces (APIs).

The APIs provide the capability to integrate with enterprise applications like business support systems, sector-specific operational technologies and IT systems. This architecture can provide configurable modules for the development of cross-sector use cases like digital twins and augmented or virtual reality (AR/VR). These use cases can be offered with new business models to catalyze 5G adoption across sectors, enable frictionless consumption of advanced services and deliver measurable benefits across the value chain.

Road to Pervasive Intelligence
Preparing for and benefiting from the era of pervasive intelligence requires an interconnected and integrated infrastructure spanning local areas, campuses and the wider geographies in which sectors and supply chains are situated. This is not currently the case and is limiting the realization of 5G+ and all its promise. Industries can prioritize specific approaches for implementing programs and realize the benefits of 5G+.

Ecosystem enablement: A partnership, or an ecosystem-driven approach, can help industries explore the full range of collaborative potential — whether of devices or clouds — networked together. The EY 2021 CEO Imperative Study found that data centricity and trust are paramount for future success; however, only 34% of the respondents showed trust in their data and the role intelligent technologies can play to bridge that gap.

Cybersecurity and regulation: Geo-specific industries like manufacturing have stringent security and operations technology (OT) requirements. As ICT standards mature with 5G+, they will need to integrate closely with these OT systems. The goal is to achieve a multi-access, high-performance, low-latency and ultra-secure network. An EY ecosystem study found that over 85% of executives agreed that ecosystems are an effective way to connect large companies with small disruptors, inform new regulation and foster innovation across value chains.

A human-centric approach: EY research with the University of Oxford Saïd Business School has found that the probability of success is more than 70% if transformation programs are anchored in a human-centric approach. Human-centered technologies that augment and extend our capabilities to cope with and benefit from the creation of new knowledge will be critical as we prepare to enter the era of 6G and pervasive intelligence.

Key Actions for Business Leaders
A structured approach is required to achieve the goals of pervasive intelligence. The right business models and use cases need to be developed, enabled by future-proof architecture, with the right ecosystem partners and an outcome-driven transformation approach that is human-centered. By leveraging these essential elements, companies can chart and execute a series of initiatives to transform their operations. To facilitate this transformation journey, companies should undertake a phased approach, addressing ideation, strategic planning and implementation.

To seize the opportunities of pervasive intelligence, firms need to act decisively now. A partnership- and ecosystem-driven approach can help them explore the full range of collaborative potential. Furthermore, a human-centered, managed transformation program will ensure companies meet their productivity, resilience, safety and sustainability goals. TR

For more information on how emerging technologies can usher in the dawn of pervasive intelligence, read this EY article.

By Fuad Siddiqui, EY global 5G industry and emerging tech leader

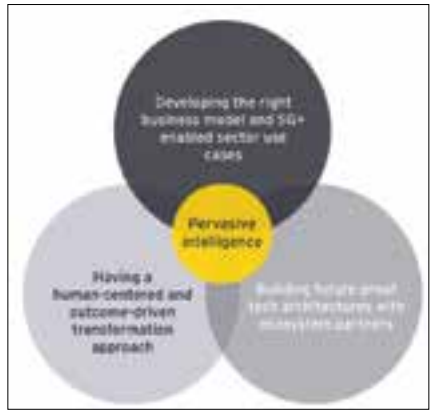

Figure: Essential Elements for a Successful 5G+ Enabled Sector Transformation

Digital Industrial Era on the Horizon as 5.5G Takes Shape

The telecommunications industry has thrived by envisaging the future and evolving technology. While 5G continues to grow, the industry has already made remarkable progress toward enabling the next evolution in wireless technology, 5.5G.

Huawei first proposed an outline for 5.5G in 2020, and 3GPP officially named the concept "5G-Advanced" in 2021. As an upgraded version of 5G, 5.5G features will power future industry scenarios such as the IoV, IoT, robotics and manufacturing and serve as a key driving force of the digital economy.

While 5G has been instrumental in enabling new service scenarios, applications and business models and has paved the way for unprecedented growth opportunities, there are growing demands to cater to new consumer and industry digital transformation needs. Huawei predicts that global connections will reach 200 billion by 2030, including about 100 billion wireless (cellular) connections. Only 5.5G can cater to this explosion in connected devices: it will upgrade network capabilities by 10X, support 10 Gbps experience, and enable 100 billion connections and native intelligence for numerous services. In short, 5.5G will mark a key milestone for leading towards an intelligent world.

By 2030, Wi-Fi networks will need to deliver 10 Gbit/s experiences for mid- and large-sized campuses and support intelligent operations and management. Micro and small

enterprises will require Wi-Fi networks to provide ample bandwidth, premium experiences and one-stop intranet services. On the other hand, industrial internet will require a bandwidth higher than 10 Gbit/s and latency lower than one millisecond. Further, enterprises will adopt a multi-cloud strategy that requires networks to adjust routing dynamically. Driven by green development and automation, we will see 10-fold increases in network capacity, energy efficiency and O&M efficiency.

At the recent Global Mobile Broadband Forum (MBBF) 2022 in Bangkok, David Wang, Huawei Executive Director of the Board and Chairman of the ICT Infrastructure Managing Board, noted how, through concerted efforts, the industry has made significant progress and is ready to make the move to 5.5G. To hit this milestone, Wang called upon all industry players to prepare on all fronts so that the world can move faster towards the 5.5G era and eventually build a better, more intelligent world together.

Already, notable developments in the 5.5G evolution are underway. First, 5.5G standardization is on track. Second, the industry has made breakthroughs in crucial wireless technologies for 5.5G, providing wider spectrum bands, higher spectrum efficiency and Massive MIMO technology with ELAA to address millimeter wave spectral challenges. Moreover, Passive IoT technology will combine cellular networks and passive label technologies to provide low terminal prices and long coverage distances. At the same time, wireless sensing technology will provide cm-level outdoor positioning accuracy and mm-level perceptual imagining resolution.

These new technologies will form three new capability dimensions as part of 5.5G, including:

- Uplink Centric Broadband Communication;
- Real-Time broadband communication; and
- Harmonized communication and sensing.

There are reasons why nations and businesses are excited by 5.5G. They will enhance the immersive user experience tenfold and expect industry digitalization to power the next wave of global economic development. The new capabilities of future 5.5G will provide a 10Gbps experience. Users will enjoy a more immersive experience in communication and can download 100 4K films simultaneously in a jiffy. Three 5G-centric technologies — Passive IoT, RedCap and NB-IoT — will support 100 billion connections in the next decade. Together, 5.5G will enhance many industry use cases. For example, future remote operations will be more precise, and quality checks in the manufactory production line will be faster and more accurate. Utility management will be more efficient and predictable. Remote healthcare monitoring will provide more visual images to aid diagnosis. With Passive IoT-enabled devices for measurement and monitoring, agriculture production will improve. Positioning and tracking in logistics will be more real-time and reliable.

Huawei believes that ICT is pivotal to building a greener world and promoting the sustainable development of society at large. In this case, the development of green technology and system-level innovation has a significant and positive impact on energy efficiency. With that in mind, the ITU-T has adopted Network Carbon data/energy intensity (NCIe) as the unified energy efficiency metric to guide the industry's green development roadmap.

Huawei has therefore developed network solutions for green sites, networks and network operations, as well as more efficient and low-carbon energy solutions. Huawei also works with its ecosystem partners to deploy more energy-efficient ICT infrastructure to make ubiquitous connectivity a greener possibility.

So, as we approach the intelligent world of 2030, the industry should continue working together to set the stage for 5.5G deployment. These measures include setting standards and promoting fundamental technological research; securing more spectrum for ultra-large bandwidth, products, ecosystems and applications to ensure 5.5G success; preparing for 5.5G with mature networks, devices and chips where networks and devices are upgraded to deliver 10 Gbit/s experiences; collaborating within ecosystems to build a thriving 5.5G ecosystem; and ensuring developers continue to work on groundbreaking applications. TR

By Vanness You, vice president, Huawei Middle East Carrier Business Group

> Huawei first proposed an outline for 5.5G in 2020, and 3GPP officially named the concept "5G-Advanced" in 2021

Khalifa AlShamsi, CEO, e& life, part of e& (formerly known as Etisalat Group)

A Digitally Driven Lifestyle With Advanced Technologies Is The Future, Says e& life's CEO Khalifa Alshamsi

Telecom Review spoke with Khalifa AlShamsi, CEO, e& life, part of e& (formerly known as Etisalat Group) who shared his insights on the ambitious goals of e& life to become the go-to digital player in the financial, entertainment as well as retail sectors, as it continues to deliver superior experiences for its customers that fit in with their digital-throughout lifestyle.

e& money, the fintech arm of e& life and MoneyGram International, recently entered into a partnership in the digital payment business. What other potential areas in financial services is e& life focusing on, and how can it benefit e&'s over 160 million customer base?
The announcement that we made with MoneyGram International and e& money is one of the many collaborations and partnerships that will strengthen our service offerings made available through e& money, thereby enriching its product portfolio and embedding innovative fintech capabilities. Our vision of e& money is to revolutionize the customer experience through its innovative financial super app marketplace catering to all types of services in the financial services domain, starting from what is available today, which is merchant payments, local/international remittance to payments, lending, investments, insurance services

At GITEX Global 2022, we are also demonstrating the service types of the future that will be added to the existing e& money application. The lending and micro-finance types of services will evolve e& money to services in insurance, wealth management, and various investments that will cater to the various segments in our market. Some of these services will be built on the e& money platform, and some will be deployed through partnerships in the form of the acquisition of different available players in the region.

Please update us on the latest developments in e& life consumer digital offerings in both the retail and entertainment verticals.
We are excited about our development in the entertainment verticals. e& has within its portfolio evision, the media, and entertainment arm of the group, which has been in operation for the last 20 years in partnership with major Hollywood studios, independent studios, and regional content suppliers. We have evolved our B2B relations with our services like IPTV to reach a global market, including the MENA region and Pakistan where we have our telecom operations. As a result, through the evision-led consortium with ADQ, we acquired the majority stake in STARZPLAY, which has strengthened our service offerings, adding significant value for our customers who enjoy high-quality content, seamless streaming capabilities, and have immersive experiences using Virtual Reality (VR) and Augmented Reality (AR). accelerate their set growth by leveraging on assets and customers within e&. We're extremely excited to venture and double down on the entertainment space because we believe the region as a whole has major potential for growth compared to the MENA region's penetration of such premier services at 10% compared to the more mature markets, which is in the 80 to 90% bracket. We'll increase focus on both global and regional content, especially sports content, as well as niche content that caters to certain segments of the users.

Dubai recently launched its Dubai Metaverse strategy. How will e& life leverage next-gen technologies to contribute to this strategic national agenda?
We are a big believer in the future of the metaverse. Following the e& announcement of our virtual world, e& universe at GITEX Global, and two other use cases, we are seeing the metaverse as a platform for launching a lot of future services that our customers have been early adopters of, be it in gaming or other domains that are emerging with time. We are demonstrating different types of services that are in alignment with the recent Dubai Metaverse strategy, which is centered on transforming industries in ways never imagined before. For example, in the tourism industry, we believe technology can provide a more immersive experience for the user than what they are experiencing on the traditional internet. We are also doing this in the sports and entertainment domains by leveraging our capabilities in that particular area and the assets that we have. We'll be working with a lot of strategic and mutually-beneficial partners to enable optimal engagement experiences with the fans that are relevant to this region or even in the global market. We are also looking into how we can use the metaverse for the benefit of our employees as well as our customer-facing centers. We are not only demonstrating such services as a proof of concept but launching them commercially on the metaverse, and will be the first telecom operator in the region to do so. It might not be profitable in the early days, but we believe that by putting these building blocks [together] today, we can unlock the future potential of the metaverse and the value-add it creates for the e&. TR

We are demonstrating different types of services that are in alignment with the recent Dubai Metaverse strategy

Tamer Bdran, managing director, NEC GCC

NEC Always Adopts the Technology Disruption Approach

NEC has been a leading technology company for the past 120 years and continues to be recognized for the quality, durability and innovative approach to all its information and electronics solutions. Tamer Bdran, managing director, NEC GCC, talks to Telecom Review, giving a regional perspective to its operations and a look to the year ahead.

The GCC is among the most digitally-advanced regions globally. How does NEC contribute to this tech evolution?
The GCC countries have developed enormously over the last couple of decades. It is one of the most digitally-advanced regions in the world, thanks to its government's digital leadership initiatives.

People's lives in the GCC have become even more digital than ever imagined by Sci-Fi books. These include: paperless initiatives, blockchain implementation, crypto-leading initiatives and regulations and, of course, safety and security, which are "perceived everywhere," with this region becoming the safest place in the world.

At NEC, we are proud to be part of this evolution and one of the main partners helping in this evolution in both ICT and safer city solutions with our leading offerings in biometrics, smart surveillance, AI/ML, cloud, 5G and other technologies and solutions that heavily contribute to digital transformation.

These technologies are used by millions of users in many verticals: transportation, government, telecommunications, retail and many more.

NEC always adopts the technology disruption approach in which we are investigate the aimed business value, service excellency and seamless customer experience.

Can you share notable case studies NEC has worked with in the GCC regarding digital transformation?
Although there are several use cases, allow me to highlight two: one for Safer/ Smart Cities and one for the Telecom Sector:

Safer/Smart Cities: NEC successfully implemented seamless travel experiences in more than three recognizable airports in the GCC region. The project's goal was to ensure that travelers' journeys were safe, easy and comfortable.

It is worth mentioning that we proudly contributed in significant countries major events through our excellent collaboration with transportation authorities for the smart mobilities.

Telecom/CSP Sector: In partnership with leading CSPs in the region, we launched end-to-end 5G slicing and a fully automated MEC experience to enable the 5G B2B offering.

In summary, we are making people´s lives much easier, thanks to technologies that do not need to be "perceived" (they are mostly in the "backstage") to enable better, faster and more reliable digital services.

From your perspective, which technology trends will continue in the GCC, and how will NEC maximize its products and solutions in response to these?
To serve economic diversity and new business expected in the region, such as tourism, fintech/ wealth management, smart cities, manufacturing and entertainment, I believe that the following technologies will comprise the mainstream for the upcoming 2-3 years:

- 5G-Advance use cases and Autonomous Networks
- Cloud native adaption, synergy with hyperscalers and edge computing
- AI applied to operations, biometrics, big data and automation
- Fintech and metaverse

NEC is aware of the quick evolution in market dynamics. We have a solid strategy and roadmap to serve "from the bottom of the sea to space" (e.g., we have been the market leader in biometrics for 10 consecutive years and acquired market leaders in digital government, open networks, automation, orchestration, fintech/ wealth management, agritech and advanced networks domains, and our world-wide R&D has developed next-generation solutions like HPC, quantum computing and many others). In addition, we are leading in open network (world-first MIMO ORAN), 5G core (world's first cloud-native 5G SA), smart transportation, biometrics, Safer/Smart Cities , AI and other technologies applied to medical research and treatments. For the latter, we recently announced new initiatives on cancer treatment, with more than 10 years of experience in big data and ML-based skin cancer detection.

How will NEC continue to deliver on its commitment to empowering lives through connectivity in the region?
NEC has been, and continues to be, a leading company for the past 120 years, always recognized for the quality, durability and innovative approach to all its solutions, coming from one of the most technologically advanced societies in the world, like the Japanese market and community.

This experience in such an advanced, 126 million-person market allows us to:

1. Understand the customer's needs: Provide the optimal, workable and scalable solution, taking into consideration that these needs change over time and from generation to generation (as an example, what will be the highest priority and killer application for Gen Z?)
2. Provide superb products and solutions: Based on our global experience on needs and trends in long term, we continue innovating and enhancing our products and solutions to meet the new and future demands and features requirements in an Agile way to achieve a smarter, happier society
3. Empower people and communities: Last but not least, we care about people and society's development, both in the region and globally. Continuous learning and personal development are keys to our prospective future and empowering the lives of those in the region, as well as helping governments achieve their sustainable development goals through continuing innovation.

What are NEC's regional aspirations for 2023?
Backed by 117 years of experience and innovation, NEC knows what it takes to evolve to meet changing technology and enterprise demands. This capability to leverage decades of award-winning technologies enables NEC to deliver integrated information and communications solutions that create social value through problem resolution and bring new value to people, businesses and society. TR

NEC knows what it takes to evolve to meet changing technology and enterprise demands

TDRA Announces Completion of 'United IX Initiative' Between etisalat by e& and du

The Telecommunications and Digital Government Regulatory Authority (TDRA) invited Telecom Review to the official press conference for the Internet Exchanges Union initiative "United IX," which aims to link the SmartHub-IX platform, supported by etisalat by e&, and UAE-IX platform, supported by du, to form an integrated interconnection system at the national level.

The joining of the two platforms allows the interconnection of all connected customers, regardless of the service provider, and is the first cooperation of its kind in the Middle East.

Commenting on this step, H.E. Majed Sultan Al Mesmar, TDRA director general, said: "This initiative is part of TDRA's efforts to develop the telecom sector infrastructure [and] enhance interconnection and integration, to serve the objectives of attracting investments, providing the best experience for global companies such as emerging technology companies and service providers, in addition to enhancing speed of data transmission and improving response time."

Speaking to Telecom Review about the benefits of this project, Al Mesmar gave the example of sending emails and routing the traffic internationally, which can cause delays. "Why do I have to do that outside when I can have the UAE to be the main hub for the whole region?" he pondered in making his point.

The TDRA Director General added that the United IX initiative also enables business continuity, in the case that submarine cables connecting the UAE to the world — 17 as of present — are cut off or interfered with.

H.E. Masood Mohamed Sharif Mahmood, CEO of etisalat by e&, expressed: "For us, SmartHub IX is a key supporter of our digital infrastructure in the region, and we are committed to making it the partner of choice for carriers, cloud service providers, internet providers and companies looking for business-class data centers."

This cooperation will build on the capabilities of our SmartHub IX platform and be in line with the overall strategy of e& group to provide digital transformation technologies and innovative solutions to the telecom sector's customers in various fields.

On a further note, H.E. Fahad Al Hassawi, CEO of Emirates Integrated Telecommunications Company (du), articulated: "As part of this partnership, du will harness the world-class capabilities of our datamena center to create and design hybrid environments for ICT systems. Our interconnection services and solutions that we will provide under this partnership will enhance the capabilities and quality of modern communication technologies, enabling our partners and all stakeholders to establish direct and secure communications and link their operations across multiple sites, as well as achieve savings in time and costs."

Omantel Launches Middle East's First 400GbE DCI Service With Ciena

Oman Telecommunications Company (Omantel), Oman's first and leading integrated telecommunications services provider, announced the launch of a 400GbE DCI service utilizing Ciena's Data Center Interconnect solution. The service is designed to meet the rapidly rising connectivity demands of Omantel's wholesale, cloud and content provider customers while delivering a superior customer experience through optimized performance.

Omantel's 400GbE DCI service runs on Ciena's 6500 Packet-Optical Platform powered by WaveLogic 5 Extreme coherent optics and is managed by the Manage, Control and Plan (MCP) domain controller. The Ciena solution gives Omantel the ability to deploy 100G and, for the first time, 400GbE DCI connectivity over wavelengths up to 800Gb/s to accommodate increasing network traffic.

"Our vision is for Oman to be the leading gateway to the region and beyond. We are bringing this mission to life, and a recent example is our new 400GbE data center interconnect service that we developed with Ciena. At Omantel, considering the numerous benefits on technical, commercial and social levels, we acted upon a clear strategy for data centers by partnering with Equinix, the world's digital infrastructure company, to launch MC1, the premier carrier-neutral data center in MENA. We are now taking the next step by introducing an innovative new DCI service, the first of its kind in the region," said Sohail Qadir, vice president of wholesale at Omantel.

He added, "Crucially, we were able to launch the service sustainably — without deploying additional platforms — doubling wavelength transmission capacity from 400G to 800G and improving overall fiber capacity leveraging our existing footprint. What this means for our customers is faster delivery of on-demand cloud applications and content with the highest quality."

Nokia Collaborates With Saudi's MCIT for New Regional Maintenance Hub

Nokia announced the opening of its new regional maintenance hub in Riyadh, Saudi Arabia, that will support its customers across the Middle East and Africa (MEA) region.

The new center will provide repair and support services for Nokia's 5G and legacy telecoms network equipment as well as training to local engineers. The move supports Nokia's efforts to extend the lifespan of its network equipment through the adoption of circular practices that enable greater material efficiency and waste reduction, enabling more sustainable networks.

The center is one of Nokia's first initiatives following the signing of a Memorandum of Understanding (MoU) between the Ministry of Communications and Information Technology (MCIT) of Saudi Arabia and Nokia in 2019. The agreement supports the country's Saudi Vision 2030 strategy.

Moreover, the initiative is part of Nokia's plan to expand its operations in the Kingdom and support digital transformation and the localization of equipment services. Nokia's investment is dedicated to knowledge sharing, particularly in undertaking complex and critical repair and reuse services while ensuring sustainable localization. The new center is also expected to save at least four weeks of end-to-end logistics time and reduce the environmental impact of logistics by having a local center instead of a global model.

Eng. Bassam Al Bassam, deputy minister for telecom and digital infrastructure at MCIT, said: "We are pleased that Nokia has chosen Saudi Arabia as a regional hub for its maintenance operations to serve enterprises and service providers not only in our Kingdom but also across the MEA region. This is yet another milestone in the collaboration with MCIT, and it further deepens the strong relationship between Nokia and the Kingdom."

ZainTech, Oracle to Create Business Advantages for MENA Customers

ZainTech, the one-stop digital and ICT solutions powerhouse of Zain Group, has selected Oracle Exadata Cloud@Customer to introduce new technology services to create business advantages for its customers across the Middle East. With Exadata Cloud@Customer, ZainTech will now provide in-country cloud hosting services for an organization's Oracle Database across its operating countries, starting with Jordan. This will be a first for the Kingdom and will help ZainTech customers meet strict data residency and security requirements.

Oracle Exadata Cloud@Customer combines the world's leading database technology and Exadata, the most powerful database platform, with the simplicity, agility and elasticity of a cloud-based deployment. It runs the same Oracle Exadata Database Service and Oracle Autonomous Database Service operated in the Oracle public cloud but is located in customers' own data centers and managed by Oracle Cloud experts. This enables a consistent Exadata cloud experience for customers, whether on-premises or in Oracle Cloud Infrastructure (OCI) data centers.

Commenting on the agreement, ZainTech CEO Andrew Hanna said, "ZainTech provides end-to-end multi-cloud capabilities across advisory, professional and managed services. Through our network of data centers, significant investments in automation and partnerships with innovative global players like Oracle, we will drive strong transformational results for enterprises in the MENA region."

"With Oracle Exadata Cloud@Customer, ZainTech has laid the foundation for an advanced technology infrastructure that can help the company scale quickly by offering new innovative services to its customers," said Nick Redshaw, senior vice president – cloud tech, Middle East and Africa, Oracle. "Oracle Exadata Cloud@Customer is the simplest way to move an organization's business-critical Oracle Database workloads to the cloud. It can simultaneously run Oracle Exadata Database Service and the automated and fully managed Oracle Autonomous Database Service inside customers' data centers and behind their firewalls to help meet strict data residency and security requirements. I am confident that the Oracle Database customers of ZainTech will appreciate this new offering."

ZainTech's collaboration with Oracle is a strategic initiative as the company prepares to launch Oracle Database hosting services to its customers across the region.

Mohammad Marashi, SVP, product and strategy, networks, SES

SES: Redefining Satellite Services With O3b mPOWER

In an exclusive interview with Mohammad Marashi, SVP, product and strategy, networks, SES, he explains how they aim to fulfill connectivity needs seamlessly with a flexible selection of services and what O3b mPOWER's impact is to these services.

Currently marking 37 years in the business, SES is a pioneer in space. How will SES continue to play its role in satcoms and continue to deliver amazing experiences on Earth?

After 37 years of being in business, SES has grown from being a European player focused on satellite TV distribution to a leading content connectivity solutions provider that is delivering innovative services to our data customers.

We have achieved this in two ways: first, through acquisitions over the decades, and second, and more importantly, through innovative technology adoption. Some examples include when we were among the first in Europe to broadcast high-quality HD (High Definition) content to satellite TV homes and first in the world to invest in and deliver satellite-based low-latency broadband services through our O3b MEO (Medium Earth Orbit) constellation.

For both its Video and Networks businesses, SES always offers the latest and most advanced technologies to meet the ever-changing and challenging demands of its partners and customers. Now, after almost four decades of service, SES continues to remain committed to placing our customers' needs above all and innovating to make sure we offer the best services.

The most-awaited O3b mPOWER satellites will start launching this year. Please share with us the company's MEO journey that leads to O3b mPOWER.

SES's MEO journey started back in 2009. We were one of the early investors in O3b Networks, whose mission was to connect the other three billion. When the first batch of satellites launched in 2013, we could not have expected what awaited us. O3b's MEO network reduces latency, increases throughput by an order of magnitude and improves both voice and video quality. We went on to fully acquire O3b Networks in 2016.

For the last 10 years, we have seen how our MEO constellation has positively shaped business and communities. For example, in the Central African Republic, service from O3b has enabled Orange to rollout 3G and 4G cellular services in 10 cities. Orange was also able to provide better-quality broadband services to businesses, boosting secured mobile data and payment services across the country.

After having seen how O3b has transformed our customers' businesses and communities' lives, it is no wonder that we started thinking how we can deliver even better performance and flexibility in connectivity services, and that is when we envisioned our second-generation of MEO satellites, O3b mPOWER. Built by Boeing, the O3b mPOWER satellites will start launching this year. Just like O3b, it will operate in the medium Earth orbit at about 8,000km away from the Earth's surface. O3b mPOWER will be providing unrivalled high throughput, unmatched flexibility, constant low latency and uncontended capacity, enabling customers to support a multitude of segments, including Government, Fixed Data, Energy, Cloud and Mobility. O3b mPOWER enables us to enhance our services and tailor them to fit our customers' needs in the most efficient way.

What can you tell us about the O3b mPOWER technological ecosystem? Who are your key partners, and how will this system impact market segments in a data-dependent world?

The uniqueness of O3b mPOWER lies in the ecosystem of partners. We do not only have satellite partners who will be helping us build and launch the satellites; we also have a very robust network of ground equipment and software partners.

Our ground equipment partners, such as Gilat, Intellian, ALL.Space and Comtech, have been developing equipment that will allow us to simplify and optimize our networks. For example, our customers' terminals and gateways have been designed and built to make sure that they are easy to install and are of low-maintenance.

Additionally, through our software partners, we are building an automation and service orchestration platform where network services can be effectively and easily managed by our customers and channel partners.

What does O3b mPOWER mean for the MENA region?

With the launch of O3b mPOWER satellites, we will be able to offer our customers all around the world unrivalled high throughput, unmatched flexibility, constant low-latency and uncontended capacity in 2023. More specifically for the MENA region, we recently signed a tripartite agreement between e& (Etisalat), Microsoft and SES where e& will be hosting the co-located SES O3b mPOWER and Microsoft ground station to facilitate connectivity to the cloud so that customers can optimize their global business operations and accelerate their digitalization plans while unlocking more value for their businesses.

One of the unique features of O3b mPOWER is the ability to enable our customers to land beams wherever they choose. This means that our MENA customers, either in telco or in government, who are keen to have their own O3b mPOWER gateways can choose its location depending on their operations and connectivity usage — something that is highly valued by our customers in this region.

What other revolutionary plans do you have in store for the upcoming years?

For the upcoming years, we will continue to develop our offerings by tailoring and enhancing our products and services jointly with our customers to meet their growing and changing needs. In addition to the six satellites, we will be launching initially, we will be additionally launching five more satellites to deliver enhanced throughput and performance.

We have also ordered another software-defined geostationary satellite, SES-26, for the region. The totally digital satellite will replace NSS-12 at 57 degrees East to extend content and connectivity services flexibly across Europe, Middle East, Africa and Asia and will support government communications solutions across the region.

Through our multi-orbit satellite services, we can enable our telco customers to meet the rapid growth in mobile data usage in their markets and support them in complying with their digital inclusion requirements. At the same time, our different tiers of services could cater to companies and organizations that need secure and reliable networks for staying connected among offices. At SES, we understand that our customers' demands can vary, and we aim to fulfill their connectivity needs seamlessly with a flexible selection of services. TR

> SES continues to remain committed to placing our customers' needs above all and innovating to make sure we offer the best services

Santiago Madruga, VP, partner ecosystem success, EMEA, Red Hat

Red Hat: The Cloud Partner for Right Performance, Security and Availability

In an exclusive with Santiago Madruga, VP, partner ecosystem success, EMEA, Red Hat, we gain insights on the relevance of having partners in the ecosystem and how it influences Red Hat's operations and platform development.

How do you oversee operations and ensure that Red Hat achieves critical business objectives?
We try to leverage all of the power of innovation that happens in the open source community. We package it on the software that we provide, after all the quality tests, documentation and lifecycle management. Together with the partners, we make it available to the end customers. The partners play a critical role here because, with their help, we assist the end customers in deploying, utilizing and making the software more productive.

At the end, we're selling a platform that helps the customer use any application they need, in whatever environment they prefer, either in a private cloud,

multi-cloud or hybrid environments. What they get with us is the freedom to move the workloads on whatever situation they want flexibly and to also automate their operations. That automation runs from the development up to the operations.

There's a lot more agility in how the development and operations work together due to a DevOps environment that helps the collaboration between the different parts of the company in a very secured, controlled manner.

What significant role do partners play in Red Hat's cloud ecosystem?
Partners are absolutely key for telcos and any other end customers to get value from [cloud] technology. First of all, they help clients to implement and adopt the technology but also make everything else underneath work through the platform that helps customers move workloads from one cloud to the other.

Partners help on the integration of the whole environment as well as the workloads of the applications that run on top to make it a business solution to whatever they're looking for.

Also, when the clients, like telcos or others, are developing their own software, partners play a fundamental role in helping the clients know how to work through an agile development environment [DevOps]. There are many different types of partners — from software vendors to OEMs, services companies, etc. I think all of them play a role, and Red Hat is just one more partner in the ecosystem. All of us are working together with quality and good relationships for the benefit of the end customers.

Red Hat's OpenStack Platform (RHOP) was just made publicly available. What benefits could this bring to the table?
OpenStack is not a new technology; we've been working on it for more than a decade with the open-source ecosystem partners and a lot of input from the clients, who are majorly telcos. The recent release is a new step to make it even more usable, more cloud-friendly and still bring in the quality, performance, security and reliability that telcos need.

How will Red Hat contribute to the world's ongoing digitalization journey?
The world is going digital, not only the telcos but also the whole value chain across society, from consumers to enterprises. We will see both businesses' and consumers' behaviors change.

One example of this is the amount of information that is going to be available. We all have information on our mobiles, but even the machines – the things that we use – will be consuming information that gets generated, consumed and processed closer to the consumer.

This may sound theoretical and high-level, but when we are discussing smart metering for electricity companies or cars driving alone, these sectors are forming the business models based on more information that is available and being processed where it is needed.

All of these means going digital, and Red Hat is driving technology to support all of those changes with new architectures that make applications a lot more modular. Modern applications will not be software that gets installed in one computer. Instead, a part of the application will be installed very close to the consumer so that it can process the information and act on it in real time.

Red Hat is providing the platform and the architectures to do that at scale with the right performance, security and availability. We might usually think of it as simply technology, but we are actually talking about people's lives. For instance, health operations will be done remotely. You don't want the systems or the network to go down when a doctor is performing his duties virtually.

With this life-changing potential, Red Hat's technology will be instrumental, together with the rest of the ecosystem and the telco partners.

What are the next steps to be taken in expanding Red Hat's ecosystem further in the region?
The business is growing, and we already have a great value proposition with a market that is very eager to have more. Hence, we are looking for partners that can help us scale our presence and bring more value of open source to the end customers.

Moreover, we are also looking for deeper relationships with partners where we can construe joint value propositions that make more sense to the clients. Due to this, we see telcos as partners and not only customers. We sell to the telcos but also partner with them to reach out to more clients with a higher value proposition.

Aside from telcos, we partner with system integrators, ISPs and OEMs, among others. Again, we are expanding and we are looking to cover the market with more partners, particularly focusing on those partners that can make more of a difference to the end clients. TR

> We try to leverage all of the power of innovation that happens in the open source community

Advancing Automotive Connectivity: Cellular V2X Communication

In this new era of smart transportation, customers demand new capabilities in their vehicles, and cellular vehicle-to-everything, or simply C-V2X, will be a crucial enabler. These capacities include integrating mobility-enhanced, autonomous-driving and other personalization and safety features.

C-V2X is a 3GPP standard that defines cellular technology that enables vehicles to communicate with transportation infrastructure, other vehicles, the cloud, cellular network infrastructure and even pedestrians.

As reported in a research study, the C-V2X market is estimated to exceed a valuation of US$6 billion by 2030. The involvement of governments in the improvement of transportation systems as well as automotive OEMs, suppliers and communications service providers (CSPs) will accelerate the industry's development and innovation.

Cellular vehicle-to-everything is also a key component of modern day's intelligent transport system (ITS), which aims to be safe, efficient and inclusive. It covers everything from connectivity and telematics to in-vehicle computing, sharing sensor data and cooperative maneuvering.

Consensus on C-V2X and adoption by all industry players will also drive its widespread adoption across all lines of vehicles. Indeed, from now on, an interconnected digital road infrastructure will pave the way for real-time traffic updates, hazard warnings and high-definition mapping services.

The C-V2X technology is set to revolutionize the mobility ecosystem and the way vehicles (and drivers) interact with the world. Now nearing commercialization, this technology has been in the works since 2018, but efforts are now being catalyzed by the rollout of 5G networks.

C-V2X in Brief

People have been searching for ways to become better informed behind the wheel. Cellular vehicle-to-everything (C-V2X) is a state-of-the-art wireless technology designed to offer vehicles low-latency, direct and network-based communications with other automobiles, roadside infrastructure and other road users. It operates in the designated 5.9 GHz spectrum band, the safety band reserved for transportation-related communications.

Collectively, the transmission modes of shorter-range direct communications, or device-to-device, that include vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and vehicle-to-pedestrian (V2P), as well as longer-range network-based communications (V2N), comprise C-V2X.

While C-V2X is relatively new, it was designed to replace previous standards developed by the FCC and ETSI, namely dedicated short-range communications (DSRC) and cooperative intelligent transportation systems (C-ITS). These earlier standards had dedicated bandwidth and helped facilitate device-to-device communication, but C-V2X offers more advanced functionalities.

Due to this, the effects of C-V2X will be felt by a broad range of players across economic sectors, including infrastructure owner-operators, service providers, vehicle and chipset manufacturers, technology providers and mobile network operators (MNOs).

According to a researched forecast, cellular connectivity will be available in 346 million vehicles by 2025 while smart city cellular connections will exceed 165 million.

Having said that, there is a strong global momentum for C-V2X in Asia, Europe and North America. According to a report, the North American region cellular vehicle-to-everything industry size will be valued at US$ 150 million by 2030 while the Asia-Pacific region is also predicted to be a highly lucrative C-V2X market in the long run.

China is the first country to have a national strategy for the Internet of Vehicles (IoV), while Japan is targeting 2023 for a 5.9 GHz allocation for designated ITS use. Korea, Brazil and others are also developing go-to-market plans in line with recent

automotive market traction and global trends.

Safety Among Other Benefits
At the top of the list, C-V2X plays a role in safety because it allows more than what meets the eye. In fact, the expected benefits from C-V2X include up to 800,000 injuries avoided per year, up to 2.8 million fewer damaged vehicles per year and over $12 billion in savings annually due to fewer damaged vehicles.

According to a 2021 study, safety features were the most important factors when consumers considered their next vehicle purchase. Hence, by making the adoption of C-V2X technology and safety applications an integral part, automotive OEMs can appeal to the premium that consumers place on vehicle safety.

When vehicles are connected to everything around them, travel is made safer because accidents, injuries and fatalities on roadways are reduced. Enhancing safety also helps to improve mobility, which directly correlates to sustainability. These can be seen through real-time route guidance to bypass congestion and adjusted vehicle dynamics for optimal speed with less braking and idling for better fuel use, among others.

Other examples of C-V2X safety use cases are:

- Cooperative Adaptive Cruise Control (CACC) adjusts cruise control speed to react when the vehicle ahead brakes or the vehicle behind accelerates, creating a safer, tighter feedback loop.
- Emergency vehicle prioritization helps emergency responders get to their destinations faster and more safely.
- Intersection-movement-assist alerts drivers going straight or making a right turn when it is unsafe to proceed due to something out of their line of sight.
- Do-not-pass warnings alert drivers not to attempt a passing maneuver when the passing zone is occupied by oncoming vehicles.
- Signal-phase and timing services integrate the traffic signal controller (light color and remaining time) with a roadside unit (RSU), which broadcasts to the onboard unit (OBU) and helps the route decision-making.
- Collision warnings alert drivers when a vehicle is sensing a potential pedestrian collision via an IP camera and RSU along the streets, or if there's a risk of collision towards an intersection.
- Emergency-brake warnings alert drivers if the vehicle in front of them will make a sudden brake.
- Hazardous-location warnings alert drivers of potentially hazardous situations, such as deep waters, manholes or slippery roads ahead.

C-V2X is also one of the main ways of utilizing IoT in transportation. It enhances automation in driverless cars while also improving the information drivers have at their fingertips, particularly when it comes to navigation and visibility.

Impact of 5G

With the fast progression of cellular vehicle-to-everything communication from LTE to 5G NR, the automotive industry faces new opportunities for ultra-low latency and highly-reliable automotive connectivity.

The 5G Automotive Association (5GAA) — a cross-industry consortium that helps define 5G V2X communication — ran V2X performance and functional tests that revealed that even in a congested scenario, C-V2X latency remained bound within the 100-ms latency budget.

Additionally, 5G brought direct communications (sidelinking) to industry C-V2X by advancing C-V2X applications such as platooning, advanced driving, extended sensors and remote driving. It is worth noting that the C-V2X sidelink is the first wireless system to introduce distance as a dimension at the physical layer, enabling a uniform communication range for both level of service (LOS) and non-LOS implementations.

By sharing a fabric of common connectivity, automotive stakeholders and telecom players could enable centralized transportation management and neighborhood traffic management by leveraging mobile edge computing and 4G/5G networks.

As C-V2X and mobile networks move into the 5G era, there will be new services supported by the new business opportunities available. One case would be operators integrating the functionality required for V2I applications with 5G infrastructure. Alternatively, RSUs can include the necessary functionality to support 5G network infrastructure build-out and densification. This can yield win-win opportunities for public-private partnerships.

Envisioned to boom later on, 5G V2X — a future version of C-V2X that has been standardized in 3GPP starting with Rel-16 — provides sidelink for automated vehicle applications. 5G V2X will provide increased situational awareness through richer sensor sharing and group casting, heavily supporting such coordinated driving and real-time infrastructure updates.

In the 5G era, C-V2X will also be able to support a range of advanced safety services, including very precise positioning and the delivery of local, dynamic maps based on camera and sensor data. With 5G, vehicles will be able to capture more data about their immediate surroundings, and ultimately, C-V2X will play a pivotal role in enabling the deployment of fully autonomous vehicles.

Outlook

Without a doubt, C-V2X is positioned to be the global solution for V2X technology, supporting advancements in wireless communication and new automotive applications. These are necessary for improvements in safety, autonomous driving and traffic efficiency, which will be a mandatory part of ITS.

By 2023, German automotive manufacturer Audi estimates that there will be 5.3 million vehicles, work zones, railway crossings, bicycles and other devices that will be connecting to C-V2X frequencies.

From 2025 onwards, 5GAA anticipates the mass rollout of more advanced automated driving and safety use cases supported by vehicle connectivity, while additional automated driving functionalities are anticipated from 2026. TR

5G and Public Cloud: Telcos Paradise

As modern enterprises embrace innovation and digital transformation, higher connectivity and data processing capabilities are the prerequisites for friction-free operations. The combination of emerging technologies such as machine learning, artificial intelligence and cloud computing is set to change business operation models dynamically.

Strategizing along those lines, leading cloud services provider Amazon Web Services (AWS) launched two cloud regions in the Middle East — Saudi Arabia and the UAE — as the two countries' appetite for technology adoption has been garnering global attention. Using advanced technologies to drive innovation and with availability zones spread across the region, AWS is supporting developers, SMEs, entrepreneurs and enterprises, as well as government, education and nonprofit organizations, to run their applications with zero to minimal connectivity interruptions as the data exchanges happen at data centers closer to the end users. In the UAE, AWS estimates that its spending on the construction and operation of the UAE Region will support an average of nearly 6,000 full-time jobs annually at external vendors, with a planned $5 billion (AED 20 billion) investment in the local economy through 2036. The AWS Middle East (UAE) Region will also add an estimated $11 billion (AED 41 billion) over the next 15 years to the UAE's gross domestic product (GDP).

Accelerating AI Innovation

Public cloud and AI can help telcos innovate their service offering and generate new revenue streams through data monetization. Bandwidth-guzzling business applications require the power of cloud computing and network infrastructure for storage, computing and processing of data; telcos' advantage over these data exchanges can help them formulate digitalization offerings across industries. Gleaning through these data, telcos can get a good footing on understanding the unique requirements of enterprise customers and fulfill those accurately. A recent market survey reveals that 59% of marketers in the UAE agree that customer expectations are more difficult to meet than they were a year ago. The power of the cloud and analytics will help operators realize their wider business objectives and enhance their competitive advantage. Application of AI in micro-managing data into distinct categories and cloud analytics can reveal insights that are bound to give telcos an upper hand when it comes to decoding their customers' operational constraints.

Reliance on Technology

The supply chain industry is an integral part of any economy; however, they are faced with various challenges as a result of the current geopolitics and global recessionary environment and are turning to technology to streamline their operations. In a new DP World study, 75% of the respondents said they expect technology to be a significant factor in easing the current supply-chain woes. Over 56% felt that digitalization would be the primary driver of efficiency, supporting the industry to move ahead. A majority of them placed technology at the center of cost savings and onboarding new customers.

However, many were fuzzy on how to incorporate technology into their industry. As telcos, supporting this important industry in their digital transformation journeys is a great responsibility and an opportunity. Again, this means working closely with other industries and trying to understand their pain points to come up with solutions that work. Network providers can work with hyperscalers to help industries design a cloud strategy that optimizes for business outcomes, including speed, resilience and agility involving management, logistics, tracking and delivering. This is an opportunity to position themselves as leaders in the industrial sector, which is constantly evolving.

Cost Optimization and Efficiency

Perhaps one of the most important advantages for telcos from a partnership perspective with public cloud operators is cost optimization and efficiency. The migration of network workloads to the public cloud and running virtual network functions (VNFs) or cloud-native network functions (CNFs) on cloud infrastructure will liberate them from owning their own. Network operators may utilize the cloud and its platform capabilities — computing, IoT platform, machine learning (ML), container orchestration and security — to enable enterprise clients to customize and scale their network experience on demand, using the latest technology such as network slicing or dedicated private networks.

A case in point is the collaboration between e& (formerly known as Etisalat Group) and AWS.

The two companies are leveraging their respective expertise to build industry-specific solutions that offer low latency and high-performance computer services on 5G private networks and Mobile Edge Computing (MEC) across use cases such as interactive AR/VR, industrial automation and ML/AI at the edge. These solutions are enabling enterprise customers in the UAE to streamline their operations, enhance the safety of work sites and employees and increase production resiliency across critical business processes.

Faster Adoption

At the kind of pace 5G rollouts are taking place regionally and globally, cloud adoption by the enterprise is not a matter of how but when. Here in the UAE, the preparation has already begun on a war footing. The UAE Cybersecurity Council (CSC) and AWS are collaborating to enable faster adoption of AWS cloud services in the UAE's public sector and regulated industries, including healthcare and financial services.

The government is keen on leveraging AWS' global cloud infrastructure to unlock a plethora of opportunities for government entities and other strategic industries to accelerate innovation and digital transformation in line with the UAE's economic and national agendas.

With public cloud services changing business dynamics in major sports events such as the F1 race in the UAE and World Cup 2022 in Qatar, the technology will soon encompass many other sectors, and telcos must be well-prepared for the unprecedented windfalls of sorts. TR

> The power of the cloud and analytics will help operators realize their wider business objectives and enhance their competitive advantage

Driving Tech Value: Digital Adoption Across Five Leading Sectors

A learning mechanism on an individual, community or organizational level, digital adoption is the process of utilizing technology and successfully carrying out digital processes to usher in the innovation era.

Through digital adoption, people must understand the potential of digital resources, accept and utilize such resources to achieve their goals and leverage technology to its fullest for optimization. The inclination to add new digital tools and platforms to gain an edge in the digital transformation journey is fully evident.

By and large, digital adoption is the key to actually making the transformation happen, as well as enabling greater efficiency, integrating more innovation and delivering a better customer experience.

Based on a recent digital business study, big data/analytics, mobile technologies, multi- and hybrid-cloud

and APIs were the top technologies already implemented by business and industrial environments. With the right approach to digital adoption and a solid strategy, you can minimize the growing pains of digital transformation and succeed in raising human performance instead.

Telecommunications

Telecom companies are striving to maintain market leadership in 2023 and beyond. Market trends that were once categorized as "new and emerging" are now "evolving and maturing" across telecom. Because of this, telcos plan to continue investing in infrastructure and cloud enablement, AI and big data, and the modernization of tech architecture, allocating on average about 50% of their total digital enablement spending to these areas.

As we move into 2023, 6G, cloud, NaaS and edge computing will be among the core tenets of the digital experience. And to take exceptional care of the quality of this experience, telcos must also adapt OSS/BSS, migration, integration performance, and cybersecurity testing and automation.

Major regional operators, like etisalat by e& and du, have already started their paths toward becoming digital telcos. Their top focus is on the customer experience and customer journeys. This continued digital adoption advances the operations of digital customer engagement, smart network applications, digital operations and support functions, as well as next-generation sales and marketing.

Without a doubt, the world is living through the peak of telecom digitalization. From a business perspective, there are four pillars that today's telecom industry must stand on: security, effective monetization, enhanced attention to customers' needs and corporate social responsibility.

With cloud computing at the heart of digitalization, both small and large

"Market trends that were once categorized as "new and emerging" are now "evolving and maturing" across telecom"

CSPs can find productivity benefits and cost savings from digitalization, while the telecom IoT market is also one of the fastest-emerging markets with the growing adoption of intelligent communication systems, wireless payments, 5G technology and integrated networks.

Moreover, for telecom firms, ecosystem partners, including cloud platform providers, device manufacturers and application providers, are among those that could help them spark innovations and co-create a digital ecosystem.

Banking

It has been proven that mobile/digital banking adoption positively correlates with higher incremental adoption of revenue-generating products like credit cards and personal loans. The UAE is one of the world's biggest adopters of digital banking, and by the end of 2027, digital banking penetration is projected to increase by 41%.

According to the 2021 Global Digital Banking Index — an analysis of surveys and research done with over 47,000 banking customers in 28 markets — nearly 1 in 4 persons already has a digital-only bank account. Almost half (46%) of the survey's participants are motivated to open one in order to access the simple and convenient user experience, clear and simple communication, competitive pricing and user-friendly features that digital banks offer.

Additionally, the top three countries with the highest share of customers with a digital-only bank account are Saudi Arabia (54%), the UAE (51%) and Brazil (44%), while the countries demonstrating the fastest growth in digital banking adoption in the last two years were Switzerland (82%) and Australia (58%).

The rapid digital adoption brought about by the COVID-19 pandemic has accelerated the continued interest in digital banking solutions as a way to access funds, make transactions and manage personal finances conveniently and remotely.

Digital banking transformation results in optimized processes and operations, competitive advantage and increased top-line growth. With more digital adoption anticipated in the banking sector, supporting digital payments, collaborating with fintech, focusing on hyper-personalization and uncovering data and AI opportunities are among the major trends.

To be able to successfully digitize, banks must modernize their data models and legacy technologies; utilize RPA and AI in back offices; upskill their talents; and evolve banking applications from being basic self-service tools to customer relationship management platforms.

In-app or browser-based online purchases as well as in-store checkout using a mobile phone and/or QR code are the most commonly used digital banking methods at present.

Insurance

Leading insurers who manage to get the right mix between CX, AI, data management and process optimization will likely retain their market position. In keeping with this, emerging and existing technologies offer a strategic route for increased market share and improved customer relationships.

A study showed that top players in the Middle East, like ADNIC, Bupa Arabia, Tawuniya and Wafa Assurance, are already innovating across the value chain. They have successfully implemented digital transformation in insurance and moved towards amplifying their digital strategy by deploying new technologies such as AI, IoT and blockchain to generate more value in the market.

With insurance digitization, insurers can fully enable an end-to-end digital advice journey, a digital onboarding process and an omnichannel solution to managing their policy changes online through their mobile or connected devices.

Insurers have also identified big data as one of the most significant developments of the digital age. They are using data from myriad sources, from personalizing marketing messages to more accurately matching risk-premium pricing.

Insurance claim managers at leading companies were also found to have reduced the amount of money spent on processing claims due to digitization. About 83% of participants said that a slow and inefficient insurance claim process leads to high associated costs, making data-driven and cloud-based operations an ideal solution.

Investing in new-age technologies to build intelligent data blocks and cloud platforms to drive data analytics can help develop a focused selling pattern, push cross-selling and upselling based on life stages and have a retention strategy in place.

In a rapidly changing market, digital adoption platforms (DAPs) can provide a huge advantage to insurers. With this instructional no-code software that sits as an additional layer supporting other software applications, such as Claims Management or Policy Administration Systems, DAPs can massively improve the agility and effectiveness of business processes.

> Research done with over 47,000 banking customers in 28 markets shows that nearly 1 in 4 persons already has a digital-only bank account

Another research also suggests that they should start shifting their focus from basic operational transformation — such as transitioning to cloud — to proactively fulfill distributor and policyholder expectations and prioritize greater levels of cost reduction and risk-taking to drive ongoing innovation, competitive differentiation and profitable growth.

Media & Entertainment

Also impacted by a massive, irreversible shift and transformation to a predominantly remote workforce during and after the pandemic, the media and entertainment industries have increasingly vested interests in cloud technologies to support more resilient, secure IP generation workflows.

Prior to the pandemic, there was already a surge in demand for online content and streaming media; post-pandemic, the consumer appetite for internet-based entertainment has resulted in the continued, accelerated adoption of cloud and hybrid environments.

Over-the-top (OTT) video streaming platforms such as Netflix and Hulu have used ML to predict user preferences and automate the presentation of viewing options. New video-hosting platforms, such as TikTok, are also incorporating AI-driven smart content offerings that give automated, personalized experiences.

According to a research, subscription video-on-demand (SVOD) and OTT video (including streaming services like Netflix and Amazon Prime Video) are projected to surge and reach more than twice as many consumers as the box office in 2024. Unsurprisingly, it's expected that media industry marketers will allocate over half of their budgets to digital advertising by 2023.

In the MENA region alone, digital revenue is expected to make up 46% of total entertainment and media revenues by 2024. Furthermore, online and downloaded games continue to account for the vast majority of revenue and are set to increase their market share from 83% in 2019 to 91% in 2024.

An essential enabler to support the growth of digital media and entertainment is a robust digital infrastructure that can support watching, playing and listening to online content anytime and anywhere. GCC countries have already made significant investments in this area, which will surely accelerate digital adoption in the region.

Among the biggest revolutions within this industry will be the metaverse. With features and technologies like play-to-earn gaming, digital property, non-fungible tokens (NFTs) and cryptocurrencies, the metaverse is bound to create new opportunities for the media and entertainment businesses.

Utilities

As the digitalization of power distribution and retail companies is expected to continue to accelerate this decade, it was assessed that digital investments are directed toward enhancing customer service, optimizing grid operations and developing interconnected businesses.

In parallel, digital technologies, data and IoT will play a vital role in the digital transformation of utilities, optimizing the use of energy resources and operations at remote facilities, while ensuring reliable, safe and secure infrastructures.

As a matter of fact, during the pandemic, the various utilities' adoption of certain technologies was above the global average. These included investments in IoT (65%), streaming data (56%), edge computing (54%), bottom-up AI (54%) and trust-based architecture (53%).

Supporting this move, a global Industry 4.0 survey findings state that 95% of energy leaders believe that digital transformation must be a top priority. Among their efforts are preparing their networks to support both Distributed Energy Resources (DERs) and Advanced Distribution Management Systems (ADMS) applications.

By leveraging various blocks of digitization, including smart meters, application platforms and advanced analytics, utility companies can understand the energy consumption patterns of customers and determine how energy will be produced or consumed.

As an underlying facilitator for all industries, the utility sector has witnessed a spike in the adoption of digital technology, and it is expected to climb as power demand rises to drive economic development. Studies indicate a potential reduction in operating expenses of up to 25%, as well as performance gains of 20–40% in areas such as safety, reliability, customer satisfaction and regulatory compliance, are also achievable.

Alongside this, efficient operations and lower costs mean that utility companies can pass on the savings to consumers. This is especially important given the current challenging landscape of high-energy prices that are affecting the world, especially those in Europe and the US. TR

Digital revenue is expected to make up 46% of total entertainment and media revenues by 2024

Global Data Center Industry Outlook 2022-2023

A data center can provide stable and reliable operating environments with advanced computing, storage and information capabilities. By 2023, the global data center industry is expected to grow further, be more dynamic and deliver optimal efficiency and resiliency.

Regional Overview

Data center spending on data and related services is strong, despite talent shortages and supply chain delays across regions. According to analysis, the Middle East and North Africa (MENA) data center market is estimated at US$3.4 billion in 2022 and is expected to reach US$10.4 billion by 2028. The MENA data center spending, including servers, network equipment and storage, would hit an estimated US$5–6 billion, up 3–5% from last year.

In the Middle East, the IT and telecom sector is driving the data center demand due to the increase in cloud adoption, data localization and maturing technologies like 5G, AI and IoT.

The Middle East is indeed on the path of rapid cloud growth in the coming years, in line with various public sector initiatives such as New Kuwait 2035's nationwide digital roadmap, the UAE Vision 2021 towards a fully digitalized society, Bahrain's Cloud-First policy utilizing cloud computing services and the billion-dollar plan to build a large-scale data center network across the Kingdom of Saudi Arabia.

In 2022, various initiatives have been implemented to cater to data center demand in the region. These include Nokia launching 5G private wireless networks to support enterprise digital transformation; Amazon Web Services (AWS) launching a cloud-based region in the UAE; e& opening its cable landing station and data center called SmartHub Kalba; Ooredoo Oman constructing three more state-of-the-art Tier 3 data centers with 500 rack-capacity in Barka, Salalah and Sohar; and new data centers from stc and partners unveiled in Riyadh to provide a wide range of proven and secure public cloud computing solutions.

Additionally, the African data center market is also in the midst of a remarkable growth surge, having spent a cumulative US$2 billion in building data center facilities since 2017, bringing to market more than 200 MW of fresh commercial IT load capacity. It has become one of the world's top locations for the fastest-growing commercial data center deployments.

Unsurprisingly, North America also dominates the data center market owing to the presence of several technology giants and other large enterprises. There are over 2,750 data centers in the United States alone, which is the most of any country. The adoption of competitive strategies such as partnerships, mergers, acquisitions and joint ventures is prominent in this market.

Data Center Growth Drivers

With the digitization of existing processes, usage of digital technologies across sectors and SMEs, accelerated demand for OTT services and the new normal hybrid working model, data centers have huge pressure to collect, store, process and analyze chunks of data.

Here are some of the growth drivers that influence the data center trends for 2023:

Cloud-based solutions. The growing use of SaaS cloud solutions has generated data center market expansion opportunities. For more scalability and easier distribution of workloads across servers, there will be more migration to software-defined data centers (SDDCs). These data centers utilize virtualization technologies to recreate computing power and storage in software form. Edge computing is also one of the prominent technological developments for data centers in 2023, aiming to bring down latency and improve the overall performance of connected devices. Hybrid cloud deployments are also on the rise, where critical data and resources are managed on secure private servers and can be moved to a public server for different processing requirements.

Intelligent automation. Through integrating APIs, configuration management tools, AI and other relevant technologies to automate routine procedures like patching, updating and reporting, as well as programming all data center scheduling and monitoring tasks, data center automation will play a vital role in accessing real-time information and conducting troubleshooting of inefficiencies. In addition, automated infrastructure management (AIM) is becoming a go-to solution for increasingly complex data center infrastructures.

5G adoption. The buildout of private 5G in the cloud is already happening. This data-intensive, latency-sensitive application will further drive growth in edge and traditional data centers. This will be evident as carriers get more

access to 5G spectrum and enable more industrial use cases.

Better data protection. Security is integral to the data center's DNA. From 2023 onwards, better data protection is expected through both physical and digital security. Measures may include a zero-trust framework, perimeter defense systems, the latest data encryption, enhanced network filtering and improved biometric technology to protect, limit and secure access control.

Eco-friendly measures. By contributing to 2% of the total global greenhouse gas emissions, data centers have a significant impact on climate change and the environment. Thus, data centers are striving to be more environmentally friendly by having sustainable designs, recyclable equipment, renewable power sources and comprehensive reporting.

In Demand: Colocation Data Centers

For decades, the data center has stood at or near the center of the network, and whether it is for enterprises, telco carriers, cable operators or content service providers, the data center serves as the heart and muscle of IT.

Theoretically speaking, data centers can be built anywhere there is power and connectivity. But it is important to consider what you need from a data center and incorporate those requirements into your data center strategy.

Established colocation data centers (colos) reported strong client demand as more companies outsource their data operations to third-party providers that specialize in data center operations. This is preferred due to the proximity of the client's premises and readily accessible IT servers.

Relatively, the demand for colos is expected to surge alongside the next wave of edge computing as CSPs seek colo space to deliver low-latency services. Having said that, among the greatest investments in data centers are from colocation service providers, making colos ideal for leasing physical space, power and cooling systems of servers, as well as connections to local communication networks.

With regards to these colos — aka multi-tenant data centers — customer networks are quickly flattening and spreading out far and wide to handle the increase in data-driven demands. The interiors are interconnected to keep pace with applications like IoT management, augmented reality clusters and AI processors. To address connectivity gaps, colocation providers are using virtual networks as cloud on-ramps.

Data Center Capacity and Efficiency

As the vision for next-generation networks comes into focus, the data center industry must confront the challenges of implementation. A CommScope whitepaper detailed it as the following: server connections will go from 50G per lane to 100G; switching bandwidth will increase to 25.6T; and migration to 100G technology into 800G pluggable modules.

In the data center, capacity is a matter of checks and balances among servers, switches and connectivity, with each aspect pushing the other to be faster and less expensive.

In the Middle East, the data center market is expected to double its capacity in the next few years, driven by strong digitalization and massive cloud adoption. The region's data center footprint is mostly concentrated in the United Arab Emirates and Saudi Arabia, among other GCC countries.

Connected to this, CommScope recommends a holistic approach in which switches, optics and fiber cabling operate as a single coordinated transmission path. How all these components will work together will dictate the network's ability to reliably and efficiently support new and future applications.

One solution being considered is integrated colocation data centers or cloud partner ecosystems. This will result in data centers that are interconnected and collaboratively support each other by sharing assets. Through automation, data-center efficiencies can also be improved by managing thousands of servers.

For hyperscale and cloud-based facilities, the need to deliver ultra-reliable connectivity for a growing number of users, devices and applications requires the ability to deploy and manage ever-higher fiber counts. Technologies like rollable ribbons and 200-micron fiber are deployed to support the increased demand for inter-data center connectivity.

In terms of maximum energy efficiency and minimal environmental damage, green data centers are being designed and built. As suggested, future efficiency gains will need to focus on IT power, requiring additional metrics to supplement power usage effectiveness (PUE).

Survey data forecasts that larger facilities tend to have the lowest PUEs, which means they will likely be running increasingly dense and more efficient infrastructures than smaller operations.

Half of the data center operators surveyed also stated that software-defined power is one of the technological innovations that will likely deliver significant improvements in data center energy efficiency in the next five years. Other technologies will emerge, evolve and be adopted gradually, such as green hydrogen and 10-hour to 10-day storage technologies.

Moreover, the growing use of public cloud infrastructures and cloud-style enterprise IT has been accompanied by the broader adoption of multi-site resiliency, making distributed redundancy easier because network traffic and workloads can be dynamically diverted to, and lost service easily recovered at, other sites.

Adopting a systematic approach is key to handling repeated periodic upgrades within data centers, reducing the time and cost needed to plan and implement the changes. TR

ERM:
How Enterprises Prepare Amid a Volatile World

Uncertainty surrounds the business world landscape, making the concept of "enterprise risk management" (ERM) more critical and valuable. With businesses becoming increasingly interconnected with partners, vendors and suppliers across global markets, risks across categories can have a ripple effect.

At the core of this journey is trust. Recognizing the importance of trust and taking steps to address trust issues in various areas — cybersecurity, privacy, fraud, compliance and ESG, among others — could strengthen risk management. A good example of this is EY's Trust-by-Design service, launched in response to clients' growing demands. This approach helps clients become digitally confident and trusted enterprises that have the intelligence and insights to drive growth, increase business value and maintain stakeholder trust.

Functioning within a rapidly changing, complex and highly at-risk environment, the 2022 Global State of Risk Oversight report found that the majority have insufficient approaches to risk management and immature ERM processes. In fact, over the last five years, approximately 60% of global finance and business leaders have witnessed a surge in the volume and complexity of corporate risk.

Geopolitical shifts, supply chain disruptions, talent competition, increased data volume and environmental concerns will continue to drive the complexity of risk challenges that senior business executives across the globe must learn how to navigate.

Moreover, the emergence of new or unseen risks, as evidenced by the COVID-19 pandemic, requires long-term and intensive focus on improving enterprise risk management. This can be accomplished by seeking ways to better identify, assess and manage risks.

ERM and the Risks Associated With It

Enterprise risk management (ERM) is defined as a strategic business discipline that supports the achievement of an organization's objectives by addressing risks and managing the combined impact of those risks.

In modern times, ERM should consider risk impacts more holistically across all risk scenarios. ERM needs to look for new and better approaches by considering risk intelligence tools that deliver advanced analytics, big data and AI in order to have more integrated insights that can avoid unwanted surprises and potential impairments to working capital, customer engagement or the overall brand.

ERM typically embraces fundamental components that extend into the following common risk categories:

- **Compliance risk**. This is a threat posed to a company's financial, organizational or reputational standing caused by violations of laws, regulations or codes of conduct. This can result in customer loss or hefty fines. As per a 2022 compliance risk study, compliance leaders expect evolving business, regulatory and customer demands to increase compliance-related operating costs by up to 30%.
- **Strategic risk.** As a CEO and board-level priority, this threat is inflicted by internal and external events that may make it difficult — or even impossible — for an organization to achieve its goals or deploy its strategies. It can have severe consequences that could have a long-term or, in the worst cases, irreversible impact. Examples are changes in senior management and leadership, unsuccessful mergers and acquisitions and sudden market demand changes.
- **Operational risk.** This threat corresponds to losses caused by flawed or failed processes, policies, systems or events that disrupt business operations. IT disruption, data compromise, theft and fraud, third-party risk and employee well-being are some of the major targets of operational disturbance. By 2028, the size of the operational risk management solutions market is expected to grow to US$3 billion.

Enterprise Risk Management Benefits and Strategies

Today's enterprise risk landscape has become more sophisticated, with new network access points, data privacy concerns, misuse of technology and compliance frameworks among the many risk factors. All these require enterprise risk managers to have a revamped ERM program with integrated technology that drives cross-team collaboration and provides a wider view of risk exposure.

Technology empowers the ability to consolidate and centralize data from various departments and understand the potential impact of all risks. Leveraging AI by identifying a cause-and-effect correlation between various risk events is an efficient enterprise-wide risk management approach.

Here are the benefits of having a proper ERM in place:

- Greater awareness of the organization's risks and enhanced ability to respond
- Minimized risk of legal and regulatory compliance breaches
- Greater confidence in achieving strategic goals and better competence in mitigating possible curveballs
- Clearer oversight of risks and opportunities
- More systematic, productive and secure operations across an interconnected portfolio
- Daily business integration for continuous monitoring and evaluation
- Early and proactive risk detection, identification and action

With these in mind, there are five necessary steps to move forward with the risk-mitigation process: identify, assess, treat, monitor and report. The strategies below lay out the best framework for identifying all possible risks and executing informed decision-making.

- **Embrace digital**

Instilling the right risk mindset across the organization means embracing new digital thinking as well as involving a diversity of talent. In the current landscape, these could help broaden the perspectives to the enterprise risk management process. As per EY, it's about flipping the thinking from "what could go wrong?" to "what must go right."

- **Utilize ICT technologies**

ICT technologies could help filter an increased volume of data into

decision-driving insights. Having more automation in capturing and acting upon risk information leads to a higher competitive advantage. Furthermore, technology can help ensure that the data is relevant, accurate, well-protected and easily accessible, while being applicable for predictive risk metrics, emerging risk trends and business context indicators.

- **Modify cybersecurity strategy**

Organizations need to reassess their cybersecurity to consider whether and where to implement new analysis, identity access management and tools, as well as processes like zero-trust. With trends like digital transformation, cloud migration and hybrid work, perimeter-driven defense is no longer adequate for protecting against rising attack vectors. More attention has been drawn to the zero-trust security model that assumes attackers are residing inside the enterprise environment, enforcing least-privilege access and verification.

- **Evolve data quality and governance**

Due to new customer demands, interfaces, business models, etc., organizations need to evolve their data quality and governance. Moving from a purely rule-based, reactive approach to a broader approach that integrates risk management and risk responses creates a culture of mitigating risks. Data systems must remain intact and precise. To cite an example, machine learning algorithms are applied to not only monitor but also improve data quality levels across the organization.

- **Include third-party SOC reports**

A service organization controls (SOC) report provides a means for organizations to gain insights into the control environment of their third-party providers. It involves an independent and objective assessment of the design and operating effectiveness of their controls. It is important to include the review of third-party SOC reports in an organization's compliance function and ERM process to assess and monitor third-party risks.

ERM in Telecom Industry

In response to the specific needs for risk management in telecom and technology, companies should invest more in R&D and prioritize resource allocation with objective risk assessments. They should also improve collaboration and communication across departments with automated workflows and protect data by advancing cybersecurity procedures.

As telecom advances into 5G and network infrastructure, IoT, cloud computing and other high-connectivity models, identifying and mitigating risks is key to sustainable and profitable operations.

An Asian telecom operator implements its risk management policy across three pillars: structure, process and culture. It is important to carry out risk-taking responsibility and implement authority that facilitates ownership and accountability. At the enterprise and operational levels, telcos must continuously facilitate the identification, assessment, quantification, mitigation, management, monitoring and communication of risks. By aligning with industry and global best practices, having transparency and timeliness in sharing risk information helps enable risk-adjusted decisions and embed the right risk skills across the organization.

Clearly, an extensive spectrum of third-party risk is prevalent among telecom players, whether from the supplier, partner or end-user sides. There is a combination of risks with various degrees of severity, and if service providers lack appropriate visibility and monitoring of their third-party engagement, severe impact can occur.

Thus, telcos must adopt an enterprise risk management policy that covers the breadth of their segments. For B2B, it includes network services, software-defined network platforms, content delivery networks, connected and edge data centers and private lines, to name a few.

Likewise, a European telecom operator can adopt ERM in a cyclical process with the following stages: risk appetite and risk tolerance definition, risk assessment, risk response and risk performance evaluation.

In the finance sector, across Canada, a number of telcos use risk management techniques with instruments like interest rate swaps, forward contracts and money markets.

Enterprise risk management within the telecom industry is maturing in both the functional units and the project management processes. It has empowered executives to take appropriately calculated positive risks (rewarded risks) and accept, mitigate, avoid or transfer any negative risks (unrewarded risks). TR

Organizations need to reassess their cybersecurity to consider whether and where to implement new analysis, identity access management and tools

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Deep Fakes: The Menace on the Prowl

Advances in technology have brought about countless changes in the way we interact with the world. In the communication industry, social media has become a ubiquitous platform for sharing everything from dissent to the coolest gigs in town. Automation and artificial intelligence (AI) are transforming industries and manufacturing like never before. However, on the flip side, advanced technologies such as AI are being manipulated by perpetrators to create hyper-realistic images and voices of people that could easily convince the unaware audience to react to their intended provocations; spotting such videos/audios is becoming extremely hard as the world of the deep fakes gets murkier.

Where It All Began

The coining of the term "deep fake" is attributed to a Reddit website user with the same username, who created a space on the site for sharing x-rated videos that used open-source face-swapping technology back in 2017. Since then, the term has grown to encompass "synthetic media applications" for developing realistic images of non-existent individuals. Applications like FakeApp that popped up thereafter only made the creation process that much more simple and easy. "Deep fake" combines the terms "deep learning" and "fake," since the process of making deep fakes

involves using deep learning, a subset of AI technology. As per experts, a deep-learning system studies images and videos of a target person from various angles and ultimately picks up the exact patterns of speech and behavior. Further, the finishing touch on the process is provided by GANs, or generative adversarial networks, to make it more lifelike and seemingly undetectable.

Obscuring the Real

In recent times, deep fake tech has been used for marketing, political satire and entertainment. The technology has been experimented with by big names such as tech entrepreneur Elon Musk and Hollywood actors Bruce Willis and Tom Cruise, among others, with a design to make attractive endorsements, albeit with bold disclaimer lines. On asking the marketers about using deep fakes for endorsements, they have referred to cost-efficiency as their biggest motivation compared to using a real celebrity.

Though the above instance can be seen in a lighter vein, "the technology can be used to make people believe something is real when it is not," argues Peter Singer, a cybersecurity and defense-focused strategist and senior fellow at the New America think tank.

Deep fakes have become the perfect tools to spread misinformation that has the potential to instigate violence or damage a reputation if passed undetected. Countries like India are suddenly facing new terrorism challenges from radicalized individuals, also termed as "lone wolves," "DIY or "freelancer" terrorists with no real connection with known terrorist groups, who are taking advantage of the internet and social media to spread propaganda and radical ideas. Furthermore, deep fakes and other technologies, such as autonomous systems and 3D printing, have become tools of weaponization for extremist groups.

How Can Telcos Fight Deep Fakes?

Telecom infrastructures are at the center of protecting business processes from the menace of deep fakes. Network operators must help the companies identify the vulnerable points, from connectivity to the use of the software. Frequent and comprehensive education of customers on technological solutions to secure their infrastructure should be a constant feature of the customer-relations strategy.

Social media and tech companies such as Facebook, WhatsApp, Google, YouTube, Twitter and others have become platforms for malicious deep-fake activity. These companies are constantly calling cybersecurity experts for collaboration to root out the activities of the deep fake on their platforms. One such real-time deep-fake detector, called FakeCatcher by Intel, has claimed a 96% accuracy rate in determining whether a video is genuine or fake. It is "the first real-time, deep-fake detector in the world that provides results in milliseconds," according to Intel's Responsible AI research. As per Intel, FakeCatcher analyzes authentic clues in real videos, like blood flow in the pixels of the video to signify humans. It uses spatiotemporal maps created by translating these signals gathered from all areas of the face and determining if a video is authentic or fake using deep learning on a web-based platform. Given the potential power of misinformation/disinformation from deep fakes, these promising solutions from tech companies are refreshingly welcome; however, their efficacy will only be determined with time.

From a regulatory perspective, the updated European Union Code of Practice on Disinformation sets ambitious commitments and measures aimed at countering online disinformation. With a more diverse range of stakeholders, the code ensures commitments to demonetizing the dissemination of disinformation; guaranteeing transparency of political advertising; enhancing cooperation with fact-checkers, and facilitating researchers' access to data for a more transparent, safe and trustworthy online environment. Regional regulatory bodies have also developed their agendas to fight the challenges of unlawful online activities in some form or another.

Despite the evolving regulatory frameworks to fight deep fakes, experts are wary of the deep fake technology getting more advanced and sophisticated, and the chances of such videos becoming all the more real are not far away.

As a defense, experts are pointing towards building a social immunity system whereby each one of us must be willing to ask the valid questions of who, what and why and verify the authenticity of such a video when we encounter one. Putting on our thinking caps and understanding the nuances of modern technology seems like a reasonable choice to insulate ourselves from the urban menace until a permanent solution has been found and established. TR

The technology can be used to make people believe something is real when it is not

etisalat by e& and ADGM to Provide Digital Power for Businesses

Etisalat UAE, branded etisalat by e&, has partnered with Abu Dhabi Global Market (ADGM), the capital's financial center, to provide digital solutions and products to all new tenants and startups, accelerating its digital transformation journey and vision to deliver the best-in-class customer experience and become a world-class innovative financial hub.

The ADGM, as one of the world's leading international financial centers, has put Abu Dhabi firmly on the international business map. In just seven years, the financial hub has become home to more than 5000 entities, including international financial institutions, professional services firms, investors and start-ups.

Through this partnership, etisalat by e&'s digital solutions will address the digital needs of businesses by providing benefits that will facilitate office, remote and hybrid working. The next-generation Internet solutions are comprehensively designed to provide high-speed Internet access based on the size of the workforce as well as specific user benefits.

The proposition is an all-in-one solution designed to ensure complete business mobility by equipping each employee to work remotely or in a hybrid work environment. Employees will have access to user packages that include a multitude of collaboration, communication, productivity and security tools.

Esam Mahmoud, senior vice president, SMB, etisalat by e&, said, "Businesses undergoing digital transformation are constantly looking at how they can add more value for all their customers. ADGM is looking to innovate and expand its offering to advance its competitive ecosystem and support the ease of doing business with and from the region. Through this partnership, etisalat by e& will bring together its network capabilities, teams and expertise to meet the needs of the financial centre's growing startup and enterprise community.

"This will enhance ADGM's digital platforms, intelligent services and applications, improving the overall experience of hosting a business. This collaboration and our efforts to bring this digital connectivity is part of the overall vision of the UAE leadership to chart a course towards a diversified, knowledge-based economy and attract investments that generate long-term benefits for society and future generations."

Hamad Sayah Al Mazrouei, chief operating officer at ADGM, said, "ADGM is delighted to partner with Etisalat by e& to bolster the digital transformation of the UAE economy. This partnership is in line with and is an extension of our commitment to foster, protect and strengthen Abu Dhabi, UAE and the wider region's financial landscape. We look forward to working with Etisalat by e& to digitally empower the ADGM community, ease customer onboarding journey through integrations and positively contribute towards the prosperity of the economy."

Zain Bahrain Launches ZainTech to Accelerate Digital Transformation

Zain Bahrain announces the launch of ZainTech, the one-stop digital and ICT solutions powerhouse of Zain Group, aiming to accelerate the digital transformation of enterprises and government entities in the Kingdom.

ZainTech unified Zain Group's ICT assets to offer a unique value proposition of comprehensive digital solutions and services under one roof. By offering a center of excellence and end-to-end services across the ICT stack, including cloud, cybersecurity, big data and drone services, the company is well-positioned to drive the transformation of enterprise and government customers in Bahrain without the need to negotiate multi-vendor complexities.

ZainTech's capabilities, global alliances, significant investments in automation, and strong advisory, professional, and managed services coupled with Zain Bahrain's infrastructure and telecom expertise create the ideal partner for customers on their digital transformational journeys.

Zain Bahrain Managing Director Mohammed Zainalabedin commented, "Having ZainTech present in Bahrain will accelerate our ability to provide our enterprise customers with the sophisticated services they require. Digital transformation is a critical facet of the Kingdom's socio-economic development, and the introduction of ZainTech into the market with its industry-leading technologies, solutions and partnerships will catalyze this progress."

ZainTech CEO Andrew Hanna said, "Our mission is to provide state-of-the-art solutions to small and medium-size enterprises and larger organizations across the Zain footprint and beyond. ZainTech is uniquely positioned to leverage numerous competitive advantages, and we look forward to being able to offer on-the-ground support and optimal services to our growing number of customers in Bahrain."

du, Huawei Talent Program Readies Workforce for UAE's Dynamic Telco Industry

du, from Emirates Integrated Telecommunications Company (EITC), and Huawei, a leading global provider of information and communications technology (ICT) infrastructure and smart devices, have announced the successful completion of the "Seeds for the Future" program for 2022. The two-part program is designed to enhance skillsets and accelerate efforts to drive talent progression for women and Emirati graduates in the UAE.

Through the Seeds for the Future program, 28 Emirati graduates got the opportunity to visit the du offices and gain knowledge in the technical areas of the organization. Attendees were also able to interact with different technology subject matter experts from du and develop key competencies, knowledge and technical skills required in the business world. In the program's second phase, 11 female participants interned at du HQ in Dubai Hills and other retail stores as a part of vocational training to help accelerate their careers.

Ibrahim Nassir, chief human resources and shared services officer at du, said, "du is committed to developing and supporting a robustly diverse, equitable and inclusive workforce. Our long-standing partnership with Huawei and subsequent educational initiatives align with du's transformative agenda and focuses on developing and employing qualified women and Emirati youth. This enables us to strengthen further the development of ICT skills among UAE youth well into the future."

Meanwhile, Shunli Wang, vice president of Huawei Middle East, said, "The cutting-edge technologies that underline UAE's digital transformation initiatives require advanced ICT skills to fully leverage the dividends of the digital economy. Collaboration between industry partners, academia and ICT companies have proved highly effective in equipping young people with the expertise to thrive in a dynamic industry. Therefore, we value our partnership with du to nurture this young talent through the Seeds for the Future program to further develop the UAE's telco industry."

du and Huawei have a long history of partnership, especially in ICT technologies and network development. This is the second consecutive year both entities are collaborating to offer industry training opportunities to support du's HR efforts to strengthen its talent transformation process. These programs also contribute significantly to upskilling and improving knowledge and experience on the latest ICT technologies, such as 5G and Cloud, among Emiratis.

Initiated by Huawei in 2008, Seeds for the Future is Huawei's flagship and long-term global Corporate Social Responsibility (CSR) program. As of June 2021, the program has been implemented in 137 countries and regions, reaching 12,000 students from over 500 universities and gaining the endorsement of more than 180 heads of state and high-level government officials globally.

MTN Sells Afghan Unit in Order to Exit Middle East

The Johannesburg-based company announced that MTN Group is selling its Afghanistan business for $35 million to Beirut-based M1 New Ventures, owned by Lebanon's Mikati family, to exit the Middle East. This news comes alongside the release of the company's third-quarter results.

The group abandoned its Syrian business and transferred its Yemen unit to a partner. Since the US withdrawal in August 2021, MTN has had difficulty operating in Afghanistan, where it is the biggest operator; however, it remains active in Iran.

Its Middle East exit is part of a wider group strategy to focus operations on Africa, which it embarked on in 2020. MTN CEO and President Ralph Mupita said the operator remained resilient under difficult macroeconomic, geopolitical and regulatory conditions, delivering a solid operational and financial performance.

MTN expects outcomes by the first quarter of next year and highlighted that data traffic grew almost 40% year-on-year in the first nine months of 2022, and customers in the fintech business increased by 23.3% to 63 million in the third quarter from a year earlier, with transaction volumes up by a third to 9.5 billion, added Mupita.

Resilience Strategy Needs Smart Technology and Data

Resilience means successfully handling unexpected circumstances as they happen and having the ability to withstand their environmental, political, economic and social impact. With this in mind, a solid resilience strategy is an essential tool for today's modern enterprises and cities.

Enterprises around the world are surrounded by waves of interconnected disruptions, influencing business plans and challenging their ability to adapt and survive. As a result, industry leaders must transform into resilient digital businesses where value creation is maximized by the use of fast-evolving and innovative technologies.

With regard to cities, urbanization is one of the four demographic mega-trends expected to continue, resulting in nearly 70% of the world's population living in urban areas by 2050. The World Health Organization (WHO) released guidance for national and local authorities towards strengthening emergency preparedness in cities and urban settings. In the digital age, where regions, countries and cities are more interconnected than ever, authorities can utilize technologies and ICT investments for policy implementation and capacity building.

Sufficient capacity; continuous monitoring; security provisions; high availability of services; and disaster and risk recovery and management are some of the key aspects of a resilience strategy.

Regardless of the size and duration, emergency situations present a potential risk to an individual's health and livelihood, organizational and societal welfare and the wider environment. These require urgent action to restore operations to the previous steady state or new strategies to adapt to changes in the present.

Emerging technologies, including those related to Industry 4.0, are well positioned to help in building or reconfiguring resilience capabilities empowered by strong ICT infrastructure.

Role of ICT in Resilience Strategy

In the context of resiliency, we'll focus on mission-critical operations and how telecom operators and Earth observation (EO) data providers can work alongside authorities and enterprises to maximize ICT technologies.

When an unforeseen situation happens, the operations typically rely on the stability of the network infrastructure in order to communicate. If the network goes down, businesses, governments and residents, in general, are affected. It's critically important for servers and storage systems to be fail-proof or have a backup in case of network downtime.

In emergencies, authorities should accurately map the whereabouts of

particularly vulnerable groups through the use of technologies like geographic information systems (GIS) and other forms of geo-data or spatial mapping. Investing in the basic requisite digital and ICT infrastructure and technology for data analysis is also crucial; this enables end-to-end decision support systems to effectively extend from the national down to the local levels.

Another important strategy is that of improving automated alert and warning capabilities through the use of the Internet of Things (IoT), which involves developing and testing sensor technology that can provide real-time updates on weather conditions, rising water levels and other environmental metrics.

The enhanced information processing and visualization capabilities of modern computing hardware and software can also enable better documentation of the needs that have to be met. If the information processing capabilities are coupled with ICT to enable both superior field data collection and effective dissemination to those who can best address the needs, the performance is even greater.

Another role of ICT in resilience strategy is allowing synchronous and asynchronous communication across space, enabling greater coordination of spatially separated actors. This is especially important when a disaster has a geographically wide scope and physical transportation systems are not working.

As we have seen in the case of Tonga, satellite-based communication systems are among the most reliable, especially for emergency first responders. EO data providers gather key information about the physical, chemical and biological systems of the planet by using observation satellites — remote-sensing technologies — or through direct-contact sensors in either the ground or atmosphere.

With the right EO data stack, governments and the private sector can assess current ground conditions as well as changes in temperature and geology over time and, with that information, determine potential future risks. As commercial satellite imagery continues to be developed cost-efficiently, this allows for more accurate emergency response planning and current ICT infrastructure and urban resource management.

As for telecom operators, notably in the West, AT&T's FirstNet mission is committed to deploying, operating, maintaining and improving the first high-speed, nationwide wireless broadband network dedicated to public safety. This reliable, interoperable and innovative public safety communications platform will bring 21st-century tools to public safety agencies and first responders.

When we circle back to the GCC, telecom operators are also well-positioned to provide such networks and related services due to their robust and advanced ICT infrastructure. According to experts, telecom operators have the option to serve as mission-critical LTE providers, either jointly or individually. These include upgrading commercial networks; establishing a greenfield mission-critical network; or launching a hybrid brownfield network.

Communications, video and telemetry are among the main telecom offerings that can be monetized in this particular use case. But to succeed in mission-critical services, telecom operators need to act in three areas: network deployment strategy, a go-to-market approach and operations capabilities.

For an effective combination of the resilience approach and smart technology, big data tools and artificial intelligence are prioritized. Smart and resilient system services can offer much more rapid action, which can largely minimize the damage and likely speed up the recovery phase of the systems as well. It can reinforce adaptive capacity when needed through community involvement and improved emergency response.

Digital Resiliency With Data

Data is critical to building effective resilience plans, considering that the information is made to be actionable. Aside from simply accessing network data, one needs to be able to act on that information in time to mitigate pending failures, bottlenecks and situations that affect operations and network availability.

The use of AI and machine learning can take collecting, correlating and visualizing data to another level. This can be done by highlighting the correlations and patterns and then using that information to derive insights, discover issues and plan the environment correctly.

Another important aspect to consider is data resilience, wherein a set of technologies and strategies can help maintain data availability and ensure it is always accessible, thus minimizing any disruptions or downtime. These can include cluster storage, data replication, backup and disaster recovery.

Revisiting the mission-critical context, a proper data analytics strategy is valuable in order to have the capacity to create resilient analytics results. This strategy aids in quickly adapting and deploying high-performing and trusted analytics for the best response.

In the Middle East region, more senior business decision-makers (SDMs) are now looking at data both differently and strategically. According to a recent report, organizations that had mature enterprise data strategies in place for at least 12 months were more likely to achieve higher profit growth at an average rate of 6%.

Data resiliency has been likened to having spare house keys on hand — the more sets you have in different spots, the less likely you are to be locked out. Such thinking can apply to the business landscape as well; the more choices an organization has for digital resiliency, the more likely it will succeed.

Digital resiliency is about acknowledging, augmenting and even modifying the interdependencies and risks associated with such systems. In doing so, cities, states and provinces can use these technologies to best respond to changing events or disruptions and better serve their citizens. TR

Behind the Digital Infrastructure:

Open Source

According to the results of the 2022 State of Open Source Software survey, when asked about organizational usage and adoption of open-source software within the past year, over 77% of respondents indicated that their organizations had increased such usage.

The regions of North America, the Middle East, Africa and Asia have increased the use of open source in their organizations by over 80%. As these numbers confirm, open source has seen an explosion in usage thanks to improvements in developer tools and workflows.

The open-source principle has become widespread and is now seen as the engine that powers digital innovation. Well-known examples of such software are Linux and Android, while large companies such as Red Hat, Oracle and Google are advocates and distributors of open-source projects and applications.

Simply defined, open source is a type of software development that harnesses the power of distributed peer review as well as the transparency of the process. The promise of open source is better quality, higher reliability, more flexibility, lower cost and the prevention of vendor lock-in.

With proprietary solutions being less favored, many enterprise leaders are adopting open-source alternatives, which is fueling the growth and diversity of open-source data technologies.

As a standard for digital infrastructure projects and in overall software development, open-source licenses such as MIT, GNU General Public and Apache include provisions that allow the public to use, modify and redistribute the code.

Our society nowadays is heavily reliant on software, which is typically built with open-source methodology. GitHub, which is the primary place where today's open source is made and managed, is dubbed the next "open source utility."

In recent years, new trends have emerged in the open-source software domain, giving birth to new ideas and creating more opportunities for programmers to learn and adapt while further contributing to the software industry.

Trends for Open-Source Technology

Open source has become a popular software practice. But in order to maintain this pace of progress, we need to adapt to the ongoing trends and potentially invest back into the tools that help us build better open-source software.

Across the Middle East, sectors such as telecoms, banking and financial services, as well as education and healthcare, have been using open source to optimize and simplify their operations, reduce costs and facilitate their digital agendas. As digital transformation and cloud become mainstream in the region, demand for

open-source solutions and skills will intensify.

With this in mind, here are the open-source technology trends affecting the digital landscape this year and beyond:

Digital transformation. Customers modernize their application platforms to accelerate and achieve digital transformation. Many are choosing open-source software because that's where software innovation is happening, and the reusability of open-source software, including thousands of libraries, allows organizations to be more cost-effective and speed up their time to market, all while modernizing their technology stack.

Hybrid-cloud environment. Many organizations are looking to burst out of their existing infrastructure on-prem and harness the consistency and flexibility of various cloud offerings that are available in the current market. Open-source platforms represent the best foundations for hybrid clouds, with crucial services such as integration, data and analytics.

Enterprise open source. With enterprise open-source vendors being preferred, the availability and reliability of automated operations are improved. Through the use of container technology, cloud-related tools and data technologies, organizations are using various open-source software to modernize their stacks and keep up with new technologies. This can help sustain healthy open-source communities and influence the development of needed features.

More talents with open-source IT skills. There will be a surge in demand for full-stack developers and programmers with open-source skills. Talents should enhance their skillsets in the development, modeling and operations of software systems. As a matter of fact, the lack of internal skills and formal technical support continues to be a top concern in the use of open-source software.

Open-source containers. The adoption of Kubernetes, which acts as an open-source container orchestration platform for cloud applications, will be on the rise. Kubernetes is regarded as the most important open-source technology, and its adoption is anticipated over the years. A Red Hat survey found that the use of Kubernetes had the highest number of most important selections.

Stronger open-source security. New tools that can scan for vulnerabilities in open-source software will be used frequently to mitigate any harm. IT firms and organizations dealing with open-source technology will acquire new versions of software and patches that will improve their overall cybersecurity situation. Already in use, Software Composition Analysis (SCA) is the methodology providing users better visibility into apps' open-source inventory.

Technology strategy. Having a tech strategy motivates opportunities for the use, contribution and creation of open-source software. Research has found that the leading strategies are cloud, infrastructure modernization, API-first and containerization.

Emerging tech. Open source has solidified itself as an innovation engine, with enterprise open source set to be leveraged in the edge computing and Internet of Things (IoT) settings. It will also be more beneficial for artificial intelligence and machine learning (AI/ML).

Business model innovation. Open source is changing the software industry by breaking old and creating new business models. Open source itself may not be a business model, but it is a vital tool to use in a competitive environment. The distributor and single-vendor models are specifically important because they enable attractive ROIs.

OpenStack: The Telecom Industry's Preference

By definition, OpenStack is a cloud operating system that controls large pools of computing, storage and networking resources throughout a data center. This is all managed and provisioned through APIs with common authentication mechanisms.

Currently, the most common use cases of CSPs for OpenStack are to manage the private cloud and use it as the basis for network functions virtualization (NFV). Moreover, CSPs see OpenStack's open-source and modular architecture as being suitable for edge deployments.

As an example, the Red Hat OpenStack Platform (RHOP) version 17 integrates containers and virtual machines (VMs) into a single cloud environment, allowing telecom operators to deploy additional services for 4G and 5G network environments. It will include more virtual network functionality (VNF) and cloud-based network functionality (CNF) for connected telecom platforms.

Figures also show that over 80% of CSPs say that OpenStack is essential or important to their company's success, while those who are already implementing their NFV and cloud strategies are even more positive, with 96% and 85%, respectively, saying it is essential or important.

Acting as the virtual infrastructure manager (VIM) and being deployed alongside other software-based network components, OpenStack is helpful in assigning compute, storage and network resources for VNFs, while at the same time complementing 5G network capabilities like high throughput, low latency, workload isolation, high availability and redundancy.

Another notable telecom vendor is Huawei, a global leader in technology and open source. Joining the OpenChain Project, Huawei will work to align the supply chain behind OpenChain ISO 5230, the international standard for quality open-source compliance. Through mutual understanding, cooperation and trust with global developers and open-source communities, Huawei hopes to build a more secure and trustworthy open-source software chain together. TR

Huawei Builds Intelligent Horizontal Transportation Solution at Tianjin Port

Huawei has built an intelligent horizontal transport system at the terminal of Section C in the Beijiang Port Area of Tianjin Port, using cloud-based centralized dispatching to increase port-wide efficiency. The project has achieved Level 4 autonomous driving, enabling 76 Intelligent Guided Vehicles (IGVs) in a fleet to collaborate efficiently.

Ports worldwide are going through a process of automation driven by the latest technologies like 5G, cloud and AI. A typical port deals with vessel arrivals and departures, shore-side operations, horizontal transport, yard operations, manual tractor-trailer transport and gate operations. One of the key steps in port digitalization is automating horizontal transport that handles cargo within the port. Currently, conventional horizontal transport faces three major challenges: harsh working environments, safety risks due to driver fatigue and inefficient manual dispatching.

Huawei's intelligent horizontal transport system has five key advantages:

- **Global path planning:** Huawei has designed a global path planning algorithm based on vehicle kinematics, which ensures that individual vehicles stay on their paths. The algorithm enables multiple IGVs to make turns smoothly, whether traveling in one or both directions.
- **High-precision positioning:** Huawei uses BeiDou, 5G, HD maps, and roadside sensing assistance to assure high-precision lane-level positioning.
- **MDC intelligent driving platform:** The upgraded Huawei MDC offers automotive-grade assurance, including ultimate computing power and long service life.
- **Core system integration:** In addition to core service systems such as TOS, Huawei's intelligent horizontal transport system can quickly interconnect with other peripheral service systems.
- **Cloud-vehicle decoupling:** Huawei decouples the cloud from vehicles through an open ecosystem. As a result, the solution can support a wide range of intelligent driving vehicle models, making it more cost-effective and easier to promote.

Nokia Deploys SDAN Solution for du's Zero-Touch Networking

Nokia is deploying software-defined access networks (SDAN) for du, from Emirates Integrated Telecommunications Company (EITC) to enable zero-touch network operations. The three-year project is built on the two companies' long-term relationship that brings world-class technologies to the UAE.

As one of the first operators in the Middle East to deploy zero-touch networking, du is accelerating the innovation and deployment of new and innovative services on du's existing fiber broadband network. Using Nokia's innovative Altiplano cloud platform, the evolution towards a virtualized network environment provides du with the network intelligence, automation and control the company needs to support emerging new use cases such as 5G backhaul, augmented reality, virtual reality, cloud gaming and network slicing for enterprise.

Saleem AlBlooshi, chief technology officer at du, said: "Adding SDANs to our infrastructure is an essential step in keeping up with the demands of our business as we move towards faster speeds and a more virtualized environment. A key component of du's network strategy is the inclusion of SDAN in order to ensure that the company will be able to drive future value by integrating smart apps, artificial intelligence and a higher level of automation. This will ensure that the user experience is as seamless as possible. As a result of these developments, we will be able to provide an enhanced customer experience, which accelerates the company's ability to meet the growing demand by utilizing fully automated operations and zero-touch services."

Rima Manna, vice president of Middle East business at Nokia MEA, said: "We're excited to successfully extend our long-term partnership with du on SDAN technology. Nokia's end-to-end SDAN solution is changing the game for how service providers operate their networks. Delivered from a single cloud-optimized platform, we provide du the tools to efficiently unlock new business opportunities and use cases."

Ooredoo and Huawei Enable an Immersive, Seamless Experience for Sports Fans

Ensuring the best customer experience and network quality during one of the world's most famous and popular events has been at the top of all telecom players' agendas. Two of the world's leading digital enablers, Ooredoo and Huawei, have signed a Key Event Assurance agreement to offer critical services during the upcoming FIFA World Cup, which will be held this year in Qatar.

In the framework of the agreement, more than 100 Huawei experts will work at the Ooredoo 24x7 Operations Center in Qatar to guarantee seamless services and always-on connectivity at the most anticipated event of the year.

Li Peng, president of Carrier BG Group, Huawei, visited Ooredoo Group in Doha, Qatar, to meet Sheikh Mohammed Bin Abdulla Al Thani, CEO of Ooredoo Qatar, and Deputy Group CEO.

On the occasion of the Key Event Assurance Agreement signature, Sheikh Mohammed Bin Abdulla Al Thani, Chief Executive Officer, Ooredoo Qatar, said: "This strategic partnership between Ooredoo Qatar and Huawei looks set to be a winning team as the largest single-sport competition in the world comes to Qatar. Ooredoo continues to be committed to upgrading our customer's world, and with 1.2 million fans expected to convene over the 29 days of the event, our common goal is to deliver transformational digital experiences for all, as well as to the billions watching on TV around the world."

Mr. Li Peng, president of Carrier BG Group, Huawei, said: "Huawei has rich experience in various international sporting events. Huawei will use multiple leading technologies in partnership with Ooredoo to contribute to the success of this exceptional sports feast taking place in Qatar."

Ooredoo and Huawei will also deploy a state-of-the-art broadcast solution that will carry live broadcasting traffic globally, with centers installed at three different locations in Qatar to ensure its smooth operation. In addition, viewers in the state of Qatar who decide to watch the matches from the comfort of their homes will boast an immersive experience thanks to the next-generation TV services that will be provided by the two digital enablers through their fixed broadband network.

The best customer experience will be guaranteed thanks to the latest-generation network equipment that will be deployed in seven stadiums and the proactive response to any potential issues, which will be identified by resilience tests to be performed regularly in all the stadiums. Fans will also be able to stay connected at all times and benefit from seamless voice and data services in key public locations, such as the Qatar Rail metro lines.

Voice over LTE service experience will be upgraded to carry the massive increase in data traffic and subscriber load, and customized packages will be offered to customers. Ooredoo and Huawei will also deploy augmented reality assisted operations across stadiums and broadcast networks to ensure a smooth experience.

Huawei will be using its global experience of delivering network assurance programs during various international sporting events, along with the latest AR assisted operations, to guarantee the best experience for fan, whether at stadiums or at home.

Nokia Honored by e& With 2 Prestigious Awards for Best Performance

Nokia received the two most prestigious awards from etisalat by e& – Partner of the Year and Best Account Management – during the 'e& Partner Recognition Award' event in Abu Dhabi, UAE.

Under the sponsorship of e& Group Chief Operations Officer Mr. Obaid Bokisha and e& Group Chief Procurement Officer Mr. Saeed AlZarouni, the event was organized to recognize the best of their partners.

Amr K. El Leithy, SVP, Middle East and Africa market, Nokia, commented: "We are proud and honored to receive the two most prestigious awards from Etisalat UAE by e&. I would like to sincerely thank the whole e& team for their continuous trust and long-lasting strategic partnership. These awards will further motivate our whole Nokia team to continue to deliver world-class technology innovations and support e& in creating a digital future to empower societies."

Enterprise Metaverse:

An Industry in the Making

Industry visionaries have been inspired by this latest technology trend, which is the metaverse. Not a day goes by without a mention of metaverse at our offices, in our households or from our news centers. The applications of emerging technologies such as AI and automation are being used in innovative ways to bring about this digital marketplace; one where there will be no language barriers as end-to-end human-powered AI video conferences and audio will allow global teams to communicate with ease. The merging of human intelligence with AI automation power is expected to create opportunities for new ventures that have yet to be tapped. A recent roundtable for the Dubai Chamber of Digital Economy explored, at length, the kinds of talent that Dubai-based companies should be targeting; the role of the private sector in strengthening the emirate's value proposition to attract the brightest minds globally; and how businesses can capitalize on new consumer trends and opportunities emerging in the age of Web3 and the metaverse.

Some of the areas that metaverse will incorporate include digital currency, e-commerce, social media, entertainment, gaming and digital assets. Specific sectors, like recruitment companies, for instance, could benefit from innovative and disruptive artificial intelligence that can help recruiters tap the best talents before their competitors. For mobile operators, it could be leveraging AI to provide footfall and mobility analytics for businesses and governments, creating insights on how people move, their mode of transportation, places they visit, and so on.

Highs and Lows

Although the concept of the metaverse is in its nascent phase, it would not be incorrect to forecast its imminent future. Indeed, one company currently diminishing the confidence in this "unknown future" is Meta (formerly known as Facebook) — the harbinger of the virtual world, its Reality Labs unit losing a whopping $5.8 billion on AR and VR operations early this year. However, such examples cannot be construed as failed projects as of yet.

On the other hand, 5G standards are evolving. China and some countries in the Middle East are already in a transition from the initial 5G phase of 5G standalone to a 5G advanced (5.5G) phase.

Huawei proposes four distinct capabilities for 5.5G — 10 Gbps downlink, 1 Gbps uplink, support for 100 billion connections and native intelligence. Moreover, it is urging industry players to set up standards frameworks as proposed by 3GPP, ETSI and ITU telecom organizations. Huawei believes that incubation projects of new use cases will lead to the advancement of a prosperous industry ecosystem that will speed up digital and intelligent transformation.

Similarly, world-leading equipment manufacturers Ericsson and Nokia are setting up 5G networks along with network providers in new markets in the MENA region and globally. 5G integration with technologies such as cloud and AI promises new services for both consumers and businesses. For instance, telcos can provide services with extended reality (XR), cloud gaming and enriched calling for individual consumers and provide enterprises with sector-specific digital transformation solutions that open new revenue streams other than connectivity. 5G network slicing is being tested for commercial use whereby a subscriber can access slicing services over a dedicated line for seamless video live streaming and gaming on their devices.

Back to the Future

It is estimated that by 2025, 85% of enterprises will have migrated to the cloud and will need high-quality and high-bandwidth networks.

Moreover, the latest KPMG UAE Tech Report 2022 notes that organizations in the UAE are ahead of their global counterparts in achieving digital transformation goals, including investing in IoT, Edge, 5G and intelligent automation. The report also states that a majority (93%) of UAE businesses plan to invest in the metaverse, enabled by widespread technology adoption and customer demand. According to the report, UAE tech leaders are realigning their plans to address the challenges of the talent gap and risk-averse corporate culture as well as cybersecurity with clear data strategies and investments in robust controls to meet the changing business models and evolving customer expectations.

Aspiring global tech leaders such as e& (formerly known as Etisalat Group) and EITC's du have launched their metaverse strategies in line with the Dubai Metaverse strategy that aims to turn Dubai into a digital hub where emerging technologies will play a transformational role in driving businesses ahead in the future.

As the inevitable virtual world and its activities are set to grow, telcos also need to establish a framework that will address the aspects of capable talents, investment in new technology and strategic incubator projects to reap the benefits of this new world.

Importantly, since the network operators are the connectivity catalysts for the data flow of every transaction, the nature of financial contributions by companies who use their networks also warrants attention. Strategizing along the same lines, the European Union's executive body is reportedly launching a consultation in 2023 to discuss whether tech giants such as Google, Microsoft, Amazon, etc. should contribute to the cost of Europe's telecoms network. It has been argued that it should comply with the net neutrality policies whereby internet service providers (ISPs) cannot manipulate internet traffic on the basis of biased preference and that the concept of "fair share" should be applicable based on the volume of the internet traffic of each company. This seems to be a valid proposition and certainly one to keep our eye on. TR

Thales Data Leaked by Ransomware Group

French defense and technology group Thales confirmed that data relating to the group has been released on the dark web via the publication platform of LockBit 3.0, an extortion and ransomware group.

Thales's experts have identified one of two likely sources of the data theft and are continuing to investigate the other source of theft. As of November 11, the company affirmed that there has been no intrusion of its IT systems and there is no impact on its operations.

"The Group remains vigilant towards any data theft, systematically mobilizing our teams of security experts, as data security of any of our stakeholders is our utmost priority," read an excerpt from the company's statement.

This is the second time this year — the first being earlier in January — that the French company has been the victim of compromised data sharing. At the time of writing, no ransom demand has been reported from Lockbit 3.0.

According to the 2022 Thales Cyberthreat Handbook, the increasing number of organizations that agree to pay a ransom to retrieve their data plays a crucial role in guaranteeing the lucrative nature of this malicious cyber activity. In 2021, 32% of the organizations targeted by a cyberattack agreed to pay a ransom to the hackers, with one hacker group managing to extort 180 million euros from a single cyberattack.

AWS Report: Hyperscale Cloud to Bring $17.1 Billion for UAE SMEs and Startups

A new report commissioned by AWS, in partnership with the Dubai Chamber of Digital Economy, reveals that between 2022 and 2030, the UAE's SMEs and start-ups stand to gain a total of US$17.1 billion (AED62.6 billion) in economic benefits from hyperscale cloud computing.

This consists of US$10.1 billion (AED37 billion) in user benefits and US$7 billion (AED25.7 billion) in local technology partners' and resellers' benefits. Moreover, 74% of UAE SMEs have opportunities to benefit from hyperscale cloud computing advantages, which include cost savings, productivity, operational resilience and sustainability.

As per the AWS report, the increased scale, productivity and revenue for the UAE's SMEs and start-ups, enabled by hyperscale cloud computing, will lead to the creation of 133,000 direct, indirect and induced jobs by 2030.

The report also estimates that by 2030, hyperscale cloud computing will reduce the country's carbon footprint and carbon dioxide emissions by up to 78% and 2.2 million metric tons, respectively, in comparison to other IT infrastructure models, in addition to reducing security incidents by more than 30%.

Commenting during the report's launch, Khalid Al-Jarwan, executive director of the Dubai Chamber of Digital Economy, said: "Despite its rapid progress, the UAE continues to look to the future as it pushes ahead with strategies and initiatives to fast track its digital transformation. Hyperscale cloud computing offers tremendous potential for startups and SMEs in the UAE that are keen to enhance their competitiveness and contribute to a thriving innovation ecosystem."

Yasser Hassan, managing director/ general manager for MENA and Turkey, Amazon Web Services (AWS), added: "The report findings are a further testament to the value creation potential that the cloud has to offer to SMEs, entrepreneurs and startups. By leveraging the power of the cloud, UAE businesses can accelerate innovation and digital transformation agility to build business resilience in a competitive and dynamic marketplace."

Canada, UK and Singapore Unite for IoT Cybersecurity Measures

The governments of Canada, Singapore and the United Kingdom have united in the belief that the Internet of Things (IoT) offers tremendous economic and social benefits, and appropriate cybersecurity requirements must be built into these connected products.

The continued growth in IoT offers great benefits to citizens and a revolution in connectivity. However, many of these products currently need more basic cybersecurity provisions. As a result, the security, privacy and safety of consumers are at risk, with the wider economy vulnerable to large-scale cyber-attacks.

"Our approach supports growth and innovation and allows citizens to benefit from the remarkable opportunities offered by this connected revolution," read an excerpt from the states' released joint statement.

In response, the three governments are working together to promote and support the development of international standards and industry guidance, thereby fostering innovation and encouraging approaches that incorporate internationally recognized security requirements.

"Through this global alignment, we can reduce duplication of testing and similar assessments and the challenge for the industry of needing to apply to multiple schemes underpinned by identical or very similar requirements," they explained.

SES YTD 2022 Performance Reflects Solid Ongoing Business Execution

SES disclosed the company's YTD financial performance, which reflects solid execution across the business, complemented by the value-accretive DRS Global Enterprise Solutions (GES) acquisition.

Commenting on the financial results, Steve Collar, CEO of SES, said: "Our year-to-date performance reflects solid ongoing execution across the business and we remain fully on track to deliver on our 2022 outlook, to capture significant value from US C-band, and to position SES for profitable long-term growth through the deployment of our state-of-the-art multi-orbit assets and architecture."

Total revenue of €1.4 billion reported a YoY change of 6.1%, while the adjusted net profit made a double-digit growth of 23.2%, amounting to €277 million, including a net foreign exchange gain of €87 million and a higher income tax expense of €52 million.

Looking at the business segments, Video revenues of €763 million represent a reduction of 5.6% year-on-year. As of September 30, 2022, SES delivers around 8,000 total TV channels to 366 million TV homes around the world.

"Our Networks business is up 2.7% year-on-year, primarily driven by ongoing success in Cruise and Aviation," added the CEO. The Networks revenue reached €636 million, including the first contribution from DRS GES of €32 million. This segment also involves Mobility and Fixed Data, which had a YoY growth of 17.7% and 2.2%, respectively.

AWS as F1's Global Partner: Leveraging Cloud for Data-Driven Sport

Formula 1 (F1) announced a renewal and expansion of its partnership with Amazon Web Services (AWS). This will begin a new phase of innovation and digital transformation of the sport and will see the world's most comprehensive cloud platform become a global partner.

Since 2018, F1 and AWS have innovated together through the use of AWS's machine learning (ML), launching 20 data-driven F1 Insights on live TV that offer unique race strategy, car performance and competitor insights to fans. Moreover, the power and scale of AWS's high-performance computing (HPC) enabled complex two-car Computational Fluid Dynamics (CFD) aerodynamic simulations that contributed to the 2022 car design and more of the wheel-to-wheel action that fans love.

The renewed joint technical venture between AWS and F1 aims for the following outcomes:

- Exploring new, unique and innovative ways for fans to enjoy F1 through the power of machine learning, artificial intelligence and cloud technologies.
- Designing solutions across the areas of motorsport, media and data architecture, future track designs and delivery of regionalized media offerings such as a fusion of gaming, live events and live-action experiences.
- Maximizing opportunities for sustainable solutions across the sport by building on previous work to reduce freight and personnel travel through remote production capabilities.
- Offering direct access to technology-related entertainment, competition and education through F1-themed platforms and developing fans' machine learning and artificial intelligence skills via the successful AWS Deep Racer and AWS Gameday programs.

Divestment of Cellnex's 1,100 Existing UK Sites on Track for Year-End

To finally close the transaction with CK Hutchison in the UK, in accordance with the UK's Competition and Markets Authority's (CMA's) regulatory approval, Cellnex Telecom has agreed on the disposal of approximately 1,100 sites with Wireless Infrastructure Group (WIG).

Cellnex expects this transaction with the UK telecommunications infrastructure operator (WIG) to be completed by the end of this year.

"The divestiture agreement reached with WIG allows us to meet the conditions required by the UK Competition and Markets Authority and to proceed to complete the UK CK Hutchison transaction, the last of the deals announced in November 2020 to integrate the global CK Hutchison's telecommunications sites in six European countries," said Àlex Mestre, deputy CEO of Cellnex Telecom.

In retrospect, in May 2022, the CMA approved Cellnex Telecom's acquisition of CK Hutchison's 6,000 passive telecom infrastructure sites in the UK, subject to the divestment of around 1,000 of its own existing UK sites that overlap geographically with the CK Hutchison sites to be acquired.

A total of 24,600 sites in six European countries — Austria, Ireland, Denmark, Sweden, Italy and the United Kingdom — are part of this deal. The six transactions represent an investment of €10 billion, which also covers the deployment of up to 5,250 new sites (600 of which are in the UK) over the next eight years with an additional investment of €1.15 billion.

Nokia Expands Reach With Market First Core SaaS for 5G

Nokia introduced its pioneering Core SaaS for 5G to provide communication service providers (CSPs) and enterprises the option of running the heart of their network through a highly flexible, fully automated, scalable software model that enables greater business agility and faster time to value for delivering and monetizing network services.

Nokia Core SaaS allows operators and enterprises to move away from the legacy practice of deploying customized software that runs on private infrastructure and to consume Nokia's Core software, including 5G Packet Core, on-demand through a more cost-effective subscription service, eliminating large upfront capital expenditure and avoiding the need to perform on-site software maintenance and updates.

Fran Heeran, SVP and general manager of core networks, cloud and network services at Nokia, said: "Nokia Core SaaS changes the way core networks are built, deployed and run, with important customer benefits that include network on demand, speed to market and easy and fast scaling, in an affordable way. Nokia Core SaaS is not the core network we've known for decades but something entirely different. And this reflects the technology leadership Nokia continues to deliver to the market."

Claimed as the first complete 5G core solution to market with all core cloud-native network functions available through a SaaS delivery model, Nokia Core SaaS's commercial availability is expected in the first half of 2023.

Ransomware Accounted For 40% of Total Cyberattacks in Q3, Cisco Reveals

Cisco Talos, one of the world's largest private threat intelligence teams, released its latest quarterly report, "Incident Response Trends in Q3 2022," that examines incident response trends and global cyber threats.

Highlighting the key findings, the report notes that for the first time since the compiling of these reports, Cisco Talos Incident Response saw an equal number of ransomware and pre-ransomware engagements, making up nearly 40% of threats this quarter.

Interestingly, the report has found that the education sector was the most targeted by attackers this quarter, closely followed by the financial services, government and energy sectors, respectively. For the first time since Quarter 4, 2021, the telecommunications sector was not the top-targeted vertical. While the reason for the education sector being more frequently targeted this quarter is unknown, this is a popular time of year for adversaries to target education institutions as students and teachers have returned to school.

Q3 was also characterized by previously seen high-profile ransomware variants such as Hive and Vice Society and a new ransomware family (Black Basta) that first emerged in April 2022 and had yet to be observed in incident response engagements.

Cisco Talos also continued to observe threats that have been consistently present in previous quarters, including phishing and Business Email Compromise (BEC), attempts to exploit weaknesses or vulnerabilities in public-facing applications and insider threats.

The lack of Multi-Factor Authentication (MFA) remains one of the biggest obstacles to corporate security within enterprises, notes the report. Nearly 18% of engagements either had no MFA or only had it enabled on a handful of accounts and critical services, allowing the cybercriminal to log in and authenticate.

Consulting Firm Under Fire From French Authorities

France's national financial prosecutor's office widened the scope of an existing probe targeting consulting firm McKinsey. These include alleged tax fraud and the role of consultancy groups in the 2017 and 2022 elections and presidential campaigns.

According to a French newspaper, the recently launched criminal investigation will additionally focus on the potential improper bookkeeping of campaign accounts and allegations of favoritism.

President Emmanuel Macron faces an explosive inquiry into allegations that the American consultancy, because of close ties, won lucrative French government contracts after helping with his successful presidential election campaigns.

There are extensive ties between McKinsey and Macron's La Republique En Marche (LREM) party, such as Paul Midy, a McKinsey partner from 2007 to 2014; Mathieu Maucourt, a project leader at McKinsey for three years; and Etienne Lacourt, who was on LREM's direction committee until 2018 before being hired as a McKinsey partner.

"My 2017 campaign accounts were going through all the procedures and submitted to judges, who cleared them. Those of 2022 are currently being checked, like those of every other candidate," Macron said.

"McKinseygate" Scandal

In March 2022, French authorities already launched an initial investigation into McKinsey after the Senate inquiry accused McKinsey of benefiting from a tax arrangement that resulted in non-payment of the country's corporate tax between 2011 and 2020.

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