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■ stc expands transcontinental cables at Capacity Conference in the Middle East 2022

■ Nokia: CSPs should be ready for the metaverse era

■ Mobilis set to make and transform the future

■ Dual band antennas are the smart way to meet 5G backhaul challenges

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Toni Eid,
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Enough with Covid19

Throughout the Covid era that stroke over 2 years ago, we were monitoring how every city and country is handling this unprecedented situation that happened overnight without warning.

The duties of a mayor or government and corporate managers are alike; they both have to manage a group of people but to a different extent. Authorities have to work responsibly for the good of their citizens, the residents or even the visitors.

Unfortunately many counties have failed. They chose to close their countries for over 2 years and repelled visitors from all over the world.

Following an adapted version of the successful models some countries adopted is the right decision. Invest in vaccines and sanitizers products, talk to every entity to raise awareness.

It will cost much less than damaging the economy, hurting the people and distorting the country's image for years to come.

Do not be shy to copy the good leader or successful country model.

What's more important is to move on because life should continue. Enough is enough.

The Tbit/s era:
Unlocking the 6G conversation

Just when we thought that the hype around 5G has come to an end, a new spotlight is shed on the next network generation. As much as 5G is powerful, the capabilities of 6G will be unimaginable. Even though 5G still hasn't materialized all over the world, however, getting ready to 6G is now a reality, even if it might seem far-fetched at this stage.

The new target year in the telecoms industry is 2030. Visions have been elaborated to meet a set of goals by this deadline, with 6G being one of them. Telecom vendors have initiated their 6G research efforts a few years ago, long before the sixth network generation drove conversation, in a bid to lead the race to 6G and deploy it by 2030.

Characteristics

According to the ITU Journal on Future and Evolving Technologies, Volume 2 (2021), Issue 6, 6G will deliver throughput/data rate up to 1 Tbit s−1 and user−experienced data rate of 1 Gbit s−1, which is ten times the one targeted by 5G. It will provide end−to−end latency less than 1 ms and an 'over−the−air' latency of 10 −100 μs with mobility up to 1000 km h−1 with very broad bandwidth with frequencies reaching 1 −3 THz.

The vision of 6G has also been enhancing the idea of 'ecosystem' of networks (or network of networks), preliminarily started with 5G. This has been making 6G closer and closer to the concept of the 'Web of Everything Everywhere'.

Every new network generation brings along a new experience. 2G and 3G brought voice and text that enabled human-to-human communication. 4G drove data consumption and traffic while 5G unleashed new use cases and allowed users to benefit from a plethora of revolutionary technologies such as IoT. In the 6G era, the digital, physical and human world will seamlessly fuse to trigger extrasensory experiences. 6G will serve as a distributed neural network that provides communication links to fuse the physical, cyber, and biological worlds, truly ushering in an era in which everything will be sensed and connected.

6G will build on top of 5G in terms of many of the technological and use case aspects, driving their adoption at scale through optimization and cost-reduction. At the same time, 6G will enable new use cases. In 2030 and beyond, augmented reality and artificial intelligence will shape our lives. With 6G, ultra-high speed and ultra-reliable wireless connections will allow sensing and AI to flourish.

Digital twins will be found not only in factories but also in wide area networks of cities and will operate at a larger scale with 6G deployed.

The pillars of 6G

Artificial intelligence will be the main pillar of 6G. Each 6G network element will natively integrate communication, computing, and sensing capabilities, facilitating the evolution from centralized intelligence in the cloud to ubiquitous intelligence on deep edges.

Wireless sensing capabilities will be required to explore the physical world through radio wave transmission, echo, reflection, and scattering. 6G will feature this capability that will enable intelligence. Such a mode of sensing can help create a "mirror" or digital twin of the physical world in combination with other sensing modalities, thereby extending our senses to every point the network touches. Combining this information with AI/ML will provide new insights from the physical world, making the network more cognitive.

6G will also allow the integration of terrestrial and non-terrestrial networks into one system to provide uninterrupted high-quality services to users everywhere.

6G will serve as a distributed neural network that provides communication links to fuse the physical, cyber, and biological worlds

> Security and trust are a fundamental element in 6G

Moreover, security and trust are a fundamental element in 6G. According to a white paper by Ericsson, the four important building blocks for trustworthy systems are the use of confidential computing solutions, secure identities and protocols, service availability, and security assurance and defense. Huawei states that data, as well as the knowledge and intelligence derived from it, is the driving force behind 6G network architecture redesign, wherein new features will be developed to enable E2E native trustworthiness. These include new data governance architectures supporting data compliance and monetization, as well as advanced privacy protection and quantum attack defense technologies.

6G networks will also aim to improve energy efficiency 100 times across the network and limit energy consumption of ICT infrastructure and terminals while also ensuring optimal service performance and experience. Sustainability will be at the heart of the sixth generation network.

How will 6G change the world?

6G will be an extension of 5G, with an even more enhanced and immersive experience. G will build on top of 5G in terms of many of the technological and use case aspects, driving their adoption at scale through optimization and cost-reduction. At the same time, 6G will enable new use cases.

Digital twin models, already being used with 5G, will operate at a much larger scale with 6G. They will be found not only in factories but also in wide area networks of cities and digital twins of humans will have a major impact on the network architecture.

A new man-machine interface will emerge. Smartphones will remain a key device, however typing will gradually be replaced by gesture and voice control and wearables will gain even more ground.

Enormous capacity demands require new spectrum

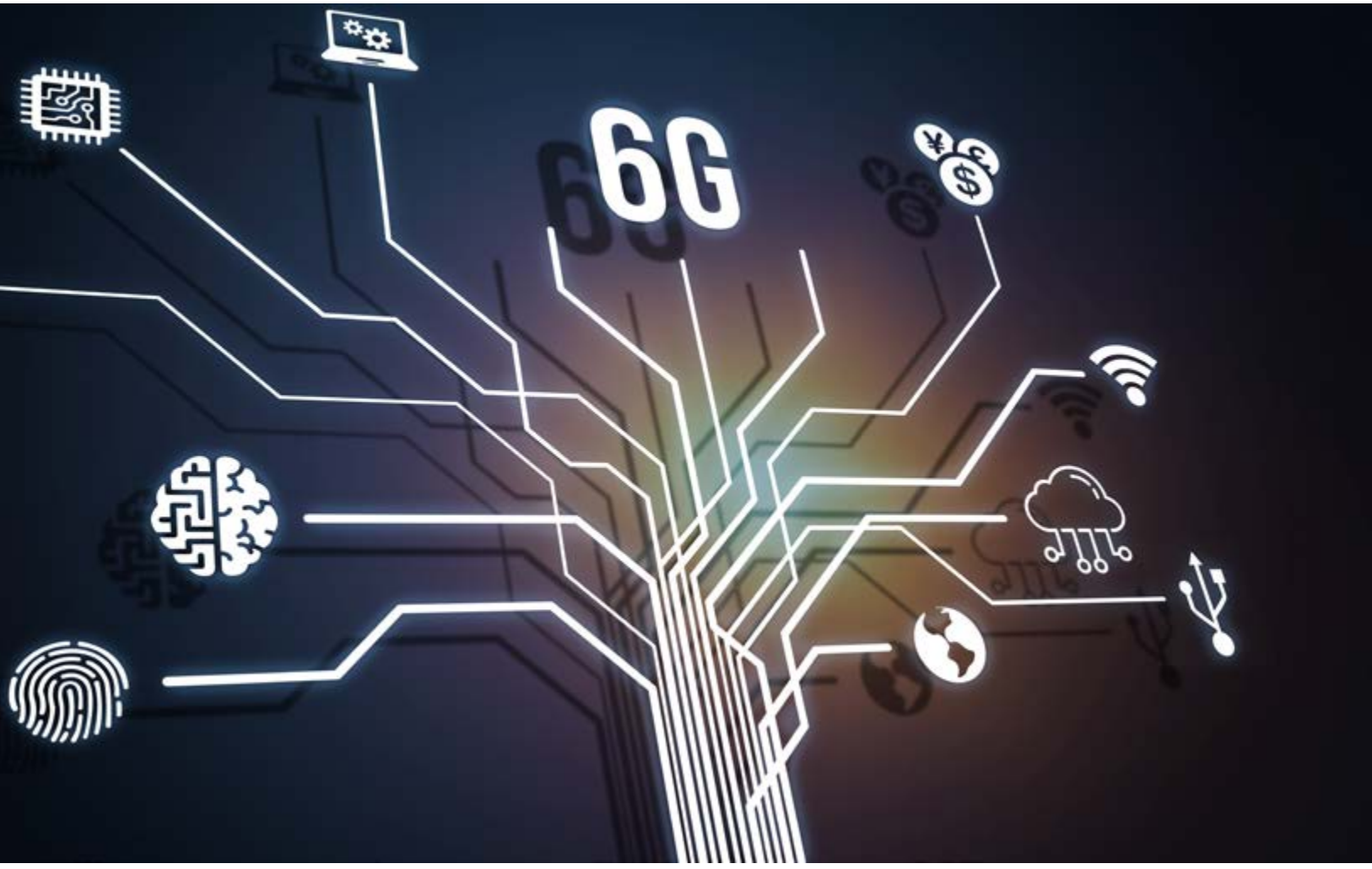
The evolution into the next network generation has always required a transition into a higher frequency band. The move from 3G to 4G grew carrier size from 5 MHz to 20 MHz, while the transition from 4G to 5G saw carrier bandwidth grow from 20 MHz to 100 MHz. A blog article by Bell Labs expects that with 6G spectral bandwidths will increase once again, reaching 400 MHz, greatly increasing the baseline capacity of a single cell.

Clearing up new spectrum will be necessary to unleash 6G's capabilities and use cases. Bell Labs expects that new spectrum bands between 7 GHz and 20 GHz will open up for 6G use, which will provide the necessary bandwidth to create these new high-capacity carriers.

Furthermore, new bands will be identified for mobile use by governments and regulators are looking at the 470-694 MHz band as a means for providing broad coverage in rural and remote regions. The low frequencies in this band mean signals propagate much further, extending the network's reach. Sub-THz bands beyond 90 GHz might also come into use, which could supply extremely high peak data rates for the most bandwidth-intensive applications as well as connect highly dense sensing networks.

However, new spectrum might not be enough. Multiple-input multiple output (MIMO) techniques were deployed

> Clearing up new spectrum will be necessary to unleash 6G's capabilities and use cases



> 6G allows space-earth integration that can pave the way for a 100% coverage that can reach remote areas

with 4G and 5G to improve spectral efficiency of wide area cells. 4G uses 2x2MIMO and 4x4MIMO while 5G benefits from massive MIMO using around 200 antenna elements and up to 64 transceivers. 6G may support on the order of 1024 antenna elements in the new mid-bands.

Challenges

Ensuring coverage across the whole world remains a challenge, especially that remote areas still lack access to connectivity. The main mission of 6G is to make this happen. 6G allows space-earth integration that can pave the way for a 100% coverage that can reach remote areas.

Another challenge resides at the level of bandwidth. It is estimated that the terahertz in 6G era will have the same problems as the millimeter wave today: weak coverage capability, high cost of deploying network, premature ecosystem of terminals, among others.

Security is also an important issue that 6G should address. Given the need for trustworthy networks, especially in light of new use cases, securing 6G networks is undeniably a top priority.

Operators are called to deploy low-carbon and energy-saving networks that is why green and sustainable development is the core requirement and ultimate goal of network and terminal designs in 6G.

Is it too soon to talk about 6G?

2030 might seem a long way to go, but when it comes to technology, it's never too soon. Research on 6G started even before 5G was deployed. The ITU is planning to issue its IMT-2030 vision document in 2023, and the 3GPP timeline calls for the studies on 6G to

start in 2024, so 6G doesn't sound so far into the future anymore.

Telecom vendors, operators and research bodies are well involved in 6G studies to better define the network generation. Work done in the framework of the race to 5G is a lesson that all industry experts should learn from in order not to replicate the mistakes made with 5G and avoid the obstacles that impacted its deployment.

One key area that should be addressed before 6G launches is the digital divide that has further widened with 5G. While 6G promises 100% coverage, a significant number of countries still lack 5G network coverage. Expediting 5G networks deployment across all regions should go in tandem with 6G research to be able to achieve the sought objectives of 6G. TR

Work done in the framework of the race to 5G is a lesson that all industry experts should learn from in order not to replicate the mistakes made

Eng. Muhammad Al-Abbadi, chief wholesales officer, stc

stc expands transcontinental cables at Capacity Conference in the Middle East 2022

As part of stc Group's participation in the Capacity Conference Middle East 2022, which took place in Dubai in March, and which involved a number of global partners in the ICT sector, the discussion was held around cooperative projects and possible future partnerships as well as opportunities for international expansion in the field of carriers and operators.

During the conference, the Saudi digital enabler stc Group shed light on its plans for the regional digital center and its expansion in data centers in the region through a discussion by Eng. Mohammed Al-Abbadi, CWO of the carriers and operators sector at stc; Adil Alaskah, international cable management GM, stc and Rayan Alsaedi, global infrastructure development director, stc. During their panel discussions on the importance of submarine cables and the services they provide after the completion of projects, it was decided that stc expands its scope in transcontinental submarine cable projects and the 2Africa cable project which provides distinguished connectivity services by linking it to three continents, namely Africa, Europe and Asia through multiple landing sites in the Kingdom, in addition to several countries where this cable will land.

And based on stc's "Dare" strategy, which revolves around expanding the selected growth axes of digital and basic services, instilling digital thinking, developing digital and analytical capabilities, adopting new ways and methodologies, and exciting customers with a smooth, personalized and secure experience, in addition to being the trusted partner for business in the region striving to connect the markets in which it operates through pioneering next-generation technologies, as well as being a role model for sustainability and corporate governance and a leader for cultural change at the company level, stc will offer these sites with the necessary capacities for service providers through neutral data centers and landing stations on a fair and equitable basis, which contributes in supporting and developing the Internet ecosystem. It is worth noting that the contribution of the 2Africa cable, through the new extensions aims at supporting the digital economy and enhancing the ability of many communities to provide more and more efficient internet-based services, such as education, healthcare and business activities, besides achieving significant economic and social benefits as a result of this increased international connectivity.

Eng. Mohammed Al-Abbadi; CWO of the carriers and operators sector at

stc, confirmed the group's role in the Capacity Middle East Conference, where stc plays the role of the largest digital enabler in the region providing the necessary capacities and speed to telecom service providers, international operators and the international business sector. After such investment, stc aims to enhance the digital infrastructure and develop a highly efficient network of international cables, which enables stc to meet the application of the principle of rapid fulfillment that lines up with the 2030 vision of increasing digitization in the Saudi market. stc invests in data centers to develop local content and digital transformation, and it contributes to providing digital resolutions to develop a world-class cloud computing solution.

stc has announced the establishment of the main digital center; MENA Hub for the Middle East and North Africa, with an investment of $1 billion in cooperation with regional and international partners. It will also include the installation of a number of highly efficient cables to meet the future requirements of cloud services by investing in an advanced fiber-optic network ensuring continuous service availability, enabling growth in the Kingdom's economy and GDP.

On the sidelines of the conference and based on its endeavor to develop the carriers and operators sector, stc signed a number of agreements with major telecommunications and technology companies, most notably China telecom Global. The group also signed an extension of its agreement with Virgin Mobile, in addition to an agreement with London Internet Exchange (LINX) in order to expand the JEDIX service for interconnection to new Internet Exchange Points (IXPs) in the Kingdom, including the cities of Riyadh and Dammam, for the purpose of completing the initial JEDIX cooperative project that was launched in 2018 in Jeddah.

These efforts came as a confirmation of the leadership of the Kingdom of Saudi Arabia within the communications and information technology sector in the region and the great capabilities that stc possesses as a digital enabler in the Middle East. TR

UAE has put words into actions, says TDRA at ITU Council 2022

The United Arab Emirates, represented by the Telecommunications and Digital Government Regulatory Authority (TDRA), participated in the 2022 session of the ITU Council, at the ITU headquarters in Geneva.

H.E. Eng. Majed Sultan al-Mesmar, director general of TDRA headed the TDRA's delegation, while the council's meeting was chaired by Eng. Saif bin Ghelaita executive director of the technology development affairs department at TDRA. Bin Ghelaita won the presidency of the Council in the elections during the ITU Plenipotentiary Conference, held in Dubai in 2018.

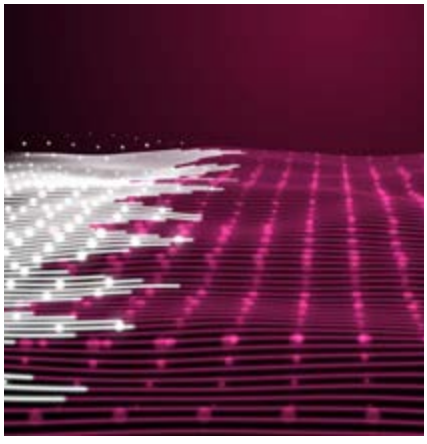
The ITU Council acts as the Union's governing body in the interval between Plenipotentiary Conferences. Its role is to consider broad telecommunication policy issues to ensure that the Union's activities, policies and strategies fully respond to today's dynamic, rapidly changing telecommunications environment.

The significance of this session comes from it being the first to be held in person, after two years of virtual consultative meetings chaired by the UAE. Participants discussed issues related to the functioning of the ITU Council and topics related to the budget, human resources and action teams, where the results of discussions have been incorporated in the reports submitted to the presidency of the Council by the team leaders.

The UAE delegation expressed their wish to be re-nominated for membership in the ITU Council at its forthcoming session in 2023-2026.

In that context, H.E. Eng. Majed Sultan al-Mesmar said, "The UAE has officially joined the ITU in 1972, only a few months after its founding. Such early joining was a realistic translation of the wise leaders' vision of the importance of the UAE as an active member of key and leading global platforms, at the forefront of which is the ITU, for the UAE to affirm its humanitarian mission and its quest to help the people of the world achieve Sustainable Development Goals. My country has not wavered for once in its noble mission... and to that end has put words into action."

Qatar unlocks new digital skills opportunities



With the aim of accelerating sustainable human development and promoting digital transformation, Qatar's ministry of communications and information technology, in collaboration with Microsoft, launched the National Skilling Program.

Qatar's National Skilling Program aims to train 50,000 people across all demographics by 2025 and empower them with the advanced digital skills they need to drive innovation and contribute to boosting the country's regional and global competitiveness.

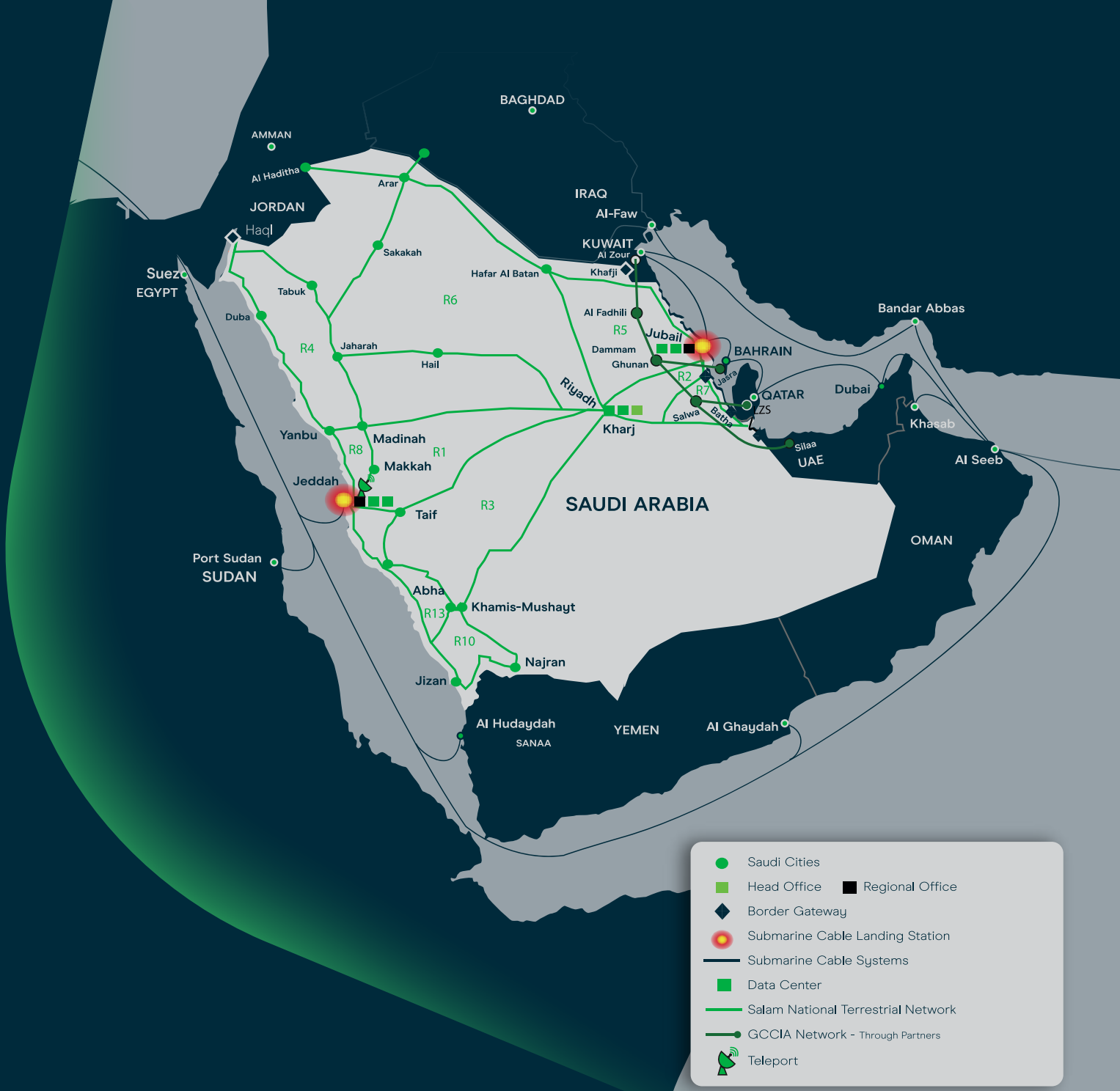
In parallel with the launch, the first of its kind Digital Center of Excellence was also inaugurated in Msheireb Downtown Doha, under the auspices of His Excellency Mr. Mohammed bin Ali Al Mannai, minister of communications and information technology, and in his presence. The Center comes as part of the National Skilling Program and aims to create a highly skilled workforce for a rapidly growing, diversifying and technologically advanced economy in line with Qatar National Vision 2030.

During the opening speech, Eng. Mashael Ali Al Hammadi, acting assistant undersecretary of information technology, ministry of communications and information technology said, "The human development pillar of Qatar National Vision 2030 motivates us on a daily basis to empower and equip the people of Qatar with the skills needed to develop the country into an advanced society capable of sustaining its development and providing a high standard of living for its people,".

She added, "The launch of the National Skilling Program and the opening of the Digital Center of Excellence will be key to this effort; providing advanced knowledge of modern technology and cloud computing that will empower all demographics."

Lana Khalaf, general manager of Microsoft Qatar said the official launch of the National Skilling Program and the launch of the Digital Center of Excellence was a major milestone in the tech company's ongoing partnership with the ministry of communications and information technology. "Our efforts represent our joint commitment to unlock opportunities for the people of Qatar in the digital era by developing the technical skills of students as well as those already in the workforce," she said.

A new Microsoft Cloud datacenter is set to open in Qatar soon and will offer enterprise-grade cloud services couples with data residency, security, and the broadest compliance for organizations and companies in Qatar.



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Open RAN network model demands further assessment from operators

In recent years, the introduction of 5G connectivity in the Middle East's telecommunications market has thrived and local industries are increasingly looking to digitization to gain a competitive advantage in their operations. With this, the future of 5G network design has come under question as deliberations continue on open radio access networks (Open RAN), and what this model could mean for operators, telecom vendors, and end-users.

Several telecom operators in the GCC recently agreed to explore Open RAN's potential in greater detail. Theoretically, the Open RAN model enables a fundamental change in the way operators manage networks by calling for interoperability between the solutions offered by equipment vendors. In recent years, Open RAN has been explored and tested in international markets, with those learnings influencing its trajectory in the Middle East.

This poses a dilemma in how telecom operators should approach 5G implementation. Typically, networks are built with solutions and models that are in line with global standards frameworks, such as the GSMA's Network Equipment Security Assurance Scheme. These standards influence the way networks are designed and deployed, setting a benchmark for operators as well as equipment makers.

While Open RAN is not a standard in itself, it is an implementation framework that would see network standards being tested. Industry analysts and global operators have recognized that there are inadequate defined standards or methodologies to guarantee that different vendors' solutions will actually be interoperable in an Open RAN model. The limited representation of Chinese technology vendors within the Open RAN ecosystem, several of whom have been on the forefront of 5G research to date, may also pull the framework into geopolitical waters.

Another key consideration in this model is the matter of cost. Operators are investing heavily to expand and enhance their 5G networks. Open RAN has been put forward as a model that would drive greater competition amongst telecom equipment manufacturers. This competition would potentially lower the cost of network site equipment available to operators.

While this is yet to be seen, analysts have cited other areas where operators may incur costs under the Open RAN model. Managing a more complex 5G network made up of many different vendors' solutions could prove more costly than using a single vendor—or a smaller list of vendors—who can take responsibility for network upkeep and maintenance. Even if operators can achieve savings in capital expenditures of their network sites, industry experts have estimated that the operating expenses of managing networks can often account for around 80% of the total cost of ownership, far outweighing the capital expenses.

The assessments of Open RAN to date suggest that there are opportunities as well as challenges related to effective competition, service compatibility, costs, and even security. It is only through further assessments that these questions may be resolved. TR

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Nurettin Cetinkaya, CTO, Middle East, Nokia MEA

Nokia: CSPs should be ready for the metaverse era

The hype around the metaverse has been gaining ground recently. How does this trend impact the telecommunications and ICT industry? Nurettin Cetinkaya, CTO, Middle East, Nokia MEA answers this question in an exclusive interview with Telecom Review.

The metaverse is expected to be more competitive than social media both in terms of data exchanges and monetization opportunities. What does this mean for the carriers and how can they be ready for this paradigm shift?

Let's first define what we mean by metaverse. Despite being one of the latest trends, the metaverse was first coined in a sci-fi novel back in 1990s and was envisioned as a new paradigm of the internet which would revolutionize human relations and provide a disruptive paradigm for human-machine interaction. Metaverse has become a key trend, but it is important to quantify that. Metaverse can simply be a consumer metaverse which is used for social interactions, gaming, entertainment or even shopping. It can also be in our workplaces where it is used for collaboration, training, and even digital co-design which forms an enterprise metaverse. In the world of operational technologies for industries, industrial metaverse comes into the picture to provide safety, efficiency, and productivity.

Trends across digital media and advertising, immersive, hybrid workforces, and evolutions in technology (i.e., 5G advanced and upcoming 6G) are all coming together to change how we consume content, work, access services, and communicate. These changes will create tremendous demands on networks and computational resources. Beside the readiness of their networks, CSPs should now move to identify potential opportunities, collaborate with content creators and partner with hardware companies to develop compelling propositions for consumer and enterprise markets.

A range of actors are already increasing their efforts towards metaverse including hyperscalers and CSPs. One good example is SK Telecom which launched Ifland, a Metaverse platform designed to maximize user experience through diverse virtual spaces and avatars. Besides this, SKT has pledged to expand this to holding large-scale events such as lectures, festivals, and concerts. With several companies launching their own metaverse platforms, success may depend on attracting as many users as possible through themed events and customized services. Accordingly, SKT plans to offer special programmers and content, such as fan meetings with K-pop stars and social media influencers.

SKT managed to grow to more than 1.1 million active monthly users by the end of 2021. Looking at B2B opportunities, SKT reported more than 1500 requests for partnerships. As these numbers underline, there is great interest for virtual platforms within both the consumer and enterprise worlds. Therefore, now is the right time to look at how CSPs can play a role in these applications and what strategies they should pursue.

How will digital twin technology play a role in IR4.0? And how can Nokia help?
Digital twins started out as virtualized representations of physical things. In many cases today that's still how they're used, for everything from aircraft engine design to building systems for monitoring and optimization. But what if we could perform non-destructive large-scale experiments within a digital copy of everything? A digital twin can essentially be an abstraction of any "thing" used to achieve a goal or outcome based on the analysis of a purpose-defined data set. Bringing together hardware, software, and data, digital twins enable engineers to optimize the design and operation of a product or service in real-time. Digital twins build on AI, IoT, and software analytics to create living digital simulations that interactively update and evolve with their physical counterparts. To make this possible, connecting physical and digital in almost real-time becomes quite crucial.

As the digital twin becomes a mission-critical capability for industries, connectivity requires special attention. 5G with an evolution to 5G-Advanced are steppingstones to achieve full capability of the digital twin. As a leader in 5G, Nokia provides dedicated 5G private wireless and network slicing based solutions to bring reliable, low-latency connectivity to every inch of industrial operations. Nokia recently deployed the world's first 5G Edge Slicing solution on a live commercial network with Cellcom and Telia Finland. Our innovative solution is available now and enables operators to provide 5G Virtual Private Network services on 5G public networks as well as enabling services like the digital twin.

Interactions in metaverse will require large bandwidth, high reliability and low latency. How can CSPs effectively address these areas?
It is obvious that metaverse generates more demand on the network because it implies a heavy usage for volumetric video, processing, transmitting (downstream and upstream) and rendering (immersively), also including an intensive usage of AI for implementing the merge of realities in real time.

CSPs in the Middle East are the early adopters of 5G networks which puts them in a strong position to support user engagement, develop new services and revenue streams, and collaborate with content and app ecosystems to accelerate the adoption. This fast pace of metaverse adoption will have an impact on mobile traffic and capex which requires readiness. As Nokia, we will bring advanced features to further improve the immersive experiences with 5G Advanced that will come by 2025. Our collaboration with AT&T to improve their 5G uplink with distributed massive MIMO is an example of it. Moreover, by the end of the decade, the arrival of 6G technologies could enable further advances to achieve virtual and physical fusion.

The rollout of high-quality, reliable 5G with an evolution to 5G Advanced networks is therefore the main pathway for operators to carve out a position in the metaverse ecosystem. Besides the mobile connectivity being the platform, there are network innovations like edge computing and slicing that operators could use to capture new value from metaverse growth areas.

CSPs are inherently at an advantageous position to enable highly interactive Metaverses with their network and edge cloud infrastructure. How should they leverage this capacity?
High-capacity and low-latency connectivity is key for a fully-fledged metaverse to succeed. Real-time updates of the graphical elements of immersive mixed reality worlds in response to how people are interacting with them is quite crucial. Local real-time rendering could make it possible to meet such tight latency constraints. This is where edge cloud plays a role to serve as both a resource computing platform and a mobile network capability platform that can host metaverse platforms.

Besides the latency, customer experience is key to make metaverse a success. Innovations like network slicing can be onboarded to provide metaverse services with the required network resources to ensure network availability to enable immersive experiences.

CSPs have been positioned strongly with their 5G investments and assets to offer the required edge cloud environment. With these capabilities, CSPs will be a natural partner of metaverse platform providers and become part of the metaverse value chain. To achieve this, CSPs should envision their edge cloud and network slicing strategies to be ready for the metaverse era which is on the horizon. TR

> "High-quality, reliable 5G with an evolution to 5G Advanced networks is the main pathway for operators to carve out a position in the metaverse ecosystem"

Mobilis set to make and transform the future

On the sidelines of MWC22, Telecom Review secured an exclusive one-on-one with Chaouki Boukhazani, chairman and chief executive officer of Mobilis, to discuss the operator's objectives, vision for the future, and their remarkable network coverage in Algeria.

Mr BOUKHAZANI Chaouki, can you briefly outline Mobilis' vision and objectives?
The vision of Mobilis is to be the first digital service provider in the region. This requires of course a transformation, whether at the level of our vision, strategy, or organization, but also to put in place consequent investments. Currently, and in parallel with MWC22, Mobilis is already providing the best coverage in Algeria. It is just a first step that will be followed by improved performance for all the country. Moreover, we have undertaken a set of actions and measures establishing the pillars of a digital service provider and putting our focus on offering the best services and content.

'Together We Make the Future' is your new slogan. Mr BOUKHAZANI, can you elaborate on what it reflects?
Our former slogan was 'Mobilis, Everywhere with you'. This slogan has been honored and Mobilis has kept its commitment by winning the Speedtest Award for the best network coverage in Algeria during MWC. However, the future is not just about best coverage, or best speed. It must be about fulfilling the needs of our customers, businesses, and country in general, and engaging in a government policy that aims to boost both knowledge and

service economies. For this purpose, we have adopted our new slogan, reflecting on creating our future by acting as one team with our partners and customers. It is a slogan that also has value within the company with our employees, present in the 58 wilayas of Algeria. Moreover, with this slogan, we focus on all aspects of education which is main driver to build the future.

You mentioned receiving the Speedtest Award for the best network coverage in Algeria in 2021. What is its importance for you?

Obtaining this prize is another testimony that the actions we have undertaken in recent months have borne fruit. it is true that this award is the culmination of several years of work and dedication by our employees, these employees and this Mobilis team have moved up a gear in recent months and we will continue in this pace for more achievements and for the satisfaction of our customers.

We are present everywhere in Algeria even in the remote and deprived areas not for profitability reasons but to guarantee to our customers, citizens of Algeria, the right of connectivity. Obtaining this award proves that we have indeed achieved this goal. This is only the start for other achievements, whether in terms of quality of service, content, or services provided to our customers.

For Mobilis, it is important to be the engine of the market, the leader by inducing and forcing change. To this end, we are going to install and establish a new dynamic that focuses on our customers, but which contributes more and more to the evolution of our country and our economy, particularly in the knowledge economy and digital services for the benefit of companies.

Mr BOUKHAZANI, have you set yet other objectives for the future?

I do not believe that revealing all our objectives is the right strategy in a market known for its competition, but we can give the main lines. Evolution and transformation require investment, and Mobilis is ready to invest and will invest above all for Algeria. To be leader in Algeria, we must provide more efforts. We must provide our customers, our citizens with better services and better contents that is worthy of this country. TR

> Mobilis is ready to invest and will invest above all for Algeria

Rubi Kaur, technology strategy manager and chair, Vodafone

Rubi Kaur:

Team diversity drives innovation

In an attempt to shed light on one of the ICT industry's leading women, Telecom Review spoke to Rubi Kaur, technology strategy manager and chair of Vodafone Women in Technology Network in an exclusive interview to know more about her perspective on gender equality in the tech workspace.

As the newly-appointed technology strategy manager, how do you plan to strengthen the execution of Vodafone's products and solutions?

Vodafone began its journey towards its vision to become a new generation telco several years ago. A big part of that vision is our company strategy to be a technology communications (Tech Comms) company, enabled through our technology strategy. My role at Vodafone involves technology strategy creation and development, but also strategy adoption too. We can create the best technology strategy, but if no one is ready to adopt and use it, then our strategy has failed. Becoming a Tech Comms company means offering more than just connectivity. We will offer the best customer digital experience and put our customers at the heart of everything we do.

Being part of the team creating and developing this approach and enabling technology strategy is incredibly exciting and challenging too at the same time. It's a challenge I'm really looking forward to. I'll be working and interfacing across all our technology teams in Vodafone. To help this, I'll be establishing a technology strategy community that will have representation from all the market strategy leads across the Vodafone footprint. By working together using our collective knowledge, we will be building the strategy; learning from each other, developing and exchanging ideas as we go on our technology strategy development journey together.

Having a Women in Technology Network within Vodafone reflects the importance of women's role in the ICT industry. As the chair of this network, how do you see women's role today in the industry?

It has been over a year since I created the Women in Technology Network. Since then, we have grown our membership, and our community now has become a hive of activity for our members to network, attend events, listen to speakers, share learnings, and help shine a spotlight on the need for

greater diversity and gender equality in the tech industry.

We are an open group, anyone from Vodafone can join us. Male allyship and advocacy is super important to us and I am so proud that we have men on our committee too. The number of women taking up technical roles is still not at parity in Vodafone and so it's important to have a network to encourage and help address that imbalance.

Gender equality is something I've been passionate about since I started in the tech industry 20 years ago. In the early years of my tech career, I would be hard pushed to find more than 2 other females in any technical team. Today the tech industry is starting to recognise that diverse and inclusive teams perform far better. While women still constitute less than 20% of the tech population, the tech industry still has some way to go before we reach parity, but I passionately believe that creating the right environment and culture where women feel valued, have a greater sense of belonging and attachment to their work and company, they are therefore less likely to leave, which is seen as one of biggest problems of retaining women in tech as well as building a healthy pipeline of female talent.

Our Women in Technology network mission statement is "We will support, encourage and empower all women in tech to be incredible #VisibleTechWomen". The industry needs more female role models who are working in tech roles. It's often thought that role models are often senior figures who people look up to, but equally we need early career role models too. We have many women in Vodafone who young girls contemplating STEM subjects and tech careers can identify with and therefore they can help nurture the next generation female tech pipeline through coaching and mentoring onto technical career paths.

What are the core principles you follow as a leading woman ICT leader?

There are a few principles which are important to me. The first is to be authentic. Bringing my whole self to the role and being genuine and honest are super important. For me, this builds trust which is a vital component if we want people to come with us on our journey and believe in our movement for change. That trust has to be earned and being authentic and open in everything helps achieve it.

On top of that, I am a strong believer in collaboration and working together. No one has a monopoly on the best ideas and solutions. Only when we listen to each other and share our knowledge and viewpoints do we make progress in everything we want to achieve. It's vital to recoginise that everyone's voice is valid, no matter how challenging to the status quo, it's just as important as every other voice in the room.

Lastly, I believe it's important to be humble and show kindness. Humility inspires greater teamwork all round and creates a culture of acceptance no matter who we are, so that we all move together with greater respect for one another.

In your perspective, how do tech innovation and gender equity go hand-in-hand?

According to an article in the Harvard Business Report, Innovation is six times higher at organizations with the most equal workplace cultures. Like many companies, Vodafone too needs to continually innovate to stay competitive. Diverse teams bring diverse thinking leading to radical solutions and this could never be achieved through monoculture team environments. I'm a firm believer that we need diverse teams at the very concept stages of innovative ideas, through the development, testing and deployment stages to ensure that we build for all sections of society. In effective we need to embrace diverse teams' input throughout the entire product lifecycle.

In Caroline de Criado's book Invisible Women, she brilliantly exposes a world of data bias, built for men. In the book there are many accounts from many industries where products and services were built and tested only by men, with minimal or no female input, yet these products and services must be used by all society, which includes women. It's incredibly important therefore to ensure we build our products and services for all of society and take into account any differences and needs we must develop, otherwise we will start to leave people behind as they have been excluded from using our products and services.

What are your goals for 2022?

My main goal for the Women in Tech Network is to continually move us towards gender equality. I hope to continue leading the Women in Tech Network, grow the network and keep shining a spotlight on the need for greater gender equality not just at Vodafone but in greater society. We have many initiatives this year from looking at the blockers to female progression to launching Vodafone Experience days to encourage young girls to take up STEM subjects and discover what it's like to work in a technology communications company like Vodafone.

My goal is to also grow the technology strategy community. This is an important community that will have market representation where we will work collaboratively together, sharing our strategy adoption challenges and our best practices, learning from each other, and creating the right can-do culture to refresh and further develop our technology strategy. TR

> Diverse teams bring diverse thinking leading to radical solutions

Dual band antennas are the smart way to meet 5G backhaul challenges

For MNOs, the 5G opportunity continues to soar. A recent survey predicted "The global market for 5G infrastructure should grow from $12.9 billion in 2021 to $115.4 billion by 2026, at a compound annual growth rate (CAGR) of 55.0% for the period of 2021-2026." As they move to seize their share of the bonanza, agile operators are under more pressure than ever to boost network capacity, so they can accommodate a flood of new data, and an increasing volume of users.

Backhaul is the foundation of the wireless network, and network engineers and designers face serious challenges in deploying backhaul solutions that can keep pace with these changes.

5G backhaul breaks old rules

The challenge of 5G backhaul is not only about capacity, but architecture. According to one recent article, global mobile traffic is expected to surpass 2,708 exabytes by 2025. Higher frequency spectrum can help operators meet these traffic demands, but they also introduce potential signal issues. The higher the frequency, the more the potential for signal propagation loss. To mitigate this issue, operators must deploy significant numbers of small cells or macro cells—each providing a direct connection to the core network to backhaul the traffic.

Backhaul solutions also require architectural enhancements. To meet high performance expectations, 5G requires ultra-low-latency connectivity. Operators must support thousands of simultaneous clients per cell, with data throughput of 10Gbps. Although the demands on the backhaul network may not be as substantial fronthaul requirements, meeting escalating capacity demands for 5G will probably require a significant upgrade to 10GbE or higher for 5G—more than tenfold that of 4G.

As technologies develop, operators also face new challenges as they consider infrastructure upgrade solutions. Vendors have introduced many new technologies and components, which in turn have increased network complexity. When operators multisource components, or use new, emerging, untested technology, they may threaten the performance and reliability of their infrastructures—and introduce time-consuming diagnostic and remedial tasks.

Considering fiber and microwave

How can operators address these challenges and support the increased levels of backhaul traffic for 5G? The two main options are fiber and microwave/ millimeter wave (mmWave).

Fiber is a proven solution

Fiber is generally the first backhaul choice for mobile network operators, and a great deal of fiber backhaul capacity is already in place. Reports indicate that in existing cells worldwide, fiber makes up about 50 percent of the backhaul. Its advantage is its ability to deliver virtually unlimited bandwidth over a long distance. With more than 10 Gbps of throughput and latency of less than 1ms latency, a fiber connection deliver essentially loss-less data transmission over approximately 40 miles. However, for new locations, the time, resources, and expense needed to put thousands of miles of fiber in place can strain budgets. As they build out new cells for 5G, operators need a solution to backhaul traffic in a cost-effective way, from locations that are far from the network core.

Microwave and mmWave on the increase

Fiber remains a proven technology that will continue to enable operators to meet backhaul demands, but microwave backhaul is on the ascent. Many operators are looking to utilize microwave to complement their fiber backhaul networks, and before long the technology is predicted to account for the majority of backhaul links around the world. According to a recent report, microwave will compose 65 percent of all installed backhaul links by 2027. Like all wireless point-to-point and point-to-multipoint technologies, microwave does not require the time, cost, and permitting required by fiber backhaul. As with any wireless point-to-point or point-to-multipoint solution, microwave eliminates the cost, time and permitting issues of a fiber backhaul.

For backhaul applications, mmWave, especially the 80 GHz (E-band) spectrum, has emerged as an attractive option. Its benefits include low licensing costs and low cost per megabyte, with a channel size big enough to carry 10 Gbps. GSMA/ABI research predicts that at least 60 percent of all global mobile backhaul will be transported by microwave or mmWave by 2027— 25 percent of which will be E-band. However, the E-band spectrum is subject to distance limitations, especially in harsh weather.

More traditional microwave frequencies like 18 GHz and 23 GHz are less impacted by poor weather, but the tradeoff is limited capacity. To boost capacity over existing traditional links, many operators are utilizing link aggregation techniques, combining traditional, lower-frequency microwave bands with an 80 GHz signal. This approach lets operators bring together the best of both worlds. They can enjoy the added capacity of 80 GHz E-band microwave, while extending link distance and reliability utilizing the traditional bands.

New dual band antennas increase capacity, not expenses

Doesn't this combined approach require two sets of infrastructure, including separate antennas for each band? Normally, operators would have to invest in both, spending time and resources to have each antenna separately installed and aligned, as well as paying for tower rental for both links. Fortunately, dual band microwave antennas enable operators to take advantage of link aggregation, without doubling their operational costs.

Using dual band microwave antennas, operators can support not only traditional microwave frequencies but 80 GHz mmWave in the same antenna—without a negative impact on the performance of either. The approach uses one compact installation, with only one device to configure, install, and align. Instead of two tower rental costs, operators pay only one.

The performance and distance benefits for backhaul are impressive. Using the link aggregation technique and one high-performance dual band antenna, operators now have the ability to send multi-gigabit backhaul several miles. Even in foul weather conditions, link aggregation supports very high (99.999%) reliability. Using integrated intelligence, the solution can continue to maintain the connection by reducing radio modulation, as interference levels from weather increase.

When choosing a dual band microwave/mmWave antenna, operators should look for a proven vendor that can not only offer an advanced antenna solution, but a portfolio of microwave connectivity accessories to help them optimize installation and performance. For maximum flexibility, the interface should support simultaneous integration with multiple microwave radios.

The solution should also be supported by a rich partner ecosystem, including certified design and deployment partners such as independent consultants, integrators, installers, and distributors.

Research confirms the dual band antenna advantage

CommScope recently performed a study to determine the benefits of combining an 80 GHz mmWave link with a traditional microwave link, using the company's ValuLine dual band antenna solution. The researchers focused on how the solution would impact throughput capacity, cost of ownership, and long-distance reliability. The results of the study confirmed that a dual band microwave antenna solution can substantially enhance 5G backhaul capabilities—all while helping operators keep costs in check.

To learn more about the report's findings, download the white paper, "Maximizing E-band potential with dual band antennas." TR

By Raed Aoude, director of sales, MENA | SEA, CommScope

Fiber remains a proven technology that will continue to enable operators to meet backhaul demands, but microwave backhaul is on the ascent

The world needs chipsets: what's next?

Businesses have become closely knitted to the semiconductor industry, as chips become an integral part of the supply chain for highly profitable industries like automotive, industrial, ICT, electronics, data processing, and aerospace.

Chips power everything from cars, smartphones, and equipment – securing its relevance in facilitating the adoption of emerging technologies such as artificial intelligence (AI), quantum computing, and 5G. Given the increasing demand for semiconductors across the world, the expertise and capabilities needed to understand the market landscape, as well as the procurement and manufacturing processes of chips are very critical for product development.

In fact, as per a BCG report, semiconductors are the world's fourth-most traded product, only after crude oil, motor vehicles and parts, and refined oil. This sector's value creation is also now among the ten major industries. It is worthy to note that the US, Japan, Europe, South Korea, Taiwan, and China are the most important regions for the semiconductor value chain and R&D.

From a global perspective, the US leads in electronic design automation (EDA), core intellectual property (IP), chip design, and advanced manufacturing equipment while East Asia is at the forefront in wafer fabrication. The former delves into the most R&D-intensive activities while the latter requires massive capital investments and access to robust infrastructure and a

skilled workforce. China is also a leader in assembly, packaging, and testing while Europe is now more committed to bringing a thriving semiconductor sector from research to production and a resilient supply chain.

A matter of chips: Digital economy

Chips are strategic assets for key value chains, particularly in the ongoing digital transformation within automated cars, electric vehicles, cloud, IoT, connectivity (5G/6G), space technology, computing capacities, and quantum supercomputers. In parallel to that, semiconductors are also among the most ambitious geopolitical interests to drive more digital.

Industry 4.0 is placing higher demands on semiconductors because it is a must to manufacture the computing devices at the foundation of emerging technologies. In addition, by adopting Industry 4.0 manufacturing strategies, like future-ready manufacturing execution systems (MES), the semiconductor industry is set to accelerate the pace of change and produce smarter and smaller chipsets.

A good use case for this is industrial robotics, which reflects the importance of semiconductors. To cite an example, South Korea's high robot density reflects its market position in making memory chips, LCDs, and batteries for electric cars. While in Japan and Germany, high robot density is in part due to the importance of the automotive industry.

Connectivity, whether through mobile devices or laptops, also prompted mass teleworking arrangements. This further boosted demand on smart devices which in turn obliged semiconductor requirements to be met. At the same time, COVID-19 digital acceleration also amplified the need of the telecom sector for semiconductors in rolling out 5G, deploying cloud-based services, and connecting volumes of IoT devices. Due to the supply shortage, inventories for the production of smartphones, routers, and IoT devices are influenced and telecom operators' experienced changes in device sales and service revenues.

More so, the car industry is rapidly adopting new digital technologies like augmented-reality head-up displays, onboard biometrics, fully autonomous driving, in-car all-time connectivity, and electrification.

With this boom in consumer and business demand, it is important to emphasize that semiconductor chip production requires large R&D investments, fabrication plants, specialist knowledge, intellectual property, as well as specialized manufacturing equipment and raw materials.

Digitalization is indeed an important reminder that chipsets are needed in this world, not as a temporary disruption but for permanent evolution.

Chips for a smarter environment

Chipset usage was up substantially during 2021 as the whole industry is still struggling to recover from the wake of COVID-19 production shut-downs. Production capabilities are being ramped up to meet the market needs of the smart era.

In reality, sourcing and manufacturing materials for high-quality semiconductors is becoming progressively more challenging. To relate it in the current context, the ongoing geopolitical tussle between Russia and Ukraine can affect the sector as Russia supplies over 40% of the world's palladium and Ukraine produces 70% of the global supply of neon. These two resources are key to the production of semiconductor chips. Apart from this, due to its low cost, an abundance of material, and useful electronic properties, silicon also quickly rose to become the backbone of the semiconductor industry.

The smarter and future-oriented technologies of today introduce new demands for semiconductors, letting new materials that have a distinct edge over traditional silicon be explored. Among these are silicon carbide, which is a combination of silicon and carbon, and gallium nitride, which is made of gallium and nitrogen. Proponents say that these two can do a better job as a power converter and could cut charging time in half.

As systems become more complex and demanding, manufacturers should improve system performance by adopting greater component reliability and process control. These include fabless companies such as Qualcomm, Broadcom, NVIDIA, AMD which mainly innovate and design semiconductor chips and outsource manufacturing production to foundries such as TSMC, Samsung, and SMIC as well as integrated device manufacturers (IDMs) such as Intel, Infineon, and Apple who design and manufacture their own chips.

AI chips

Among the semiconductor components, PWC data shows that memory chips are expected to continue to maintain the largest market share through 2022. As automotive and data processing markets among other markets are thriving, so will be the demand for AI chips.

Numerous types of AI chips are available for acceleration including GPUs, field-programmable gate arrays (FPGA), and application-specific integrated circuits (ASIC). GPUs, which are the most widely used flexible AI chip, have very high performance suitable for deep learning AI algorithms, and are present in cloud and data centers for AI training, and especially utilized in the automotive and security sectors. Clients that want to reprogram based on their own requirements can opt for FPGAs which have a faster development cycle (versus ASIC) and low power requirements (compared to GPUs). Lastly, ASIC AI chips have higher efficiency, a smaller die size, as well as lower power consumption but take more time to be developed, affecting their commercial adoption.

Unsurprisingly, the market for AI-related semiconductors is expected to grow by over $30 billion by 2022, a CAGR of almost 50%. With AI comes the need to pack bigger power into small chip sizes, shifting from 5nm up to 2nm. Accentuating the hardware infrastructure of an AI chip involves computing, storage, and networking parts. While computing or processing speed has been developing rapidly in recent years, more time is needed to improve the storage and networking modules.

Edge AI chipsets are designed to be smaller, more economical, less power-consuming, and considerably less heat-generating, making their integration much simpler and delivering myriad benefits in terms of speed, usability, privacy, and security of data. By 2024, sales of edge AI chips are expected to exceed 1.5 billion; dominating consumer devices such as high-end smartphones, tablets, smart speakers, and wearables as well as multiple enterprise markets like robots, cameras, sensors, and other IoT devices.

It is also predicted that nearly 72% of enterprises will be deploying AI solutions within the enterprise physical facility or application system by 2025. Chipsets will then be used to track user location, choice and preference, surrounding environment, machine behavior, and many other data patterns to generate actionable insights and tailored recommendations.

Being able to connect, collect, and compute will be powered by the performance of AI chipsets. Thus, by providing next-generation accelerator architectures, semiconductor companies could increase computational efficiency or facilitate the transfer of large data sets through memory and storage. As a case in point, specialized memory for AI has 4.5 times more bandwidth than traditional memory, making it much better suited to handling big data within AI-powered applications.

Massive investments are imperative

According to a BCG study, if regional supply chains wanted to reach total self-sufficiency, it would require $1 trillion in incremental up-front investment to meet current levels of semiconductor consumption. It would also result in a 35-65% overall increase in semiconductor prices and higher costs of electronic devices for end-users.

Industry experts also expect the West to be dependent on the East for supply. Changing this landscape and avoiding further technological dependency on Asian suppliers, both the US and Europe announced plans to boost each country's semiconductor industry. Reshoring chip production is now official US government policy with a $52 billion spending for semiconductor production and research. Mirroring this move, the EU plans to quadruple the supply of semiconductors in Europe by 2030 and spend some €42 billion in public and private funds to become a microchip producer.

Competing with Taiwan's business model is also tough when it comes to capacity. As per data, TSMC accounts for more than 50% of the global foundry market. Owning fabrication houses is a costly investment, creating a huge outsourcing opportunity to major foundries overseas. Yet, a co-location strategy would shrink the length of trade routes and move endpoints closer to the supply chain network. With great demand, increasing capacity utilization is just as critical to diversifying supply networks.

Chipmakers' coming capital investments are also extraordinary such as Intel's plans for two mega fabs totaling $200 billion in the US and Europe, with Germany as the recent location, while Samsung expects to spend $145 billion through 2030, expecting the company's chip and components division to perform strongly in 2022 as well.

Globally, spending on chip equipment will also rise 10% in 2022 to a record high of $98 billion, the third year of growth in a row with South Korea as the biggest spender, followed by Taiwan and China, collectively accounting for an expected 73% of spending this year. Looking ahead, an investment of about $3 trillion in R&D and capital expenditure across the value chain is needed to meet the fast-growing demand for semiconductors over the next ten years. Semiconductor companies will need to keep investing around 20% of their annual sales to develop increasingly sophisticated chips. Along with this, doubling capacity by 2030 is essential to keep up with the expected 4-5% average annual growth in semiconductor demand. TR

> “Chips are strategic assets for key value chains, particularly in the ongoing digital transformation”

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MVNOs and operators: A growing market across the Middle East

The mobile virtual network operator (MVNOs) market has been a source of differentiation and has introduced a new dimension in the competition space. However, many challenges were presented that include embracing margins and gaining the right conditions to thrive on mobile operator networks.

According to Research and Markets, in 2020, the MVNO market was worth USD 1.63 billion, and it is likely to reach USD 2.22 billion by 2026, with a CAGR of 5.3% during 2021-2026.

Managing the complexity of technology while remaining competitive, wise, and profitable can be challenging. Despite that, and amid the recent drop in mobile prices around the world, the MVNO market is still expected to grow over the next decade.

As MNOs (mobile network operators) shifted offerings to provide low-cost options in response to MVNO competition, MVNOs should also shift from focusing only on cost benefits to the consumer to focusing on value-added services as well. In addition, an MVNO must be agile and adapt to be able to succeed; the mobile market and opportunities change, so needs the MVNO.

Thus, one of the best things MVNOs can do when entering the market is to partner with an MVNE (a mobile virtual network enabler- MVNO business model) provider that can offer MVNOs multi-tenancy, scalability, security, transparency, operational efficiency, and low operating costs.

Market overview

As people work and study remotely, and as the number of service providers offering telehealth and e-education solutions increased, operators had to adapt quickly. The Saudi Telecom Company (stc), for example, has shown a high sense of social responsibility by launching and implementing solutions based on AI (artificial intelligence). In addition, due to the impact of the pandemic on consumer behavior, many operators have seen a decline in revenue from mobile phones. Emirati operator du announced "a decline in revenue from mobile phones partially attributed to consumers shifting from fixed contracts to prepaid mobile plans to manage personal budgets."

Mobile devices and technological advancements such as cloud-based services and government initiatives to deliver better network service access for consumers are driving the growth of the MENA mobile virtual network operator market. In light of the limited competition, increasing government initiatives, and businesses increasingly adopting cloud services, MVNOs are getting into the developing economics; for example, in January 2020, Saudi Arabia's Communications and Information Technology Commission (CITC) announced plans to allow new MVNOs to enter the market. By this move, the business environment will enhance and promote competition in the market.

Furthermore, the Middle East & North African countries are experiencing an increase in telecommunications subscribers, which will drive the market. However, there are unique challenges relating to civil unrest that can hinder the growth of the market, such as, in countries like Yemen and Syria, operators face more challenges related to infrastructure destruction, security concerns, economic pressure, and humanitarian crises.

MVNOs play an important role in driving innovation and must seize every possible opportunity. As MVNOs adopt new technologies and business models, they can continue to prove their competitive advantage, reduce MNO dependency and gain more control over the market.

Pros and cons of going virtual

One of the benefits of switching to an MVNO is that consumers will get lower prices; an MVNO doesn't have the cost of infrastructure creation, hence can offer lower prices to subscribers. Also, many MVNOs have little retail infrastructure, sell plans online through other retailers, or have few stores, so the overhead is low and those savings can be returned to subscribers. In addition, MVNOs provide a quality of coverage and reception up to the consumers' expectations since they lease their service from a major operator. So, in a nutshell, MVNOs offer great service at a great price.

However, some disadvantages are presented in parallel. MVNOs don't offer bundles; By combining a mobile phone plan and a broadband home internet plan into one package, consumers can save money. However, there will be no price advantage so if the consumer chooses a dual plan, there won't be any savings.

It is becoming clear that an entirely different world of MVNOs is taking shape. Many unknowns are kept behind the horizon. Despite the uncertainties, the necessity for strategy and innovation, as well as an evolution, remains clear. Planning to achieve business goals during an MVNO revolution raises big questions and demands big ambitions. TR

Building momentum for 5G networks

The migration from 4G to 5G including 5.5G innovation to enrich the customer experience across multiple markets in the Middle East has begun. With this new connectivity, the need and demand to introduce new digital services in the market is evident and CSPs are looking for flexible ways to deploy 5G private networks and deliver services such as network slicing and edge computing to manage customers' needs.

Optimizing network architecture to extend 5G capabilities to support IoT, ultra-reliable low latency communications, uplink-centric broadband, real-time broadband communication, and harmonized communication, and sensor technology has become all the more important.

In its report '5G in MENA: GCC operators set for global leadership', the GSMA states that by 2025, there will be around 50 million 5G connections, with around 20 million in the GCC Arab States. The GCC Arab States will be slightly ahead of the global average by 2025, with over 16% adoption (5G as a percentage of total mobile connections), compared to 15% globally.

Collaboration, collaboration and more collaboration

To provide a seamless converged experience for customers on 5G, operators need to upgrade their network technologies to support user migration, 5.5G innovation, and intelligent network development, fast-tracking the introduction of new digital services. Furthermore, advancing AI and digital solutions will greatly benefit customers across multiple markets.

In the future, 5G needs to support multi-dimensional services such as AR/VR, cloud gaming, passive IoT, autonomous driving, mobile hospitals etc. Both operators and vendors will need to pursue deeper collaboration to manage the volume of data traffic emanating from the newer connections.

Getting ready

A recent Market Statsville Group study shows that the global 5G enterprise market size valued at $2.1 billion in 2021 and is projected to reach $21.7 billion by 2030, growing at a CAGR of 33.9% from 2022 to 2030.

Investments in fiber deployment: In the Middle East and African region, investments in submarine cables have increased considerably over the years, with the government and enterprises continuously strengthening fiber infrastructure for better connectivity with other countries as well as driving investments in data centers.

6GHz wave: 6 GHz is one of the optimal bands in medium frequency to provide seamless wide-area coverage and high-capacity connections. It is essential to sustain a healthy IMT development. Licensing 6 GHz to IMT services will facilitate management and help the industry fulfill higher requirements. Mobile networks will create more economic and social value than any other wireless technology, therefore, it justifies the mobile industry's bid for more spectrum reserve. Global collaboration is vital to developing a 6 GHz IMT ecosystem and making it commercially available by 2023.

As a global mobile industry standards organization, 3GPP has initiated the standardization of U6G, which will be completed in 2022. It is a critical step towards the global launch and will provide future industry chain a standard basis for the research and development of 6 GHz products.

Security still a concern

Unauthorized access to enterprise networks has been one of the pain points in the 5G growth story. Ethical hackers participating at a joint hackathon event during the recently concluded GISEC 2022 were able to hack into almost all the networks, highlighting the vulnerability of potential cybersecurity threats for both public and private organizations. Netscout Systems' bi-annual Threat Intelligence Report states that during the second half of 2021, cybercriminals launched approximately 4.4 million Distributed Denial of Service (DDoS) attacks, bringing the total number of DDoS attacks in 2021 to 9.75 million. These attacks represent a 3% decrease from the record number set during the height of the pandemic but continue at a pace that's 14% above pre-pandemic levels.

In a bid to protect the cyber landscape, UAE's Cybersecurity Council has signed an MoU with Huawei to collaborate in the strengthening of local strategies and efforts related to cybersecurity in building visibility and promoting thought leadership in the area of cybersecurity, cooperating in the field of cybersecurity research and development through an independent think tank. Spending on security including hardware, software, and services is also on the rise across the region, predicted to grow 7% to $3.76 billion in 2022 according to IDC.

Furthermore, the increasing investment by several countries in mobile computing and communication solutions and the increasing need for low latency connectivity are anticipated to create lucrative opportunities globally in the 5G enterprise market.

Responding to how 5G will be incorporated in every aspect of the urban world, Borje Ekholm, president and CEO, Ericsson Group says, "Consumers have digitalized, we are seeing governments needing to digitalize, enterprises digitalizing and that shows how important the digital infrastructure is to change the way we work, live and function." TR

> The global 5G enterprise market size valued at $2.1 billion in 2021 and is projected to reach $21.7 billion by 2030

Prioritizing security:

DevSecOps

Today, there is more awareness about the importance of security than before, especially when 80% of businesses that would fail to shift to a modern security approach are anticipated to deal with both increased operating costs and lower attack responses by 2023.

This finding makes it clear that businesses must keep up with modern security technologies to avoid losing ground internally and externally. The digital transformation of business organizations, including telcos, requires an approach that could strengthen the adoption, transformation, and expansion of digital technologies without compromising security. This impact will continue in the long run because new threats and hackers would certainly emerge to trigger and expose vulnerabilities into systems.

The reality that we are living in right now requires security to be integrated deeply. In fact, cybercrime is claimed to be the third-largest economy, expected to be valued at $6 trillion by 2025. Every year, the number of data breaches grows by 30%, while the number of compromised records soars by over 200%. With this in mind, companies should invest in building stronger security systems to protect their data and developments.

Solutions like development, security, and operations (DevSecOps) is one of the ways to do that. As the continued shift in operations will be observed drastically, including advancement in automation technologies, application development, and IT infrastructure, more complex threats must be identified and addressed at an early stage.

DevSecOps: Definition, challenges, benefits

The global development, security and operations (DevSecOps) market size is expected to reach $11.3 billion by 2027. The idea of putting security as a responsibility that can be in line with the growth of an organization's development and operations is a primary example of a cloud-based feature that reduces technical risks.

The core essence of DevSecOps is built-in security, not security that serves like a perimeter fence around applications and data. A trending practice in app security, it involves introducing security earlier in the software development life cycle (SDLC) and expanding the collaboration between DevOps teams to integrate security teams in the software delivery cycle. By and large, DevSecOps requires a change in culture, process, and tools to achieve security as shared responsibility.

Accordingly, DevSecOps' mantra is to make everyone accountable for security

by implementing security decisions and actions at the same scale and speed as what DevOps does. And yet, the challenge arises when DevOps teams see security as a nuisance or IT security teams can't keep up with the fast pace of DevOps. Point in case, open-source tools may have inadequate security features as well that could result in more attack opportunities.

Building security into DevOps then requires various steps to be taken carefully from the planning stage up to coding, building, testing, deploying, and monitoring, with real-time feedback loops and insights. Basically, everyone involved in the SDLC has a role to play in the DevSecOps continuous integration and continuous delivery (CI/CD) workflow.

Few best practices that will make the DevSecOps process run smoothly include (1) shift-left testing or embedding automated security controls and tests early in the SDLC; (2) threat modeling exercises to discover the vulnerabilities of assets and plug any gaps in security controls; (3) secure coding and static/dynamic code analysis; (4) controlling access to sensitive information with zero trust framework; (5) creating an incident response plan, and (6) automated scanning upon deployment and tracking of dependencies.

Selecting the right tools to continuously integrate security would help meet DevSecOps goal of promoting the fast development of a secure codebase. This is applicable for embedded, networked, dedicated, consumer, and IoT devices. Five common categories of DevSecOps tools are alerts and notifications, automation, dashboards, threat modeling, and testing.

Alongside this, organizations with a DevOps framework is considering to shift towards a DevSecOps mindset by bringing individuals to a higher level of proficiency in security. As a result, the test-driven development environment in place as well as continuous and automated workflow testing and integration of organizations lead to seamless work, increased code quality, and enhanced compliance.

Other benefits of adopting DevSecOps include better return on investment (ROI) in the organization's existing security infrastructure; less administration failure incidents that could otherwise contribute to cyber-attacks and downtime; better communication, collaboration, and accountability between teams; greater flexibility in managing sudden changes during SDLC; and faster releases of quality-assured products.

Without a doubt, DevSecOps is quickly becoming the status quo for application development and IT infrastructure processes, causing more frequent deployments, shorter lead time to change (LTTC), lower change failure rates, and faster mean time to recovery (MTTR).

Collaborative DevSecOps principles and practices

According to Gartner, DevSecOps will have a 20-50% market penetration within two to five years. The ongoing surge in the number of companies and applications shifting to the cloud, IoT deployments, and 5G rollouts are also anticipated to open new growth prospects for the market.

Gone are the days of monolithic applications as APIs, microservices, and serverless functions deliver modern DevOps workflows. Telcos are among the most active users of these applications as they evolve to serve the needs of digitally-focused customers. Operator software development teams actually work to maintain their unique mix of operational software used to manage their network and services. As a result, they must deal with a resilient network environment where new services and infrastructure are constantly added or enhanced. Thus, network operators should follow a DevSecOps approach by incorporating the security culture, practices and tools to drive visibility, collaboration and agility.

Areas of attention could include robust microservices-based infrastructure architecture with built-in security capabilities; configuration management mechanisms to enable consistent, controllable and maintainable overall system configuration; and a common set of automation, testing, and logging tools to maintain a consistent level of assurance.

It is evident that collaborative DevSecOps environments must include various technical controls, process controls and management techniques to minimize the risk of attacks. Being an extension of DevOps, it complements the philosophy of shared ownership by making security objectives part of the overall structure.

One good DevSecOps practice is the use of zero trust controls between containers. In highly collaborative environments such as data centers, mutual transport layer security authentication (mTLS), an encrypted communication tunnel per server cluster should be utilized. Aside from this, new 5G core capabilities and architectural attributes are well suited to cloud native DevSecOps deployment models to create value-added services (VAS) and applications integrated into the 5G core itself.

In conclusion, the focus on security and performance offered by DevSecOps is particularly important in network service provider environments given the unique needs in providing wide-area communications services. TR

> Every year, the number of data breaches grows by 30%, while the number of compromised records soars by over 200%

WoT:

Making 'interoperability' of Things easier

The ongoing technological advancement is making the Internet of Things (IoT) adoption spur worldwide, with the number of IoT-connected devices projected to increase to 43 billion by 2023. Amidst the latest wave of IoT maturity and execution of bespoke solutions, considering an approach that can respond to the fragmented nature of IoT technology is a strategic move.

Being a core challenge, IoT market fragmentation has complicated the path to IoT adoption. With hundreds of separate IoT vendors around the world, there are various IoT protocols and network standards being used. Sooner than later, stable and foundational IoT offerings that can plug and play with other IoT products would emerge and interoperability can be achieved to prevent hours of hand-coding IoT interfaces for end-to-end product functionality.

But in reality, the IoT market hasn't reached consistent interoperability yet. Device deployment happens on the top-most network layer, what happens underneath in the application layer still requires an organized and compatible path for all players. This is the reason why the World Wide Web Consortium (W3C) worked on the Web of Things (WoT) subset of IoT; a standardized language that can preserve and complement existing IoT standards and solutions.

Internet of Things aims to bring connectivity to almost every object

found in the physical world. Transmitting it into the digital world might seem easy but could be complicated, particularly when it involves different access points, servers, and software. Without a doubt, the current trend of collaborating, distributed teams through the Internet, mobile communications, and autonomous entities can be efficiently advanced and deliver diverse services and applications if flexibility and interoperability are ensured.

Collaborations are threatened by the fragmentation that we witness in the IoT industry, bringing difficulty to integrate the diverse technologies found within various objects in IoT systems. For IoT to constantly function as a global infrastructure, following a standard approach in interconnecting things based on ICT and massive information can open up new revenue streams, drive business efficiencies, and facilitate new business models.

WoT: Architecture, interactions, and patterns

Imagine that you are a smart business that wants to automate actions inside the office — from scanning your biometrics at the door, booking meeting rooms, updating inventories, and scanning databases, among others. To facilitate the interoperability, fragmentation, and usability of IoT, Web of Things (WoT), a set of standards can be of use. This is built around web standards such as REST, HTTP, and URIs that allow devices to interact with one another seamlessly.

WoT follows a progressing architectural framework with four layers: accessibility, findability, sharing, and composition. Moreover, there are three key integration patterns as well that are defined by the point at which a WoT API is exposed to the internet: direct integration, gateway integration, and cloud integration.

In layman's terms, first, it works in a way that Things are on the web (layer 1) and can be found by humans and machines (layer 2). And once their resources are being shared securely with others (layer 3), it's time to look at how to build large-scale, meaningful WoT applications (layer 4).

Layer 1: This layer converts anything into a 'web' Thing or REST API. This will enable interaction using HTTP requests just like any other resource found on the web.

Layer 2: This layer ensures that the Thing can not only be easily used by other HTTP clients but can also be findable and automatically usable by other WoT applications by reusing web semantic standards.

Layer 3: This layer finds a safe way to transfer the data across services securely by using different protocols such as transport layer security (TLS), OAuth, and RDFa.

Layer 4: This layer deals with understanding the integration of data and services from diverse Things into an immense ecosystem of web tools such as analytics software and mashup platforms.

By these four layers, the Web of Things provides a set of standardized technology building blocks that help to simplify IoT application development through a web paradigm. At its core is an IoT device's metadata called Thing Description (TD). The TD can be considered as the entry point of an IoT instance as it provides information on which data and functions are provided, which protocol is used, how data is encoded and structured, and further human-and-machine-readable metadata.

Following the properties-action-event interaction model, a property exposes the state of the Thing. This property should be readable, could be updated, and could be observable by pushing the new state after a change by action happens. Hence, an action allows invoking a function of the Thing by either manipulating a state indirectly; manipulating multiple properties at a time; manipulating properties based on internal logic; or manipulating state over time. Lastly, an event describes a source that pushes data asynchronously from the Thing to the consumer.

To put it simply, the WoT interaction model can be perceived, for example, through a smart speaker that is turned off (property), and will start to play (action) upon detecting a voice that says 'music please' (event).

Ensuring security

Javascript is at the heart of IoT applications. In particular, Node.js is an open-source, cross-platform that makes the request-response flow faster and smoother. This JavaScript runtime environment is used to build data-centric, real-time solutions that can handle a large number of requests coming from sensors, beacons, transmitters, motors, and other IoT devices.

In the context of modern IoT and WoT development, JavaScript and Node.js are said to be the Swiss army knife that serves as a great option for IoT projects. Having said that, securing Javascript code for WoT is crucial to ensure that device integration to the web is more accessible and easier to program. By observing a proper cybersecurity approach, exfiltrating private information, malwartizing, defacing websites, and phishing attacks can be prevented. In an application-level, the least privilege access of zero trust framework can also be applicable to gain better control of information flow and APIs. TR

Huawei, Zain KSA join hands for MENA's first 5G LAN network

Zain KSA and Huawei released the joint innovation achievement on the first 5G LAN network in the Middle East and North Africa (MENA) region, which means that Zain KSA is capable of commercial deployment and large-scale replication of 5G private networks.

During MWC22 Barcelona, Zain KSA and Huawei exchanged ideas on the joint innovation plan in the near future. Based on Zain KSA's leading achievements with 5G LAN, the two parties are planning to promote the maturity of 5G LAN and MEC technologies and develop replicable scenario-based solutions, so as to bring a high-quality experience and innovative services to enterprises.

5G LAN is a key technology to enable the application of 5G in vertical industries. It can help customers achieve seamless 5G network convergence without changing the network topology, configurations, and applications and enable a simplified network architecture, efficient deployment, and centralized network O&M. Leveraging both 5G LAN and MEC advantages can address the reconstruction requirements of conventional wired networks in vertical industries as well as the differentiated and deterministic network requirements.

Zain KSA's CTO Abdulrahman bin Hamad AlMufadda stated, "Our journey is driving forward digital transformation in the Kingdom. Today, Zain KSA plays a pivotal role in empowering a digital society and in pursuing the transition towards a digital economy, towards accelerating nationwide digital transformation. We will continue to focus on exploring the new technology capability, such as 5G LAN, backed by our partnerships with the global tech leader Huawei, to achieve our objectives in promoting economic growth and sustainable development, in line with Saudi Vision 2030."

Huawei and Zain will continue to explore the MEC field and promote the in-depth integration of 5G and industry technologies. Together, the two sides will work with local partners to boom the 5G MEC ecosystem, helping enterprises transform, upgrade and boost the digital economy.

e& initiates discussion to increase shares in Mobily

e& approaches Etihad Etisalat (Mobily) to discuss increasing its shareholding in the Saudi Arabia-based telco to 50% plus one share. This can be done by means of a preconditional partial tender offer, pursuant to the M&A regulations issued by the Kingdom's capital market authority (CMA).

Over the period ending on March 15, e& has proposed a price of SAR 47 per Mobily share, representing a premium of 22.2% to Tuesday's closing share price of SAR 38.45, as well as a boost of 38.8% and 45.1% respectively to the 3-month and 6-month volume-weighted average prices of Mobily's shares.

Accordingly, this proposal from e& aims to deepen the strong existing ties with Mobily, with the potential for further collaboration and the realization of greater synergies. It has been clearly emphasized by both parties that there is no certainty of the potential offer's approval at this stage, with the discussions still ongoing.

Eng. Hatem Dowidar, Mohamed Karim Bennis and Khalifa Al Shamsi have declared their conflicts of interests as they are Mobily board members and currently holding senior executive positions at e&. Hence, they would refrain from being involved in this particular discussion between Mobily and e&.

If the potential offer is made and implemented, it will be subject to compliance with Saudi law and to the applicable requirements of the M&A regulations. e& is being advised by HSBC Saudi Arabia, while Mobily selected JPMorgan Saudi Arabia and Riyad Capital as its financial advisers.

On a separate note, Mobily has recently decided not to renew the agreement for services and technical support with e&, with e& continuing to be a strategic shareholder to the company.

KACST's satellite products to benefit from stc networks and infrastructure

Saudi Telecom Company (stc) and King Abdulaziz City for Science and Technology (KACST) signed a cooperation memorandum in the field of developing telecom services and satellite images.

The cooperation agreement, signed in the presence of stc chief business officer Eng. Riyad Saeed Muawad and KACST director general of international cooperation and partnerships Dr. Hassan Alayied, seeks to develop satellite products, such as remote sensing projects, earth observation, and space science and its applications.

Through this cooperation, both sides would benefit from stc networks and its infrastructure, along with KACST services, to explore available options for satellite images products. In a bid to serve national needs, they will target the sector of institutions and consumers in a way that contributes to increasing and expanding opportunities in the various market sectors and client sectors in the field of image services.

Both sides will cooperate to invest joint capabilities and expertise in research and technological cooperation by developing KACST services with the use of stc cloud networks and benefitting from MPLS network of stc Group to offer the IPVPN service.

e&'s E-Vision, ADQ acquire 57% stake in MENA's leading SVOD provider

The e& led consortium consisting of E-Vision, a part of e& life, and ADQ, an Abu Dhabi-based investment and holding company, announced the signing of a binding agreement to acquire a majority equity stake of circa 57% in STARZPLAY ARABIA, a leading subscription video on demand (SVOD) and streaming service provider in MENA.

The demand for high-quality content and seamless streaming continues to rise. Commenting on the announcement, Khalifa Al Shamsi, CEO, e& life, and chairman of E-Vision, said, "STARZPLAY ARABIA is a leading video streaming platform in MENA. This acquisition is a major milestone for E-Vision and will be a catalyst for the newly formed e& life consumer digital vertical in e&. This investment further strengthens our service offering and significantly enhances STARZPLAY ARABIA's positioning across the entire MENA region."

The e& led consortium will acquire a controlling stake in STARZPLAY ARABIA based on a post-money valuation of USD 420 million, while also investing E-Vision's existing stake and secondary investments to join the other existing shareholders, including STARZ and SEQ investors.

Al Shamsi added, "STARZPLAY ARABIA is a great platform for us to work closely with to customize the content options for our customers. With 5G's super-fast download speeds and low latency, we have the perfect opportunity to drive the streaming experience to new heights with viewers being able to have immersive experiences within their favorite shows and movies using virtual reality (VR) and augmented reality (AR)."

Benefiting consumers across the MENA region, this new development is expected to accelerate E-Vision's transition from focusing on the telecom network business to providing also direct to consumer (DTC) streaming services.

Jaap Kalkman, group chief investment officer at ADQ, remarked, "The investment in STARZPLAY ARABIA provides ADQ access to one of the leading SVOD and OTT service providers in the region. With its state-of-the-art technology, distribution strength and compelling and engaging content, STARZPLAY ARABIA has developed a unique market positioning in the MENA region and is well positioned for further growth."

With this joint investment, STARZPLAY ARABIA can leverage media content delivered by both E-Vision and ADQ portfolio companies, further optimizing its content acquisition spending. Additionally, STARZPLAY ARABIA will also gain significant scale through immediate access to e&'s vast customer base. Under E-Vision, the company stands to benefit from improved economies of scale and can substantially accelerate deployments across key markets in the region.

Maaz Sheikh, chief executive officer & Co-founder of STARZPLAY ARABIA, said, "STARZPLAY ARABIA has transformed the region's entertainment sector, bringing truly homegrown competencies to serve the fast-growing demand for streaming services. The investment by E-Vision and ADQ will enable us to grow further by focusing on original content production and advanced customer personalization."

Overall, the acquisition provides potential for international expansion, leveraging STARZPLAY ARABIA's reach across 20 global telcos.

AFR-IX telecom signs landing party agreement with Telecom Egypt for Medusa submarine cable

Barcelona, 2 March 2022: Telecom Egypt, Egypt's first integrated telecom operator and one of the largest subsea cables operators in the region, and AFR-IX Telecom, a Barcelona-based infrastructure and telecom operator, signed a landing party agreement for the landing of the largest Mediterranean submarine cable system, Medusa, in Egypt. The agreement was signed during the Mobile World Congress 2022 in Barcelona by the Managing Director and CEO of Telecom Egypt, Mr. Adel Hamed and Norman Albi, CEO of AFR-IX Telecom and Medusa.

Medusa is an 8,760km long submarine cable system with 24 fiber pairs and a capacity of 20 Tbps per fiber pair that is planned to connect the northern and southern shores of the Mediterranean Sea. The cable will have 16 landing points in several Mediterranean countries, such as Portugal, Morocco, Spain, Algeria, France, Tunisia, Italy, Greece, and Egypt.

Telecom Egypt, as the partner-of-choice for major global submarine cable owners, is providing the international community with state-of-art infrastructure across Egypt and the globe to over 140 landing points in more than 60 countries. The company has invested extensively in its submarine cable infrastructure, which is the shortest and most reliable crossing path between Africa, Asia, and Europe. Additionally, Telecom Egypt is working on multiple layers of its infrastructure diversity, such as establishing new submarine landing stations and crossing routes as well as investing in new systems and solutions that cater for the rising global demand for international bandwidth.

Medusa is a new generation submarine cable and follows the open cable standard. As such, the project aims to respond to the current challenges of submarine connections, which are establishing new routes to diversify and decongest data traffic, gaining capacity with greater number of fibers per cable, and promoting open access to all European landing stations.

The Managing Director and CEO of Telecom Egypt, Mr. Adel Hamed, commented:

"We are pleased to introduce additional connectivity to Egypt through the Medusa submarine cable system, which will increase diversity in the Mediterranean basin. We believe this agreement will be the beginning of more upcoming collaborations with AFR-IX telecom."

CEO of AFR-IX telecom, Norman Albi, said:

"The agreement with Telecom Egypt is key to the project as Egypt is an essential transit route for submarine cables due to its privileged position between Europe, Asia, and Africa. It is a very valuable connection to link East to West and North to South. With Medusa, we will also contribute to diversifying traditional routes such as those that land in Alexandria or Suez."

Mobily invests in building new 19,200 km-long submarine cable

Etihad Etisalat Company (Mobily) announces its participation in the Southeast Asia – Middle East – Western Europe 6 (SEA-ME-WE 6) consortium that would build a 19,200 km-long new undersea cable system connecting the Kingdom of Saudi Arabia with ten other countries.

This new system will enhance Mobily's global network connectivity and offer one of the lowest latencies available between the three continents, transferring more than 100 terabits per second. Furthermore, it will create an additional layer of network diversity and resiliency for the heavily loaded traffic from the Middle East toward Europe and Asia.

This announcement comes in line with Mobily's effort to enable the digital transformation journey of the Kingdom's Vision 2030 by empowering businesses with reliable infrastructure and stronger, far-reaching connectivity to provide digital services that are on par with international standards.

"Our investment in SEA-ME-WE-6 is a pivotal step toward achieving unparalleled global connectivity to Saudi Arabia's digital ecosystem and to support the Kingdom's vision of becoming an international hub of telecommunications services and traffic. This new state-of-art system will bring faster and more reliable connectivity to all of our users in The Kingdom, and the region, as the demand for high-speed data is rising due to the digital transformation and development of emerging technologies such as 5G, IoT, artificial intelligence, and virtual reality," said Eng. Thamer Alfadda, Mobily's SVP of carriers, operators, and wholesale services.

The SEA-ME-WE 6 submarine cable will land at Mobily's new international cable landing station in the city of Yanbu. Its strategic red sea location, nearby data centers, and Saudi Vision 2030 projects position it as one of the key cable landing sites for Saudi Arabia and the region.

GBI deploys Infinera's ICE technology for increased capacity

Gulf Bridge International (GBI) has deployed Infinera's industry-leading Infinite Capacity Engine (ICE) technology to increase capacity on GBI's smart network. This has enabled GBI to launch new initiatives like its Capacity Protection Program and prepare for major events like the World Cup scheduled to take place in Qatar later this year.

"Deploying Infinera's ICE technology across our network provides the terabits of capacity required to meet the demanding bandwidth needs of the region," said Gavin Rea, chief technical officer at GBI. "This deployment has enabled GBI to kick off our exciting new Capacity Protection Program to better support our customers and stream international events with reliability and ease. With Infinera's ICE technology, we are well-positioned to provide a variety of reliable, high-capacity services now and in the future."

Positioning GBI's network for success, Infinera's ICE technology on the GX Series Compact Modular Platform has enabled GBI to launch its Capacity Protection Program, which seeks to provide customers with increased protection and optimize both the restoration and repair processes, as well as take a proactive approach to fault prediction and detection. Launched earlier this year, GBI's program will provide billions of international viewers with a seamless viewing experience of the world's largest football competition.

"GBI operates significant subsea and terrestrial networks in the Middle East and globally, providing their customers with industry-leading network services," said Nick Walden, senior vice president, worldwide sales, Infinera. "By deploying Infinera's high-capacity coherent optical transmission solutions on their smart network, GBI is able to increase network capacity and deliver new services to their customers. We are delighted to support GBI and their customers throughout the Middle East and globally."

Telenor Myanmar subsidiary sold to Lebanese M1

Myanmar's junta has approved the sale of Norwegian telecoms giant Telenor's Myanmar subsidiary to Lebanese conglomerate M1 Group, in a move activist groups warn could put sensitive customer data in the hands of the military.

The Southeast Asian nation has been in chaos since a coup last year sparked huge protests and a bloody military crackdown on dissent, sending its economy into freefall.

In July, Telenor announced that it planned to sell its subsidiary Telenor Myanmar and later cited junta demands that it installs monitoring equipment on the network as a reason for leaving the country.

After months of stalled negotiations, Telenor and M1 – which is helmed by current Lebanese prime minister Najib Mikati – both said the sale had been approved by junta authorities.

"M1 Group has been informed that the Myanmar Investment Commission has approved Telenor Group's application for the sale of Telenor Myanmar to Investcom PTE Ltd, an M1 Group affiliate," M1 said in a statement.

A separate statement from Telenor said the sale had been given "final regulatory approval".

M1 will partner with local consortium Shwe Byain Phyu to take ownership of the new entity, according to the group's statement.

Founded in 1996, Shwe Byain Phyu started out distributing petroleum products for the then-military government, and employs more than 2,000 people in Myanmar.

It has interests in petroleum trading, manufacturing, commodities trading and marine products, according to its website, which lists no previous telecoms experience.

"Sanctions screening from external consultants has assured Telenor that Shwe Byain Phyu and its owners are not subject to any current international sanctions," the Norwegian firm said in a statement.

Mitigate harm

Last year, 474 civil society groups in Myanmar called Telenor's decision to pull out irresponsible, saying it had not sufficiently considered the impact on human rights.

Activist groups say any new owner could comply with future requests from the junta to provide cellphone data of dissidents protesting against the putsch that ousted Aung San Suu Kyi's government last year.

"There are still many things Telenor can do to mitigate harm," said Joseph Wilde-Ramsing, senior researcher at SOMO, a Netherlands-based non-profit that conducts research and advocacy on corporations.

"If they won't take any steps to minimise the data transfer, they can still do things like set up a fund to help victims, remediate some of the harms they are going to be contributing to with the sale."

Time to automate:

Smart homes and businesses

The late JFK said that automation does not need to be our enemy. "I think machines can make life easier for men, if men do not let the machines dominate them," he said. This cannot be more relatable today where systems and processes across offices, factories, and homes are often automated.

In 2021, the automation industry as a whole was expected to generate around $214 billion worldwide. With the growing adoption of artificial intelligence (AI), machine learning (ML), and robotics – three important digital game changers – the advent of automation and connected devices allows industries to innovate and grow in size rapidly. Automation has become an important factor to most modern industries and industrial software development, making it not only a mere technology to increase production and influence economic growth, but it also acts as a service to industrial, domestic, and personal living.

By expediting processes and minimizing human error, the essence of building an automation framework is expanding constantly with various advantages. Zooming in to the home and business automation landscapes, the 21st century is driven by the Industry 4.0 era and technologies, encompassing control and automation of devices, machines, and security, among other facets.

Smart living at home

There are around 175 million smart homes worldwide, with a growth expected to be at 21.4% by 2025. This only means that the golden age of smart technology has pushed forward in leaps and bounds to make people's lives easier, especially at home.

The days when someone has to manually check the house twice before leaving so that no lights or appliances are left switched on are slowly

fading. Controlling, management and coordination of home appliances in a comfortable, effective, and AI-powered manner are made possible through automatic systems. These can be programmed and can even perceive and learn from the environment. In the age of automation, where smart devices and sensors optimize energy consumption, reduce time-to-deliver, and streamline security, homes can now serve as your personal assistant and innovative landlord. To emphasize, energy management systems, as well as security and access control systems, are driving the smart homes market.

In parallel to this, the Internet of Things (IoT) is what makes smart homes run, and coupled with 5G technology, they will run even faster and offer more possibilities. With this in mind, telcos have the opportunity to move up the value chain and operate at the service layer. By focusing on customer experience and service simultaneously, the value of telcos will increase with a strong, bundled smart home solution.

The smart homes of tomorrow will be built on the back of services, enabling seamless connectivity, integration, and automation. The extensive customer base and existing infrastructure of high-speed internet cables and cell towers of telcos could be the lifeline of every smart bulb, camera, lock, or speaker in the household. Fiber optics are also ideal to deliver smart home services along with the continuous launch of various wireless technology-based devices and deployment of cellular network technologies.

As per TechSci Research, the Middle East smart homes market benefited from wireless communication advancements to support system integration, increasing wireless devices market, and growing adoption of low power and cost-effective hardware. Network technologies like 5G and Wi-Fi are being widely used to offer high voice support, strong coverage and appropriate data speeds to residents.

Moreover, the Middle East smart homes market is expected to register a healthy growth rate in the coming years on account of government initiatives towards energy efficiency and building smart cities like NEOM. Apart from the increasing IoT market, the booming M2M communication market and thriving touch-free intuitive gesture control are also expected to positively influence the region's smart homes market. These can be applied to lighting controls, HVAC controls, security & access control, entertainment controls, etc.

Backed by technological and infrastructural developments and growing usage of mobile devices, the digital lifestyle is indeed a reality in the region, with the rising demand for robust IoT infrastructure and telecom networks to power and secure these smart systems.

Automating businesses to be competitive

New technologies like AI, computer vision, robotic process automation (RPA), virtual assistants, low-code application development, and business intelligence combined to bring a hyper automated infrastructure in place can be pivotal for business planning, managing operations, and streamlining processes.

Investing in automation can reap long-term benefits if the company's business needs are prioritized. Automating tasks by developing advanced rules-based processes that allow for greater control and improved accuracy and compliance can reduce cycle and waiting time, can be easily audited, and can be scaled to demand and utilized across processes.

In the Gulf region, according to YouGov, half of the data workers now rely on automation to carry out manual duties at work, placing the region in a unique position to further advance the benefits of AI innovation. These employees are producing faster results through the use of analytics technology compared to five years ago. Supporting effective collaboration and governance, RPA and cognitive automation tools are among the most helpful when it comes to digital process automation.

Digital process automation refers to the use of digital technology to perform processes in order to accomplish a workflow. Businesses across the world have been relying on business process management (BPM) for enhancing and managing the back-end activities efficiently which is necessary for optimization, digital transformation, and customer experience.

Business automation has become a strategic priority for the majority of SMBs and enterprises and is gaining momentum as the development of AI-driven automation solutions booms further. With the help of connected ecosystems in the workplace, apps, technologies, and other solutions can give quick access to a network of services that allow for a better allocation of available resources – increasing productivity.

In fact, in countries like Bahrain, Kuwait, and the UAE, the projected adoption of automation by 2030 is higher than the projected global average of 32%. Through AI/ML-powered automation, workers and companies in the Middle East can focus on the real challenge (and opportunity) presented by digitization in implementing new technologies in everyday workflow.

Empowering workers to become more capable and independent when using technology solutions is the way forward for automation. Instead of fearing job displacement or eviction, AI and ML can be used to break the boundaries when connecting remote, on-site, and hybrid team members and encourage proper decision-making. Even RPA, which is an enterprise-class software automation solution, can be relied on to deliver repetitive process executions and data handling across legacy, desktop, and web applications. MENA is also in line with the global trend of rapidly opening up to embark on the RPA transformation wave.

Heading into 2022, still heavily impacted by the pandemic, the business landscape is constantly changing by automating business processes, increasing productivity, and engaging with customers effectively. No doubt that automation will ease the burden of repetitive, mundane tasks and create more value-added work for human workers and enterprises. TR

Solutions for evolving multi-cloud set up

Communication Service Providers (CSPs) and mobile network operators (MNOs) are facing huge 5G investment decisions over the next few years, especially when it comes to strategizing for the cloud. Modern network infrastructure solutions must support CSPs to build and deploy open, cloud-native networks faster with lower cost and complexity. The development of both private and public clouds has created a huge expansion in co-location facilities and internet exchanges, where enterprises and cloud providers can easily connect from a unified center. Moreover, 5G and edge deployment will receive a boost from cloud-native technology with greater choice and agility to accelerate new connectivity and service options.

The three leading global hyperscalers (AWS, Microsoft, and Google Cloud) hold more than 80% market share for global public cloud services specifically for IoT workloads according to the latest research from IoT Analytics. Operators and enterprises will require services or resources from multiple public clouds, to connect their networking infrastructure with an emphasis on saving cost and optimizing efficiency to their operations.

With the growth of connected devices as we transition towards 5G connectivity, mobile operators need to be on top of edge cloud requirements to provide the performance, responsiveness, and consistency to accelerate their offerings to customers in the coming years.

Here are a few key solutions that telcos can consider for their multi-cloud strategies.

Secure Access Service Edge (SASE): It's obvious that running applications across multiple clouds pose security and compliance risks due to a lack of insight and visibility into what's happening to applications on networks in other clouds. Genetec's State of Physical Security 2021 Report states that the pandemic forced physical security professionals to work from home and 45% of larger organizations (with over 1,000 employees) have already adopted cloud solutions, indicating a 19% increase from 2020's results. It further states that only 14% of respondents in the Middle East indicated that at least 25% of their physical security environment is cloud or hybrid cloud. This could be due to the strict regulatory environment in some Middle Eastern countries as respondents from the Middle East were most likely to select 'hosting data outside your country' as a reason which deters them from deploying cloud security solutions. The survey revealed that over half of respondents (52%) chose access control as the priority solution that they would be investing in to advance or improve their physical security environment.

As a cloud architecture model, SASE allows organizations to combine their network and security tools in a single management console that can independently support remote working. SASE uses software to connect to cloud technology to combine SD-WAN with network security functions.

Edge computing: Mobile network operators (MNOs) need to build their cloud strategies with a focus on edge computing, which is complimentary to centralised cloud computing. Research shows that 75% of enterprise-generated data will be created at processed at the edge by 2025. Since edge deployments will be in thousands as compared to 8 to 10 deployments in a typical data center, scalability and agility become crucial.

Multi-access edge computing (MEC): MEC is a fundamental technology in 5G and essential for unlocking new business value. MEC is going to be a critical component for achieving 5G capabilities around URLLC (ultra-reliable low latency communication) and has been added in 3GPP standards as well. With MEC, ubiquitous connections and high computing capabilities can be delivered to individuals for their diverse services, such as VR, AR, and multimedia; and low latency and high security can be provided to enterprises by restricting data to within enterprise campuses. The sustainable development of both B2B and B2C services requires the scale-up of MEC. Telcos can explore and innovate in the MEC field to deliver high-quality certifications to empower business ventures not only in tech but across industries as reliable service and product providers. Recently, telecom operator du and Huawei signed an agreement for a joint innovation on MEC whereby the two companies will research, validate, and reproduce MEC-oriented applications in the Middle East, helping du provide more diversified communications services.

Cloud-managed DDI: In an ever-increasing cloud-first world, many organisations still rely on siloed hardware that locally manages DNS, DHCP and IP address management, also called DDI individually for each site at the risk of incurring higher costs, bad latency, weak performance, and security gaps. Cloud-managed DDI provides a simpler and more effective way to manage networks, devices, apps and services across locations. The technology allows full DDI visibility, automation, and reliability, giving way to a faster, more reliable network experience for users at the edge with instant access to cloud apps, and a more controlled and efficient management experience for IT pros in the network operations center.

Agile multi-cloud networks are all about delivering the adaptability of the dynamic scale and performance starting from the application layer. Telcos' cloud-native 5G networks must provide a reliable, scalable, and distributed autonomous network solution that helps enterprise and consumers build their solutions to deploy IoT, private/enterprise networks, MEC networks by drastically reducing the burnout factor in modern communication networks management. TR

> The Middle East smart homes market is expected to register a healthy growth rate in the coming years on account of government initiatives towards energy efficiency and smart cities

Huawei reports $99.9 billion in revenue in 2021

Huawei released its 2021 Annual Report , revealing that the company had maintained solid operations throughout the past year. As per the report, Huawei achieved $99.9 billion in revenue in 2021, and $ 17.8 billion in net profits, an increase of 75.9% year-on-year. The company's R&D expenditure reached about $22.38 billion in 2021, representing 22.4% of its total revenue, and bringing its total R&D expenditure over the past 10 years to over $132.5 billion. Moving forward, the company also plans to continuously increase investment in R&D.

Guo Ping, Huawei's Rotating Chairman, stated at the press conference, "Overall, our performance was in line with forecast. Our carrier business remained stable, our enterprise business experienced steady growth, and our consumer business quickly expanded into new domains. In addition, we embarked on a fast track of ecosystem development."

Meng Wanzhou, Huawei's CFO, also spoke at the event, "Despite a revenue decline in 2021, our ability to make a profit and generate cash flows is increasing, and we are more capable of dealing with uncertainty." Thanks to the enhanced profitability of its major businesses, the company's cash flow from operating activities dramatically increased in 2021, amounting to $9.3 billion. Its liability ratio also dropped to 57.8%, and its overall financial structure has become more resilient and flexible.

In 2021, Huawei's carrier business generated $44.1 billion in revenue and helped carriers around the world deploy leading 5G networks. Third-party test results have found that 5G networks built by Huawei for customers in 13 countries, including Switzerland, Germany, Finland, the Netherlands, South Korea, and Saudi Arabia, provide the best user experience. By working with carriers and partners, Huawei has signed more than 3,000 commercial contracts for industrial 5G applications. These kinds of 5G applications are currently seeing large-scale commercial use in sectors like manufacturing, mines, iron & steel plants, ports, and hospitals.

Thanks to continuing digital transformation trends, Huawei's enterprise business also grew rapidly, generating $ 16.06 billion in revenue during 2021.

Huawei's consumer business zeroed in on consumer wants and needs, further building out the global ecosystem for a smart, all-connected era, as part of the company's Seamless AI Life strategy for consumers around the world. This business generated $ 38.17 billion in revenue in 2021 and continued to see steady sales growth in smart wearables, smart screens, true wireless stereo (TWS) earbuds, and Huawei Mobile Services (HMS).

Ericsson unlocks new 5G edge use cases

Ericsson has launched the Ericsson Local Packet Gateway, enabling CSPs to unlock innovative edge opportunities in both hybrid private networks segments and on the network edge, to support high-data bandwidth and low-latency use cases. The Ericsson Local Packet Gateway is an all-in-one appli-ance – including hardware, Container-as-a-Service (CaaS), software and lifecycle management – that makes edge applications easy to deploy and manage.

The optimized cloud-native user plane and service functions enables compact deployment in a one-server low footprint, with integrated lifecycle management enabling fast time-to-service for new edge use cases.

The Ericsson Local Packet Gateway brings dual-mode 5G Core user plane and network slicing to the edge, enabling both mobile broadband and enterprise use cases, from small user plane deployment in a CSP core network, to routing to local applications. Examples of CSP enterprise use cases in-clude sport events applications, virtual reality (VR) gaming and augmented reality (AR) for inspect-ing factory quality.

Laurent Leboucher, Orange group CTO & senior vice president Orange Innovation Networks said, "At Orange, we continue developing meaningful networks to adapt to the needs and uses all over the world. According to enterprise customers' needs, a first option is to create a virtual private network on Orange's public network. A second solution is to create a hybrid private network rely-ing on shared equipment in the Orange network and dedicated equipment at the customer's site for critical flows and data. Ericsson's 5G Core for standalone, including the Local Packet Gateway help us meet both these enterprise customers' needs."

Monica Zethzon, head of solution Area Packet Core, Ericsson, said, "With the launch of the Ericsson Local Packet Gateway we have taken yet another step in supporting our CSP customers to address the enterprise market, by providing a powerful, slimmed-down user plane that's easy to deploy at the edge, using an integrated lifecycle management making it easy to scale."

e&, Ericsson, Huawei deploy first E2E live multi-vendor VoNR ecosystem

Etisalat UAE, part of e& (former Etisalat Group), in collaboration with Ericsson and Huawei, announced the successful deployment and testing of the first E2E live multi-vendor voice over new radio (VoNR) ecosystem worldwide. The launch marks an important milestone for the UAE's digital transformation objectives.

Khalid Murshed, chief technology and information officer at Etisalat UAE, said, "The launch of VoNR is in line with e&'s vision to bring the best in digital technologies, smart connectivity and innovative solutions to all our customers. With Ericsson and Huawei as our strategic partners for this project, we will maximise opportunities to further enhance the end-user communication experience by ensuring better voice continuity and quality."

VoNR is a call service that uses the standalone architecture of the 5G network, providing lower latency and improved quality, resulting in an elevated calling experience and high-speed data. VoNR call has been made and verified over a live multi-vendor ecosystem consisting of core and radio 5G SA related nodes from both Ericsson and Huawei. This innovative milestone is an important step towards the commercial introduction of seamless 5G voice services in e&'s cloud-native network.

Ekow Nelson, vice president at Ericsson Middle East & Africa, said, "Over the past years, voice calling has become a key service in the UAE. As the UAE is driving ever-more digitalization powered by 5G, high quality and seamless voice calling will become a must-have service for residents across the nation... We remain committed to providing network excellence to ensure the nation is equipped to offer the numerous digital opportunities that 5G will bring to the region."

A spokesperson at Huawei remarked, "As 5G SA coverage expands within UAE, the demand for better voice quality with best possible experience is inevitable on 5G Core. This is why VoNR will be the key to further improve the customer's confidence trusting voice continuity in 5G coverage areas..."

It is expected that new services will be rolled out through the VoNR ecosystem, such as accessing real-time mobile interactive gaming and voice call at the same time, exchanging secure media content during the voice call and experiencing interactive augmented and virtual reality.

Nokia launches new cloud-native solution for consumable, agile and automated cloud networks

Nokia announced the launch of its cloud-native solution, Adaptive Cloud Networking, to transform service provider cloud networks to be consumable, agile and automated. The comprehensive solution is designed to respond to the unpredictable demands of the 5G era by supercharging a service provider's data center fabric and seamlessly extending its operations to the edge clouds. This innovation in the way telco clouds are built and operated will enable service providers to reinforce their critical role in the 5G digital network value chain.

5G networks are pushing the limits of existing data center fabrics and edge cloud infrastructures: cloud native designs drive the agility and dynamicity of applications, and low latency performance requires those applications to be delivered from edge clouds close to end users. Data center fabrics need to adjust to these new demands. A new NetOps era is emerging – one that provides the tools and capabilities that allow service providers to transform their networks to become more efficient and productive and increase both service revenue and ARPU.

Nokia's comprehensive Adaptive Cloud Networking solution helps service providers overcome these challenges to deliver a consumable, agile and automated network. A consumable network provides a needed foundation of openness, extensibility, visibility and control to access network data to optimize network operations. An agile network adapts to the constantly changing scale and performance required from the application layer, ensuring needed elastic scalability as dictated by the applications. An automated network supercharges network operations by making various built-in automation tools available throughout the network's lifecycle.

Nokia's Adaptive Cloud Networking solution provides these values in three key areas of the service provider network – the data center fabric, the rapidly emerging edge cloud, and the seamless inter-connectivity needed across the WAN, connecting applications across the WAN to different parts of the network.

The solution leverages Nokia's proven data center fabric elements, including the SR Linux network operating system, the Fabric Services System and the Nokia 7220 and 7250 IXR hardware platforms; the newly introduced Edge Network Controller, designed specifically for the automation of the network in edge clouds; and Nokia's Network Services Platform (NSP) for programmable automation, connecting data centers and edge clouds across the wide area network (WAN).

Thomas Löffler, AVP, Exhibitions, Dubai World Trade Centre

Getting ready for CABSAT 2022

Thomas Löffler, AVP, Exhibitions, Dubai World Trade Centre tells Telecom Review all about Cabsat 2022 theme, exhibitors and new features.

What can we expect from CABSAT 2022?
With the global broadcast and media technology market expected to grow from $41.4bn in 2021 to $62bn in 2027, it's never been more important to ensure the right strategies are in place to capitalise on these opportunities. CABSAT 2022 is the region's super-connector event to engage with thousands of key buyers, thought leaders and decision makers from over 120 countries.

CABSAT, the Middle East and North Africa's leading specialist event for the satellite, digital media, filmed entertainment and professional AV industries, is set to reunite the region's content and broadcast communities in-person once again at Dubai World Trade Centre (DWTC) from 17th-19th May 2022. CABSAT is set to spark meaningful, industry-changing dialogue in the broadcast, content and satellite industries.

This edition of CABSAT will feature a greater focus on sustainability, with the SatExpo Summit returning under the theme 'Building a Sustainable, Innovative Satellite & Space Sector'. Topics covered at the Summit will include sustainability and the clean-up of space debris; new business and financing models; ground operations innovations; ensuring satellite security; AI and machine learning applied to satellite communications and satellite insurance and risk mitigation.

CABSAT 2022's Content Congress will engage a unique cross-section of senior industry stakeholders with up-and-coming influencers to share insights on how to adapt traditional broadcast models, the benefits of disruptive thinking and the future of worldwide broadcasting. Content Congress will tackle the toughest challenges that the industry now faces, including how the metaverse will create content opportunities; content Intelligence: using AI for both your content and your audience data; how to stand out as a vlogger; demonstrating green filming practices; reducing the carbon footprint of the film and TV industries; remote production and role of the cloud and deepfakes and synthetic media

Are there any new exhibitors at CABSAT 2022?
CABSAT 2022 will host a range of first-time international exhibitors specialising in broadcast and satellite-related products and services, including TAG media (Israel), NXT Edition (UK) and Piko TV (Turkey) on the broadcast side of things, as well as Gilat satellite Networks and Amos Spacecom (both from Israel) who operate in the satellite industry.

What new topics or themes will be tackled at this year's show?
CABSAT 2022 sees the event expand into the realm of professional AV technology. It's important that we support this community, which is a key part of the broader media and entertainment industry, especially as the focus is increasingly on creating profound experiences.

AV manufacturers, solutions integrators, distributors and resellers won't want to miss out on this launch, while venue owners and managers, installers and other end users will benefit from learning about latest advances in conferencing, sound, lighting, video and streaming technologies to captivate audiences.

The AV Connect buyer matching programme will give thousands of industry professionals, technology buyers, distributors and end users from over 120 countries the opportunity to create targeted, high value connections.

Plus, our AV Academy will offer the chance to explore the latest trends and best practices through workshops and masterclasses delivered by leading AV professionals. TR

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IoT cloud strategy for telcos

The IoT and cloud marriage seems almost perfect; however, the integration between the two is something that telcos need to consider to help enterprises and consumers take advantage of Industry 4.0 capabilities such as real-time monitoring, predictive maintenance, and autonomous operations of vehicles and equipment to explore new revenue stream opportunities.

The adoption and deployment of Internet of Things (IoT) infrastructures and systems for a wide set of applications such as fintech, logistics, healthcare, and smart cities, etc. are gaining ground. The total installed base of Internet of Things (IoT) connected devices worldwide is projected to amount to 30.9 billion units by 2025, which is a quick climb from the 13.8 billion units that were expected in 2021. And the high demands on data storage, processing, and management services are being met through cloud-based data centers.

IoT services and related cloud infrastructure investments are expected to grow faster than general public cloud spending and will thus increase in strategic importance during the coming

years as the public cloud becomes a multi-trillion-dollar market. Cloud services now act as a computation and data processing platform as well as management platforms for IoT deployments.

Cloud plays a big role when it comes to scalability and essentially reduces upfront CAPEX as well as provides energy efficiency for IoT deployments on the infrastructure level. When deploying IoT solutions across multiple regions, it becomes important for businesses to manage things centrally. Cloud provides great value-add in terms of troubleshooting and quick response time. Additionally, IoT systems are likely to require the use of a variety of processing software for efficient operations, and the adaptability of cloud services is suited to deal with new requirements, firmware updates to enable new service offerings.

To be successful, telcos need to become cloud-first businesses by accelerating their digital transformation, innovating faster, and creating value by helping customers fast-track their applications and data modernization initiatives, building and operating modern cloud environments while delivering ongoing innovation and transformation. One such technology supporting the IoT cloud strategy is Narrow Band Internet of Things (NB-IoT). It is being deemed as the proposed 4.5G standard technology that brings considerable advantages to mobile operators building their low power wide area (LPWA) networks when it comes to deployment, operation, and re-usability of existing processes, IT, and infrastructure assets. Sensor nodes using NB-IoT can send data to the cloud and can directly communicate with other NB-IoT nodes setting up a fog computing paradigm on peer-to-peer subnetworks. This approach may be crucial for the development of complex IoT infrastructures while providing high flexibility.

Typical IoT cloud services

Managing billions of IoT devices requires a set of dedicated cloud services. IoT Analytics classifies IoT cloud offerings into three main categories.

IoT application management/ enablement: These include cloud services designed to enable the developer to make and manage IoT applications. IoT-specific application development and management services include rule engines, IoT development environments, and digital twins.

IoT device management: These include cloud services designed to ensure connected things are working properly by seamlessly running patches and updates for software and applications running on the device or edge gateways. Examples include device monitoring, firmware updates, or deployment configuration management.

IoT data management/enablement: These cloud services are designed for seamless asset/edge connectivity, such as drivers to connect devices and for providing the capabilities to store and analyze IoT data.

Telcos can consider IoT platform as a service (PaaS) in some areas, such as the following:

Leveraging real-time: IoT systems function in real-time. By using real-time data streams to optimize internal operations or to track business performance, companies can improve efficiencies such as saving energy, waste reduction, better response speed, data-driven application, and automated business processes.

Green networks: IoT and AI can also be used in the 5G network to reduce the network's carbon emissions and combine them with other vertical industries to improve production efficiency, which will lead to a cut in carbon emissions.

IoT at the edge: Today, there are more mobile devices than people in the world. Mobile devices and networks data can be stored at the edge of the network or stored centrally in data centers. Provisions for enhancing enterprise edge cloud capabilities can add value to connectivity services by easily connecting devices, assets, IT-OT systems from edge to cloud.

Keeping the data safe

IoT as a business intelligence tool is undoubtedly proving to be beneficial; however, secure communication to IoT devices, data, and device management capabilities, such as device provisioning and data protection policies are critical to achieving better interoperability and cohesion with other services in the IoT value chain. A security model that starts at the device layer and seamlessly deploys at the edge, the central cloud, and the APIs must be in place.

Moving on

According to market forecasts, the global IoT cloud platform market size is set to grow from $6.4 billion in 2020 to $11.5 billion by 2025, at a compound annual growth rate (CAGR) of 12.6% during the forecast period. The drivers for the growth of the IoT cloud platform market include the proliferation of IoT devices, the need to increase operational efficiency, rapidly decreasing costs of IoT-based sensors connectivity hardware, and government initiatives for Research and Development (R&D) activities related to IoT, the emergence of Internet Protocol version 6 (IPv6), and the shift from on-premises to cloud-based data management strategy.

Telcos need to collaborate with public cloud players to offer customers support through the various stages of platform assessment, design and deployment, and migration to build an end-to-end IoT cloud solution and develop joint go-to-market activities for 5G networks.

From smart factories to smart buildings to smart cities, telcos are well placed to help organizations use the combination of IoT cloud services to help digitize people, places, and things to visualize, simulate, and analyze new business processes. TR

Australia, Canada enhance joint efforts to combat unsolicited communications

Australia and Canada will look to further enhance ongoing joint efforts to combat unlawful telemarketing and spam under an agreement signed by the communications regulator of each country. The Australian communications and media authority (ACMA) and the Canadian radio-television and telecommunications commission (CRTC) renewed an MoU that will see them share strategic approaches, exchange intelligence and assist each other with investigations on illegal communications.

ACMA chair Nerida O'Loughlin said the agreement builds on the already strong strategic and working relationship between the ACMA and CRTC in cracking down unlawful calls and messages, particularly when entities operating across borders are involved.

"Scams, flooded inboxes, and unlawful calls are eroding people's confidence in communication services," O'Loughlin said. "Unsolicited communications are an international problem in origin and impact, and increased global collaboration is required to address the escalating issue."

CRTC chairperson and CEO Ian Scott said that the CRTC has a longstanding and trusting relationship with ACMA that will prove rewarding for both countries.

"The landscape of threats to consumers is constantly shifting. The only way we can tackle this global issue is by working collaboratively with other international jurisdictions. We look forward to continuing to exchange information and best practices as well as the sharing of expertise as we tackle these issues in a united fashion," he said.

Intelsat, PCCW Global to deliver enterprise connectivity worldwide

The integration of Intelsat's FlexEnterprise global connectivity fabric with PCCW Global's Console Connect Software-Defined Interconnection platform enables organizations to deliver enterprise connectivity to locations around the globe while leveraging an easy-to-use platform underpinned by one of the world's largest private MPLS networks.

The combined solution addresses two key obstacles to delivering reliable, agile services across all of an enterprise's locations: limited local telecom infrastructure that can challenge traditional network deployments in developing or hard-to-reach places, and lengthy lead times typically associated with creating high-performance networks and services.

PCCW Global CCO Frederick Chui said, "The collaboration with Intelsat brings together the latest innovations in fixed network and satellite network technologies to deliver more flexible enterprise connectivity solutions. By integrating Intelsat's FlexEnterprise solution with the Console Connect digital platform, our global customers can access satellite-connected locations wherever they need to and effortlessly turn up services across all sites."

FlexEnterprise leverages the world's largest and most advanced integrated satellite fleet and ground infrastructure to enable service providers to integrate the reach and reliability of Intelsat services without the need to manage wholesale satellite capacity. On the other hand, Console Connect is home to a growing ecosystem of cloud, SaaS, IX, IoT, carrier and enterprise partners, which are directly interconnected by the platform's private high-performance network, delivering higher levels of network performance, speed, and security.

Intelsat GM and VP of networks Brian Jakins added, "Our sales and product teams work closely with the telecom ecosystem to make satellite services more relevant and easier to adopt for a broader set of customers. With the integration into the Console Connect platform, Intelsat is able to more easily meet customers anywhere on the PCCW Global network, while enterprises leverage the platform to extend applications and services to their most remote users and outposts."

Safaricom and Ethiopian Electric Power will share a dark fibre-optic agreement

Safaricom signed a five-year lease agreement to share a dark fibre-optic agreement with Ethiopian Electric Power (EEP).

EEP has built a network of optical ground wire ("OPGW") cables along high voltage transmission lines. Optical Ground Wire is one of the most reliable fibre optic mediums for telecom service providers or other organizations who are involved in the transmission of one or more forms of voice, data, video, text, messages, conferencing, and Tele-metering.

The OPGW installed on EEP's high voltage transmission will be used as part of Safaricom's network to provide national telecommunications services.

Commenting on this agreement, Safaricom says that such infrastructure sharing agreements will enable the operator to fulfil their commitment to transform Ethiopian lives for a digital future and contribute to efforts being made to the phased operation launch.

"We are grateful for the spirit of cooperation from EEP on the win-win partnership to support our contributions to the digital transformation of Ethiopia," says the operator.

First completed section of the PEACE cable project now fully functional

PCCW Global and PEACE Cable International Network Co. Ltd., have announced the completion of the PEACE cable system's PEACE-MED Mediterranean section, which is now ready to provide a range of high-speed and low-latency connectivity services for international customers.

Frederick Chui, CCO, PCCW Global, said, "Despite the global impact of the COVID-19 pandemic, PEACE-MED's completion was achieved thanks to the tireless efforts of our delivery teams, assuring that all elements of system planning, design, manufacturing, integration, laying and testing were concluded smoothly. We recognize their contribution, and look forward to welcoming our clients and partners on to the first completed section of the PEACE cable project."

PEACE-MED, a part of the trunk of the PEACE cable system trunk, is a 3,200km undersea cable that connects Egypt to France, with additional landing points in Cyprus and Malta. The landing in Marseille, France provided by Orange helped form PEACE-MED's open cable system, which is now fully operational and ready to provide customers with a wide range of telecommunications and data services.

PEACE-MED's cable landings in Cyprus, Abu Talat, Marseille, and Malta were all completed during the course of 2021, while stub branching units have been reserved for direct landing points in other countries thereby providing additional access options and opportunities for the entire Mediterranean region.

Sun Xiaohua, COO, PEACE Cable International, said, "Announcing the completion of PEACE-MED is an exciting moment for the PEACE cable team as a whole. We are very grateful for the efforts of the entire PEACE-MED delivery team, as well as the efforts of our partners, Orange Marine and PCCW Global, that have enabled us to reach such an important milestone. The successful delivery of PEACE-MED gives us great confidence in the success of the project as a whole, and we look forward to the completion of the entire PEACE system this year, which will contribute to the optimization of a digital ecosystem across the Mediterranean region and achieving our vision of a connected world with our partners."

Internet connectivity became less affordable in 2021

According to the latest statistical analysis by the International Telecommunication Union (ITU) and the Alliance for Affordable Internet (A4AI), the share of people's incomes spent on fixed broadband and mobile Internet services increased globally last year, in parallel with upticks in demand and usage compared to 2020.

Fixed broadband services saw the highest jump, with prices increasing by 8% last year. This meant fixed broadband became less affordable for many users, with relative prices climbing from 2.9% of gross national income (GNI) per capita in 2020 to 3.5% in 2021. The price of mobile broadband services also increased slightly, from 1.9 to 2% of GNI per capita worldwide.

Affordability gaps have also persisted over the past year with fewer economies now meeting the affordable cost target of 2% of monthly GNI per capita for entry-level broadband service, as set out by the United Nations Broadband Commission.

Consumers in low- and middle-income economies typically paid five to six times more, relative to their income, to use ICT services than consumers in high-income economies did in 2021.

At the regional level, users in Africa paid more than three times the global median price for mobile broadband services, and over five times the global median for fixed broadband.

Google's subsea cable lands in Tongo, can offer 20x network capacity

Google's Equiano subsea cable has arrived in Lomé, Togo, marking the cable's first stop along Africa's Atlantic coast. The subsea cable is expected to result in faster internet speeds, improved user experience, and lower internet prices in Togo.

"With the arrival of the Equiano cable in Lomé, we look forward to helping contribute to the achievement of Togo's digital goals and accelerating digital transformation not only in the country, but across the continent," Nitin Gajria, managing director, Google Africa officially stated.

As 300 million people come online in Africa over the next five years, the arrival of Equiano is a key step in the country's continued digital development. According to a recent economic impact assessment conducted by Africa Practice and Genesis Analytics, Equiano is expected to double Togo's internet speed from 10 Mbps in 2021 to 21 Mbps in 2025, while retail internet prices are forecasted to decline by 14% over the same period.

Multiple key telecom players including Société d'infrastructures numériques (SIN) and CSquared are partnering with Google to ensure that the cable can reach more businesses and end-users across Togo and the African continent.

Commenting on the landing of Equiano, HE Madam Cina Lawson, minister of digital economy and digital transformation for Togo, said, "Broadening the access to high-speed internet is a fundamental part in our national digital development process as we strive towards achieving the objectives set out in our Digital 2025 Strategy."

Malaysia confirms utilizing SWN model for 5G implementation

The Malaysian government is sticking to its plan of deploying 5G through a single wholesale network (SWN). In a joint statement from the ministries of finance and communications and multimedia, up to 70% equity in the wholly state-owned 5G company, Digital Nasional Berhad (DNB), will be available to telcos.

Malaysian finance minister Tengku Zafrul Aziz emphasized that the maintenance of the SWN model is the government's firm stance on policy continuity. "The implementation of 5G will drive the country's socio-economic transformation and this is estimated to contribute RM 659 billion to the value of GDP until 2030," Aziz explained.

The finalized decision has come in contrast to the concerns among wireless carriers that a single, shared 5G network could hamper digital competitiveness. Nonetheless, the government will retain a 30% equity stake in DNB while the majority of the stakes are intended for operators. It is worthy to note that this special-purpose vehicle company was established in early March 2021 to drive 5G infrastructure development in Malaysia.

Accessing DNB's 5G network is estimated to cost less than what major local telecom operators such as Celcom Axiata, Digi, Maxis, and U Mobile have incurred during 4G rollouts. In line with this, DNB has offered free 5G services to service providers until March 31 as part of its commercial trial. Aiming to achieve 80% coverage of populated areas by 2024, the trial is bound to be extended until June 30 to allow more operators to sign up.

China Telecom reports record double-digit growth in 2021

China Telecom's "Cloudification and digital transformation" strategy has paid off. In 2021, China Telecom's net profit reached RMB25,948 million, representing an increase of 24.5% year-on-year. Operating revenues amounted to RMB439.6 billion, growing by 11.7% over the preceding year.

In 2021, the company implemented its "Cloudification and digital transformation" strategy, developed integrated intelligent information services with a customer-oriented approach, and built core sci-tech innovation capabilities and the new information infrastructure. The company also established industrial and capital ecologies featuring strong alliances and open cooperation, while carrying out system and mechanism reforms, achieving new results in high-quality development.

China Telecom continued to enhance its 5G coverage and network quality, innovated e-surfing cloud handset device ecology, enriched the 5G application and privilege portfolio and launched 5G cloud packages. The company optimized the service experience for users through ultimate convergence, facilitated the upgrade of individuals' demands for emerging information consumption, continued to unleash the new round of data traffic benefits and propelled the scale and value enhancement of its mobile subscribers.

In 2021, mobile communication service revenues reached RMB184.2 billion, representing an increase of 4.9% from the previous year. The total number of subscribers reached 372 million, with subscribers' net addition maintaining the industry-leading position for four consecutive years. Meanwhile, the penetration rate of 5G package subscribers reached 50.4%, maintaining the industry-leading position.

Rogers' acquisition of Shaw's broadcasting services gets CRTC approval

The Canadian radio-television and telecommunications commission (CRTC) approved Rogers' acquisition of Shaw's broadcasting services, subject to a number of conditions and modifications.

"Given the nature of this transaction, we have put in place safeguards aimed at addressing potential risks to the broadcasting system for both consumers and programming services. Rogers must honor all existing contracts for Shaw customers. This adds to the safeguards already in place, which allow Canadians to subscribe to a basic television package and to select channels either individually or in small packages," said Ian Scott, chairperson and CEO, CRTC.

It is worthy to note that as part of this transaction, Rogers is acquiring 16 cable services based in Western Canada, a national satellite television service, and other broadcast and television services. Thus, in order to approve this transaction, the CRTC had to ensure that the application is the best possible proposal and that the transaction serves the public interest, consistent with the overall objectives of the Broadcasting Act.

In line with this, the CRTC has required Rogers to pay five times more in benefits to the broadcasting system than it had originally proposed. Rogers will then contribute $27.2 million to various initiatives and funds, including those that support the production of content by indigenous producers and members of equity-seeking groups. Benefits will be directed to the Canada media fund, the independent local news fund, the broadcasting accessibility fund, and the broadcasting participation Fund, among others.

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