


TELECOM **Review**

THE TELECOMS INDUSTRY MEDIA PLATFORM

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SHAPING THE DIGITAL WORLD OF TELCOS AND BUSINESSES

A portrait of Marc Veeleenturf, a middle-aged man with short brown hair and blue eyes, wearing a dark blue suit, white shirt, and orange patterned tie. He is standing with his arms crossed, looking directly at the camera with a slight smile. The background is dark and out of focus.

MARC VEELENTURF
CEO, Middle East & Turkey and Head of Telecom,
Media and Technology for Growing Markets, Atos

Is there a way out of
internet shutdowns?

M2M security:
A must-have for
business continuity

eSIM market
trends in the smart
device era

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Editor in Chief & Senior ICT Analyst

Toni Eid
toni.eid@tracemedia.info

Deputy Content Manager

Jennifer Saade
jennifer.s@tracemedia.info

Senior Journalist & Content Manager

Christine Ziadeh
christine@tracemedia.info

Journalists

Elvi Correos
elvi@tracemedia.info

Jonathan Pradhan
jonathan@tracemedia.info

Editorial Team

Christine Ziadeh (Lebanon), Corrine Teng (Singapore), Elvi Correos (UAE), Elza Moukawam (Lebanon), Jeff Seal (USA), Jennifer Saade (Lebanon), Jonathan Pradhan (UAE), Marielena Geagea (Lebanon), Toni Eid (UAE)

Advertising Enquiries

Mohammed Ershad
ershad@tracemedia.info

Issam Eid
issam@tracemedia.info

Graphic Designer

Tatiana Issa

Responsible Manager

Nada Eid

News

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Zouk Mikael, Lebanon
Kaslik Sea Side Road,
Badawi Group Building, 4th Floor,
P.O. Box 90-2113, Jdeidet el Metn
Tel. +961 9 211741
M. +961 70 519 666

Trace Media FZ.LLC.

Dubai Media City, UAE
Building 7, 3rd Floor, Office 341
P.O. Box 502498, Dubai, UAE
Tel. +971 4 4474890
M. +971 55 639 7080

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Toni Eid,
founder
editor in chief
Telecom Review International

We need more from technology – CREATIVITY NOT ONLY CONNECTIVITY

During the past couple of years, the world has seen no rest due to the Covid-19 pandemic. We have been moving fast and trying as much as possible to get back to our normal lives!

Technology played an amazing role in keeping us connected and as long as we're moving forward, there's no risk to lose that.

All aspects of life have changed due to Covid-19 and its variants, from Health to Transport and Work at the office, using video conferencing for almost anything!

Airlines have come up with a smart solution to provide a safer environment: self-check-in counters or online check-ins. However, the downside is that many still touch the same screen! The latest amazing innovation was made by TELUS at Calgary Airport with touchless check-ins using facial recognition!

WestJet and TELUS have launched a first-of-its-kind trial in Canada that will see facial recognition used prior to boarding for some flights at Calgary international Airport. The process is touchless, and uses "safe and secure facial verification technology."

"The travel experience is evolving to include many touchless processes and WestJet is innovating to ensure our guests' travel journey improves to become more seamless and efficient, while prioritizing safety above all," said Stuart McDonald, executive vice-president and chief information officer at WestJet.

"As air travel gradually reopens, the passenger experience continues to evolve. Our groundbreaking, built in Canada solution allows travelers to enjoy a secure, touchless identity verification experience, while ensuring they are able to maintain control of their personal data," said Ibrahim Gedeon, chief technology officer at TELUS.

This is an innovation to serve everyone!

Bring digital to every person,
home and organization for a fully connected,
intelligent world





Atos and du: Shaping the digital world of telcos and businesses



Marc Veelenturf



Peter Larnholt

In an exclusive with Telecom Review, a joint discussion between Marc Veelenturf, Chief Executive Officer, Middle East and Turkey and Head of Telecom, Media and Technology for Growing Markets of Atos and Peter Larnholt, Chief Information Officer, du, has brought light the ongoing technology innovation within the Middle East region such as cloud transformation, edge adoption, private 5G networks, network automation, artificial intelligence, cybersecurity, and decarbonization.

Digital revolution has forced every organization to reinvent itself, or at least rethink how it goes about doing business.

It is a journey, and in its true essence, digital transformation combines business and technology to make customers' lives easier. The future of telecommunications is data-centric, and digital-savvy consumers will dominate the next decade of growth. Enterprises in the Middle East need the right strategy, right local knowledge, the right tools and the right partners willing to stride the path of digital transformation together with them.

Cloud transformation

As Middle Eastern markets mature and gain momentum through technology-backed investments, organizations and enterprises face immense challenges as customers' demand competitive agility, increase virtual interactions, and put a social imperative to shrink the carbon footprint. Data monetization, data personalization, emergence of 5G, accelerated digitalization, data volumes, regulations, and privacy all together are and will continue to exponentially demand a linear drive toward the cloud in a collaborated ecosystem.

Atos understood the impact of this paradigm shift and has invested in capabilities that are combined to offer a unique cloud forward program – Atos OneCloud. One year in service on November 2021, this initiative aimed at bringing business outcomes to customers, adapting to their industries, answering their market challenges, and fitting their cloud journey maturity, which can be either foundational, opportunistic, strategic, or transformational.

Atos OneCloud is a unique program delivered in close collaboration with strategic partner ecosystem including Amazon Web Services, Dell Technologies (and VMware), Google Cloud, IBM and Red Hat, Microsoft, Salesforce, SAP and ServiceNow. This allows customers to implement new technologies at speed, reduce implementation risks and costs, and

benefit from the close integration of leading cloud capabilities capable of addressing complex business challenges. Designed as a modular approach, this program allows Atos' customers to move their entire landscape to the cloud or by business-by-business building blocks to unleash potential through business processes optimization, applications, and infrastructure modernization, making them more agile, data-driven and customer-centric.

Over the next five years, Atos plans to intensify its investments, totaling €2 billion, in its full stack of cloud capabilities to expand the existing pool of expert certifications, accelerate R&D outcomes, pursue cloud investments for customers and multiply acquisitions delivered through highly secure and decarbonized, public, private or hybrid cloud environments.

"We have been very successful in bringing and offering this global initiative to our customers in the Middle East region by providing the much-needed impetus to our customers, enabling them with a well-articulated drive to their cloud transformation journey to help them stay ahead of the game always and be commercially competitive, and at the same time creating organizational alignments. We have and are in the process of successfully delivering medium to large-scale cloud transformation programs for telcos in the region and across other industries," said Veelenturf.

As telecom operators look to the future, cloud transformation will be key for business continuity and enhanced services. Operators are destined to benefit from a host of significant benefits in light of successful cloud migration, and this is why the wider telecom community is already pursuing action in this direction. Cloud transformation will provide greater resilience, thanks to process automation and high calibre anomaly detection and situation adaptiveness. Cloud-based operator databases will also offer seamless disaster recovery should security breaches or data losses occur, while cloud infrastructure will

enhance customer experiences, ensure high scalability, and significantly reduce operating expenses for hardware, software, servers, and energy bills. From a du perspective, the vitality of cloud was identified some time ago, and this year alone has seen remarkable progress where this technology is concerned. "In 2021, du launched an exclusive cloud platform to accelerate digital transformation nationally and regionally, as well as two data centres to provide additional yet essential support," stated Larnholt.

Cloud transformation aside, edge computing and data monetization are other avenues sure to empower operators in the decades ahead. With edge computing capabilities, operators will boast robust data management cycles and empower end-users to utilize uninterrupted connectivity and run low latency applications. Meanwhile, data monetization will help ensure operators maximize profits, optimize opportunities, and convert data into competitive advantages.



Enterprises in the Middle East need the right strategy, right local knowledge, the right tools and the right partners willing to stride the path of digital transformation together with them





With our longstanding partnership and trust with Atos, we will boost efficiency, enhance time to market, increase the quality of deliverables, bolster overall service efficiency, transform application development, and elevate operational excellence



Private 5G

5G has already proven to be a compelling proposition for the wider telecom industry since the COVID-19 outbreak. The technology has enabled operators to provide lower latency, higher capacity, and increase bandwidth in terms of customer services, streamlining connectivity and guaranteeing world-class experiences with many businesses and professionals working remotely. "Given the vast capabilities of 5G and continued rollouts across respective geographies, the 5G revolution is by no means the finished article, and further changes will become apparent in due course," said Larnholt.

In a regional perspective, the Middle East is addressing the long-term decline in oil revenue by repositioning the region as a high-tech hub. The drive to high tech requires high-bandwidth, low-latency networks that is exactly what 5G technology brings. The challenge for telcos is to avoid becoming a commodity by selling value-added services. An example of this is Atos partnering with a telco to sell surveillance for unmanned gasoline stations. The solution uses the 5G network, but the selling point is the service that 5G enables. In line with this, du also noted about the provision and

sustained expansion of next-generation digital services such as augmented reality (AR) and virtual reality (VR). "Others pertain to introducing many connected devices, implementing virtual networks, and powering machine-to-machine communication and demand-driven supply chains," Larnholt specified.

One approach to seamlessly integrate 5G is building mobile private 5G networks. Private 5G rarely directly contributes to productivity; it does so indirectly as an enabler of innovation. Once there is a business case to build a private 5G network, a partner ecosystem will be required to blend the necessary capabilities and resources for these newly advancing technologies. Telcos will seek to provide synergies between their public network and the customer's planned mobile private network, rendering easy entry for customers.

"It would be a mistake to assume that an enterprise mobile private 5G network is just a copy of a telco public network. While it might be in some cases an extension of a public network, mobile private 5G networks require specific technologies and technological expertise. What's clear, however, is that demand for them will increase exponentially as appetite from enterprise customers grows," explained Veelenturf.

Hyperscale public cloud providers are also key. Whereas a telco would think twice before outsourcing their 5G core network functions to a cloud provider, for private 5G users the public-cloud benefits of agility, cost-efficiency and flexibility are attractive. That makes private 5G a domain for cloud innovation.

"In all cases of enterprise private 5G, the role of system integrators like Atos is likely to be pivotal," expressed Veelenturf. By understanding customers' requirements and working in collaboration with telcos, hyperscalers, application developers and others, they can blend, integrate and optimize mobile private 5G networks for leading enterprises. Once the network is built, they can offer

managed services to efficiently operate a private 5G system throughout its full lifecycle.

Edge computing

More complex data opens the door to a new era: edge computing. That's why enterprises are including edge computing in their ICT strategies. Adopting edge is now on every CXO's strategic board with high priority tag assigned, as telcos embrace 5G and network modernization wave looking for new sources of revenues, operational efficiencies, and data monetization for a better and enriched customer experience.

Within three years, most enterprise-generated data are estimated to be processed outside major data center locations, representing a five-fold increase from current levels. With its ability to support real-time analytics, edge computing will be essential to enterprises looking to tap the data opportunity. For other enterprises, edge computing can ensure continued competitiveness, enabling them to deliver high-performance, low-latency applications.

Broadly, across industry verticals, there are some common challenges of the data wave and there is an immediate need to find an alternative. Unfortunately, installing bigger pipes through the oceans or underground won't enable to handle the internet bandwidth produced and key contributing reasons are latency constraints, GDPR compliance and data privacy, and recurring cost.

Telcos, in particular, are facing challenges that supports their motivation towards modernizing networks and investments in the edge. For this matter, telecom infrastructure vendors offer solutions that are designed to help CSPs take advantage of edge computing architectures and technologies, especially as they transition towards 5G. Many of these solutions aim to help CSPs develop specific edge computing business models. "For example, some CSPs may choose to use edge computing to deliver high performance, low latency services to their customers, while



others may also decide to sell edge computing resources and services to enterprise clients," added Veelenturf.

The hyperscale cloud companies have also begun to make their cloud computing resources available more locally, closer to where applications are developed and consumed. These solutions are still at the early stages of development and have very limited geographical availability. However, going forward, they will become an important part of hyperscalers' edge computing strategies with potential to transform the overall market.

In addition to selling directly to enterprise customers, the hyperscalers work closely with CSP partners to take advantage of the additional benefits of 5G network connectivity. Many CSPs are in the process of establishing their own approaches to edge computing and, in recent months, a growing number have come to market with multi-access edge computing (MEC) solutions. Many recognize that edge computing offers them greater opportunities than simply opening up their networks to the hyperscalers. Some CSPs are recognizing the benefits of pooling their resources in ways that advance the availability of edge computing resources for application developers and other stakeholders.

Atos reiterated that there are three major factors should be considered. First, telcos need to find a partner

to take end-to-end responsibility for the different hardware and software components needed. Second, once the edge network is established, telcos will need automation and orchestration



Uniquely positioned on the market as a digital security enabler, solutions provider, E2E integrator and cybersecurity leader, Atos ranks first in Europe and second worldwide in providing managed security services to its customers





tools to launch new services. This means rolling out applications consistently to all connected edge devices. Lastly, edge computing means that networks are no longer safely locked away in data centers: they extend in thousands of points in all kinds of locations. Thus, telcos need end-to-end security solutions to make sure that the edges don't become the 'weak leak' to allow exploitation of their network.

"In the sustainability context, telcos will have to work to reduce their energy footprint. It is an opportunity to develop a sustainable and resilient business while reducing energy expenditure. To address this challenge, the use of edge computing can be effective in reducing the energy footprint of data analysis," Veelenturf pointed out.

As per Larnholt, it is essential for everyone connected with the telecommunications industry to understand why exactly edge computing trends have emerged. "In simple terms, edge computing integration is essential for operators because this is an effective avenue for modernizing networks, availing new revenue sources, and migrating workloads and services from core networks toward the network's edge. Furthermore, edge computing is now established among the most practical components for reducing latency effects on applications. As a result,

new network apps and services can thrive performance-wise with the lower latency and high bandwidth connectivity that accompanies edge computing," he expounded.

Network automation

In today's evolving operating climate, network automation is essential for operators because this allows for maximizing network efficiency and functionality. With network automation, manual workloads can be reduced and human error eliminated, various services can be rollout and managed seamlessly, and a large number of network slices can be handled simultaneously while providing enhanced end-user experiences.

"Given the exponential demands for telco service today, improved customer services are essential, and network automation ultimately bolsters the planning, configuring, testing, deployment, and continuity aspects, collectively ensuring services are aligned with the highest possible standards," Larnholt commented.

In Atos' case, as they work with their partner ecosystem, the selection and integration of the technology platform best suited to their customer's needs happen. "This can be an open-source orchestration solution or a vendor-specific orchestration platform, depending on customer's requirements.



Network automation ultimately bolsters the planning, configuring, testing, deployment, and continuity aspects



We then develop, deploy and integrate machine learning, AI and data analytics solutions into intelligent automation and staff decision making to improve performance, productivity, efficiency and customer service," described Veelenturf.

Artificial intelligence

AI is considerably or very important to the future of the business, with the acquisition of Ipsotek, a leading AI enhanced video analytics software provider, Atos has strategically reinforced its leading position in Edge and Computer Vision by adding key software capabilities and IP to its solutions portfolio.

Atos Computer Vision Platform is based on compute intensive servers allowing cloud to edge computer vision models to process data in real time anywhere, whatever business constraints. This Platform brings together a set of pre-trained and customisable AI models, enriched by consultancy expertise with six Atos AI Computer Vision labs worldwide, based on high performance hardware and software. The software layer of the platform is powered by Ipsotek's VI Suite engine and the hardware includes Atos' BullSequana Edge nano and BullSequana Edge servers.

It enables to identify events and behaviours, to reduce error rates,

to guarantee people and asset safety, to deliver highest quality, to offer frictionless and personalized customer experiences. Business and organisations keep up the pace of events and demand, by analysing videos in real time at the edge to drive the best decisions.

Cybersecurity

With boundaries increasingly blurred between physical and digital, the impact of digital security is no longer limited to business or legal but extends to environmental and human impacts. It must be seen as the vital ingredient in achieving operational resilience and supporting digital transformation. Within this context, CIOs and CISOs will have to tackle five main challenges in the years to come: a new resource-centric, identity-based paradigm that requires a segregated approach; a transition from a patchwork of IT/OT solutions and cyber solutions to modern architectures; a need to guarantee a level of protection for complex architecture; secure collaborative mechanisms for the new normal; and unprotected accelerated developments caused by faster go-to-market digital services and pressure on cost savings.

"Uniquely positioned on the market as a digital security enabler, solutions provider, E2E integrator and cybersecurity leader, Atos ranks first in Europe and second worldwide in providing managed security services to its customers. We have over 6,000 technology patents, which itself is a testament to culture of innovation and future based outlook towards security," Veelenturf emphasized.

Our approach to digital security is based on two main recommendations: develop a corporate culture of security across organizations and adopt a zero-trust approach based on protecting your resources instead of your perimeter. Moreover, organizations need to review their strategic business transformation plan, their state of legacy, their risks and transformation constraints to determine the best roadmap to strengthen their cybersecurity and transform their operational capacities. They must also

set out an articulated approach and include a secure transition at business level.

"This is possible through our strong foundations for digital transformation through key cybersecurity building blocks supported by Atos' own IP solutions and selected partner offerings that are built with experience and domain specific knowledge from past decades. Trusted digital identities, access management, data protection, and hybrid cloud security are all part of Atos' digital security capabilities," Veelenturf continued.

Cyber threats are rising in both volume and sophistication. Therefore, there is a need to add strong detection and response capabilities to identify threats and respond before they turn into breaches. Traditional security monitoring is built around limited log collection, and rule-based analysis is no longer sufficient. While it is good for compliance use cases and visibility into common attacks, it is ineffective against newer forms of attacks. The next generation of security operations needs other technologies beyond traditional security information and event management (SIEM) and newer skills beyond eye-on-glass monitoring. Building such next-generation capabilities for threat detection and response is not feasible for most organizations. Atos can help bridge this gap by delivering advanced detection and response as a service, thereby removing the complexity and cost of building in-house next-generation security operations.

The Atos Managed Detection and Response (MDR) is built on the power of AI, big data analytics, and edge computing to bring multi-vector threat detection and full-service response at remarkable speeds. MDR is a combination of technology and skills to deliver advanced threat detection, deep threat analytics, global threat intelligence, faster incident analysis, and collaborative incident response on a 24x7 basis. MDR is designed to have six outcomes: threat anticipation, threat hunting, security monitoring, incident analysis, auto containment, and response orchestration.

Collaboration for digital transformation

"At du, we recently renewed our long-standing partnership with Atos, and this is particularly significant where digital transformation is concerned because related activities will support critical objectives for the future, including application modernization and digitalization," Larnholt indicated. As a strategic partner, Atos is already helping the telco transform its operating model in line with a five-year plan, facilitating the introduction of agile ways of working and creating additional business value. "At the same time, the partnership will boost efficiency, enhance time to market, increase the quality of deliverables, bolster overall service efficiency, transform application development, and elevate operational excellence," elaborated Larnholt.

When these outcomes collectively come to fruition, a groundbreaking step forward in digital transformation will be made. du will then have greater agility, reduced cost of ownership, and enhanced operational efficiency in an increasingly competitive industry. **TR**



Cloud transformation
aside, edge
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other avenues sure to
empower operators in
the decades ahead



CITC publishes public consultation on Digital Content Platform Regulations



The Communications and Information Technology Commission (CITC) has published a public consultation on 'Digital Content Platform Regulations Document' as part of its initiatives under the Digital Content Council that was approved by the Saudi Cabinet by resolution number 125 dating 28/9/2021, chaired by His

Excellency Abdullah Alswaha, minister of communications and information technology.

The initiative is aimed to regulate, govern, activate, and motivate digital content platforms to expand and grow. In addition to engage the private sector, empower entrepreneurs as

well as attract investments and protect users of digital content platforms.

These comprehensive regulatory proposals stem from CITC's overarching initiative: "Create clear and transparent licensing framework for digital content platforms". This in turn is aligned with the General Commission for Audiovisual Media (GCAM) and other supporting government stakeholders; aiming to create a regulatory framework for digital content platforms in line with global standards and best practices that supports the Commission's strategic developmental objectives, taking into account the appropriate legislative requirements.

The commission calls on interested parties from the Kingdom and abroad as well as the public to submit their views on the consultations document before November 30, 2021. The Digital Content Council and CITC value the importance of engaging interested parties, investors and entrepreneurs in regulations drafting process.

'Business resilience plays a very important role in digital transformation'

Telecom Review hosted a virtual panel titled 'Digital transformation driving the next phase of innovation. The panel featured speakers, including Sebastian Alberto Delgado, vice president/Internet of Things & Artificial Intelligence, Etisalat; Karim Benkirane, CCO, du; Günther Ottendorfer, chief technology & infrastructure officer, Ooredoo Qatar; and Danial Mausoo, head of sales mobile networks Middle East and Africa, Nokia.

The panel was moderated by Ghazi Atallah, former CEO, NXN

Ghazi Atallah drove the conversation towards exploring the areas of measure to assess and benefit from the outcomes of the digital transformation.

Responding to Ghazi's inquiry, Danial Mausoo said, "From a telco perspective, typically transformation has been very focused on operational efficiencies. The KPIs have always been about how to build new capabilities. From a Nokia perspective, it's about how we make sure that our operations are right sized, consolidation of footprint, shifting to cloud driven automation, etc.

"Beyond the operations aspect, I think there's a lot of factors around resilience that has been brought in now when you look at transformation because of COVID, climate change and so on. Plus, business resilience plays a very important role when looking at opportunities in digital transformation," he said.

He cited an example of Nokia's CEO mentioning that there is "no green without digital" to drive the message of how climate crisis has brought in opportunity in terms of transformation and need for change in business models.

Mausoo expressed that digital transformation should be more outcome-based than process-based. Hence, for telcos, transformation is more focused on operational efficiencies as well as resilience. "In telecom and IT, it's always been buying or building, and that has changed. It's not about buying anymore, it's how we consume this overall infrastructure with KPIs falling into operational efficiencies."

Bahrain's BNET launches portability process for broadband internet



Bahrain Network (BNET), the country's national broadband network, announced the launch and implementation of its new portability process for broadband Internet.

This streamlined process will contribute to creating effective and sustainable market competition between service providers. It is worth noting that BNET has taken the initiative to offer this

process to the telecommunications sector in the Kingdom, based on the requests received by the service providers. End users can now transfer their broadband services to their preferred service provider with minimal service disruption. Maintaining the same number, customers can communicate directly with the new provider of choice to commence the transfer process. The old provider will then invoice customers for all fees due until the date of transfer.

On this occasion, Ahmed Jaber Aldoseri, CEO of BNET, stated, "In BNET we seek to achieve one of our strategic goals by presenting the portability process, which ensures the Kingdom's telecommunication sector's competitiveness and market adaptability through facilitating and encouraging fair competition among local operators. BNET will continue to work on enhancing this process with the aim of achieving a smooth transition with minimum disruption, as we are very keen to provide the best services to improve and enhance the end-user experience."

Artel appoints Egor Tyagunov to head business development and account management for EMEA



Artel Video Systems, a world-class provider of innovative, real-time multimedia delivery solutions serving global markets, has appointed Egor Tyagunov as lead business development and account manager for the EMEA region and other emerging markets.

Tyagunov brings to the role more than 15 years of experience in broadcast and broad expertise in media over IP, media processing, content delivery, and production workflows. He has also spearheaded business development efforts for leading broadcast and pro-AV technology providers throughout Europe and Asia.

"Egor's extensive experience in both audio and video broadcast, plus pro AV, will be essential to Artel's growth," said Paul Seiden, director of international and channel sales at Artel Video Systems. "In this position, Egor will play a powerful part in supporting end users' technological and organizational challenges while also building on our existing relationships and growing Artel's clientele."

Prior to joining Artel, Tyagunov served as sales director at DEVA Broadcast and Sound4 and as sales manager working with dealers and partner networks at Telos Alliance. Earlier in his career, Tyagunov held product management and chief operating officer positions within the industry.

"Artel's commitment to developing resilient, cost-efficient solutions and to offering top-notch customer care and technology training creates a unique opportunity for broadcast and enterprise network organizations," Tyagunov said. "I look forward to leveraging my experience with broadcasters and enterprises to help Artel users improve end-to-end workflow performance and integrate innovative media delivery solutions."



UAE drives the future of mobility and autonomous technology

Autonomous vehicles will soon become a reality in UAE, with the country becoming the first in the Middle East and the second globally to test self-driving cars on the streets with the approval of a temporary license to test self-driving vehicles on the roads.

This landmark announcement will bring a revolutionary change in the future of the automobile and technology industry, with both being so central to our society and economy – so much part of our everyday life – the reality of autonomous vehicles will alter our lives in the most remarkable ways.

Developing the future of transport, vehicles and the systems require the entire ecosystem to be working in tandem with each other, this translates to intense collaboration between innovators, automobile manufacturers, telecoms, and government departments, among others.

With the region's first 5G autonomous vehicle shuttle bus to hit the public roads of Ajman last month, an initiative

led by the government accelerator AjmanX and Etisalat was in line with the country's long-term ambition of the leadership's digital journey and national agenda seeking to place the country among the top in the world in autonomous transport enabled by the 5G network and advanced technologies.

H.E. Sheikh Rashid bin Humaid Al Nuaimi, director of Ajman Municipality and Planning Department said, "Today Ajman is one of the most advanced emirates in terms of harnessing technologies in all aspects of work and life for our residents. As we are constantly exploring opportunities to shape more sustainable, resilient and human-centric urban mobility systems, this exclusive Etisalat 5G powered autonomous shuttle bus forms a significant part of our digital transformation initiative bringing the latest in technology and innovation to the emirate. With the country all set to celebrate its golden jubilee and the UAE leadership's vision for the future of autonomous transportation we will continue to work towards the country's digital goals contributing to the growth of the emirate and economy."

Autonomous ecosystem coming together

Collaboration is key, right from regulations to connectivity, mobility and the human factor have to all come together to develop an ecosystem that enables integration and is able to deliver the solution.

"In order to launch the 5G autonomous shuttle by AjmanX, Etisalat worked closely with a team of experts on mobility in creating the solution design with every partner playing their part that is the OEM autonomous vehicle, the cellular vehicle to everything technology [C-V2X], the 5G connectivity and the automotive Artificial Intelligence (AI). In addition to deploying the network, Etisalat has built a partner ecosystem for this project with technology companies like Navya, IoN, Derg and Acacus so to deliver a robust autonomous car proposition that contributed to the success of the 5G autonomous shuttle bus in Ajman," explained Masood M Sharif Mahmood, CEO, Etisalat UAE.

In the project, Navya, specialists in autonomous mobility systems in partnership with ION contributed as an autonomous car OEM while Derq specialised in vehicle to everything (V2X) communication and Acacus with their knowhow in automotive AI brought their joint expertise on one platform to enable the implementation of the 5G shuttle bus in Ajman.

With the support of the Ajman government, local police and transport authorities, this was a great opportunity to bring the future of technology and successful deployment of mobility use cases into becoming a public utility service with the best experience for all citizens and tourists visiting the emirate.

Working towards an autonomous future

Infrastructure plays an integral role in empowering the future of the network especially for Internet of Things (IoT), mobility and autonomous technologies. In terms of building this future, Etisalat has continuously made investments over the years becoming the fastest in the world and providing a platform like the 5G, the latest low power wide area network (LPWAN) networks, and long term evolution for machines (LTE-M) to connect vehicles to traffic regulators, to traffic signals, to buildings and to all elements enhancing road safety as well. This is significant for the connected car market, telematic solutions and to emergency call (eCall) which is a new system to enhance the speed of response when road accidents occur, whereby vehicles fitted with this new technology, are connected via eSIM solutions provided by Etisalat.

With 5G, there are already other implementations in smart cities, ports and other industries with dedicated 5G private networks that support ultra-low latency features considered to be the prerequisites for any autonomous transport.

Etisalat has worked on a variety of autonomous projects over a period of time. Mahmood said, "To cite the free trade zones as a use case, Etisalat has worked on delivering autonomous solutions which will be soon replicated



to university campuses in the country. In ports, which are mission critical use cases, the project involved remote management and operations from anywhere in the country with UAE as a base to be able to manage a national emergency".

This is only the beginning as the market is evolving at a rapid pace moving to other people transport and verticals targeting use cases like the delivery

of goods, warehouse logistics, port telematics, and also including robotics and drones.

Etisalat will continue working closely with automobile OEMs, local governments and transport authorities across emirates in UAE, to bridge the gap for residents with these technologies becoming a way of life and a gateway into the future creating a safer and healthier society. **TE**



Safder Nazir, SVP of digital industries, Huawei Middle East

The digital economy: The Middle East's new growth frontier

Today, the digital economy is at the forefront of the national development plans of many countries across the world. Nations such as China, Australia, and Singapore—as well as those closer to home including the UAE, Saudi Arabia, and Qatar—have not only made the digital economy a cornerstone of their future national development, but also introduced various digital-specific strategies to achieve this end. Many other countries in the Middle East are moving in the same direction, increasing their focus on the digital economy and introducing strategic initiatives to enhance digitalization.

The Middle East has in fact made significant progress in the adoption of digital technologies over the last decade. Consequently, digitalization is a vital component of national visions and development plans across the region. There are already some good examples that show the extent of digitalization in the region and the evolution of the digital economy.

The Digital Consumer: The Middle East has a young, tech-savvy population. Approximately 75% of the region's population is under the age of 40, a figure that's much higher than the world average of 63%. This large proportion of young people, combined with large-scale infrastructure developments currently underway in the region, has made the Middle East one of the fastest global adopters of digital technologies. For example, mobile infrastructure investments in the broader Middle East and North Africa (MENA) region are estimated to total US\$70 billion over the 2019–25 period. Mobile broadband penetration in GCC countries has already reached 100%, and more than 50% of consumers in the region shop online. In the UAE, 80% of digital payments are already contactless. With respect to the prevalence of digital skills among the population, GCC countries are ranked on a par with major global players such as Hong Kong, Germany, South Korea, and Ireland.

Digital Business: The changing characteristics of consumers have also changed the nature of businesses in the region. Today, digital business models are dominant in key sectors in the Middle East. The UAE, for example, has significantly focused on digital governance in the last decade and made several strategic investments. Government-to-consumer interactions in the country are now predominantly digital, and there are plans in place to close half of existing government service centers in the next two years. A similar digital trend has been seen in the UAE banking sector as well. The number of bank branches in the country fell by 34% between 2016 and 2020, coinciding with the launch of several



The digital economy
is at the forefront
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across the world



digital banks, such as Liv., E20., NEO, NEOBiz, and CBD Now.

The Development of the Digital Economy in the Middle East

The recent rise to prominence of Middle Eastern digital economies has been propelled by the emergence of the digital consumer and the associated development of digital business models. The national visions of countries across the region place great emphasis on the growth of the digital economy, and several digitally-focused initiatives have been introduced as a result. These initiatives can be grouped into three overarching categories: the overall economy and the development of skills, sector-specific efforts, and tech-specific efforts. These categories, as well as examples of initiatives in different countries, are worth exploring in more detail.

The Digital Economy and the Development of Skills in the UAE

A few months after the outbreak of the COVID-19 pandemic, many nations announced plans to prioritize the development of the digital economy. In the UAE, for example, the country plans to double the size of its digital economy over the next 10 years by rolling out smart infrastructure and enhancing the digital readiness of the government. To achieve this goal, the

UAE created a new cabinet post: the Minister of State for Artificial Intelligence (AI), Digital Economy, and Remote Work Applications. This post will focus on rolling out technology applications to enhance businesses and the UAE supply chain. The nation considers AI to be central to its future vision and expects the technology to generate up to AED335 billion in extra growth by 2031.

The UAE has also recognized that skills development is essential for the digital economy. Accordingly, the government recently introduced a National Program for Coders, which aims to make the UAE the world's foremost destination for coders and future innovators. The program is seeking to train and attract 100,000 coders and establish 1,000 digital companies over five years. In another related move, the government has established the world's first graduate-level, research-based university for AI, the Mohamed bin Zayed University of Artificial Intelligence (MBZUAI).

Sector-Specific Digital Development Efforts in Qatar

In 2008, Qatar introduced its Qatar National Vision 2030 with a strategic goal to develop a knowledge-based economy. The key areas of development outlined in this vision include innovation, entrepreneurship, skills,

infrastructure, and the efficient delivery of public services. To help realize all of this, Qatar has introduced various initiatives focused on three key sectors: government, Smart Cities, and Financial Technology (FinTech).

Government: Qatar is currently preparing to launch its updated digital government strategy: Qatar Digital Government Strategy 2021–2026. This new strategy will focus on transforming the user experience by applying AI, Machine Learning (ML), big data analytics, blockchain, and cloud computing technologies in the public sector.

Smart Cities: To prepare for the upcoming FIFA World Cup Qatar 2022 and aid the long-term sustainable growth of its cities, Qatar introduced the TASMU Smart Qatar Program. This program focuses on five key sectors: transportation, logistics, healthcare, the environment, and sports. For example, establishing a smart transport system is one of the key objectives of the program, with lowering road fatalities to six per 100,000 persons and cutting car emissions by 10% set as two specific goals. Qatar is also pursuing several related projects, such as the introduction of electric buses, the buildout of smart bus hubs, and the expansion of public Wi-Fi.

FinTech: The evolution of the financial sector and the advent of FinTech has provided fresh impetus to Qatar's vision for a knowledge-based economy. In 2017, Qatar formed its National FinTech Taskforce with the mission to create a sustainable, robust, and internationally competitive FinTech ecosystem. Accordingly, the taskforce has created a national FinTech strategy and established an incubator: the Qatar FinTech Hub. The taskforce is also planning to launch a regulatory FinTech sandbox, offering a safe, controlled space for organizations to trial FinTech solutions.

Tech-Specific Development Efforts in Saudi Arabia

As mentioned earlier, Saudi Arabia is pursuing major economic diversification plans. The Kingdom has several giga-projects under construction including the cross-border Smart

City project NEOM, The Red Sea Project — billed as the world's most ambitious regenerative tourism project — and the ultra-luxury tourism project AMAALA. All are envisaged as digitally-enabled, sustainable, carbon-neutral developments. Indeed, in 2020, the Saudi government introduced new policies aimed at achieving sustainable growth and creating competitive advantages through the digital economy. The country has since undertaken several tech-specific initiatives to realize these policy goals, focusing on three key areas: data and AI, the cloud, and 5G.

Data and AI: Saudi Arabia is banking heavily on data and AI to spearhead the development of its digital economy. The government has established the Saudi Data and AI Authority (SDAIA) and introduced the National Strategy for Data and AI (NSDAI). According to the latter, Saudi Arabia expects to attract investments worth SAR75 billion and create 300 start-ups in the data and AI field. NSDAI also focuses on skills development, with plans to increase the number of data and AI specialists and experts to 20,000 and boost workforce literacy to 40%.

Cloud: To thrive in the digital economy, organizations need to evolve into digital enterprises. However, digital enterprises need to build their foundations on cloud-centric digital infrastructures. Saudi Arabia has consequently introduced a cloud computing regulatory framework and a cloud-first policy to facilitate digital transformation in the public sector. These rules compel government entities to consider the cloud when making new technology investments and are expected to accelerate cloud adoption in the public sector.

5G: GCC countries are among the world's leaders in 5G development. In addition, the UAE, Saudi Arabia, Qatar, and Kuwait have all featured in the global top 10 in terms of national mobile broadband speeds. In Saudi Arabia, approximately 83% of 5G-capable devices are actively connected to 5G networks, a clear sign of Saudi Arabia's 5G maturity. With its high speeds and low latencies, 5G is a key catalyst of the digital economy. Saudi Arabia therefore intends to continue investing in 5G

technology, with plans to allocate or improve spectrum to boost speeds and coverage across the Kingdom.

Conclusion

Today, a nation's future heavily depends on advancements in science, knowledge, innovation, and technology. Yet urban and economic development in any nation now also needs to meet sustainability goals. Many countries in the Middle East are nurturing and empowering such advancements through initiatives focused on developing the foundational elements of the digital economy — such as infrastructure, data, and skills — using critical technology enablers such as 5G, the cloud, and AI. Collectively, these initiatives will help countries reach underserved segments of their populations, and will have far-reaching impacts on economic growth, employment creation, and public service delivery. **TR**



The changing characteristics of consumers have also changed the nature of businesses in the region



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Aji Ed, CTO Mobile Networks MEA, Nokia

Network slicing and migration to 5G standalone architecture to gather pace from 2022: Nokia

5G network slicing promises the delivery of a new generation of high-speed services, allowing operators to meet requirements towards network adaptation, modification, scaling to accommodate new subscribers or more capacity. Aji Ed, CTO Mobile Networks MEA, Nokia, talks more about this technology in an exclusive interview with Telecom Review.

5 G network slicing technique promises dynamic efficiency to various industry verticals with its potential of secure and high-performance connectivity.

How must organizations prepare themselves to make the most of this new technology?

Different types of services have varied requirements in terms of bandwidth, speed and latency. For example, applications like gaming require high bandwidth and low latency, whereas many IoT services (factory automation, assisted driving etc.) do not necessarily need high bandwidth, but low latency is important. Network operators must be able to offer dynamic resource allocation and guaranteed Quality of Service (QoS) specific to the services and applications. Network slicing is a technology element that facilitates network operators to provide services tailored to the specific needs of their customers. Network slicing allows operators to meet requirements towards network adaptation, modification, scaling to accommodate new subscribers or more capacity. This enables splitting services

on resource level to create separate use-case-specific logical networks upon a shared physical infrastructure. Network slicing allows to create and switch on a dedicated new service quickly.

This enables innovative business models for current and new businesses for operators. For example, operators can offer new business models such as Network-as-a-Service (Fixed Wireless Access, smart city, eHealth, public safety, Connected vehicle and Industry 4.0, among several others). This is applicable for both, 5G and 4G (LTE).

How can Nokia help the operators with network slicing implementation and what are the solutions available?

Nokia has deployed 4G and 5G network slicing with several operators around the world. In the Middle East and Africa, Nokia successfully completed a pilot with Mobily Saudi Arabia early this year. This was the first network slicing trial on a live commercial network that showcased Fixed Wireless Access (FWA) slicing use case. Nokia was the first vendor to deploy 4G and 5G network slicing in live multi-vendor network across all domains, including access, transport and core.

Nokia's 4G/5G network slicing solution works in LTE, 5G Non-Standalone (NSA) and 5G Standalone (SA) networks. It provides mobile broadband connectivity from 4G/5G devices and customer premises equipment (CPE) to cloud applications through sliced access, transport and core. With the Nokia slicing solution, an operator can divide its network into multiple virtual networks and offer different service tiers and premium services to its customers utilizing advanced network resource allocation mechanisms.

The operator can utilize Nokia's AirScale 4G/5G base stations with its NetAct solution with management, control and assurance, as well as Nokia's routers, network services platform (NSP) and digital operations software. This can work in multi-vendor environments as well.

Nokia's slicing solution supports existing LTE, 5G NSA and 5G SA devices. The slice continuity between LTE and 5G allows operators to maximally utilize

their network coverage and assets such as the available spectrum for new mobile services. Nokia's customers are already working on a variety of slicing use cases, including enterprise applications, transportation, manufacturing, utilities, public safety and smart city applications.

Most of the services today have been built using non-standalone networks. How will the deployment of stand-alone 5G networks change the market dynamics?

In today's world, almost all the 5G networks are deployed with NSA architecture and it is focused on providing FWA or high capacity mobile broadband solutions. However, transition to 5G SA is required to achieve the full potential of 5G to enable ultra-low latency and extreme high capacity.

Standalone eliminates the need for an LTE anchor layer and connects directly to the cloud-native core network. This supports advanced network slicing functions. Since latency will be extremely low, this will facilitate new use cases such as mission-critical use cases, like autonomous driving. With carrier aggregation (CA) of mid-band and low-band spectrums, the coverage challenges in the networks with standalone architecture can be mitigated.

Nokia's comprehensive end-to-end portfolio for CSP's allows the deployment of 5G SA networks for greenfield operators but also ensures smooth migration from NSA to SA networks as an overlay, i.e. providing seamless interworking to the legacy LTE/EPC network. Nokia has deployed one of the largest SA networks in the world with T-Mobile USA. Based on the recent studies, we expect to see more and more networks migrating from NSA to SA from 2022 and beyond in the Middle East and Africa. This will start with a hybrid model (NSA + SA) and will gradually move towards complete SA architecture.

To accelerate the development of 5G infrastructure, the growth of a small cell 5G network is crucial especially given the rise in network densification and increase in mobile data traffic. Please tell us about Nokia's offerings for indoor and outdoor environments in this category?

Small Cells Forum forecasts strong growth in 5G and multimode small cells deployments in hot-spots and indoor areas. Nokia has the most comprehensive small cell portfolio, including innovative and future-proof solutions.

A significant part of 5G mobile traffic is expected to be generated in indoor areas, such as shopping malls and high-rise buildings, so it is essential to ensure excellent indoor coverage and capacity. Nokia AirScale indoor Radio System (ASiR) can leverage the installed base and deliver an enhanced end-user experience in indoor premises. It supports all radio access technologies (2G to 5G) with rapid and graceful 5G insertion via chaining. ASiR can support a Single Frequency Network for fast and easy planning and leverage existing in-building systems with AirScale RFC (RF converter). This supports all features of the macro base station by default.

For extreme capacity solutions for high-performance street level and hot-zone deployments, Nokia has AirScale mmWave Radio which covers all mmWave bands: 24/26, 28 and 39 GHz (n258, n257, n261, n260) and this provides extreme bandwidth: 1400 MHz IBW (Instantaneous Bandwidth) and 800 MHz OBW (Occupied Bandwidth). This has a very compact form factor for easy deployment.

What is Nokia's latest view on Open RAN?

Undoubtedly, one of our key focus areas continues to be Open RAN. Nokia is the leading contributor in the O-RAN Alliance and our new AirScale portfolio is O-RAN ready, supporting our efforts to develop cloud-based, open approaches to building networks. There are many steps to build the O-RAN ecosystem and we expect this to develop over time. For example, massiveMIMO radios are an integral part of 5G traditional deployments, and these are not yet proven in the Open RAN architecture. Open RAN introduces more entities and stakeholders, and this brings additional integration complexities in the network deployment. Overall, we expect that Open RAN will continue to evolve over the next few years. **TR**



Femi Oshiga, vice president of service providers for the Middle East and Africa, CommScope

Rethinking your 5G infrastructure expansion

Although the COVID-19 pandemic brought some disruption to wireless operator rollouts, the race to 5G has not slowed down. According to a Q1 global market study by S&P Global Market Intelligence, 158 local operators now run active 5G networks in 67 markets across the US, Europe, Middle East, Africa and Asia. Compared to Q1 of 2020, the number of active 5G networks has increased by nearly 70% as of March 2021 during a year when many operators had to delay their infrastructure improvements.

With networks continuing to expand their 5G footprint, operators must make critical decisions on how they want to achieve higher data transmission and the increased capacity benefits of 5G networks without breaking the bank. One significant piece to this network puzzle has become the adoption of small cell densification.

Leading 5G with efficient small cell densification

According to a study by Rethink RAN Research, the demand for data traffic is expected to swell from 51,115 EB per month in 2020 to 77.46 million EB per month in 2027. To accommodate this anticipated growth of data traffic, it's also estimated that 1.56 million private 5G small cells will be deployed by 2027.

This high-density 5G small cell deployment has become the ideal solution to rollouts in urban settings where demand is high and efficient spectrum reuse is essential. Plus, they offer a number of advantages including:

- Fast-deploying
- Simplified planning and ordering
- Custom luminaire and collar options
- A total integrated solution from power to backhaul

Another reason why small cell growth continues to advance exponentially lies in the ease of acquiring zoning approvals in crowded environments. Due to their aesthetically pleasing designs, small cells, also known as metro cells, have made local government approvals simpler. Today, they can be configured where the RF equipment is housed at the top, middle, bottom or integrated in a pole, providing alternatives that can meet even the strictest ordinances. In

addition, many metro cells are physically smaller: smaller radios, more compact antennas and so forth, while still being able to meet performance targets.

While meeting code has become simpler for network operators when deploying small cells, network operators are still challenged with procuring the right location. After all, a small cell site is more than just the radio and antenna—it's also about the power distribution, fiber-optic backhaul connectivity, and ideally, a battery backup power. And unfortunately, these elements aren't shrinking in size as quickly as the radios themselves.

Because the costs associated with the site's installation and management makes a big impact on operations, the added complexity to site architecture and energy use remains the number one OpEx consideration. How can an operator maximize his existing

infrastructure to accommodate the need for smaller cell sites?

A smarter way to power your small cell networks

With a typical three-sector small cell demanding 200–1,000 watts of power, the best way to overcome these interrelated challenges would be by re-evaluating the architecture of small cell clusters themselves. Because many of these functions could be centralized remotely in a hub-spoke architecture, exploring this option makes sense. What if one simple solution could provide reliable AC and DC power connectivity, service continuity via battery backup, as well as fiber backhaul connectivity?

This is where deploying CommScope's PowerShift® Metro shines as a 5G infrastructure strategy. This innovative, patent-pending solution delivers cost-effective power, fiber and battery backup to clusters of small cells up to two miles away. Or said another way, it can cover up to a four-square-mile area, which equated to almost 6.5 square kilometers.

At the heart of the PowerShift Metro solution is a power hub—AC power supply, rectifier and battery backup—that can be deployed from any central location or macro site. This power hub distributes power (from the grid) and up to 144 fiber strands to clusters of small cells arranged in a "hub and spoke" architecture. The power hub also contains enough battery backup to deliver full power to 20-30 small cells should the grid power fail.

In addition, the power hub is a fully self-contained power station complete with cooling, power and space for additional gear—so operators can use it to install and house other components such as virtualized distributed units, baseband units, computer and network switches, and more.

It also features built-in safety features to enable non-certified electrical personnel to install the solution quickly and effectively. In most cases, the cable can be co-routed with other communications cabling. A unique, expandable bus structure lets you add edge nodes or additional power, often

without cable upgrades. Real-time monitoring delivers a wide range of data—like voltage, current, and operating temperature—on-site or from any web browser.

PowerShift Metro also supports applications such as fixed- wireless access points, mobile edge computing, hybrid fiber coaxial cabinets, smart city installations as well as other apps.

A solution such as this can impart a number of highly valuable benefits when deploying 5G small cell clusters in urban settings, including:

- Centralized battery backup resources instead of bulky batteries built into individual sites
- Efficient power management that can be customized to deliver precise voltages
- Less complex sites that are faster, easier and more economical to deploy
- Flexible backup capabilities that enable node prioritization in the event of grid failure
- Intelligent power management to unlock "peak shaving" abilities that can reduce power costs
- Offloaded site functions that enable smaller, more zoning-friendly small-cell form factors

By reducing the number of uncontrolled variables, PowerShift Metro allows operators to have complete control over how, when and where to add small cell coverage—so they can swiftly respond to new market opportunities and reduce time to market while cutting down overall costs and booting network reliability.

5G deployments show no signs of slowing down

There's no question that the growth of 5G will continue to multiply exponentially in the next several years. We know this because all wireless operators surveyed have this in their sites. But not all networks are expected to achieve this on identical timetables.

According to Rethink RAN Research's new study, China will be a primary driver of 5G along with the US, UK, South Korea and Japan. India, on the other hand, will need more time to ramp up to 5G as it

continues to complete a nationwide 4G rollout in order to upgrade 70% of its 1 billion active mobile users who are still utilizing 2G.

So, 5G traffic for mobile users is unlikely to overtake 4G until 2027—although 2025 seems more likely when Fixed Wireless Access is taken into consideration.

Besides, ramping up networks to achieve 5G shouldn't be the ultimate goal as we know that the call for 6G isn't too far behind. Operators should be seeking future-ready solutions that anticipate tomorrow's infrastructure requirements. How network operators step up to the today's challenges of migrating to 5G will determine how smoothly they will be able to transition to the next evolution.

While deploying small cell densification today seems like the ideal solution, exactly how it's implemented will determine how nimble the network will be for what's next. **TR**



This high-density
5G small cell
deployment has
become the ideal
solution to rollouts
in urban settings





Red Hat



Ayhem Al Zaaime, head of telco, CEMEA, Red Hat

Red Hat's telco commitment: Continuous innovation and transformation

Telecom Review secured an exclusive face-to-face interview with Ayhem Al Zaaime, Red Hat's head of telco, CEMEA. Focusing on giving telcos the freedom and flexibility to innovate, this opportunity translates to bringing technology in the right possible way, at the right time, at the right price.

With a decade of partnerships and engagements with telcos within the Middle East and Africa region, Ayhem emphasized on how technology and culture together make Red Hat the ideal choice of digital service providers.

Can you share some details about Red Hat's presence in the telecom sector of the CEMEA region?

Since 2011, Red Hat began partnering with telco customers within this region. What we endeavor to keep from 2011 is the ability for our customers to have the freedom and the flexibility to grow and innovate as they choose.

What Red Hat provides its customers is the framework and the methodology to be able to break away from vendor lock-in by working with an open-source community. Innovation and transformation have always been performed. In 2016, we really focused on the telecom market as a vertical, and our investment continued while putting our interest in certain resources. We partnered with a lot of people to build our ecosystem and start training them.

In addition, we did focus a lot on the local youth and we had an intensive focus on women in IT, specifically in the MENA region. For me, the road we took since a decade ago until where we are today has been an impressive journey. I am privileged to be a part of the vision and foresight in serving our customers from breaking away from the legacy, wanting to expand the horizon and ecosystems, and educating the youth.

What are the obstacles Red Hat's telecom partners face and how do you address them now and gear up for the future?

I think one of the biggest obstacles within all communities that are working to innovate revolves around people. People are not the problem per se, instead, it's more about enablement and training, particularly for fresh graduates to enhance the experience and skill set they have.

We've worked out our large ecosystem consisting of our developer and channel communities. What we are pushing, not just across the Middle East and Africa, but globally, is helping drive IT and transformation adoption amongst the new graduates and the whole ecosystem to really give them the tools that they need not only to find a job but also for life, in general. The skills that we provide our communities are getting them set up to not just do the job and grow, but to be able to meet the requirements of globalization and international communities.

Amid competitors, what makes Red Hat an ideal choice in supporting the transition of CSPs to DSPs?

First and foremost is our culture. Red Hat has always had that startup mentality where usually the best idea wins, but it's really based on meritocracy. We are able to foster that with our partners and with our customers, putting emphasis on making sure that they are continuously innovating and transforming.

Because if you stay where you are, then you're not going to have the ability to compete on an international scale. If you're just stagnant or you're not growing, if you're limited to the features in your product or new technology, then you just don't have the avenue to get to market faster. Personally, I think it's a good time to market, and now it is a race on how quickly can you bring the right service to market. Having said that, Red Hat is equipped not only through its technology, but also its culture, which is widely recognized in the market.

Particularly within the CEMEA region, how can telcos continually leverage cloud-native development opportunities?

We have different requirements that are coming from this industry; just thinking about who's using technology the most and how is it being used. You couldn't find too many similarities, specifically on what's been happening in the last three to five years. The way that technology is being adopted and being used is changing every single day, and you need to have an agile and flexible way of not only building

technology but delivering it to the user and to your platform.

Thus, I think having a heavy cloud-native is just one of the ways to make sure that you're bringing technology in the right possible way, at the right time, and of course, at the right price. These three things are really important factors that must be considered if you want to meet the requirements of the customers.

How would Red Hat's GITEX participation this year influence its telco business strategy?

GITEX provides a fantastic platform for industry experts, for people who are driving change, and for customers, partners, and communities alike to really just share openly and freely. I think there's no other forum or framework on the planet such as GITEX that keeps people who are interested altogether to discuss technologies and innovation. **TR**



What we endeavor to keep from 2011 is the ability for our customers to have the freedom and the flexibility to grow and innovate as they choose





Guillaume Boudin, CEO, Sofrecom

How artificial intelligence is revolutionizing telecoms

Around the world, major telecom operators are leveraging the latest advances in artificial intelligence to better manage their customer relationships or help deploy new high value-added services.

Like all business sectors, the telecom industry is also counting on taking advantage of all the opportunities opened up by Artificial Intelligence (AI). All market players, be it consumer and B2B operators, manufacturers and engineering companies, are moving to integrate AI into their activities.

From your point of view, what is the added value of Artificial Intelligence for telcos?

The ability of artificial intelligence to shape and solve the most critical problems is creating new opportunities in the telecom industry to improve customer experience and operational efficiency across teams and networks.

Provide a new dimension to customers' relationships

AI is at the heart of transformation programs to improve customer management, while optimizing the added value delivered by consultants.

a) Agility and efficiency: When we think of AI and customer relations, we think first of chatbots or callbots. Callbots are directly accessible by customers 24/7 and allow to qualify and potentially process customer requests, whether they are commercial or technical.

b) Prediction and anticipation: Artificial intelligence can also be used to improve the personalized services offered to customers, to anticipate their needs and optimize cross-selling and upselling. Customer interactions can be digital via the operator's portals and mobile applications that integrate these predictive capabilities, or via advisors in stores and call centers who then have access to predictive tools. By identifying and anticipating potential needs or friction points, AI becomes an excellent tool to reinforce customer satisfaction and loyalty.

Improve network management and service quality

At a time when networks are becoming increasingly complex (increasing number of services, diversity of providers, development of virtualization, ...), Artificial Intelligence can provide crucial help in managing networks and improving the quality of their services. Thanks to the very large amount of data provided by telecommunication networks on their operations, and thanks to predictive models from AI, many use cases of AI in network management have arose. These include:

a) Predictive maintenance: Some technical failures (e.g. unavailability of resources, VPN malfunction, etc.) can already be identified or even anticipated. Anticipation is based on data sets describing previous malfunctions and knowing the user impacts.

b) Crisis response: Once an error is detected or anticipated, AI can quickly assess all possible solutions, can

simulate their deployment and measure their effects, in order to propose them to a human operator who can then make a choice among the proposed solutions.

c) Optimizing network operation

in real-time: AI can also consider all the changes it can make to the network configuration and simulate the deployment of these changes in order to evaluate their effects. Artificial intelligence can thus be used to optimize network energy consumption by putting equipment (antennas, servers, fibers, etc.) that is unlikely to be used on standby or, on the contrary, by dynamically allocating more resources to them.

d) Network capex optimization: Some services rely on many metrics that can affect the quality of the user experience. Many of these parameters must be considered as a whole to measure their effects. Without knowledge of these parameter dependencies, it can be very difficult for a network engineer to optimize network parameters for a given customer, but this can be done with an AI tool.

There are many other uses of AI in networks (quality of service optimization, fraud detection, etc.), and this field remains to be further developed. To do so, more data will have to be collected and new predictive patterns will have to be built.

Orange is multiplying studies and projects in order to optimize network management and the quality of their services.

Improve team efficiencies and performance

The AI use cases described above will de facto improve the productivity of customer facing teams (call centers, stores), and those in charge of network maintenance.

This optimized productivity thanks to AI can also be found in many other activities; we will focus hereafter on the activities of the Fiber technicians.

Fiber deployments are a priority for operators. Relying on artificial

intelligence to assist technicians in the fiber rollout not only improves their productivity, but also optimizes the quality of the fiber network.

For example, an AI application can allow the technician to take pictures of the key elements of his worksite (for example, take a picture of the fiber entry point or the optical termination point). The AI analyzes each photo taken by the technicians, it instantly recognizes a non-conformity, dialogues with the technician and allows him to repair the problem online. Technicians thus avoid having to re-intervene due to the non-conformity of the site, which generates additional delays, non-satisfaction, as well as additional operational costs.

AI, acting as a personal assistant for each technician, allows to connect customers faster, to optimize costs, and to be sure that 100% of the works are checked.

What are the challenges of artificial intelligence?

The adoption of AI in business enables working on ever wider and richer scopes of work. It offers a new vision and innovative perspectives to rethink business processes and customer relations and thus gain in performance and productivity. This transformation implies numerous changes at all levels of the organization.

The first challenge of AI is a competencies challenge. Its deployment requires the acquisition of new capabilities to master new technologies, and the emergence of new jobs. The training of existing teams and the recruitment of new skills are crucial.

The second challenge is organization:

How to ensure that AI use cases can be developed in the enterprise's various activities? How to get business teams and AI teams to work together? How to gather and structure all the technical, commercial and marketing data that exists within the enterprise? AI is applicable everywhere, but should we centralize AI experts and resources, or distribute them among the operational teams?

Each organization may have its own answers, but it is important that their questions are well addressed.

The third challenge is related to trust and ethical responsibility:

AI relies on the handling of large datasets, for learning (machine learning / deep learning algorithms). Therefore, it makes operators accountable for using this data, and for respecting privacy and individual rights.

It also involves issues of transparency and fairness: the aim is to guarantee that its learning algorithms do not generate inequalities or exclusion.

These challenges must be addressed communally to make AI a major factor of development for customers and the company.

How does Sofrecom support this transformation?

Sofrecom, a consulting and engineering company specialized in the Telco sector, supports telecom operators in all transformations, and of course in those induced by artificial intelligence.

Our expertise in AI is based on 4 main issues:

- 1- Data Transformation:** We co-design with our customers the best organization to operate the Data foundation that is needed for AI programs.
- 2- Optimized network rollout planning:** We optimize investment choices in fixed, mobile and physical distribution networks,
- 3- Tailored marketing and customer experience:** We help develop customized and differentiated customer experiences;
- 4- Integrating AI solutions:** We help our clients to select high value-added AI solutions for their specific needs, and to implement them in their ecosystem.

These are major challenges for telcos, and their ability to leverage the potential of AI in their business will be key to their success. **TR**



Telcos, industries are moving forward the digital transformation journey

Telecom Review, the Middle East's leading ICT media platform, explored the different areas of digital transformation in its recently-concluded virtual panel titled 'Digital transformation driving the next phase of innovation'.

Live online on November 10, 2021, industry leaders shared insightful views on understanding the cloud's role in digital transformation, meeting emerging opportunities and challenges, innovating business models, and investing in digital skills to meet digital transformation goals, among others.

Kickstarting the virtual event, Toni Eid, CEO, Trace Media and founder, Telecom Review welcomed the speakers and participants and introduced the session's moderator, Ghazi Atallah, former CEO, NXN. The session consists of distinguished panelists namely Sebastian Alberto Delgado, vice president, IoT & AI, Etisalat; Günther Ottendorfer, chief technology & infrastructure officer, Ooredoo Qatar; Karim Benkirane, chief commercial officer, du; and Danial Mausoo, head of sales, mobile networks, MEA, Nokia.

Preliminary

The virtual panel began with Atallah giving an overview of the topic at hand — digital transformation — and the panelists sharing their initial viewpoints.

For Delgado, the topic of digital transformation is very broad because it involves everyone with each having different roles. "It's been accelerated during COVID-19 and now the world is not the same. This acceleration has created a lot of new opportunities in different use cases. One example is cloud adoption which is a key component that all companies and governments are looking at and it's one of the key pillars of digital transformation."

While for Benkirane, as a telecom operator, digital transformation has been a platform to gain the trust of customers and give control in their hands. "It is an opportunity to make sure that we can provide a seamless experience and take the customer to

the next level. The digital tools will also help in creating a new revenue stream that requires investments and different skillset."

Ottendorfer emphasized that digital transformation is a journey and at Ooredoo Qatar, they have structured it into four phases, "The starting point is to simplify and retire legacy systems, then introduce digital enablers and automatization, innovate with new, smaller partners with APIs, and in the final phase, bring that innovation into our core systems and services."

Being relatively new in the Middle East, Mausoo was amazed at the level of intense focus and initiatives that are present in the region, both on the government and operator sides. "Digital transformation allows us to drive continuous improvement and we need to take technology as an enabler. As an industry, we have a role to play in imagining no boundaries and what business models should be."

In-depth discourse

All of the panelists have mentioned technologies such as edge, cloud, 5G, IoT, and AI as important aspects of digital transformation, as well as the necessity of bridging the digital gap of talents. For digital transformation to be fully achieved, a combination of technology and talent should be in harmony.

Moreover, within the session, Atallah has thoroughly questioned the panelists about the relevant measures, particularly in innovation and infrastructure, that should be considered in the digital transformation path, the process of remodeling talents, top B2B segments for digital transformation services, emerging opportunities during COVID-19, and their prospect winners and losers in this era.

Mausoof expressed that digital transformation should be more outcome-based than process-based. Hence, for telcos, transformation is more focused on operational efficiencies as well as resilience. "In telecom and IT, it's always been buying or building, and that has changed. It's not about buying anymore, it's how we consume this overall infrastructure with KPIs falling into operational efficiencies."

Tackling about digital talent development, Benkirane explained how du was able to build an agile ecosystem of digital gurus, alongside their commercial roadmap. "Digital gurus want to keep learning. They know that what they build today will not be relevant tomorrow. This culture of learning needs to be part of HR tools for retention."

Interestingly, in terms of customer experience, Benkirane has mentioned how telcos previously have a negative net promoter score (NPS) which is a widely used market research metric asking respondents to rate the likelihood of recommending a company, product, or service to a friend or colleague. Thanks to digital transformation, the NPS of telcos today are higher. The digital journey also made the concept of a minimum viable

product (MVP) into the mainstream. This is when a new product is introduced in the market with only basic features and the other features are added later on as per feedback.

Taking a regional perspective on the top B2B segments for digital transformation services, Delgado cited a lot of examples of industries that are in this journey. These include smart cities, manufacturing plants, digital health, and automotive. In line with this, emerging opportunities during the pandemic emerged as people rely more on online, eventually leading to the shift towards the cloud.

Mausoof and Ottendorfer have both agreed that the digital government has expedited its services, especially when it comes to healthcare like conveniently checking vaccination status via an app. Mobile money and online learning have also emerged. On the other hand, phygital segments are becoming less demanding as per Benkirane.

When it comes to declaring who will be winners and losers (players or industries) in this digital transformation era on a five-to-ten-year outlook, the four panelists have zoomed in to several priorities.

Delgado said, "It's not a matter of sectors or industries, it's more a matter of how these companies are going to face these changes. At Etisalat, we have created the co-creation labs where we co-create solutions together with our customers, with different methodologies to go for an MVP very quickly and in a very agile way, and from there, we can evolve it."

Delgado believes that the winners are going to be the companies that understand digital transformation and have already started because those that haven't started yet are already late. "The losers are definitely the ones who don't believe that by using digital services, they can improve competitiveness in the market. In addition, Mausoof pointed out, "It's going to be important not to let your eye off the customer and fundamentally, technology investment is a priority. Companies that will invest

in R&D will surely see a good return on the transformation."

Mausoof specified that healthcare will have a massive transformation, with the amount of awareness it receives due to the pandemic. Ottendorfer also added that the push for online education and easier accessibility to a broader range of the population will also win, alongside transport and logistics.

Last of all, Benkirane claimed that there will be no winner or loser, "Across all verticals and industries, we will all win." In the telco space, the fintech industry shows a lot of potential for partnerships and is one of the segments that would continue to prosper.

Briefly responding to the query about security, Ottendorfer stated, "Challenges will be there, but they can be easily mastered in a digital strategy than in a conventional one."

Wrap up

As part of the panel, a three-question poll has been launched to the audience. When asked, "Has your company embarked on the digital transformation journey?" 89% answered yes, 7% answered partially, and 4% said no.

When asked, "Is your company working on developing its employees' digital skills?" 82% answered yes and 18% said partially. For the last question, "Do you consider cloud to be a pillar of digital transformation?" 96% said yes while 4% said no.

Benkirane shared some final thoughts regarding the audience perception which is obviously in line with what has been discussed. "The statistics show that everyone is taking the wave. There is no CIO, CTO, CCO who's not speaking the digital language. No doubt that it's one of the top five agendas of most CEOs today."

Before the panel concluded, Eid commented as well by saying, "It's a fact now, we are living digital. No one will go back to analog transformation. We are all going one way towards digital transformation." **TR**



Bringing connected experiences everywhere on earth

The path to building a truly connected world is closely intertwined with transformation in the telecommunications industry. New technologies, together with global efforts to connect previously unconnected populations, are enabling growth for telcos and mobile network operators (MNOs) across the world.

We asked Mihai Oancea, senior strategy and market intelligence analyst at SES, to expand on the key drivers of change in the industry.

What are some of the major trends in the telecommunications industry?

In the telecommunications space, 5G proliferation is the most significant trend going forward. Today, there are 5G deployments on each continent, with approximately 175 commercial 5G networks deployed globally. As with every new generation of wireless technology, 5G will improve the delivery of mobile broadband services. However, in contrast to previous generations, 5G is also expected to support a wide array of new digital

capabilities—including the cloud and edge computing, Internet of Things (IoT), augmented reality (AR), and virtual reality (VR).

Another important element impacting the telecommunications industry is the growing number of digital access programmes implemented globally. The COVID-19 pandemic has re-emphasised the value of connectivity and the need to bridge the digital

divide. Consequently, telcos and MNOs are required to accelerate the rollout of services to meet universal service obligations (USO) in the regions they serve.

How will 5G, and the technologies it enables, impact enterprise customers?

5G will be a core element of digitalisation across numerous industries. In comparison to 4G networks, 5G can deliver up to 10 times the speed, while vastly lowering the latency. This means it can, for example, enhance machine-to-machine communications to optimise operations at manufacturing facilities. Facilitate VR-enabled medical training in the healthcare industry. And connect thousands of IoT sensors to enable the automated mine. Imagine a fully digitalised mine that can be fully controlled remotely from a centralised operations centre—including drill control, the dispatch of trucks in a pit, train control, and port control. All of this will be made possible using a 5G network. In the manufacturing industry alone, 5G is expected to bring around USD 740 billion in benefits by 2030.

Enterprises today are increasingly looking to leverage private wireless networks at their facilities. According to GMSA, around 25% to 40% of small and medium enterprises are expected to be served by private mobile networks between 2023 and 2025. This represents a huge opportunity for the telecommunications industry—defining and rolling out 5G-based private networking platforms and services can help telcos and MNOs maximise their return on investment.

What challenges do telcos and MNOs face in bringing 5G services to customers?

While 5G brings huge performance advantages to enterprise customers, its perceived benefits over 4G are not as clear for individual end users. A typical mobile user is unwilling to pay for 5G since their 4G network already provides the connectivity they require—whether to browse the internet, stream content, or connect with friends on social media. This

makes it difficult for telcos and MNOs to monetise 5G services for the consumer market today.

In the future, however, the introduction of more connected home devices and AR and VR applications is expected to strengthen the case for 5G in the consumer market.

How is the need for digital inclusion shaping the telecommunications industry?

Globally, connectivity is increasingly recognised as a basic human right. More than 164 countries have introduced digital inclusion initiatives to connect the unconnected.

In developed countries such as the UK, for example, broadband services are required to deliver download speeds of at least 10Mbps across the country. In the US, the Rural Digital Opportunity Fund will facilitate the delivery of broadband services to 5.2 million locations nationwide by 2030. Developing economies are equally invested in bridging the digital divide. India, for example, has the world's largest rural connectivity programme, which aims to provide a minimum of 100Mbps broadband connectivity to the country's 250,000 village councils. And Colombia's rural connectivity programme plans to bring free, high-speed internet to 10,000 population centres in the country.

For telcos and MNOs, meeting USOs is a requirement. Yet, it's not always economically viable to extend networks to rural areas—some regions are difficult to reach via terrestrial fibre due to the terrain, and others are sparsely populated, providing little or no return on investment. Satellite connectivity plays a huge role in helping telcos and MNOs meet USOs while maintaining profitability.

How is SES supporting the telecommunications industry as it evolves?

Reliable, high-availability, and high-performance satellites are crucial to enabling transformation in the telecommunications industry. At SES, we're working closely with industry-leading telcos and MNOs to

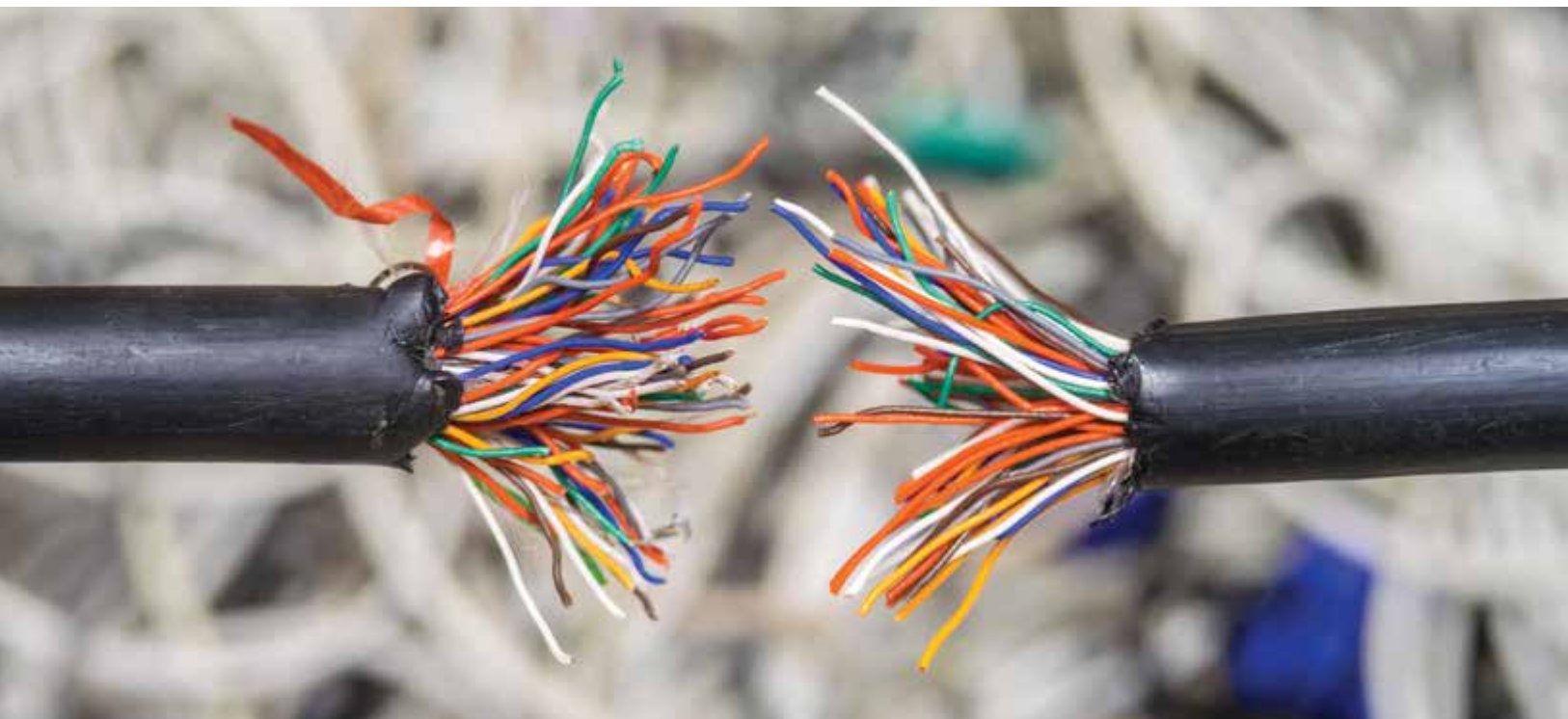
define and deliver fibre-like satellite connectivity services that help them capitalise on new technologies and maximise return on investment. Delivering cloud-grade services, for example, represents a huge opportunity for telcos and MNOs. According to a Gartner report, 55% of all enterprise workloads will be in the public cloud by 2022, and the global public cloud market is expected to reach USD 482.1 billion. At SES, we're partnering with the world's leading cloud service providers to provide one-hop connectivity to the cloud, so our customers can keep up with cloud adoption trends in the market.

Our end-to-end managed services for mobile backhaul enable seamless network expansion for telcos and MNOs, allowing them to reach new subscribers in difficult to reach regions, meet USOs cost-efficiently, and connect remote industries to 5G services. **TR**

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Today, there are
5G deployments
on each continent,
with approximately
175 commercial 5G
networks deployed
globally

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Is there a way out of internet shutdowns?

United Nations emphasized that everyone is protected with the right to access and use the internet and other digital technologies for the purposes of peaceful assembly.

Yet, internet shutdowns have been a growing global phenomenon — from full blackouts that cut off access to the entire web or blocking specific services like social media and messaging apps.

From the infamous Arab Spring until the modern-day shutdowns in India, Sudan, Iraq, Myanmar, Russia, and others, the justifications for shutdowns include national security concerns,

curbing the spread of misinformation, as well as preventing cheating on standardized tests and elections.

All of these have an obvious impact on human rights as well as the economy, healthcare, education, and civil society at large. Telecom operators, service providers, and other digital technology companies have important roles to play in this complex game.

Kicking off the public conversation to address this is the first step but governments should discuss how

they should control the telecom infrastructure in their countries and consider what will be the internet become in the future.

As the age of the shutdown progresses, it is important to know what technicalities are involved in this and how it can be prevented and mitigated by individuals. One related topic on this is the splinternet or the fragmentation of the global internet into multiple national networks held in the vice grip of their respective governments.

How does it happen?

In the first five months of 2021, Access Now, a digital rights advocacy group, recorded at least 50 internet shutdowns in 21 countries worldwide, including the longest internet shutdown ever recorded (Myanmar). In 2019, there were 213 internet shutdowns which partly decreased to 155 during the pandemic year.

When an internet shutdown occurs in a specific country, the technical impact can extend beyond its own borders as we are now living as part of an interconnected network. Thus, shutdowns have a responsibility towards the network and bring the potential to generate high risks. Having said this, there are several methods involved with regards to enforcing a shutdown:

- **Border Gateway Protocol (BGP) manipulation:** BGP is the system that allows a packet of information to find its way from point A to point B through nodes and connections. Via BGP, a user's internet address goes in a node, which in turn is advertised in the network. These announcements are picked up by the nearest nodes and echoed through the whole web, leaving trails. Whoever is in charge of the nodes advertising entry to a cluster of addresses (typically internet service providers) can stop these announcements and block a user's access to the global internet.
- **Middleboxes:** Particularly for security and performance, middleboxes such as firewalls and load balancers are a major part of today's telecom network infrastructure. These can block access to popular websites and communications platforms and services. With the exclusion of all social networks, search engines, news websites, app stores, and video sharing platforms, this method effectively disconnects a population from the world.
- **Throttling:** Slowing down an internet service is a measure employed in communication networks to regulate network traffic and minimize bandwidth congestion. Bandwidth throttling can be executed on a LAN or system admin. In countries that already suffer from poor connectivity,

throttling can be easily covered up as normal connection problems.

- **IP blocking:** IP address blocking restricts access to or from a particular geographic area. For example, content distribution to a specific region through the use of Internet geolocation is blocked entirely. The block-IP-address service is specifically aimed at preventing undesired connections, filtering incoming connections in accordance with preferences at a given time.

As a whole, internet shutdowns can also have a detrimental impact on the domain name system (DNS). Serving as a digital phonebook, when users type a domain name into a browser, DNS is responsible for finding and linking the correct IP addresses to access it. Hence, when shutdowns prevent the mutual flow of traffic, a surge in DNS requests occurs as systems in the impacted country repeatedly try to resolve hostnames. This increased load could slow server response time, causing servers to become unavailable. Generally, DNS servers can fail due to power outages, cyberattacks, and hardware malfunctions, allowing users to experience delays due to high requests being handled by backup servers.

Prevention and mitigation

Internet shutdowns create pressure among ISPs and telecom providers as they are caught between their legal state obligations to the state and their responsibilities to their customers.

The United Nations has pointed out that in general, existing national legislation addressing digital technologies or telecommunications in most countries does not provide accountability on any forms of remedy for victims of internet shutdowns. To address this, effective implementation of the prohibition of shutdowns must be embedded within the legal system.

On the path to ending shutdowns, actions by telcos and internet providers are essential. The UN Special Rapporteur recognizes that these players operate within a framework of laws and government practices that may limit their capacity to prevent

shutdowns from taking place. Thus, telcos must draw the line on where they can prevent any future shutdowns from happening, without risking their selves from non-compliance. Another important business actor in preventing shutdowns is the companies that provide governments with the hardware, software, and other services that support telecom networks.

These products and activities should increase transparency and liability in case they facilitate internet shutdowns. In addition, more distributed internet exchange points, along with increased diversity of internet connectivity at international borders, can be considered to make it more difficult for governments to effectively implement a kill switch order.

Other resources such as mesh networks, virtual private networks (VPNs), and shared proxy servers can also help people connect to the web during unprecedented shutdowns. **TR**



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Zain KSA is the digital sponsor for Saudi Arabia's bid to host 2027 Asian Cup



Zain KSA is sponsoring Saudi Arabia's bid to host the upcoming 2027 AFC Asian Cup as an official digital sponsor. The Kingdom is among the most prominent of the finalists bidding to hold this major event for the first time, along with other Asian states.

A delegation from the Asian Football Confederation (AFC) is currently visiting Saudi Arabia to inspect its readiness to host the tournament in the presence of Minister of Sports and head of the Kingdom's bid to host the 2027 Asian Cup, His Royal Highness Prince Abdulaziz

bin Turki Al-Faisal. The delegates will tour Riyadh, Dammam and Jeddah.

Commenting on this sponsorship, chief communication officer at Zain KSA, Rayan bin Abdullah Al-Turki said, "Zain KSA is an avid supporter of the sports, cultural and entertainment activities hosted by Saudi Arabia, which confirms our commitment to contribute to the Kingdom's global positioning in line with the ambitious goals of Saudi Vision 2030. The Kingdom's hosting of the 2027 AFC Asian Cup is a global, historic event that will be attended and watched by hundreds of millions of football fans world-wide. We, at Zain KSA, are proud to be the official digital sponsor for the Kingdom's bid to host this eagerly anticipated event, which the Kingdom has always been a major part of, having won three AFC Asian Cup titles."

CITRA recognizes Ooredoo as first telco to adopt IPv6 in Kuwait



Communications and information technology regulatory authority (CITRA) ranks Ooredoo as the first telecom company to adopt the sixth version of the internet protocol (IPv6) in Kuwait. This is an important factor for the growth and continuity of internet and

other related services provided by Ooredoo Kuwait for its customers.

Ooredoo has been exerting significant efforts to meet the increasing demand for the existing and emerging communication technologies. Hence,

the company is adapting the most efficient strategies to adopt the IPv6, which is essential for technological progress and goes in line with the aspiration of "New Kuwait 2035" vision.

In the age of streaming data, IPv6 is an important factor in meeting the challenges associated with the fourth generation of Internet Protocol (IPv4), and the growing shortage that has a significant impact on the continuity of service delivery and access in a fast, efficient, and better quality for all its users.

Abdulaziz Yaqub Al-Babtain, CEO of Ooredoo Kuwait, expressed his pride in this recognition, "Today we live in an era of artificial intelligence, development, growth, digitization and accelerating challenges in the technology sector, which requires us to keep pace with change and overcome all challenges that may hinder individuals from enjoying high-quality internet services. These challenges ignite us to continually improve our capabilities and services to provide our customers with the best services".

Zain Group posts 5% net profit growth in 9 months to reach \$450 million



Zain Group announced its consolidated financial results for the third-quarter (Q3) and nine-month periods (9M) ended September 30, 2021. The company ended the period with a stable customer base of 48.4 million customers.

For 9M 2021, Zain Group generated consolidated revenue of KD 1.1 billion (USD 3.8 billion), down 3% year-on-year (Y-o-Y), while consolidated EBITDA for the period reached KD 478 million

(USD 1.6 billion), down 3% Y-o-Y, still reflecting a healthy EBITDA margin of 42%. Efficiency and optimization initiatives resulted in consolidated net income increasing 5% Y-o-Y, amounting to KD 135 million (USD 450 million). Earnings per share amounted to 31 fils (USD 0.10) for the nine-month period.

In Q3 21, Zain Group generated consolidated revenue of KD 385 million (USD 1.3 billion), down 4% Y-o-Y. EBITDA for the quarter reached KD 168

million (USD 557 million), an increase of 3% Y-o-Y, reflecting a 43% EBITDA margin. Net income for the three months amounted to KD 49 million (USD 165 million), a 5% increase Y-o-Y. Earnings per share for Q3'21 amounted to 11 fils (USD 0.04).

Commenting on the 9M performance, the chairman of the board of directors of Zain Group, Ahmed Al Tahous said, "We continue to rollout high quality telecommunications services across our markets in an inclusive manner, empowering and improving the socio-economic well-being of the communities we serve."

Meanwhile, Zain vice-chairman and Group CEO, Bader Al-Kharafi said, "The operational performance that saw net profit growth over the 9M period, despite the huge impact of unavoidable currency devaluations, is testament to the successful implementation of the '4Sight' strategy."

Vodacom Group to acquire 55% stake control of Vodafone Egypt



Vodafone Group has agreed to transfer its 55% shareholding in Vodafone Egypt to Vodacom, its sub-Saharan African subsidiary. This transfer simplifies the management of Vodafone's African holdings and further strengthens the delivery of

connectivity and financial services in Africa.

Subject to regulatory and shareholder approvals, Vodacom Group will fund the acquisition of a 55% stake in Vodafone Egypt by issuing 242 million new ordinary shares at R135.75 per share and R8.2 billion (US\$548 million) in cash. This values the proposed transaction at circa R41 billion or US\$2.738 billion.

Commenting on the proposed transaction, Shameel Joosub, chief executive officer of Vodacom Group, said, "Acquiring a majority stake in Vodafone Egypt would cement Vodacom Group's position as Africa's leading techco by advancing our strategic connectivity and financial services ambitions while increasing our total population coverage on the continent to over half a billion people and more than 40% of Africa's GDP. Vodafone Egypt is ideally positioned

to capture growth in a burgeoning ICT market, which means the proposed acquisition provides our shareholders with an exciting revenue and profitability diversification opportunity and the potential to accelerate the Group's medium-term operating profit growth potential into double digits. We intend to provide an update on our medium-term targets at our full-year results, which will be reported in May 2022."

An established brand, Vodafone Egypt is the largest mobile network operator in Egypt with a 43% revenue market share, offering a range of integrated telecommunications services including voice, data, and mobile money services to 43 million consumer and enterprise customers. Egypt's appeal as an investment destination is supported by its economic growth outlook, large, young, and growing population, and structural reform agenda.



M2M security:

A must-have for business continuity

Lightning-fast download speeds, instant connections, and the affordability of connectivity are making modern communication increasingly reliant on IoT devices for various purposes across industries and homes.

During the pandemic, the global market for connected home machine-to-machine (M2M) was estimated at \$7.6 billion in 2020. It is now projected to reach a revised size of \$15.8 billion by 2026, growing at a CAGR of 12.8% over the analysis period. Machine-to-machine (M2M) technologies allow both wired and wireless systems to communicate with other devices of the same ability and can be used in a wide variety of applications for monitoring and control purposes. For instance, in the energy sector, Huawei provides smart solutions to achieve high-quality development and build low-carbon, safe, green, and efficient smart energy systems through the

Internet of Things (IoT) applications. On the personal use front, experts predict that M2M technologies in combination with smartphones will become integral elements in smart homes. Meanwhile, wireless technology is projected to record a 14.7% CAGR and reach \$12.7 billion by the end of 2026.

Further, the rollout of 5G is expected to accelerate the adoption of massive MTC (mMTC) and IoT space that have been somewhat limited because of latency and download speeds of the previous generation of networks. Adapting to these trends, communication service providers (CSPs) and enterprises must launch new services and generate revenue streams efficiently to survive in the global digital transformation

journey. However, a serious question on security still exists as malicious actors can break in from one single IoT sensor to hack into a corporate network to launch ransomware attacks and whatnot. Moreover, practices such as data surveillance called sensory surveillance by vendors passively gather user behaviour data across all the human senses of sight, smell, hearing, taste, and touch through the multi-sensory triggers inserted in these smart devices. Some tech vendors are even going to the extent of selling this customer information for targeted and mostly unsolicited ad-marketing campaigns. Given the increasing extent of IoT applications, the need for proper, robust M2M security is vital for companies to keep their businesses up and running.



Here are some of the security strategies recommendations by experts for safeguarding the M2M environment:

User awareness and training: In cybersecurity, humans are considered the weakest links. Hence hands-on integrated security skills and training are inevitable for all concerned employees for the safe operation of organizational systems. Any user of the applications on the network must be adequately educated about the security best practices to ensure the resiliency of critical infrastructure at all times.

Configuration and patch management: Configuration management (CM) of the information system components is conducted for proper alignment of compatibility, functionality, and performance to drastically minimize vulnerabilities and risks. It is aimed at supporting the product life cycle as well as safe operation and maintenance. Patch management on the other hand involves identifying, procuring, installing, and verifying software or firmware upgrades. An effective patch management program

ensures all identified information system components are the latest version, as specified and supported by its vendor.

Minimizing attack surfaces: Malicious players could find a vulnerable attack surface of an organization for hacking into business-critical assets. Using a firewall and preventing ports from staying open can make it difficult for break-ins as will isolating networks internally and externally. As networks grow, complexity grows resulting in the creation of exposed weak points. Curtailing and limiting such complexity is important. Using digital twins to simulate potential attack threats is also a great way to safeguard attack surfaces in advance.

Application whitelisting: Application whitelisting aims at preventing malicious programs from running on a network by monitoring the operating system to prevent any illicit files from executing. Application whitelisting provides control over which programs are permitted to run on a user's machine or a network by the administrators of an organization, rather than the end-user. Any program not specifically whitelisted is blocked.

Managing authentication: It is critical that all machines in a network be able to authenticate to establish their identity. CSPs can manage M2M and consumer device subscriptions for eSIM- and iSIM-enabled devices. Embedded SIM (eSIM) and integrated SIM (iSIM) are technologies used for authenticating users and devices on mobile networks. For instance, Nokia's iSIM Secure Connect builds on that technology by managing device subscriptions linked to trusted digital ID for public and private e-services. In contrast to physical SIM cards, eSIM and iSIM can store and manage multiple subscription profiles remotely. The vendor-agnostic software can work in various network and cloud environments, supporting current and future IoT business and operating models, use cases, and monetization strategies.

Securing remote access: The practice of secure remote access

involves a combination of security processes or solutions aimed at preventing unauthorized access to an organization's digital assets and preventing the loss of sensitive data. Technologies such as endpoint security, virtual private network (VPN), zero-trust network access (ZTNA), network access control (NAC), etc must be an integral part of security hygiene. An IoT security strategy must incorporate Zero Trust to enforce policies for unauthorized access control that support existing firewall investment for integrated security posturing. The solution should intrinsically apply security policies based on the intensity of malicious behavior detected in IoT devices. A unified security policy management and secure access service edge (SASE) to WFH employees is highly recommended.

Monitoring attack penetration: A penetration test involves a simulated attack on a device, network, program, platform, wireless network, or employees to find bugs and vulnerabilities. Such tests can identify flaws in the processes, network infrastructure, firewalls, access points, staff, or physical assets. It helps in re-confirming if the implemented safeguards are watertight protection against a data breach as well as provides information and guidance for developing an organization's security policies and plan of action in times of security breaches.

From a business perspective, there is palpable demand from consumers for companies to embrace IoT and M2M technology in their product and service offerings. Moreover, 5G connectivity will allow for easier, more reliable, and better results to provide that business-winning level of service. The scope and benefits of the M2M applications of 5G extend to all industries that use electronic machinery or equipment for their operations, ranging from transport, manufacturing, healthcare, education, and so on. However, the M2M security issue must at all times be strengthened and monitored for sustainable business continuity with a well-executed response plan in place for unsolicited cyber break-ins. **TR**



Survival strategies of smaller OTT players

In 2019, Verizon and Snap Inc., the creator of Snapchat, forged a first-of-its-kind partnership to leverage Verizon's 5G ultra-wideband technology to support Snap's augmented reality, visual communications, and content experiences. As 5G innovation partners, the companies used Verizon's 5G Labs to create new experiences for consumers, including opportunities to experience live events in new ways through Snapchat.

Verizon 5G ultra-wideband's low latency, fast speeds, and high bandwidth have enabled Snap's AR innovation through cutting-edge live and interactive platforms that create location-based entertainment experiences as well as unique in-stadium experiences during games.

Such strategic moves from OTTs such as Snapchat have cemented its position in the market with an ever-increasing subscriber base.

With the world getting increasingly connected, the content consumption trend has gone through the roof. The global OTT market size was valued at \$121.61 billion in 2019 and is projected to reach \$1,039.03 billion by 2027, growing at a CAGR of 29.4%

from 2020 to 2027. According to recent market research, Video on Demand (VoD) market was valued at around \$38.9 billion in 2019 and is expected to reach over \$87.6 billion by 2026, growing at a CAGR of around 12.3% during the forecast period from 2020 to 2026.

Players entering this relatively new market are in for bigger opportunities; however, the market landscape is

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not without challenges that they must override to achieve their goals.

Primary challenges

Since the OTT business model involves a high volume of transactions every single day, managing varying billing cycles and payments of clients is something that OTTs players must be prepared to handle.

In this space, there are no guarantees of consistent or normal traffic, especially with live streaming. OTTs must be able to scale quickly with reliable service delivery and transaction processing. It helps to be proactive rather than reactive and planning for these activities spikes in advance.

A new and ever-changing industry like OTT requires the ability to quickly change the structure of how best to sell products to meet customer demands. Creation and development of smart plans or smart bundles by providing

different levels of access and different ways to package content are key. The bundles need to be flexible by providing a package of services that directly meets the needs of consumers.

The inability to provide the right downgrades in subscription models can cause customers frustration and confusion, leading to attrition while not providing the right upgrade can lead to revenue loss. OTTs must ensure that they are providing the flexibility to customers to upgrade and downgrade easily given the complexity from a billing standpoint.

For subscriber growth, it is important to target new segments and maximize sign-ups or encourage previous subscribers to reactivate their accounts. This is easy when dealing with a small number of subscribers, but targeted marketing and customized promotions can be cumbersome with a huge growth of subscribers.

With such a high volume of transactions and high velocity of credit cards transactions, involuntary attrition due to credit card declines and non-payment can contribute to revenue loss. Moreover, fraudulent clicks on digital advertisements are one of the major challenges faced by OTT players globally. 'Malvertising' spreads malware through the use of malicious code into online display ads via online advertising networks, exposing user networks and connected devices to the potential risk of infection.

Digital transformation frameworks

Over-the-top (OTT) digital media services companies exploring the Middle East market must bear a few things in mind when they go about promoting their offerings. Digital solutions providers can collaborate with telecommunications companies to offer viewers access to on-demand content, games, and entertainment



channels. With telcos betting big on data, partnerships with telcos are also emerging as an important medium to reach a large user base. OTTs work closely with telco operators for connectivity as well as payment services. Hence, a collaborative relationship with telcos and third-party service providers is important. For instance, Netflix rolled out its mobile games globally to members with Android devices, exploring new ground amidst stiff competition from the likes of Disney and HBO. Users will only require a Netflix subscription to play those games and there will be no additional fees or in-app purchases. By offering games for free, Netflix aims to retain the existing customer as well as attract new customers.

Regional content focus

Market findings suggest significant interest in regional content among the region's young generation, indicating a cultural shift in the media and

entertainment industry. Untapped demand for local Arabic content could be an important business growth driver, allowing regional media players an opportunity to reorganize their business models and explore investments in high-quality local content. OTTs can work with local content providers and creator communities to continuously deliver fresh and relevant content for regional subscribers in addition to the global audience.

Partnership with digital players
To develop innovative customer experience within the digital media space, Middle Eastern countries are also experiencing partnerships between customer management service providers and SVOD service providers. For instance, in August 2021, OSN picked Evergent to help with monetization and customer management for OSN's new streaming video service in the MENA region. Moreover, the company is the exclusive distributor of new Disney+ Originals in the Middle East and has long-term partnerships with major studios, including HBO, NBC Universal, FOX, Paramount, MGM, and Sony. Importantly, securing content at the source helps limit the instances of security breaches. Hence, adopting end-to-end content protection technologies such as intrusion detection systems, audit trails as well as technologies that control physical access to server facilities are critical for organizations.

Introduce automation and tech for frictionless support

OTT players need to act quickly when it comes to getting up and going with the subscription platform. As the industry is changing quickly, laxity in internal office operations can drastically hamper customer experience. By introducing automation such as robotics process automation (RPA) to core functional departments, companies can reduce expenses, improve compliance, and increase overall productivity. Further, cloud computing allows for easy processing and inter-department movement of data. Data as a service along with mobility solutions enable

employees to access data anywhere anytime, which in turn enhances employee productivity and helps the company scale its back-office operations. Additionally, artificial intelligence and cognitive computing are also being leveraged to contain rising costs.

Utilize data efficiently to deliver personalized experiences

It is difficult to innovate without the knowledge of what is working and what is not. To drive audience engagement, understanding every aspect of the consumer's interests and dislikes is of massive importance. Hence, the role of data analytics to answer these questions is vital, and organisations need to effectively leverage consumer data to achieve near-accurate decision-making processes. Further, advanced analytics combined with a flexible subscription management platform to measure the success and performance of different bundles, price points, and other subscription tactics is important to feel confident about testing and reiterating. OTT TV market has seen a fair share of growth in the Middle East. To provide the best viewing experience for its subscribers, OTT service providers can utilize advanced analytics and churn prediction metrics to adjust to their customers' preferences and reach more audiences in the MENA region.

The Middle East market environment is highly competitive with increased mobile penetration and internet subscriptions and a huge number of social media users. The market presents opportunities for growth, which is expected to drive the competition further. Without a doubt, the OTT space will witness significant growth soon; however, like any business sector contemplating digital transformation, OTT players must constantly monitor and assess the dynamic digital pathway to realize their full potential by keeping pace with technological innovation, changing customer perspectives and embrace the spirit of organizational agility as an intrinsic business strategy. **TR**

Huawei iSitePower-S achieves a green and low-carbon campus, bridging the energy divide in Nigeria



Huawei has launched the iSitePower-S hybrid power solution in Nigeria. This solution provides economical, green, and reliable power supply for livelihoods and production in areas with poor or no mains supply, improving the working conditions and living environment for local people.

Soon after the launch, Huawei deployed the iSitePower-S hybrid power solution in a local campus. The solution enables efficient switching between the solar power system

and intelligent lithium battery energy storage system, shortening the genset runtime and reducing genset power generation costs and carbon emissions. Genset power generation is polluting, unreliable, and costly. By shortening the genset runtime, the solution addresses these issues and improves the living and working experience on the campus. It can be replicated and promoted as a green low-carbon campus solution that allows greater access to green and inclusive power supply through large-

scale application.

The iSitePower-S hybrid power solution used at the campus consists of 160 PV modules, high-density iMagicPower, CloudLi smart lithium batteries, and an intelligent energy scheduling system. The solution is easy to deploy thanks to its modular design, and equipment is transported and installed without the use of large-scale machinery, requiring just a single week to complete installation, commissioning, and service rollout.

The solution uses an innovative eMIMO technical architecture to support efficient and intelligent power generation, conversion, distribution, and consumption, delivering 20% higher energy yields than a traditional solar solution. Huawei's fifth-generation CloudLi offers enhanced performance and prolonged service life, reducing energy storage costs compared with traditional lithium batteries and lead-acid batteries.

CommScope simplifies field installation of future fiber networks



CommScope announced its new hardened connector Prodigy™, designed to accelerate and simplify field installation for the fiber networks of the future.

The Prodigy system utilizes universal, small-form hardened connectors for interoperability across different fiber terminals and cable assemblies. The compact footprint enables smaller, higher-density terminal footprints, while the self-aligning connectors minimize the chance of connection errors. To facilitate cable changeouts

and upgrades, the system allows converter attachments to be deployed without replacing or splicing the drop cable.

"Prodigy revolutionizes network architecture by making FTTH installations truly plug-and-play," said Rob Wessels, vice president, Network Cable, CommScope. "We worked closely with our global operator customers to create and refine Prodigy—applying our broad vision for faster and simpler FTTH networks to building the best connector solutions.

These hardened connections will enable operators to simplify installation and minimize their cable footprint today while facilitating the necessary upgrades and maintenance to their networks for years to come."

Prodigy addresses the key demands of modern FTTH installations: speed, density, reliability, flexibility, scalability, and ease of installation. Highlights of the Prodigy system include:

- Universal, small-form hardened connector for high-density environments
- Self-guided automatic alignment with self-locking mechanisms for eliminating connection errors and accidental release
- Break-free design enabling reuse of the Prodigy connector in the event of field connection issues
- Cable assemblies available with 5mm round and figure-8 cables in lengths up to 600 meters.

Vodafone, VMware partner to accelerate enhanced network features



Vodafone has collaborated with VMware to accelerate the roll-out of new digital services, using one scaled platform for networks and IT systems, across Europe. This allows Vodafone to quickly implement and manage new software, applications, and processes across any mobile infrastructure and any cloud.

The first application for the common platform will be the provision of 5G standalone (5G SA), giving Vodafone the ability to automate and orchestrate new

applications based on this technology in multiple countries at the same time. Other new services will quickly follow, like enriched voice services over data, the connection of many more Internet of Things (IoT) devices, and next generation video conferencing and Virtual and Augmented Reality.

With 5G SA at the core and in the cloud, Vodafone will offer customers dedicated slices of its high-speed network, quickly and on a large scale, to support critical applications requiring

ultra-low latency connectivity, such as connected vehicles and industry 4.0. In this scenario, all elements of the network use 5G, instead of the more common method of overlaying 5G equipment over a core 4G network infrastructure.

Working with VMware, Vodafone has already completed the virtualisation of its non-5G core network infrastructure across its European operating companies and 21 markets in total. This means Vodafone can securely design, build, test and deploy next generation functions 40% more quickly and for half the price.

Johan Wibergh, chief technology officer, Vodafone, said, "Having launched the first 5G standalone network in Europe, we are now putting all that power into a single cloud-based platform to simplify operations and rapidly respond to customer's needs across Europe and Africa."

SES, Isotropic Systems complete first-ever simultaneous multi-orbit antenna field tests



SES and Isotropic Systems, the leading developer of transformational multi-link satellite technology, successfully completed the first-ever simultaneous multi-orbit antenna field tests, a game-changing development empowering a new age of connectivity on land, in the air, and at sea for both civil and defense communications.

Isotropic Systems' UK-built multi-link antenna underwent a series of field tests at SES's Manassas, Virginia teleport. The terminal established multiple simultaneous, full-performance

link connections with SES satellites – linking to a geostationary (GEO) satellite while simultaneously connected with an O3b satellite in medium earth orbit (MEO).

"The success of these multi-orbit antenna trials opens the door to a new level of multi-orbit service delivery, as we integrate our geostationary satellites with our second-generation low-latency, high-throughput O3b mPOWER system to provide seamless services for our customers," said Steve Collar, CEO of SES. "Isotropic's unique

architecture enables our customers to be connected to multiple simultaneous beams from both GEO and MEO satellites, enabling us to deliver industry-defining performance and orbital resilience services. It is a game-changer for resilient, secure, global networks built on SES's state-of-the-art fleet."

Currently, users are reliant on legacy ground antennas that only connect to a single network at a time. This industry breakthrough enables satellite end-users to combine the best attributes of all available networks achieving superior network uptime and application performance. Isotropic's deep tech solution multiplies the performance of single antenna solutions to transform the global appeal of satellite connectivity, ensuring critical defense communications infrastructure and delivering multiple broadbands that are highly reliable.



Tech-celeration:

rapid adoption of technologies

Perhaps the most pressing concern for humans today is the likelihood of their jobs being taken away by emerging technologies such as AI and robotics soon. However, if it can bring some solace to the human kind, a top European Commission (EU) official has opined otherwise.

“About 50% of today's jobs could be automated by 2050. At the same time, new jobs will appear. The green transition will keep generating demand for low- and medium-skilled roles in the energy sector, with 75% of employees expected to be manual workers and technicians in 2050,” said Maros Sefcovic, European commission vice-president for inter-institutional relations and foresight. He also said that post-pandemic, Europe is in shortage of labour to fill up posts created by the adoption of digital technologies.

Since the 2010s, we have witnessed significant technological advancements and consequent societal shifts. Often, we even seem to forget when we started using the Internet as it has today become a part and parcel of our daily living. We get into online transactions without a second thought and social media has become our personalized source of entertainment. Over the coming years, more and more technological advances will take place and it is fair to say that advancements in digital electronics such as powerful

processors and sensors, memory capacity, and size of pixels in digital cameras have been a driving force of technological and social change, productivity, and economic growth. The progression of mobile networks from 3G, 4G, and now to 5G has brought about a total change in how we spend our time, money and interact in our communities.

The advancement in technology has helped humanity in many ways; however, it has also brought in some challenges to deal with.

Tech-safe roads

The UN's sustainable development goals (SDGs) aim at reducing the annual rate of road deaths globally and ensuring access to safe, affordable, and sustainable transport for everyone by 2030. According to the newly launched initiative, faster progress on artificial intelligence (AI) is vital to make this happen, especially in low and middle-income countries, where the most lives are lost on the roads each year. According to the World Health Organisation (WHO), approximately 1.3 million people die annually as a result of road accidents, and between 20 and 50 million more suffer non-fatal injuries, with many life-long disabilities. For instance, to address this issue, researchers from MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) and the Qatar Center for Artificial Intelligence have developed an AI model that can predict traffic patterns with high-resolution risk maps. With the use of road maps, satellite imagery and GPS traces, the risk maps can predict crashes and identify high-risk areas in great detail.

Tech-celerating education

Technology is enabling access to education to millions worldwide. The adoption of technology in the education sector is witnessing phenomenal growth. With the use of emerging technologies such as AR and VR, knowledge sharing and imparting has reached another level. Simulation and 3D printing is helping students learn and understand their subjects in a deeper way whilst shortening the knowledge gap. As a prime example, UNICAF, an online and blended learning higher education platform in Africa has provided almost \$30m in scholarships to students in sub-Saharan Africa since 2012. Unicaf uses the latest technology and innovative tools to enhance instructional methods' effectiveness and improve the student learning experience.

Enabling industries

From agriculture to heavy manufacturing and from retail to telemedicine the significance of technology has grown many folds. It has enabled safety, simplified

operations, and halved the cost of doing business. Advancements in the ICT industry, combined with superfast connectivity have increased job opportunities and fostered economic growth. The internet has made distance communication not only possible but also affordable. Through automation, supply chain managers can track and monitor their products on their journey to the market drastically reducing inventory and downtime. In addition to that e-commerce and online banking, capabilities have also helped reduce the cost of doing business.

Evils of tech-celeration

However, as always, we cannot overlook the downside of this technological acceleration. We are swamped with issues that were hitherto not known to humans. We spend massive amounts of money and time and energy fighting cybersecurity issues. To take an example from recent news, the United States government has offered a reward of up to \$10million (£7.4m) for information about the hacking group known as DarkSide. In May, a DarkSide ransomware attack shut down a vital 5,500 mile-long fuel pipeline on the east coast of the US. The cyber-attack caused fuel shortages after the Colonial Pipeline company shut down its operations for several days. It eventually paid the \$4.4m ransom in Bitcoin. In other news, hackers broke into FBI email system and sent tens of thousands of messages warning of a possible cyberattack. This is believed to be the first known case of a seemingly malicious actor gaining access to one of those systems to send spam to a large number of people.

Keeping pace with the technological progress

5G networks will enable unimaginable services using network slicing, edge connectivity, and private networks combined with the virtualized power of the Cloud. Telcos are at the heart of this massive paradigm shift where issues of ethics of artificial intelligence, data privacy, governance in digital innovation and green digital transition cannot go unanswered.

A recent survey with 600 global executives from the VP and board level on achieving digital transformation at scale revealed that business continuity, competitive advantage, and end-to-end process automation as key pillars for leading businesses. The survey also revealed the importance of structuring data to gain positive insights to improve businesses, but 75% of most enterprises' data is unstructured and the difficulty level of turning it into standardised structured data (i.e. data that has been organized or indexed for easier referencing) is preventing companies to use them.

The Middle East has kept a steady pace with its adoption of new technologies in the market and realizing the value of digital transformation. Conversely, the telecom industry is at the heart of the developments in the future trends in the economy and promoting entrepreneurship to create opportunities and develop new business models based on knowledge and innovation. However, to create a level playing field, the support of international cooperation and comprehensive global dialogue to move towards a brighter future is a must. "It is very important for CIOs and businesses to align their IT and digital transformation strategies with the new upcoming and new age digital trends," says Waqas Ahmed, digital transformation advisor at the Ministry of Tourism of the Kingdom of Saudi Arabia.

The telecom sector must collaborate with governments, international organizations, and individuals to establish robust communication for framing workable strategies to move forward in the digital transformation journey as different countries have their own set of policies and regulations governing their ICT infrastructure.

Ultimately, it is not only about technology, but about how human talents can work in tandem with advanced technologies to be deployed effectively across all sectors whilst preserving the environment and ensuring the sustainability of natural resources as we drive towards the future. **TR**

Huawei, China Mobile to back Haier for 5G-powered smart manufacturing solutions



Huawei and China Mobile are supporting Haier, China's largest consumer electronics and home appliance producer, in successfully applying innovative manufacturing solutions combining 5G and mobile edge computing in its smart factories.

Developed at a joint-innovation base, the solutions integrate 5G edge computing with artificial intelligence and machine vision in manufacturing

environments. They are applicable to various manufacturing scenarios where they can perform a variety of functions. Haier has launched the technologies at seven smart factories in China and plans to expand the implementation to 20 factories by the end of 2022.

Huawei is expected to help Haier deploy the 5G solutions and transform about 100 of its manufacturing facilities globally within five years. The three

partners also developed technologies to boost site and staff safety. Unlike traditional video surveillance systems, AI surveillance can automatically create alarms in real-time when it detects anomalies on the factory floor. The technology can identify non-authorized individuals, process safety violations, and workers who aren't where they should be.

In addition, the new solutions help to efficiently coordinate a large number of people, machines, and materials involved in a complex production line as a whole. The solutions achieve this through high-definition cameras, 5G gateways, and smart industrial terminals that work in unison with the help of artificial intelligence.

In the future, the solutions will be further improved to provide "digital twins" visualization. Digital twin makes just-in-time preventive maintenance a reality and enables the simulation of changes to the production process before they are implemented.

Nokia, Earthlink to help Iraq leapfrog in digital economy with high-capacity IP metro network



Earthlink will use the Nokia solution to build a high-capacity IP metro transport network in 15 provinces in the country, as part of the Iraqi National Backbone project. Nokia will set up 60 new nodes, one in each exchange as part of the initiative. After its deployment later this year, Earthlink can cost-effectively provide high-speed broadband to 3.5 million people and help the country leapfrog in the growing digital economy.



With the Nokia solution, Earthlink can automate the network with the Nokia Network Services Platform (NSP) leading to simplified management, reduced costs, and improved network responsiveness and resiliency. Nokia will also provide I&C and professional services for the smooth and timely execution of the project.

Commenting on the partnership, Dr. Alaa Mousa, deputy chief executive officer

at Earthlink, said, "We are excited to be working with Nokia for the crucial project of setting up future-ready agile and resilient IP Metro network for the National Backbone that will empower Iraqis to benefit from high-speed broadband for overall economic and social growth."

Meanwhile, Mohamed Faisal, head of the Iraq customer business team at Nokia, said, "As the digital ecosystem becomes all-pervasive, new applications stemming from 5G, IoT and Industry 4.0 place new demands on the networks. Our field-proven 7750 SR and 7250 IXR routers are designed to deliver massive scale while ensuring extreme availability and superior quality. We are thrilled to work with Earthlink to build the Iraqi National Backbone to address the growing demand for high-speed broadband."

Benya Cables signs \$30.60mln financing deal with Banque Misr



Benya Cables, a subsidiary of Benya Group, signed a facility agreement worth EGP 481 million with Banque

Misr on the sidelines of the Cairo ICT exhibition. The facility will be used to finance the establishment of the

largest fiber-optic cable factory in Egypt at the highest level over an area of 40,000 square meters in the Suez Canal Economic Zone, according to an official statement. The project is set to meet the demand for fiber optic-cable products in Egypt and the Middle East and Africa (MEA) region.

Benya group operates across various ICT verticals, offering a wealth of products, services, and digital solutions. The Group's portfolio includes telecommunication services, cloud, security solutions, and data centers, as well as manufacturing technology-based solutions and systems integration.

MYCOM OSI launches enterprise assurance solutions for service providers



MYCOM OSI, a leading independent provider of assurance, automation, and analytics solutions to some of the world's largest communications service providers (CSPs), launched its own enterprise assurance solutions for CSPs to help them deliver and assure high-capacity and high-reliability advanced connectivity services for enterprises.

The solutions enable proactive, real-time identification of service

quality and customer impact analysis, providing visibility of the enterprise SLAs, and correlating network issues to enterprise experience.

The MYCOM OSI enterprise assurance solutions, operated on Amazon Web Services, introduces advanced support for enterprise services, such as fixed and mobile broadband, IPTV, IP-VPN, SD-WAN, and 5G slicing based digital services, enabling CSPs to maintain the high performance for their

corporate, wholesale and enterprise business units. The solution provides intelligent correlations between a range of data sources, unified networks, and service topology.

"We are delighted to extend our Telco Transformation Solutions by introducing Enterprise Assurance to the portfolio," said Mounir Ladki, president and CTO at MYCOM OSI. "For CSPs offering advanced differentiated 5G services to their enterprise customers, service performance and reliability are increasingly meaningful as a differentiator and monetization enabler. Using analytics, automation, and closed-loop, we offer the highest performance and reliability required for advanced connectivity services."

"As CSPs accelerate their 5G coverage, the Enterprise Assurance Solutions support them with a single-pane-of-glass, identifying problems before the enterprise customers are impacted, providing visibility of the enterprise SLAs. It also offers service performance status to the enterprise through an enterprise portal," said Jithu Raghavendran, VP-telco transformation solutions at MYCOM OSI.

Nokia reaches 4,000 5G essential patent families



Nokia reached the milestone of 4,000 patent families which is declared as essential to 5G standards. The milestone reflects Nokia's continued leadership in cellular technology R&D and standardization.

The telecom vendor's industry-leading patent portfolio is built on more than €130 billion invested in R&D since 2000 and over three decades of driving cellular standardization and contains

around 20,000 patent families.

Jenni Lukander, president of Nokia Technologies, said, "We're proud to have reached the milestone of 4,000 high-quality patent families declared as essential to 5G but the work does not stop there. Our focus is on innovating for the future. Driving the development of the next generation of cellular standards and enabling entire industries to build upon our inventions."

Several independent third-party studies have confirmed Nokia's leadership in standard-essential patents, including 5G, and this year Nokia became one of the first companies to achieve ISO 9001 certification for its high-quality patent portfolio management.

Nokia contributes its inventions to open standards in return for the right to license them on fair, reasonable, and non-discriminatory (FRAND) terms. Companies can license and use these technologies without the need to make their own substantial investments in R&D.

Nokia has played a pivotal role in defining many of the fundamental technologies enabling 5G, working with the 3GPP organization to establish 5G standards, and enabling the rollout of 5G networks. As the deployment of 5G accelerates, Nokia's 5G technology will enable a wide range of use cases, including immersive experiences, connected vehicles, and cloud robotics.

Ericsson to support Asiacell to modernize and expand its LTE network in Iraq



Ericsson will partner with Asiacell to enhance and improve LTE services in Iraq. The ongoing project will see Ericsson modernizing and expanding Asiacell's LTE network and supplying Asiacell with the latest Radio Access Network (RAN) equipment from the Ericsson Radio System.

Ericsson has a long-standing partnership with Asiacell spanning nearly a decade and has constantly collaborated in elevating



communications in the region including network design and optimization. Ericsson's technology and solutions will help Asiacell meet the challenges of today's multi-channel, multi-platform world and continue to deliver high-performing mobile services to its subscribers.

Commenting on the partnership, Amer Sunna, CEO and managing director of Asiacell, said, "Asiacell plays a vital role in raising the level of communications

infrastructure in Iraq, that is why we ensure the latest technology readiness in everything we do. We are sure that our partnership with Ericsson will take our customers' mobile experiences to a completely new level and help them realize the full promise of the Internet".

Meanwhile, Kevin Murphy, vice president and head of Ericsson Levant Countries at Ericsson Middle East and Africa says, "Today's new partnership with Asiacell marks an important milestone in supporting Asiacell enhancing their LTE services and bringing new communication capabilities across the country. As network technology is becoming critical infrastructure for the development of any nation worldwide, we stay committed to continue supporting Asiacell in bringing the many possibilities of the next generation communication technologies to its customers".

CommScope reports third quarter 2021 results



CommScope Holding Company, Inc., a global leader in network connectivity solutions, reported results for the quarter ended September 30, 2021.

Net sales in the third quarter of 2021 decreased 2.9% year over year to \$2.11 billion. Core net sales increased 6.0% year over year primarily due to higher net sales in the Outdoor Wireless Networks and Venue and Campus Networks segments

while GAAP cash flow from operations was \$67.1 million.

As of September 30, 2021, the Company had no outstanding borrowings under its asset-based revolving credit facility and had availability of \$686.4 million, after giving effect to borrowing base limitations and outstanding letters of credit. The Company ended the quarter with total liquidity of approximately \$1.098 billion.

Commenting on the results, Chuck Treadway, president and chief executive officer, said, "Our third-quarter performance and financial results reflect the ongoing challenges associated with the global supply chain disruption, increased costs of materials and freight, and semiconductor chip shortage occurring across our industry and broader economy. While we continue to experience strong demand for CommScope's products and services, we expect these significant headwinds to persist in the near term. We are actively and swiftly addressing external pressures and are engaging with our customer base regarding pricing adjustments, as well as operational measures to make up for inflation effects. Our teams remain laser-focused on executing on our CommScope NEXT strategy and achieving our goals of incremental growth, cost optimization, and shareholder value creation."

Red Hat Enterprise Linux 8.5 adds new and enhanced capabilities



Red Hat Enterprise Linux 8.5, the latest version of the world's leading enterprise Linux platform is now generally available via the Red Hat Customer Portal. Red Hat Enterprise Linux offers a common, open operating system that extends across clouds, traditional data center operations, and out to the edge.

"Linux is the common language spoken across nearly every public cloud, private cloud, edge deployment, and

data center. Red Hat Enterprise Linux 8.5 reinforces the role of the world's leading enterprise Linux platform in the multi-cloud ecosystem, providing new capabilities to meet evolving and complex IT needs, from enhanced cloud-native container innovations to extending Linux skills with system roles, on whatever footprint our customers require," says Gunnar Hellekson, Red Hat Enterprise Linux GM.

Red Hat Enterprise Linux (RHEL) 8.5 is designed as a backbone for public cloud providers, multiple hardware architectures, virtualized environments, and edge computing models. The updated platform extends Red Hat Insights services, builds on existing container management capabilities, and makes it easier for IT teams to set up workload-specific systems wherever they may exist across a multi-cloud world.

Red Hat Insights, Red Hat's predictive analytics service for identifying and remediating potential system issues, is available by default through almost all Red Hat Enterprise Linux subscriptions. With the launch of Red Hat Enterprise Linux 8.5, Insights adds new capabilities around vulnerability, compliance, and remediation, helping organizations more effectively manage Red Hat Enterprise Linux environments across multi-cloud and hybrid cloud environments, even when it comes to nuanced security or compliance scenarios.



eSIM market trends in the smart device era

Digitalizing processes have been a necessary step in the modern era of increased mobility and connectivity. With this in mind, eSIM technology brings great benefits such as configuring device connectivity profiles remotely, mitigating operational risks, giving competitive flexibility, and enhancing geographic scalability.

Gartner estimates that eSIMs will significantly impact the computing devices market over the next three-year horizon. Moreover, GSMA Intelligence forecasts that by the end of 2022, there will be half a billion eSIM smartphone connections.

An embedded SIM (eSIM) is known to be a silicon chip that is installed in the device permanently, providing secure

storage of details in a digital format. It is where mobile networks function and store their data through radio signals. GSMA, ETSI, and other recognized industry bodies standardized this technology.

Through a series of over-the-air (OTA) commands sent to the device, an eSIM solution enables users to remotely switch from one carrier profile to another in a matter of seconds. Working exactly like a traditional SIM card with additional perks, an eSIM combines

a remotely programmable chip in the phone or device (called an eUICC) and a digital profile, which keep the information on subscriber identity and data for network authorization.

The leading comparison between a physical SIM card and the eSIM is the capacity to be re-programmed or re-provisioned to contain several profiles. It is also significantly smaller with the size of 5x6 millimeters, approximately half the size of a nano-SIM card, allowing device manufacturers more design flexibility and lowering their production costs. Profile management, customization, and network updates can also be done anytime and anywhere using the remote SIM provisioning (RSP) technology. Since it's digital-run, eSIM also provides convenience and safety, especially when traveling, as it cannot be tampered with or stolen by anyone.

eSIM market adoption

Just like any other technology adoption and vital industrial change, embracing eSIM at scale will take time but it's a prerequisite for both consumers and businesses. Based on GSMA Intelligence's data, at the end of 2020, the number of commercially available eSIM-supported devices reached 110 models. These include smartphones, laptops, smartwatches, and tablets.

The transition to eSIM-only supported devices is one of the key factors that could accelerate eSIM market adoption. Typically, commercialized smartphones today have dual-SIM support capability (physical SIM and eSIM). A realistic estimate for OEMs' transition to eSIM-only phones is considered to happen between 2022-2023. This will mainly influence consumers' ability to have and access multiple subscription plans from the same phone, giving more advantages to operators and device manufacturers.

Even tech companies that would never consider themselves as telecom providers today could compete in the future, thanks to eSIM technology and the possibilities of 5G. For operators, this presents both a major disruption and a massive opportunity as consumers can now easily go online

and purchase data connectivity from whomever they choose. Without a doubt, eSIMs' built-in connectivity is a game-changer.

The momentum for eSIM launches will likely accelerate further in 2022 since 90% of operators plan to offer eSIM service by 2025. Aside from that, the possibility for a more open market and greater competition between telcos and MVNOs as well as other tech companies looking to expand opens.

Additionally, the growing importance of RSP for machine-to-machine (M2M) communications is expected to boost the growth of the eSIM market. This can be seen across verticals such as robotics, automotive, logistics/fleet management, traffic control, telemedicine, and utilities, among others. In line with this, as the proliferation of IoT technology heightens as well, this can positively impact the growth of the eSIM market.

With the demand for better smart device solutions, the eSIM market is anticipated to propel further in the coming years. One evidence of this is GSMA's continued efforts to support the development and sustainability of the eSIM ecosystem worldwide by addressing the challenges that would emerge in the near future. These include updating eSIM specifications and introducing a new eSIM architecture specifically for IoT devices.

By and large, there are big incentives for device manufacturers, OTT service providers, and other tech players to support the industry-wide adoption of eSIMs. In fact, a study by Juniper Research disclosed that over the next four years, global eSIM deployments across all consumer verticals are expected to increase by 170%. With mainstream adoption being highly reliant on backing from network operators, there will be more pressure on operators to support eSIM frameworks and boost this market's maturation.

eSIM brings better service for IoT

With digitization strategies in place along with the need to facilitate the use of IoT devices, the demand for

eSIM has never been higher, with its growth continuously accelerating. IoT products would merit a lot in an eSIM-enabled world. As an example, service providers are already leveraging eSIMs to transform the enterprise connectivity model that incorporates IoT.

One IoT use case for eSIM is autonomous cars where blank eSIMs can be activated once it crosses an international border. In this case, the carmaker's MVNO will automatically connect to a particular CSP in the destination country.

eSIM tech in vehicles has been developed at a faster pace and the European Parliament's decision to require all new cars to be fitted with eCall technology from 2018 onwards has been a great driver of this. As a result, cars are enabled with automatic call emergency services in the event of an accident. Nowadays, vehicles are also equipped to receive software patches over-the-air to complete any necessary update remotely.

It's becoming increasingly clear that IoT devices like consumer wearables, gadgets, and cars will be better serviced by having self-contained connectivity powered by eSIMs. With an eSIM solution, network connectivity, streamlined operations, and enhanced control can be achieved. Ultimately, eSIMs simplify onboarding, inventory management, and logistics which are previously associated and time-consuming with multiple SIM cards.

Any business can benefit from eSIM technologies if they have a current IoT solution in play or seeking to deploy one to innovate. With that said, the eSIM market offer opportunities mainly among providers to deliver comprehensive, turnkey offerings. Regardless, having a trusted partner that can guide you through the enablement of an IoT eSIM ecosystem is vital to ensure maximized returns on investments.

5G is the best network for eSIM

Did you know that by 2024, 5G and eSIM are projected to reach 40% of the world's population? Accordingly, 5G users would account for 1.5 billion

subscriptions globally. With 5G's faster data transmission speed, low latency, and the ability to connect many devices, combined with eSIM's ease of use and serviceability, these two mobile-centric technologies are the perfect match.

In parallel with this, a research from Capgemini Research Institute found that over 40% of consumers would prefer to activate mobile services using eSIMs rather than visit in-store to activate a physical SIM card. Hence, a fully integrated 5G-capable eSIM can bring a more seamless experience.

The outcomes from the benefits of 5G are multipurpose and give the means for new, innovative services. As IoT expands, Wi-Fi won't be enough to cater to the number of connections and cellular connectivity through eSIM. Thus, 5G is the best network for eSIMs as it enables a full digitalization of the customer journey as well as automation and data analysis thanks to eSIM-equipped sensors.

Essentially, a Qualcomm study indicates that by 2035, 5G's full economic effect will be actualized across the globe. How much value would it bring? Roughly \$13 trillion worth of goods and services. This effect can impact eSIM's market growth by improving network connectivity with a faster, reliable, and guaranteed connection and sustaining a more significant number of connected devices.

Without a doubt, eSIMs play an integral role in 5G networks as any 5G-capable eSIM offers a versatility unparalleled to the traditional SIM technology. Businesses can manage their networked assets wherever they are located at while a device owner will be able to switch cellular carriers without visiting any provider personally.

Through an integrated IoT solution, eSIMs are being placed in numerous cellular-enabled devices where with 5G, these devices will possess processing power that is incredibly robust and will rely on their fully integrated eSIMs for connectivity and accessibility. Subsequently, 5G device renewals represent an opportunity to push the transition to eSIM. **TR**

5G to account for 40% of FWA market in 2026

The worldwide fixed wireless access (FWA) market is expanding quickly to fulfill the need for high-speed broadband connectivity, with 5G accounting for 40% of the total FWA market.

ABI Research forecasts that in 2026, the overall FWA market will exceed 180 million subscriptions and generate \$70 billion in revenue. 5G FWA, a powerful platform providing fiber-like broadband service, will be accelerating the FWA market.

Since 5G deployments continue to accelerate, operators are taking advantage of the 5G technology to provide high-capacity FWA services. High-speed and low latency supported by 5G networks enable providers to offer an attractive alternative to fixed broadband services in the areas where fiber-optic broadband doesn't reach. "5G FWA services can be deployed faster and at a lower cost compared to installing fiber to the home (FTTH). Faster time-to-market at a lower CAPEX is the key advantage of FWA deployments to expand the service coverage and boost adoption," explains Khin Sandi Lynn, industry analyst at ABI Research.

Besides selecting the right spectrum band to fit the market demand, setting strategies to efficiently monetize FWA services is crucial for service providers. "Forming FWA packages which fit bandwidth and data demand and bundling with value-added services can increase adoption rates. Service providers should also explore innovative services to capture revenue-creating opportunities, such as cloud gaming, high-resolution video streaming, AR/VR-based applications for entertainment and healthcare. The ability to offer such services can fuel demand for 5G FWA services as well as enable service providers to grow revenue," Lynn concludes.

Viasat buys Inmarsat for \$7.3 billion to create a global communications innovator

Viasat has entered into a definitive agreement under which Viasat will acquire Inmarsat in a transaction valued at \$7.3 billion. The combination will create a leading global communications innovator with enhanced scale and scope to affordably, securely, and reliably connect the world.

The combined company intends to integrate the spectrum, satellite, and terrestrial assets of both companies into a global high-capacity hybrid space and terrestrial network, capable of delivering superior services in fast-growing commercial and government sectors. This advanced architecture will create a framework incorporating the most favorable characteristics of multi-band, multi-orbit satellites and terrestrial air-to-ground systems that can deliver higher speeds, more bandwidth, greater density of bandwidth at high-demand locations.

"This is a transformative combination that advances our common ambitions to connect the world. The unique fusion of teams, technologies, and resources provide the ingredients and scale needed for profitable growth through the creation and delivery of innovative broadband and IoT services in new and existing fast-growing segments and geographies," said Viasat's Executive Chairman Mark Dankberg.

"Joining with Viasat is the right combination for Inmarsat at the right time," said Rajeev Suri, CEO of Inmarsat. "Viasat is a terrific innovator and Inmarsat brings some powerful additions: global reach, a broad distribution channel, robust business momentum, and a presence in highly attractive global mobility segments. Together, the two companies will create a new global player with the scale and scope to help shape the future of a dynamic and growing industry."

AWS Canada West (Calgary) region set to open

Amazon Web Services (AWS) announced its plans to open an infrastructure region in Alberta, Canada, that will be available in late 2023/early 2024, providing customers with even lower latency, greater fault tolerance, and resiliency for critical cloud workloads.

The new AWS Canada West (Calgary) region will consist of three availability zones (AZs) at launch and join the existing AWS Canada (Central) region in Montreal. The upcoming AWS Canada West (Calgary) Region will enable even more developers, startups, and enterprises, as well as government, education, and nonprofit organizations, to run their applications and serve end-users from data centers located in Canada.

The company's spending on construction and the operation of its Canadian regions will together create more than 5,000 new jobs with an

estimated investment of over \$17 billion (CA\$21 billion) in the local economies by 2037. Both infrastructure regions will add an estimated \$31.6 billion (CA\$39 billion) to Canada's GDP over the same time period.

"Our infrastructure in Canada has allowed customers to transform the way businesses, educational institutions, and government agencies serve their stakeholders. With another AWS Region in Canada, customers will see even lower latency for emerging solutions like 5G-enabled applications and machine learning at the edge, and it will strengthen their ability to architect their regional infrastructure for even greater fault tolerance, resiliency, and availability," said Prasad Kalyanaraman, vice president of infrastructure services at AWS. "We are excited to build world-class infrastructure to help organizations reinvent how they deliver customer solutions and fuel economic growth."

SES, Isotropic Systems complete first-ever simultaneous multi-orbit antenna field tests

SES and Isotropic Systems, the leading developer of transformational multi-link satellite technology, successfully completed the first-ever simultaneous multi-orbit antenna field tests, a game-changing development empowering a new age of connectivity on land, in the air, and at sea for both civil and defense communications. Isotropic Systems' UK-built multi-link antenna underwent a series of field tests at SES's Manassas, Virginia teleport. The terminal established multiple simultaneous, full-performance link connections with SES satellites – linking to a geostationary (GEO) satellite while simultaneously connected with an O3b satellite in medium earth orbit (MEO).

"The success of these multi-orbit antenna trials opens the door to a new level of multi-orbit service delivery, as we integrate our geostationary satellites with our second-generation low-latency,

high-throughput O3b mPOWER system to provide seamless services for our customers," said Steve Collar, CEO of SES. "Isotropic's unique architecture enables our customers to be connected to multiple simultaneous beams from both GEO and MEO satellites, enabling us to deliver industry-defining performance and orbital resilience services. It is a game-changer for resilient, secure, global networks built on SES's state-of-the-art fleet."

"We have removed the major bottleneck holding back the expansion of the satellite sector for both commercial and defense communications. Users can finally connect to as many satellites as they want, when they want, wherever they want and that's a game-changer for enterprise, aero, maritime, government, and defense," said John Finney, founder and CEO of Isotropic Systems.

Verizon and AT&T to postpone the deployment of new 5G frequency band

Telecom giants AT&T and Verizon agreed to push back deployment of a new 5G frequency band to allow time to address air safety concerns, US regulators.

The two companies will "voluntarily pause" the commercial rollout "to further assess any impact on aviation safety technologies," the Federal Aviation Administration and the Federal Communications Commission said in a joint statement.

The two companies had planned to begin using the 5G network on December 5, after spending tens of billions of dollars to purchase licenses. But aviation regulators have worried about the possible interference of the signals with flight safety equipment.

The agencies pledged "to coordinate closely to ensure that the United States keeps pace with the rest of the world in deploying next-generation communications technologies safely and without undue delay."

The FAA issued a special bulletin to aircraft manufacturers and radio altimeter manufacturers recommending analysis of potential interference at the 3.7 to 3.8 GHz levels, as well as at frequencies between 4.2 and 4.4 GHz.

Airlines should alert pilots to the "potential degradation" of safety systems "dependent upon radio altimeters," the FAA said.

"There have not yet been proven reports of harmful interference due to wireless broadband operations internationally, although this issue is continuing to be studied," the FAA said.

AT&T said it would push back deployment to January 5. "It is critical that these discussions be informed by the science and the data," the company said in statement, "That is the only path to enabling experts and engineers to assess whether any legitimate co-existence issues exist."

Nokia sets its sights on green electricity by 2025

Nokia has called for accelerated digitalization and green energy uptake, as well as setting its sights on 100% renewable electricity in its own operations by 2025.

The announcement comes with world leaders having convened in Glasgow, Scotland for the United Nations Climate Change Conference (COP26). Nokia President and CEO Pekka Lundmark joined political, business, and civil society leaders at the conference, calling for an acceleration in the uptake of green technology to reach net zero.

Lundmark said, "There is no green without digital. Only 30% of the world's economy is currently digitalized, and we must now work to connect the remaining 70% to ensure the world can reach net zero. 5G and related technologies play a critical role in making other industries more sustainable. At the same time, the ICT industry needs to minimize its footprint and accelerate the use of green electricity"

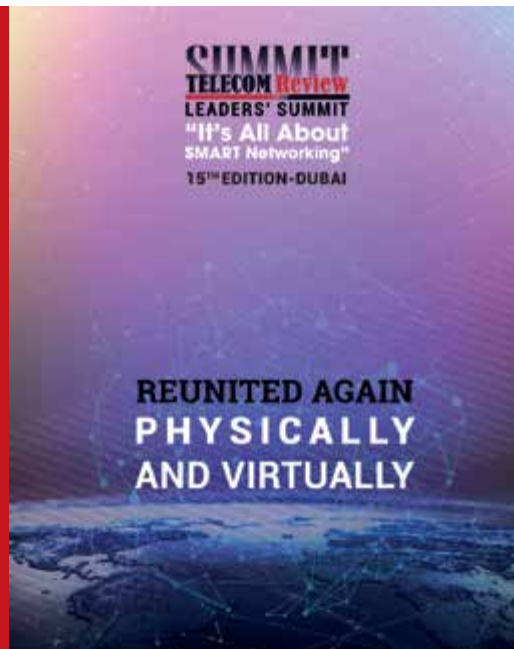
Nokia now targets to achieve 100% purchased electricity from renewable sources by 2025 to power its offices, R&D labs, and factories. While renewable energy is not currently available in all 120 countries where Nokia operates, it will work with the broader ecosystem to drive greater uptake of sustainable electricity.

Nokia has already committed to reducing its emissions by 50% across its value chain, including its own operations, products in use, logistics, and final assembly supplier factories by 2030. Its commitments have been approved by the Science Based Targets initiative (SBTi) to be in line with the Paris Agreement's aim of limiting global warming to 1.5C.

Telecom Review Leaders' Summit 2021

The 15th edition of the leading ICT gathering will be held in a hybrid mode where the latest industry trends will be tackled.

Place: InterContinental Dubai Festival City and virtual



8
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MWC 2022 Barcelona

MWC Barcelona is the world's most influential event for the connectivity industry. It's where world-leading companies and trailblazers share the latest thought leadership about the progression and future of connectivity. And it's the best place for networking opportunities with mobile and tech industry influencers. Together, we will shape the future of connectivity. It's time to reconnect, reimagine, and reinvent for industry success.

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FEBRUARY - MARCH

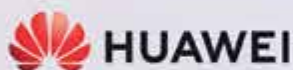
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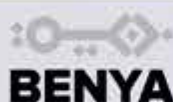
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