TELECOM Review

ASIA PACIFIC

THE TELECOM INDUSTRY'S MEDIA PLATFORM

Q4-2021

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Managing cybersecurity in a **digital era**

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TELECOM Review ASIA PACIFIC
THE TELECOM INDUSTRY'S MEDIA PLATFORM Q4-2021
telecomreviewasia.com

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Provided in cooperation with AFP, the global news agency

Published by
tracemedia Ltd.
www.tracemedia.info

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Toni Eid,
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This December: Wait for the biggest ICT event of all!

December will be different for the ICT and telecom business this year, as the long awaited event is taking place once again on December 8 in Dubai UAE. Mark your calendars and do not miss it!

By the testimonials of most industry leaders, the Telecom Review Leaders' Summit is the best networking opportunity that offers the best content, combining both international and regional experiences in one place.

Top tier leading companies of the ICT industry and the digital world are among our sponsors, ranging from Telco carriers, cloud service providers, cybersecurity companies, vendors, infrastructure providers, etc., and these are: Etisalat, Huawei, Benya Group, MEF, Sofrecom, PCCW Global, Nokia, MTN GlobalConnect, B-Yond, Intelsat, Commscope, TELUS, SES, CSG, Mycom OSI, Verizon, AWS, Netcracker, RedHat, umlaut, Hiverse, Emircom, RIPE NCC, AP Telecom

The Telecom Review Leaders' Summit will focus on the industry's main trends, discussing the topics below:

- Seizing the opportunities of 5G
- Digitizing the wholesale industry
- The Telecom Leaders' panel: The new Telcos
- The evolution of network infrastructure
- Emerging technologies: Winners and losers
- Managing cybersecurity threats

Looking forward to welcoming you. Make sure not to miss it!

Seth Ryding, chief sales officer, Telenor Connexion

IoT-powered connected shipping for vaccine delivery

Manufacturers are experiencing a heightened need for container connectivity. Shipping goods across long distances yields many opportunities for theft, accidents, tilt, and shock. With connected shipping, items are constantly monitored, ensuring that products like the Covid-19 vaccine have a consistent cold chain. To better understand how IoT is impacting global supply chains in healthcare, Telecom Review Asia Pacific spoke to Seth Ryding, chief sales officer, Telenor Connexion.

Covid-19 has placed unprecedented demands on the logistics industry. How can IoT address some key challenges faced by the industry?

When Covid-19 hit the world, business leaders across industries had to resolve immediate challenges to keep their business afloat. If anything, this pandemic is a reminder for businesses to embrace innovative technology to become future-proof. In an increasingly digitalized age, this has become the prerequisite for building resilience and continuity. In the logistics industry, for instance, IoT, together with 5G, powers connectivity that transforms and improves global supply chains, and in doing so, delivers positive impacts to countries and lives.

As we all know, vaccines were developed and produced in record time to prevent a pandemic disaster. Time was not sufficient to develop a complete vaccine in all areas and vaccines became more sensitive to temperature. Caregivers must know with full certainty that the cold barrier has not been broken for the vaccine batch they are using. IoT is used to connect and monitor parcels and containers and instantly notify if the cold barrier is broken or if the temperature for any reason became too high. The benefit is higher caretaker security.

Cross-border connectivity is a key use case and crucial to preserving national interests. How do IoT technologies ensure that Covid-19 vaccines have a consistent cold chain?

Only a few pharmaceutical companies are manufacturing Covid-19 vaccines covering the globe. For successful vaccine delivery, precision control of transporting conditions such as temperature and light is crucial to safely storing, managing, and distributing vaccines. Essentially, monitoring parcels and containers every step from manufacturing plants to caregivers is paramount to secure the vaccine quality.

IoT from Telenor Connexion enables seamless connectivity independent where the shipment is situated,

> IoT is used to connect and monitor parcels and containers and instantly notify if the cold barrier is broken or if the temperature for any reason became too high. The benefit is higher caretaker security

supporting transparency and traceability in the cold chain throughout the entire process. Data from monitoring shipments must be safe and also shared where this is needed, Telenor Connexion can offer these services.

How does 5G accelerate IoT and its implementations such as container connectivity?

The 5G evolution will bring many improvements to containers, and some of them today are already available in 4G technologies, used for enterprises like Sony. At the heart of Sony Visilion's offering, for instance, are physical trackers that customers can affix to medical equipment or shipping crates. These trackers use LTE-M, technology, which is a 5G-ready technology.

Mobile (cellular) network technology has many advantages over using GPS trackers to monitor containers as it works both indoors as well as outdoors. For instance, goods in transit stored in containers deep inside a large vessel cannot receive GPS signals to report their location. With mobile technology, goods are traceable at any time because they are connected throughout most parts of the journey. And when they connect, they constantly report their location. Global IoT connectivity allows goods to connect to all the networks in all the countries they pass through, using mobile networks enhanced with satellite if needed. While 4G can track a location within a few kilometers, 5G can increase accuracy to around 15 meters. This will bring new possibilities to scenarios such as industrial indoor positioning to locate a pallet of vaccines in a warehouse.

The 5G standards contain some improvements for location-based services, especially applicable for local 5G networks. Such a local 5G network could be deployed in a warehouse where containers are stored. In this case, the local 5G could exactly pinpoint where the container is. This is possible because smaller radio cells are used and also the local network is tailor configured for an enterprise.

When containers are in transport, for example on a ship or on a truck, they will be connected to a public (nationwide) 5G. Here the location-based services will initially be similar to 4G. There are improvements in the 5G standards.

What are other key industry use cases and what role does Telenor Connexion play in supporting the accelerated adoption of IoT across industries?

Standalone IoT is growing and new business models are emerging from connected products. The next natural step in IoT is when data ecosystems are evolving – when stakeholders from different industries share their data. Utilizing data from different industries will demonstrate 1+1=3 scenarios, in cases such as vehicles reporting road conditions to weather centrals. Telenor Connexion has a mediator enabling role in the interplay between stakeholders.

How does Telenor Connexion overcome cybersecurity challenges in IoT use cases?

We help IoT organizations address their greatest risks and find rapid and cost-effective ways to protect themselves and their information. We do this by delivering secure end-to-end VPN communication with encrypted Private APNs. On top of this, we are private

monitoring traffic and logs searching for anomalies that might indicate weaknesses.

As an industry-leading expert partner in connectivity that understands IoT and security to keep data secure, Telenor Connexion is also ISO27001 certified and operates our processes according to best practices.

With whom is Telenor Connexion partnering with in Asia?

Telenor Connexion is an MVNO that provides seamless multinetwork coverage in more than 200 countries across the globe, with typically 2-3 networks per country. That means that there are relations with the majority of operators in Asia where Telenor Connexion gets to use these networks based on a roaming basis.

As Telenor Group fully or partially owns MNOs in Bangladesh, Malaysia, Thailand, and Pakistan, there are deeper collaborations on both technical as well as customer-facing levels that create additional value. For some additional markets where there are roaming restrictions, there are technical solutions in place that can either change the identity of a SIM card to a local SIM or platform functionality that enables the customers to manage all SIM cards globally through one portal.

In Asia, for instance, Telenor Connexion is working with dtac and Digi to offer a suite of 4G and 5G IoT services to businesses in use cases such as remote surveillance, water management, smart metering. There is room for so much more growth and applications as countries continue to digitize. TR

> Standalone IoT is growing and new business models are emerging from connected products. The next natural step in IoT is when data ecosystems are evolving – when stakeholders from different industries share their data. Utilizing data from different industries will demonstrate I+I=3 scenarios

Cui Li, chief development officer, ZTE

Telco digital transformation to seize new market growths

In conjunction with ZTE's Analyst Conference 2021, Telecom Review Asia Pacific speaks with Cui Li, chief development officer, ZTE in an exclusive interview to learn how telcos can innovate, transform, and raise competitiveness in the digital economy.

Accelerating digital and intelligent transformation is a national agenda for many countries particularly in the wake of the pandemic. How does ZTE drive transformation to empower industries?

Digital transformation is now an inevitable trend as the digital economy has become a major driving force for high-quality economic growth. We are experiencing transformation from office automation to digitalization and intelligence in all fields to fuel new economic benefits. As the pandemic upended our way of work and life, we have learned to embrace digital transformation to reap advantages such as reduced costs, improved quality, and increased efficiency. For enterprises, transformation facilitates flexible production and intelligent decision-making.

Compounded with accelerated global climate changes and surge in natural disasters, we have become more aware of the importance of environmental protection, biodiversity, and sustainable development. As countries commit to achieving carbon neutrality by the middle of this century, current economic development models must undergo fundamental reforms, to which digital transformation is key.

Dedicated to the ICT industry for the past 36 years, ZTE is a top player with end-to-end, innovative technologies. We are able to integrate strong underlying capabilities and

technology innovations into product deployment and delivery to provide cost-effective, user-friendly digital service solutions that are tailored to customer needs.

Over the past few years, ZTE, together with more than 500 global partners, has been exploring innovative 5G-powered digital transformation. With innovation at our core, we manufacture 5G equipment with 5G technology to accelerate digital transformation across industries. We have developed 100 scenario-based 5G solutions for over 15 vertical industries, covering geographies and industries such as Thailand's smart manufacturing, Belgium's smart ports, Austria's smart farms, and China's smart factories. Through innovative designs, R&D, and deployment of end-to-end solutions, ZTE offers capabilities to create value for our customers, empowering digital transformation of enterprises, industries, and even societies.

What are some challenges telcos face when improving network infrastructure to raise core competitiveness in the digital economy?

In an increasingly digital environment, traditional telecom operators face stronger competition from OTT providers which are more capable of agile development and iteration to meet the changing demands of consumers. Against intensifying competition, telecom operators are pressured to raise competitiveness and seize opportunities in the new digital economy by transforming from communications service providers to digital service providers.

In terms of network infrastructure, we believe that applying the three E's can help address the technical challenges faced by operators. The first E is "Extended Capability", that is, to provide higher capacity, better coverage, and more connections. The second E is "Enhanced Performance", which is to support a wider range of new applications. For example, we can provide an uplink bandwidth of 1Gbps or above by applying carrier aggregation to meet special needs in industry scenarios. We can also achieve ultra-low latency of one millisecond guaranteed by five-nines reliability.

The third E is "Efficiency Improvement" of power to fuel a sustainable network evolution. In response to these three challenges, ZTE has various solutions to help operators deploy the "Ultimate Performance", "Ultimate Experience", and "Ultimate Operational Efficiency". In the future network evolution, ZTE will continue to innovate and focus on these three directions to create value for operators.

How can telcos seize new opportunities to generate new revenue streams in the digital age?

Traditional telecom operators have limited offerings. Today, the market's demands for integrated digital services have become increasingly clear. In the consumer market, for instance, the emergence of smart homes will integrate education, work, and entertainment in a post-pandemic era. This trend will only continue to grow.

Across industries, intelligent Internet of Everything (IoE) will contribute to an exponential growth in connected terminals, as well as the need for increased network capabilities and ubiquitous computing power. Instead of building data centers, enterprise customers will be more willing to turn to DSPs for professional, integrated, and cost-effective services, so that they can focus on other business aspects. The digital transformation of traditional industries would also bring about new incremental space.

These are new market opportunities for operators to tap on to grow, as well as impetus for operators to embark on their journey towards becoming DSPs to build a solid digital foundation to stay ahead. In this transformation journey, ZTE is able to provide underlying core technologies like chipsets, operating systems, and databases. ZTE can also provide complete cloud-network-end solutions, along with professional and efficient digital deployment, O&M, and management tools. In addition, we are committed to sustainable development with green technology.

To provide efficient and reliable infrastructure solutions for the digital economy, ZTE can help operators build a solid digital foundation integrating "network, cloud, and industry".

In this regard, networks are the basis for the IoE while distributed cloud supports various digital applications and hence computing power anytime, anywhere. Combining big data technology with networks and distributed cloud, we can achieve data collection and integration. Furthermore, we can realize high-dimensional perception and intelligent decision-making through AI technology.

Regarding industries, the key is to provide scenario-driven and value-oriented digital services tailored to various verticals. To satisfy the requirements of different customers, we can flexibly integrate underlying capabilities of network and cloud to provide cost-effective and user-friendly digital services. With a network-cloud-industry synergy, operators can effectively drive digital transformation across ToC, ToB, and ToH markets to create a win-win future.

ZTE continually innovates to build competitiveness in core technologies. Can you discuss some key developments instrumental to driving the digital economy?

Over the years, ZTE's core competitiveness lies in innovative technology that creates value for customers. For example, we proposed the concept of the SDR soft base station platform in 2009, and the Massive MIMO technology that won the MWC Best Technology Breakthrough Award and CTO Choice Award in 2016.

In a digital economy, ZTE is focused on enhancing connectivity and computing power. Based on continuous innovation in chipsets, algorithms, architecture, and other underlying technologies, we have developed products and services that help operators consolidate

their digital foundation in a multi-pronged approach – to enhance network capabilities, expand digital capabilities, and fuel the digital transformation of Industry X.

Through enhanced network capabilities, we can help operators realize the ultimate user experience and network efficiency for ToC, ToB, and ToH markets. For ToC, ZTE improves uplink rate and realizes ultra-high-speed customer experience through 5G innovations such as Radio Composer wireless intelligent scheduling solution, FAST time-frequency dual aggregation solution, and SuperDSS dynamic spectrum sharing solution. For ToB, the industry's original NodeEngine base station engine enables low-cost and rapid deployment of computing power down to wireless sites to meet the digital needs of more than 80% of SMEs. PRB-based hard isolated slicing combined with NodeEngine enables SMEs to use 5G private network with more autonomy and flexibility. Finally, for ToH, ZTE offers HOL (Home Optical LAN) solutions to realize home gigabit fiber experience.

To expand digital capabilities, we launch a cloud-network synergy solution that matches the advantages of telecom operators, providing full-scenario converged hardware in the IaaS layer, including universal servers, integrated cabinets, and NEO acceleration cards, flexibly adapting to the operator's central or edge server room deployment needs, so that computing power is ubiquitous. We propose an edge-driven middle platform reconstruction. The key is to decouple the PaaS layer to facilitate dual circulations.

For digital transformation in vertical industries, ZTE has formed a modularized library of underlying network and cloud capabilities, as a platform to empower industry customers and ecological partners to lower the technical threshold and help incubate innovation and ecological construction of upper layer applications. For example, underlying network capabilities enable enhanced uplink, high reliability, hard slicing, and low latency, and cloud capabilities enable artificial intelligence, automated guided vehicles navigation, and high-precision positioning. On top of the component capabilities, it can be flexibly combined according to different industries and different scenarios for rapid deployment, agile innovation, and scale replication.

The telecom industry is moving towards cloud-native technology. How does ZTE support telcos in integrating cloud?

In the 5G and IoE era, different scenarios and different applications

> In a digital economy, ZTE is focused on enhancing connectivity and computing power. Based on continuous innovation in chipsets, algorithms, architecture, and other underlying technologies, we have developed products and services that help operators consolidate their digital foundation in a multi-pronged approach

may have very different requirements for network capabilities, and also, require the networks to be more flexible, agile, and supportive of continuous iteration. For example, the 5G network is based on a cloud-native architecture. It has the advantages of flexibility, agility, elasticity, and supports slicing to support all industries with one network. At the same time, a large number of applications also require operators to have the ability to converge digital services.

Already, many operators are accelerating cloud-network convergence and edge expansion. More cloud-native technologies will be introduced and their application scopes expanded. In the next few years, edge cloud presents high-growth market opportunities. According to Gartner's prediction, 75% of enterprise data will be processed at the edge by 2025. As a result of market-driven ICT technology convergence, telecom operators are challenged to accelerate cloud-network synergy deployment.

From "central cloud" to "distributed cloud", low-cost and agile deployment in edge scenarios will become the key to competition. Telecom operators can leverage on their inherent advantages such as strong network foundation, abundant supporting resources like sites and computer rooms, and local service teams to deploy cloud-network.

Together with ZTE's solutions, such as the 5G BBU and OLT to provide computing power to support edge applications, operators can make full use of their ICT, software-hardware convergence advantages to realize optimal efficiency of distributed cloud edge resources.

In addition, ZTE offers customized services to accelerate cloud-network synergy deployment according to operators' needs and strategies. This is aimed to provide operators the most suitable transformation route from CSP to DSP.

Asia has one of the fastest-growing digital economies in the world. How does ZTE aim to be an enabler in driving the region's economy forward?
ZTE accumulates past and present experiences to propel Asia's digital economies through four key approaches. Firstly, continuous research and development of underlying core technologies will provide us with competitive solutions that will match the needs of the Asian market. Notably, in a diverse region such as Asia, we provide highly targeted products and solutions for customers in different markets.

Secondly, we are focused on helping customers achieve business success. Taking 5G deployment, for instance, our large-scale deployment in China has equipped us with rich commercial experience to facilitate 5G expansion in other parts of Asia. At the same time, we have supported many 5G industry applications in verticals such as mining, healthcare, energy, and manufacturing. We can partner with operators in Asia to carry out mature replication to help their customers yield successful commercial 5G.

Thirdly, we attach great importance to cybersecurity. ZTE participates in the formulation of international and industry standards on cybersecurity. We have also been working with overseas partners and have established cybersecurity labs in Europe. ZTE is making every effort to raise the level of trust customers and partners have in our 5G products and solutions.

Finally, we emphasize high-efficient overseas delivery to provide operators across all geographies with simplified processes and intelligent maintenance. In Thailand, for instance, ZTE has signed a 5G commercial contract with the True Group to build a leading 5G network in Southeast Asia. ZTE has also joined hands with Thailand's AIS to promote 5G networks deployment, as well as the Suranaree University of Technology to build a 5G smart demonstrative factory to spur 5G+ industrial applications. In Indonesia, ZTE has also partnered with an operator to launch the country's first commercial 5G services.

Essentially, we have a clear market expansion strategy in Asia, and believe that the upgrade of existing networks and the rise of new digital infrastructure network in Asia will help operators play a transformative role in the region. TR

By Jeffery Liu, president of Huawei Asia Pacific

Cultivating innovative talent ecosystem for APAC digital future

Throughout my life, I've stood in awe of the transformative powers of technology, taking childhood dreams of wireless video communication, a world of robotics, and even flying cars and making them a reality. Never have we lived in a time with such an incredible acceleration in shared technical knowledge with the tools to truly conquer so many geographical, language, and knowledge barriers.

From accessing global information in mere seconds and interacting in immersive virtual and augmented experiences, to redefining how we use the world's resources and how to create a more level playing field for opportunities across diverse cultures, identities, and organizations, the digital world delivers true ubiquitous equality and virtually unlimited opportunities for the future.

At the root of all this is a collection of new ICT that includes the latest generation of mobile networking, advanced cloud computing and storage, and sophisticated data analytics and artificial intelligence. Together these form the basis for a cacophony of applications that extend beyond our consumer lives and redefine entire industries. From using new ICT to optimize supply chains to redefining how we sell, support, and ultimately interact with customers, these technologies will redefine customer experiences, offer unprecedented cost savings and create new business opportunities.

Make no mistake, the future ahead of us is digital. Unfortunately, even though digital transformation is accelerating and our reliance on a digital economy increasingly apparent, we are headed towards a global skills deficit of massive proportions. Some estimates expect a talent shortage in the order of millions meaning although we have the stone to build the digital kingdom, we lack the masons.

With over 4.6 billion people, Asia Pacific represents the most diverse region in the world and includes economies at the forefront of digital transformation as well as those faced with extreme challenges in income distribution, geography, and population.

The next five years could see the Asia Pacific region make giant strides towards becoming a digital society, and the transformation will enable member states to recover faster from the pandemic. As organizations learn to take advantage of new ICT, cloud and AI are becoming must-haves for all organizations. Currently, 81% of enterprises use cloud-based applications. The COVID-19 pandemic has further shown a spotlight on the importance of ICT investment to improve digital resiliency and spark economic recovery.

While consumers and businesses adopt innovative services like next-generation immersive experiences, automation of everything, and a world of connected devices that extend beyond people, the demand for talent increases.

According to a study by Korn Ferry, we will face an estimated shortage of 47 million tech talents by 2030. A survey of CEOs by PwC found that more than 50% of APAC CEOs say that it is difficult to hire digital talent with the right skills.

In order to secure our digital future, we need to foster the next generation of digital talent. I have been fortunate to play an integral role in Huawei's talent cultivation programs and have first-hand witnessed the successful launches of our Huawei ASEAN Academy and Seeds for the Future programs.

Based on a "leave no one behind" belief, Huawei continues to push digital inclusion and invests in creating opportunities for digital talents through comprehensive training, competitions, and job fairs. Programs like Seeds for the Future and ICT Academy leverage decades of experience and expertise and help tackle ICT workforce challenges in APAC. Huawei Certification provides an industry-leading ICT development standard and certification program covering 11 ICT technical fields.

We have also launched the Huawei ASEAN Academy in 2019, designed to conduct joint operations with local governments, enterprises, universities, carriers, and industry organizations. In addition to cultivating digital talent, these academies promote innovation within startup communities and amongst SMEs.

To date, the program has trained over 130,000 participants for local communities and covers Indonesia, Malaysia, Thailand, and Cambodia. Huawei ASEAN Academy is one of our key talent development programs, and we expect it to play a bigger role in the future.

Innovation and development rely on a talent ecosystem. We need to come together as a collection of digital leaders ready to discover and conquer this digital frontier. At the Asia Pacific Innovation Day·Digital Talent Summit 2021, we gladly announced that, together with our partners, Huawei will invest around $50 million to develop 500,000 digital talents in the Asia Pacific region.

If digital talent is in our DNA, it's just a matter of time before evolution simply takes it course. I believe, leveraging shared experiences with win-win outcomes we can harness the power of new ICT to fly us into a digital tomorrow, and with adequate training and opportunity for future talent, we can find our pilots. TR

“Programs like Seeds for the Future and ICT Academy leverage decades of experience and expertise and help tackle ICT workforce challenges in APAC. Huawei Certification provides an industry-leading ICT development standard and certification program covering II ICT technical fields”

Indonesia: Behind ASEAN's fast-growing digital economy

As the largest market in ASEAN, with a population of 270 million, Indonesia is also one of the fastest-growing digital economies in the region, promising immense growth potential as tech efforts ramp up exponentially. Contrary to declines across other sectors, Indonesia's digital economy reported a 4% growth from the preceding year to reach $44 billion in 2020, accounting for more than 4% of the country's gross domestic product. By 2025, Indonesia's digital economy is expected to jump threefold to reach $124 billion.

According to the International Monetary Fund (IMF), Indonesia experienced a milder economic contraction compared to neighboring Singapore, Malaysia, Thailand and the Philippines, with its digital economy poised to be a catalyst for economic recovery and growth. This year, the IMF expects Indonesia's economy to rebound by 4.3%.

Even though Indonesia is still in its early stages of a digital revolution, the country displays promising signs for accelerated digitalization and unlimited opportunities. But for now, the government and businesses are ensuring that digitalization is carried out across key sectors to realize the full potential of this market.

Growing tech hub and start-up market

According to a report from the Economic Research Institute for ASEAN and East Asia, Indonesia boasts the largest e-commerce market in Southeast Asia, with the country recording 4.9 million e-commerce deliveries each day. In a separate report prepared by Temasek, together with Bain and Company, e-commerce will reach $32 billion this year, increasing by 52% from $21 billion last year.

A regional hotbed for investments, Indonesia is also home to a vibrant start-up scene that is increasingly garnering attention from global venture capitalists and tech giants. In the first half of this year, Indonesia's digital startups attracted $2.8 billion worth of investments across 202 deals, up from $1.8 billion across 123 deals in the first half last year. Some home-grown unicorns include online retailers Bukalapak and Tokopedia, and online ride-hailing app Go-Jek. Given the geopolitical tension between China and the US, tech giants such as Microsoft, Facebook and Google are leaning towards the likes of Bukalapak and Tokopedia to capitalize on the immense growth potential in Asia. Most of the funds are poured into e-commerce, followed by fintech and edtech, testifying to strong investors' sentiments going forward. Indonesia's digital economy is also ranked at the top of the country's most promising investment sources, according to the Indonesia Investment Coordinating Board (BKPM).

A recent opening up of the country's economy to foreign investment also signals more changes in the coming years, as the nation welcomes influx in foreign equity. For instance, the technology, media and telecommunication sector is no longer subject to a 67% foreign investment restriction as the sector is now open for 100% foreign investment under a regulation that came into effect as of March this year.

Becoming a tech hub

Transforming Indonesia into a tech hub and economic tech powerhouse is a national ambition. Plans are currently underway to develop the country into a tech hub similar to Silicon Valley. Named Algorithm Hill, this 888-hectare megaproject in West Java will be developed into a science and technology industrial zone.

In April this year, Tencent Cloud launched its first data center in Indonesia to tap on the cloud computing potential of the fourth most populous country in the world. Following Google and AWS, Microsoft also announced plans to open its first Azure cloud region. In one of the latest, Princeton Digital Group will be expanding its data center.

On the government's part, digitalization plans are in full swing with initiatives such as Making Indonesia 4.0, an e-commerce roadmap that includes key sectors such as food and beverages and automotive electronics. Another key agenda is improving connectivity as the pandemic created momentum for improved digital connectivity and coverage, and almost half of the adult population still lacks connectivity in the rural parts of the country.

Indonesia is also tasked to grow its ICT talent pipeline to build a future-ready workforce in a digital age. According to the World Bank, Indonesia is estimated to have a deficient of up to 9 million skilled and semi-skilled tech workers by 2030. Recognizing that digital talent is central to digital transformation, Indonesia has recently launched a Digital Talent Scholarship to train digitally savvy talents. A series of programs has also been launched – one of which involves the private sector supporting through certified tech internship programs.

To support a resilient digital economy, the government will also have to reform regulatory framework to align with quickly-evolving sectors. In particular, policy-makers need to address gaps pertaining to cybersecurity and data privacy and protection to improve consumer trust.

Spearheaded by the government, digitalization will necessarily be the backbone of Indonesia's economy. Moving forward, there is no doubt that Indonesia's digital economy will be a bright spark in the region. TR

> Indonesia's digital economy reported a 4% growth from the preceding year to reach $44 billion in 2020, accounting for more than 4% of the country's gross domestic product. By 2025, Indonesia's digital economy is expected to jump threefold to reach $124 billion

Sylvain Lejeune, sales leader, Asia Pacific, WatchGuard

Managing cybersecurity in a digital era

A digital revolution brings about benefits, but also new vulnerabilities. Telecom Review Asia interviews Sylvain Lejeune, sales leader, Asia Pacific, WatchGuard to find out about the current threatscape and how organizations can build cyber resilience to support growth and transformation.

Cyber threats have consistently been on the rise. What are some of the cyber threats trends in the Asia-Pacific region? Are there industries and countries that are more vulnerable to these threats?

Primary cyberattack vectors in the Asia-Pacific region are identity theft and advanced malware. The former is performed by threat actors who use phishing techniques or simply steal one's user name and passwords. The latter is executed through malicious links or attachments which will trigger a malicious piece of code to disable one's endpoint or network with the aim of stealing sensitive data, intellectual property or cash.

Generally, smaller organizations represent low-lying fruits for threat actors to infiltrate and exploit IT vulnerabilities. While increased threat levels are prevalent across all industries, one of the hardest hit is the healthcare industry, where data is of high value to threat actors. Australia's healthcare, for instance, has been in the spotlight for incessant ransomware attacks in the last two years. Other prime targets include critical industries such as logistics, utilities, and oil and gas as malicious actors have a high

probability of securing revenues due to the strategic, critical nature of the company's assets.

Given that managed service providers (MSPs) are gateways to vital clients' resources, MSPs attacks are also gaining traction as an indirect way for threat actors to breach into hundreds of end-clients' networks.

Remote working has exposed organizations to pervasive threat levels during this pandemic. How is a zero-trust approach important in addressing new and more sophisticated threats?

With remote work, the security perimeter has extended beyond the office to employees' homes. Increased users' endpoints and connections from homes to the office's central location or branch office, unfortunately, offers multiple entry points for attackers. As such, organizations must assume that nothing is to be trusted by adopting a zero-trust approach founded on two key tenets paramount to security.

Firstly, a zero-trust framework performs continuous monitoring and classification of endpoints, identities, and networks in real-time to provide authentication and access. Enablers of zero-trust capabilities include a strong identity framework to ensure the user is who he or she claims to be, equipped with powerful AI to detect never-seen-before malicious code and evasion techniques, and finally a team of IT security experts. This greatly enhances an organization's IT security posture.

Secondly, zero-trust cannot exist as just architecture, but as a culture to be embraced organization-wide. With users being the first and last line of defence, organizations must adopt a top-down approach in raising user awareness, with emphasis placed on educating all users so that they essentially become "human firewalls".

As critical communications providers, the telecommunications industry is susceptible to increased cyberattacks. How can telecoms safeguard their networks, clients, and customers?

Cybersecurity is paramount to gaining and maintaining trust, and telcos and MSPs have a key role to play in this regard. No single defence will protect telcos and their clients completely given multiple points of weaknesses. The recent Kaseya ransomware attack underscores the importance of a multi-layered security framework for telecom providers to protect both their critical infrastructure and their end-clients. In terms of infrastructure, for instance, they need to deploy capabilities to mitigate risks of service disruption such as DNS attacks and distributed denial of service (DDoS) attacks.

With respect to end-clients, telcos and MSPs can embed security at the core of their products and services to offer differentiated solutions to retail and business clients, and by doing so, seek new revenue streams. These capabilities include multi-factor authentication (MFA), secure remote access points, evasive malware and phishing detection, prevention and remediation, endpoint detection and response, patch management, and threat hunting.

Cloud is becoming a new hotspot for cyberattacks. How does this shift to the cloud challenge cybersecurity and what can be done to counter this?

IT managers have to navigate added complexities as workloads are now present in various locations including on-premise, and public and private clouds. Furthermore, workloads are accessed by employees from various locations such as corporate premises

and homes, making it critical for telcos and MSPs to access real-time telemetry data coming from all users, endpoints, and networks. Leveraging that data, a single, cloud-based security platform purpose-built from the ground up simplifies every aspect of service delivery for MSPs to counter these challenges and provide organizations the bandwidth to achieve a unified and secured view.

How do automation and analytics boost cyersecurity management?

Automation is critical to delivering IT security solutions that are simple to deploy, maintain, and manage. For instance, automation makes it possible for a large retail client to deploy a firewall in multiple branches and store locations with an IT team of less than 10. Except for banks and large enterprise clients, most end-clients have limited IT staff, let alone IT security experts. Therefore, automation is key to the adoption of robust cybersecurity capabilities. In terms of building cybersecurity resilience, analytics is critical to correlate data from endpoints, users, and network appliances to detect and remediate malicious activities.

How does WatchGuard partner telecoms in delivering cybersecurity solutions to enterprises?

When it comes to security, the deployment of point solutions is a dying strategy. Solution providers and the end-users they protect need access to a robust stack of security solutions to provide on-going protection of information and people.

MSP enablement is a key focus for WatchGuard and its partners, because now more than ever, organizations are relying on trusted service providers to help manage security and fill resource and expertise gaps. As a result, partners are increasingly adding high-value managed security services to their offerings while transitioning their business models.

The WatchGuardONE program makes it easy for partners to transition to an "as-a-service" model, while adopting WatchGuard's expanding product portfolio. WatchGuard's strategy is centered around helping these partners deliver better security services to customers through its flexible partner program, tailored billing options, excellent support, security-as-a-service solutions, simplified education and training program, and streamlined platform for security management, intelligent protection, and actionable visibility.

This represents a tremendous business opportunity for channel partners to expand their portfolios and adopt a services model. But to do this successfully, MSPs need a platform that offers greater coordination across critical security services. We are delivering next-generation antivirus, AI-enabled endpoint detection and response, network security and authentication services as a unified security platform that enables MSPs to provide complete protection for customers today, and we are making it simpler and more streamlined than ever to manage.

We have a long history of working with telcos and MSPs. Some recent use cases include our partnership

with Deutsche Telekom to bundle our purpose-built tabletop appliances to secure corporate networks. We are also providing advanced endpoint security for use on Windows-based 5G- and 4G LTE-enabled PCs powered by Qualcomm® Snapdragon™ to enable sophisticated protection for data and devices from chip to cloud.

2021 marks WatchGuard's 25 years of business and a huge milestone for the company. During this span of over two decades, how did WatchGuard evolve from a firewall company to selling end-to-end cybersecurity solutions now?
WatchGuard Technologies has always been innovating to make IT security accessible to organizations of all sizes. We started with a focus on firewalls, and over time, expanded our product portfolio to include a range of easy-to-deploy and consume secure Wifi, multi-factor authentication, and endpoint security. This gives us the opportunity to support our partner community in building a comprehensive IT security practice, and better protect their end-clients' users, networks, and endpoints.

How does WatchGuard differentiate itself from other security vendors?
We differentiate ourselves in three ways. Firstly, simplicity is at the core of every single one of our services and products. Since many organizations have neither the necessary skills nor the financial resources to purchase, deploy, and maintain robust IT security, we focus on simplicity to ensure that organizations of all sizes can readily adopt enterprise-grade cybersecurity solutions.

Secondly, our business model is founded on collaborations with MSPs to deliver best-in-class IT security. Working through partners such as MSPs has been in our DNA since our inception. By joining forces with MSPs, we deliver capabilities and expertise to better protect end-clients regardless of their IT skill levels at an affordable cost point.

Finally, we offer flexibility in the way end-clients procure our solutions through our partners: be it through Capex budget or a Opex pay-as-you-go basis. Over the years, we have been innovating with billing and purchasing to ensure that we provide both MSPs and end-clients maximum flexibility to reap unlimited benefits. TR

With respect to end-clients, telcos and MSPs can embed security at the core of their products and services to offer differentiated solutions to retail and business clients, and by doing so, seek new revenue streams

Kacific deploys ST Engineering iDirect's Mx-DMA® MRC to promote digital inclusion

ST Engineering iDirect, a global leader in satellite communications, and Kacific, a leading satellite broadband operator in Asia Pacific, have successfully deployed its pioneering Mx-DMA® MRC (Multi Resolution Coding) technology in conjunction with its first Ka-band satellite, Kacific1, to provide high-speed, low-cost, ultra-reliable broadband to rural and suburban areas of the Pacific and Southeast Asia.

Mx-DMA MRC is a patented multi-access waveform that incorporates the scalability of MF-TDMA with the efficiency of single channel per carrier (SCPC) into a single return technology for unprecedented service agility. It enables service providers to cover a myriad of use cases in a single return link without making tradeoffs between speed, efficiency and scale lowering their total cost of ownership.

Kacific operates over 8,000 terminals, including the new cost-effective MDM2010 modems in Mx-DMA MRC mode, spread across 56 beams.

The technology will allow access to an abundance of use cases across multiple markets, including underserved communities, businesses, and public institutions as well as 3G and 4G cellular backhaul services across the Asia-Pacific region. This allows Kacific to use a single return technology for the majority of its customers' use cases, and quickly expand to more customers in underserved areas due to better efficiency, scale and operational simplicity.

Mx-DMA MRC enables Kacific to scale its services while simplifying operations by optimizing the network bandwidth in real-time, utilizing self-organizing frequency plans that largely simplify network planning and eliminate the need for upfront traffic characterization or pre-configurations. As Mx-DMA MRC scales in MHz, it is independent of the number of terminals used in the network. Kacific can now offer the highest level of intelligent, real-time bandwidth allocation at SCPC efficiencies while maximizing the utilization of available bandwidth resources and delivering the best Quality of Experience (QoE). The new protocol fuels Kacific's capabilities, driving connectivity in regions and making it the largest regional Ka-band broadband network.

"We first introduced Mx-DMA back in 2014 as a response to the MF-TDMA versus SCPC dilemma that many of our customers face. Mx-DMA MRC builds on that legacy and takes it to another level," said Bart Van Poucke, Vice President of Products at ST Engineering iDirect. "We are proud that Kacific has become one of the early adopters of this technology. This will enable them to unlock tremendous flexibility and scale, open up opportunities and allow them to deliver a broader range of service levels at a lower cost structure without compromise. We are constantly committed to bringing innovation like this to the market, delivering industry-leading technology that protects our customers' investments well into the future."

"The efficiency of the MRC technology allows Kacific to deliver affordable price points and return speeds on small consumer-type VSAT terminals at a magnitude better than any other system," said Cyril Annarella, Chief Operating Officer at Kacific Broadband Satellites Group. "Whether in suburban, rural, or fringe and remote areas, we help businesses, governments and communities fully participate in the digital world."

Telstra partners Australian government to buy Digicel Pacific

Telstra

Telecommunications giant Telstra has partnered with the Australian government to buy Digicel Pacific for $1.6 billion.

This is widely viewed as a political move to curtail China's influence in the region, following interest shown by China's biggest telecommunications operator to buy over Digicel Pacific.

The biggest mobile operator in the South Pacific region, Digicel Pacific has 1,700 employees and around 2.5 million subscribers from retail customers through to large enterprises. Digicel Pacific has operations in Papua New Guinea, Fiji, Samoa, Tahiti, and Vanuata – important markets in Papua New Guinea.

In a press release, Telstra stated that the Australian government will contribute $1.33 billion, while Telstra will contribute $270 million in equity. Telstra will own 100% of the ordinary equity and receive strategic risk management support from the government.

This move is also aligned to Telstra operations in Papua New Guinea, where Telstra has been a licensed operator since 2012 and one of the biggest providers of voice and data services connecting the South Pacific to the rest of the world.

TPG Telecom and Nokia to deploy first 5G femtocell in Asia Pacific

Nokia and TPG Telecom have deployed the Asia Pacific region's first 5G femtocell in a live network. Using Nokia's unique modular 4G/5G Smart Node, the solution allows operators to provide their customers with superior indoor 5G coverage from a dedicated femtocell.

Nokia Smart Node is a dedicated indoor solution providing superior coverage and capacity and can be easily scaled from single to multiple units to meet the customer's indoor coverage requirements. Delivering high-quality coverage, low latency and reliability, the solution provides solid 4G and 5G connectivity for the demanding use cases expected by TPG Telecom's enterprise customers. The 'plug and play' capabilities also make it easy to set up, which keeps installation costs to a minimum. Nokia Smart Node can be wall, ceiling or desktop mounted.

Nokia Smart Node supports traffic management by reducing core network load and optimizing macro resource allocation. It delivers uncongested high throughput network performance with existing secure authentication and provides a secure connection and SIM-based authentication to assure the quality required in mobile networks. It is future-proof and supports both Non-Standalone (NSA) and Standalone (SA) 5G deployments.

TPG Telecom will be rolling out Nokia's Smart Node solution to selected enterprise customers in the coming months.

Jonathan Rutherford, Group Executive, Enterprise and Government at TPG Telecom, said: "We're excited about the possibilities this product provides for our business customers in particular. Nokia Smart Node is a simple, cost effective and seamless 'plug and play' solution to provide indoor 5G coverage for small and medium businesses and corporate branch offices."

Yago Lopez, General Manager, Wireless and Transmission Networks at TPG Telecom, said: "The Smart Node solution is another unique product from Nokia that TPG Telecom will be deploying as part of its smarter 5G network."

Rob Joyce, Chief Technology Officer of Australia and New Zealand at Nokia, said: "This new addition to Nokia's award-winning and industry-leading small cells portfolio helps operators like TPG Telecom deliver targeted 5G coverage and capacity to their key customers. The Smart Node simply plugs into a customer's existing broadband connection and that's it – superior 5G coverage indoors, it couldn't be simpler."

Starhub debuts 5G-capable mission critical communications solution

StarHub has launched Singapore's first 5G-capable mission critical communications solution, enabling enterprises and government agencies to communicate with specified groups of people simply by pressing a Push-to-Talk (PTT) button. Named StarHub SmartPTT, the new solution sets up an encrypted enterprise-grade network over StarHub 5G and 4G connectivity, for identified mobile phones to function just like walkie-talkies or two-way radios – boosted with crystal-clear quality, unlimited range nationwide, and first-of-its-kind 'live' video feeds.

"With 5G and in compliance with 3GPP mission critical PTT standards, we are delivering to customers a more attractive alternative to decades-old proprietary communications services. Built into our core infrastructure, StarHub SmartPTT offers enterprises and government agencies the highest priority for network usage, robust service reliability, and real-time connections. A key differentiator is our market-first introduction of Push-to-Video. From sending video snippets to setting up continuous streams, the solution allows emergency field teams to gain better situational awareness and to respond more effectively in a crisis," said Charlie Chan, Chief, Enterprise Business Group, StarHub.

StarHub SmartPTT is a one-stop solution comprising islandwide 5G/4G connectivity, ruggedised PTT devices, customisable user application, training, and comprehensive after-sales support with guaranteed response times. Customers just need to liaise with a single party for all of their instant and critical communication needs.

In addition, the solution offers a dispatch console for organisations to integrate voice, video, instant messaging, and CCTV feeds. Through this unified web interface, dispatchers can in real-time manage PTT groups and services, listen in to conversations, monitor video feeds, define geo-fencing limits and alarms, and activate voice recording.

With assured Quality of Service on StarHub SmartPTT, all PTT calls will always be given dedicated bandwidth and treated as top priority traffic. Even if there is network congestion, users will be able to talk, share videos, and text one another with no impact to service.

StarHub SmartPTT is suitable for use across various industries, including public safety, aviation, construction, healthcare, hospitality, manufacturing, and transportation, among others.

GSMA forms new 5G Industry Community in Asia Pacific

GSMA announced the formation of Asia Pacific (APAC) 5G Industry Community, a new ecosystem established for those seeking opportunities to deliver Industry 4.0 and digital transformation from 5G networks, edge-cloud services, enterprise IoT and AI. The Community has been designed for stakeholders across the value chain including government and agencies, industry associations, mobile network providers, enterprises and industry players, solution providers, analysts, and consultants.

The APAC 5G Industry Community is comprised of 12 contributing members, as well as the existing IoT and 5G emerging market community, which have over 500 members in more than 30 countries. APAC 5G Industry Community contributing members include AIS, Axiata, DEPA, DHL, Globe, Huawei, Kominfo, Maxis, MDEC, Schneider Electric, Telkomsel and, Viettel.

The COVID-19 pandemic has accelerated digital transformation and more businesses are now driving forward with new technologies, with a particular focus on 5G. GSMA predicts that 5G will contribute $5 trillion to the global economy by 2025, as countries increasingly benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services. 5G will benefit all economic sectors during this period, with services and manufacturing seeing the most impact.

"During the COVID-19 pandemic, the mobile ecosystem acted as a lifeline for people, businesses, and society. The industry demonstrated its resilience, and we must now continue to push the boundaries of possibility. The purpose of the APAC 5G Industry Community is to unlock the power of 5G connectivity so that people, industries and society thrive. GSMA is committed to playing a leading role in supporting and amplifying the vital work our industry is doing at this time," said GSMA's Head of Asia Pacific, Julian Gorman. "We are thrilled to announce the formation of APAC 5G Industry Community as a collaboration platform to support 5G industry innovation, application and business opportunities."

"5G will enable the substantive digital transformation of our economy, and the goals of the APAC 5G Industry Community initiative resonate with MDEC. We look forward to effective collaborations with both public and private stakeholders, in line with our vision to lead a progressive digital economy and in support of MyDigital, the Malaysia Digital Economy Blueprint," said MDEC (Malaysia Digital Economy Corporation)'s CEO, Mahadhir Aziz.

GSA: 42 devices and 40 chipsets now support VoNR

The Global mobile Suppliers Association (GSA) confirmed that 42 devices and 40 5G chipsets from four vendors have been announced supporting Voice over New Radio (VoNR) technology. In the GSA's new "VoNR Market Report" it also shares that numerous operators are now heavily investing in the technology for their 5G standalone networks.

With the introduction of the 5G non-standalone networks, voice services were enabled by continued use of LTE and 2G/3G infrastructures. However, 5G standalone networks (both public and private) require a new approach given that there isn't a legacy infrastructure to fall back on and VoNR has been designed to tackle this issue.

The GSA has identified 40 announced 5G chipsets with stated support for VoNR from 4 vendors. This includes 5 discrete modems and 35 mobile processors/platforms. Of these, 36 are known to be commercially available, including 4 discrete modems and 32 mobile processors and platforms. Chipsets are commercially available from Mediatek, Qualcomm, Samsung and UNISOC.

GSA has also catalogued 16 operators publicly announced as investing in VoNR in some way or another. Of those, 8 are evaluating/testing/trialling, 3 are understood to be planning to deploy, 3 are deploying the technology while one has soft-launched services and one is offering limited VoNR as part of a market trial of its new 5G SA network.

"Investments in VoNR are growing rapidly and given that to date only a fraction of the more than 80 mobile network operators publicly identified as working on 5G SA have yet announced investments in the technology, we expect to see considerable further growth in the near-term," said Joe Barrett, President of the GSA. "Looking beyond the standard application of VoNR, it also offers considerable potential for value-added services which can help drive additional operator revenue streams. We will continue to provide updates on the VoNR market and are looking forward to seeing it develop."


Vijai Karthigesu, CEO of Swarmio

Monetizing esports to achieve business growth

Telecom Review Asia interviews Vijai Karthigesu, CEO of Swarmio to find out how telecom providers can capitalize on the surging interest in gaming and esports to grow.

Amid increased demand for over-the-top (OTT) content provided by telco networks, why are telecom providers not reaping significant profits?
In reality, telcos do not own the OTT content. OTT providers like Netflix, Google, Facebook are using the telco network to make money. Telcos are forced to support the OTT providers because of consumers' demand. If Netflix brings out a new show, telcos are expected to deliver the new show without any quality degradation. Telcos have to put up Opex and Capex to make sure the shows are delivered to the consumers. But, telcos do not receive any additional revenue from the OTT players. In addition, telecom operators have to "pay" the OTT providers to bring in the content to their customers. So, yes, the demand for OTT is increasing. That adds pressure to the telecom operator's bottom line, raising Opex and Capex, but without yielding ARPU increase or added revenue.

How can telcos capitalize on the burgeoning gaming industry as a lucrative revenue stream instead?
Telecom operators already have gamers as their consumers. They have in place a last-mile network infrastructure, billing infrastructure, a "trustable" brand, and marketing resources. Gaming needs all of these to thrive. It is a huge opportunity for telcos to leverage these strengths to participate in the burgeoning gaming value chain.

How does Swarmio help telcos build the optimized platform for the gaming industry?
Swarmio provides telecom operators a turnkey gaming and esports solution to reach and monetize gamers such as millennials and digital natives. We help to bridge the gap between telecom operators and game publishers, such that game publishers can reach and monetize the gamers via the Swarmio platform, leveraging a telco's reputation, billing solution, and last mile access.

Sri Lanka Telecom (SLT) recently partnered with Swarmio to launch its own unique dedicated online gaming platform. Can you tell us more about this partnership?
Swarmio has helped SLT launch the SLT Esports Gamer Package as a next-generation gamer internet solution. With this gamer internet platform, SLT's consumers can access the best gaming content with fully-optimized, ultra-low-latency experiences, and access to competitive tournaments, challenges and streamed feeds. Swarmio enables SLT to reposition the brand and connect directly to the millennial and digital native generation to yield increased loyalty, reduced churn, increased engagement and increased revenue/ ARPU.

What are Swarmio's plans for the Asia-Pacific region in the coming years?
Asia Pacific is an important region for gaming and esports. Swarmio is already working with partners to bring our solutions to the region. Moving forward, we will be focused on growing our presence in countries such as Malaysia, Singapore, Thailand, Indonesia, the Philippines, and Vietnam. TR

> Swarmio enables SLT to reposition the brand and connect directly to the millennial and digital native generation to yield increased loyalty, reduced churn, increased engagement and increased revenue/ARPU

Hexatronic charts strong growth, commits to advances in unrepeatered cables

Telecom Review Asia spoke with Anders Ljung, Business Manager Submarine Cable Solutions at Hexatronic in Hudiksvall, Sweden, about the company's stellar progress and what the future holds.

Hexatronic has recently published a very positive interim report for Q2. Can you tell us more about the progress that has been made recently?
This quarter, Hexatronic has seen strong growth, unprecedented margins and an even stronger order book. Investments made in England, Germany and the US to enable growth have started to pay off. We have made four recent acquisitions, two of which are in Australia – The Fibre Optic Shop, which specialises in manufacturing fiber optic cabling for telecoms operators and "harsh environments", and the Optical Solution Australia Group, a distributor and solutions provider.

These acquisitions, amongst others, have given us a good platform for continued growth.

Earlier this year, we announced a number of submarine cable contract awards and the factory in Hudiksvall remains busy manufacturing customer orders. We have just completed loading armoured cables onto the C/S IT Intrepid for the CrossChannel project – the first submarine cable system to cross the English Channel in nearly 20 years. Those interested to track our progress can tune in to watch the CrossTalk series.

You mentioned submarine cables. Can you share any highlights from that side of the business that may interest SNW attendees?
In recent years, Hexatronic has seen its submarine cable business grow. Increasing bandwidth demands and the need for improved connectivity, low latency and route diversity have all contributed to customer requirements. I am pleased to report that our team has secured a number of new and repeated customer orders. We are providing cables for new projects in Asia, North America and Northern Europe, and our order book is a mixture of submarine cables for telecoms and offshore energy purposes, as well as integrated fiber optic parts for power cables.

In terms of product development, our range of cables is based on extensive experience in submarine cable projects, including design, project management and installation, and our offering comprises cables using a loose tube design for depths down to 3,000 meters. Hexatronic's investigations into lowering fiber attenuation are ongoing, aimed at allowing us to offer longer reach submarine cable solutions. Soon, we hope to be able to welcome visitors back to the Hudiksvall factory, although many customers now prefer

"In recent years, Hexatronic has seen its submarine cable business grow. Increasing bandwidth demands and the need for improved connectivity, low latency and route diversity have all contributed to customer requirements"

to perform virtual factory acceptance tests, comfortable in the knowledge that Hexatronic manufactures high-quality products.

You recently co-authored an article on the importance of understanding the unrepeatered sector of the submarine systems market. Can you tell us a little more about this and why you believe it is necessary?
Yes, unrepeatered cables form an important part of submarine connectivity, but have largely gone unscrutinized by the industry, mostly due to their simple design and distance limitations. Unrepeatered links were the original 'Open Systems' owing mainly to their passive nature, and they are often procured in a disaggregated manner largely due to the simplicity of their line design. They are used for different purposes in several markets. For pure telecoms, they typically form short point-to-point systems between neighbouring countries, regions and islands. They can add expand links to international connectivity by joining onto transoceanic systems at their landing points, and they are typically used to cross harbours, rivers and lakes.

Unrepeatered links are also used to provide connectivity to and between oil platforms, offshore wind farms and ocean observatories. They provide a telecoms path to power systems, either as an integral package or an outrider cable. Unrepeatered systems do away with the need for power feeding equipment, repeaters and line monitoring equipment, making them attractive for parts of the world where resources are limited, or locations where high-power equipment may not be desirable, such as oil platforms. For these reasons, we believe the role they play in both regional subsea connectivity and supporting telecoms infrastructure within sister networks such as oil and gas, renewables and power cables is too significant to go undiscussed. There will always be a requirement for short hop connectivity, and the advantages it offers in terms of cost, timescale and complexity are huge.

Earlier this year, Submarine Telecoms Forum (STF) carried out a review of unrepeatered activity across the globe and noted that the difficulty with studying this subject is that the majority of unrepeatered systems go unannounced, in particular those which support oil and gas networks and power cables. Many contract awards are directed and every supplier will not receive every tender. The team at Hexatronic worked closely with STF to analyse unrepeatered data that is publicly available and to compare it to our experience in the industry, and we estimated that the ratio of announced to installed unrepeatered systems is around 1:5. This makes it very hard to understand the global unrepeatered market and to predict regional patterns and growth rates.

Looking forward, new unrepeatered projects have been publicly announced in Europe, North America, South America and the South Pacific, which we expect to be implemented in 2022 and onwards. I do anticipate regional construction plans to differ compared to recent years, and as more of the islands in the South Pacific gain connectivity, we are likely to see less growth there, and a renewed focus in Europe and African countries as they start to replace ageing infrastructure and grow to meet increasing data demands. Emerging markets in South America are also likely to increase the amount of activities. I continue to encourage the subsea community to share data about this important infrastructure so that unrepeatered systems can take their place in history alongside their repeatered siblings. TR

“We believe the role they (unrepeatered cables) play in both regional subsea connectivity and supporting telecoms infrastructure within sister networks such as oil and gas, renewables and power cables is too significant to go undiscussed. There will always be a requirement for short hop connectivity, and the advantages it offers in terms of cost, timescale and complexity are huge”

By Geoff Bennett, Director of Solutions & Technology, Infinera

Performance factors in submarine transmission cables

Submarine cable systems provide a vital communication pathway between continents. According to analyst firm Telegeography, there are 487 of these cables operating around the world today. Each cable is unique – some are simple, unrepeatered cables, while others stretch across the oceans for over 10,000 kilometers. But there are certain factors that determine the performance of any cable, as measured by two crucial metrics – the maximum wavelength data rate and the total transmission capacity of each fiber pair.

The biggest performance factor is, of course, the cable itself. As you would expect, newer cables have much higher performance than older cables. But it can take many years to plan, approve, and deploy a new cable, and once deployed, they have an engineering lifetime of at least 25 years. This means that the vast majority of those 487 cables are inevitably going to be "older cables."

Assuming the cable is already in service, what can we do to enhance its performance and extend its viable commercial life? This comes down to the choice of submarine transponders – the devices that actually put the information into the cable itself.

Record-breaking performance

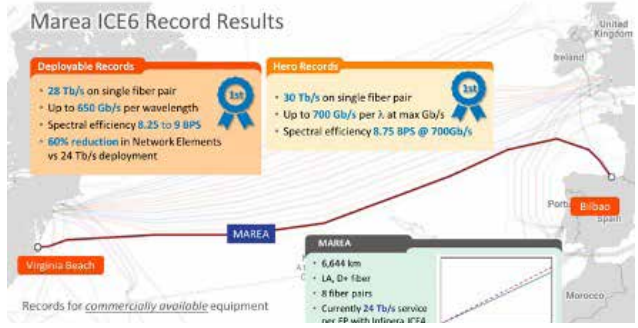
A modern fifth-generation coherent transponder is capable of transmitting up to 800 Gb/s on each wavelength while carrying up to 12 bits in each symbol for extremely high spectral efficiency, which in turn means higher fiber capacity. But these are for relatively short distances – in the case of Infinera's ICE6, reach could be up to 1,600 km at 800 Gb/s using Corning TXF fiber, or up to 1,000 km using the most popular type of fiber, G.652. These are extremely impressive reach numbers for 800 Gb/s transmission – up to 10 times further than the previous two transponder generations at their respective maximum data rates.

But what about in a submarine cable? The cable that I like to think of as the "Nurburg Ring" of subsea cables – in other words, the cable that every transponder vendor wants to test their highest-performing equipment on – is the MAREA trans-Atlantic cable. MAREA

> "We showed that ICE6 could increase that to 28 Tb/s, which is within 2 dB of the theoretical maximum for this cable. ICE was also able to deliver a per-wavelength production data rate of 650 Gb/s over MAREA, which is another record"

Figure 1: Performance factors and history of submarine cable evolution

Figure 2: Summary of MAREA's record-breaking performance



uses extremely high-quality optical fiber and was designed with unusually short repeater spacing in order to deliver the best possible transmission environment for modern coherent transponders.

Infinera's previous generation of optical engine, ICE4, holds the record for published fiber pair production capacity on MAREA at 24 Tb/s. But earlier this year, we showed that ICE6 could increase that to 28 Tb/s, which is within 2 dB of the theoretical maximum for this cable. ICE was also able to deliver a per-wavelength production data rate of 650 Gb/s over MAREA, which is another record. You may feel that 650 is an unusual number, since it does not align with service data rates (e.g., 100 GbE, 400 GbE). But ICE6 has two wavelengths per module and the capacity can be pooled to deliver 1.3 Tb/s of capacity, which could be used to support, for example, 13 x 100 GbE services.

Transponder performance factors: Variable baud rates

How has ICE6 achieved this incredible performance? Fifth-generation transponders based on the latest 7-nm ASIC technology have certainly exceeded industry expectations, but ICE6 has a few unique capabilities that make it the highest-performing fifth-generation transponder.

First is the rate at which ICE6 transmits data symbols, referred to as the baud rate. By increasing the baud rate to almost 100 billion symbols per second (100 GBd), with each symbol carrying around 10 bits, we can deliver a full 800 Gb/s data rate, plus the overhead of the framing and the forward error correction. High baud rates are a key enabler for high wavelength data rates, and a future trend will be to increase them even more – perhaps as high as 150 GBd in sixth-generation coherent.

However, when it comes to using high baud rate signals in submarine cables, the problem is that these signals are very wide – the spectral width of a signal is proportional to the baud rate. It works well for parts of the cable spectrum, but the reason that ICE6 can deliver so much more capacity than other fifth-generation technologies on MAREA is our ability to vary the baud rate, manipulate the width of the optical signal, and squeeze channels into available spaces. Variable baud rate also allows us to "monetize the margin" that a technology with a fixed baud rate would leave in the cable.

Transponder performance factors: Non-PCS modulations

Probabilistic constellation shaping (PCS) has made a staggering contribution to fifth-generation transponder performance. PCS is a highly sophisticated, highly granular modulation technique that allows us to tune the spectral efficiency of an optical wavelength to move capacity very close to the theoretical limit.

In most terrestrial and subsea cables, PCS is the preferred modulation. But as we see more and more real-world deployments with ICE6, we have found that it is possible to achieve up to 25% more capacity using non-PCS modulations over very long dispersion-managed cables, which is a key advantage since there are so many dispersion-managed cables around the world today.

Summary

Modern cables have significantly higher performance than older cables, but it could take five to seven years for a new cable to reach its ready-for-service status. Therefore, it is vital to be able to maximize the capacity of existing cables in order to extend their commercial lifetime.

Fixed high baud rate and PCS-only implementations leave a significant amount of margin in the cable, so an implementation that supports variable baud rates and non-PCS modulations enables margin monetization and extended commercial lifetimes.

For more information, please visit Infinera.com. TR

> ICE6 can deliver so much more capacity than other fifth-generation technologies on MAREA is our ability to vary the baud rate, manipulate the width of the optical signal, and squeeze channels into available spaces

Network slicing to power 5G use cases

In the wake of the pandemic, a global surge in broadband network demand has spurred growth in the networking slicing market.

Recognized as a fundamental component of 5G, network slicing is a network architecture that allows slices of a network to be allocated for specific applications to deliver a specific performance. It leverages network functions virtualization (NFV) and software-defined networking (SDN) to create multiple virtual networks on a common physical infrastructure to cater to different scenarios.

Led by 5G forerunners such as China, Japan, and South Korea, Asia Pacific has been projected by the GSMA to become the world's largest 5G region by 2025. Estimated to grow from $2.13 billion in 2020 to $13.90 billion in 2025, the region will amass 675 million connections to account for more than half of the world's volume. By then, network slicing will play a key role in supporting many enterprise and industrial use cases.

Through network slicing, operators can assign slices to individual services within a network to meet the varied requirements from customers or use cases. A departure from the traditional one-size-fits-all approach to networks, network slicing as a service allows operators to provide differentiated services at scale, improve network efficiency to reduce both Opex and Capex, and create new revenue opportunities. For instance, operators can leverage on network slicing capabilities to provide slicing at differentiated pricing based on customers' requirements on bandwidth, latency, security, and type of connection.

Industries to benefit from network slicing

5G is impacting a number of industries that are taking inventive approaches in a digital age. As industries accelerate digitalization, applications of 5G and IoT will lead to a hike in demand for faster connectivity and wider network coverage, as well as virtualization of networks. These are drivers that will boost network slicing as operators tap on the potential of new business models. Within the ecosystem, strategic partnerships forged to advance network slicing will also propel the growth of this market. This will in turn spur progress in

new technologies such as artificial intelligence, machine learning, cloudification, and edge computing.

> As industries accelerate digitalization, applications of 5G and IoT will lead to a hike in demand for faster connectivity and wider network coverage, as well as virtualization of networks. These are drivers that will boost network slicing as operators tap on the potential of new business models

According to Research and Markets, the global 5G network slicing market will reach $4.3 billion by 2026. Of which, Asia-Pacific represents the second largest region after North America. By 2026, global 5G slicing professional services is forecasted to reach $245.8 million.

Viewed as the technical foundation for the future 5G evolution, network slicing can be applied in scenarios such as real-time streaming, supply chain management, and remote monitoring. According to Research Dive, real-time surveillance will be the fastest-growing area, estimated to reach $832 million by 2027.

In Asia, a global manufacturing superpower where manufacturing is critical to the socio-economic development of many economies, network slicing is a fundamental feature in smart factories to enable real-time remote control of factory devices. For instance, O&M can be carried out using augmented reality, with real-time videos of the plant being saved to the cloud, processed and analyzed. Robotics used in plants is another example that requires high bandwidth, low-latency network slicing.

Network slicing will also play an important role in transportation as the automotive industry moves forward with vehicle-to-everything (V2X) for ultra-reliable and ultra-low latency communications between autonomous vehicles on roads. In China, for instance, smart 5G ports rely on network slicing and edge computing to support smart container trucks to replace labor-intensive work with unmanned and intelligent operations.

In the government sector, where reliable and secure data is critical to public safety services, network slicing can be used to support robust and ultra-high security data sharing across departments and agencies to facilitate better responses.

Network slicing is also important in the healthcare sector, especially in this climate, where widespread adoption of telemedicine or remote healthcare services will require lower latency, higher bandwidth, and faster speed. Smart grid and smart agriculture are other areas where network slicing will be deployed.

Accelerated digital transformation, compounded by advances in 5G technologies will add pressure on existing networks and challenge operators to address more exacting demands from industry verticals. As networks become more complex, operators should look into optimizing network management and explore network slicing as an enabler for new value creation. Beyond connectivity revenues, operators are well-positioned to offer flexible, agile and scalable solutions for tomorrow's industrial applications. TR

Ibrahim Gedeon, chief technology officer of TELUS

Building the future - TELUS' GTLP

Ibrahim Gedeon, chief technology officer of TELUS, discussed with Telecom Review about their new graduate program that enables future-proofing technology talent pools while nurturing the innovators of the future.

Companies' business and digital strategies continue to advance at an unprecedented scale and rate due to a multitude of converging forces, including software and cloud-based disruption, the ubiquity of analytics and the data-driven economy, and next-level process automation and virtualization. To layer on top of that, the COVID-19 pandemic has served as a widespread call-to-action, highlighting the criticality of mass digitization and agile innovation as we watched (and became) organizations that had to rapidly pivot to be able to deliver essential connectivity, healthcare, education, remote work capabilities and more. TELUS, like many other companies, accelerated years' worth of digital transformation in a matter of months or weeks, and this rate of transformation is here to stay. These combinatorial forces are spawning the need for innovative talent strategies, including breakthrough approaches in talent acquisition, engagement, upskilling and retention.

Only by being and building futurists will we rise above the talent predicament

Computer scientist Alan Kay famously said, "The only way you can predict the future is to build it." At TELUS, we have cast our vision well into the horizon when it comes to talent strategy, looking to build our pipeline for the future via our new graduate recruitment program, which has been a success for close to three decades now, having nurtured and developed hundreds of young engineers and technologists into cutting-edge technical, leadership, and executive roles. The Graduate Technology Leadership Program (GTLP) is a key pillar of TELUS' strategy to acquire the top caliber of technical talent that can push forward innovation, introduce fresh approaches, and power our digital strategy for years to come.

TELUS, like our global peers in the technology space, grapples with the ever-evolving technology talent landscape. Our guiding principle is simple – to bring the brightest and best technical minds onboard, in support of our mission of delivering winning outcomes for our customers and the Canadian economy at large. In return, we provide the industry's best graduate rotational program to

our incoming team members: one of the top differentiators between our programs and others in the industry is that we equip our new graduates to dive right into real-life and meaningful projects from day one! This could span everything from building the best networks to leading-edge software platforms to hyperscale cloud-native architectures to advanced data science capabilities. There are more than 100 rotational options to choose from, spanning five cutting-edge technology areas. Additionally, each graduate is paired with a number of manager and director mentors who help to guide and support their interests and skills in an all-rounded way.

We like to think of acquisition as just the beginning of our journey when it comes to our new graduate program. Two other critical pillars of focus are retention and upskilling. A common challenge across the industry is the high turnover rates for new graduates. Inherently, retention is a complex process, but that is further exacerbated with younger generations of talent who bring exceptional skills and motivation, are seeking to make a tangible impact, have unbounded access to opportunities in today's talent market, and have far less geographical mobility limitations than previous generations. With the GTLP, we focus on tapping into new graduates' strengths, supporting them to contribute meaningfully to innovation-focused initiatives, expanding our diverse talent pool, and providing one-of-a-kind mentoring, learning and career development opportunities. Ultimately, as studies have shown time and again, culture is one of the most powerful levers to boost retention, and with our new graduate program, we are committed to sustaining TELUS' world-leading engagement focus and bolstering that with an uber-personalized focus on the development of every single team member.

Upskilling isn't a new concept but its magnitude and criticality have snowballed, especially in the post-pandemic economy. According to the World Economic Forum, by 2024, close to 40% of workers will require up to six months of retraining. That need will be further intensified in the technology sector with the widespread demand for software, cloud and data skills across the majority of job functions. Additionally, close to 50% of the Gen-Y and Gen-Z workforce believes their skills will be outdated in 4-5 years (Capgemini), highlighting the need to step up the focus on training and upskilling as a key engagement and retention driver.

As we step fully into the hyperscale era and insights economy, our success as an organization will be contingent upon the thoughtfulness and rigour of our upskilling efforts, and the GTLP at TELUS are fast becoming the proving ground for our strategy. Today, our new graduates benefit from a multipronged focus on technical and leadership development (which includes in-house offerings as well as MBA-style courses from prestigious academic institutions), combined with strategic upskilling, targeted innovation opportunities, hackathons, personalized mentorship journeys, and networking opportunities with executives.

> The Graduate Technology Leadership Program (GTLP) is a key pillar of TELUS' strategy to acquire the top caliber of technical talent that can push forward innovation, introduce fresh approaches, and power our digital strategy for years to come

The GTLP offers an unparalleled and accelerated career journey

TELUS' GTLP has evolved into a one-of-a-kind, progressive rotational program that supports technical and leadership skills development, while helping new graduates chart their own unique career paths. Today, new graduates in the program benefit from a peer network of hundreds of other graduates and co-op students, helping them to build their community while accelerating their career journey. Furthermore, we deeply care about each individual graduate's journey even beyond their completion of the program, supporting them individually to land into roles and careers at TELUS that they are passionate about.

Secondly, TELUS is one of Canada's Best Diversity Employers, and nowhere is this more evident than in our new graduate program. Both at the leadership and team layers, this program speaks to how highly we value diversity. 70% of the GTLP leadership team is female* and our team is represented by team members coming from the dozens of different cultural heritages that reflect the fabric of Canadian society. We are continuously doing our part to address imbalances in the tech industry starting right from the youngest minds in our organization - importantly, we have more than twice the number of women* in our program versus the tech industry, and we're only going to amplify that more!

Like any program that's been in place for a couple of decades, we have morphed and progressed the vision, mission and strategic priorities in response to the needs of our team and our business, and will continue to do so into the future. Importantly, we believe that engaging the youngest minds of our workforce is essential to TELUS' success, but more importantly, to societal and economic progress for our nation and planet as a whole. Gen Zs already make up the largest generation at 30% of the world's population. Gen Ys and Gen Zs are redefining the future of work, with their deep passion for innovation, sustainability, healthcare, diversity, human rights and the issues that truly matter across our planet – we see this in action every day across our GTLP new graduates and remain committed to supporting their ideas and passions while engaging them to chart a vision for a progressive future for generations to come.

**The GTLP team acknowledges that "women" or "female" is not an accurate description for the many ways people identify. We use * to include cis and transwomen, as well as women-identifying non-binary, agender, or other gender minorities.*

Mentorship – technical and emotional – is the key to success

Another way the GTLP stands out is the level of personal investment and effort our executive team put into into this program from a mentorship perspective. Today, each and every one of our graduates benefits from direct mentorship opportunities with TELUS' CTO as well as a number of vice-presidents and directors - there are not many organizations where this level of personal attention is possible or consciously created. We believe this investment of time is important on many levels – the science of mentorship suggests it has both technical and emotional impacts on individuals, and if our mission is to build the leaders of the future, the key to our success is creating both technically competent and emotionally intelligent leaders who have the broad entrepreneurial and collaborative skill set required to lead the increasingly complex programs of the future while keeping the virtuous cycle of innovation and talent acquisition evergreen.

Bridging new graduate programs will fortify future talent for our industry at large

Partnerships and collaborations have always existed to some degree in the technology sector, but will be even more important in the hyperscale era to unlock new possibilities in emerging business areas in an agile manner. As such, we believe that such partnerships should extend beyond merely a business and technology focus, and reach even wider to talent peering initiatives to enable upskilling and enrich our collective talent pool.

Specifically, with the GTLP, we are in the process of bridging our program with partner organizations in different verticals to amplify the learning and career development possibilities for our teams, while expanding our joint access to the top tier of talent that has been able to benefit from this broad, multi-organizational experience in a condensed time frame. Multiply the access to hundreds of rotational streams with the richness of the experience gained across sectors, whether that be healthcare, energy or AgTech, and it is easy to see that we will be left with a new breed of ultra-qualified young engineers and technologists who will truly build the digital future. New graduate program peering is most definitely a winning formula for the future, at least in our TELUS reality. TR

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Rick Seeto, vice president & general manager APJ, Ciena

Future-proofing the backbone of our digital economy

Shooting or firing data across continents faster than it would take to finish reading this sentence, submarine networks play a critical role in keeping the world connected. Afterall, they are the undergirding infrastructure for our digitally connected world, carrying over 99 percent of the world's intercontinental electronic communications traffic.

As we continue to adapt to new digital ways of living and working, there is a critical need to ensure that subsea cables are reliable and robust to provide round-the-clock connectivity. Cloud services, on-demand content delivery, and data center connectivity are some of the key drivers for the increase in global internet bandwidth over the past few years, but it was really the impact of the pandemic that caused a significant 35% jump in 2020. Furthermore, as 5G-enabled applications continue to garner traction in the Asia-Pacific (APAC) region, demands for higher bandwidth and lower latency traffic will only continue to grow.

We are already in the midst of a cable construction boom that is projected to reach US$8 billion by 2024. Besides investments from traditional carriers, hyperscale content providers have also been driving projects and route prioritization for submarine networks all over the world to support the connections between their data centers. For example, Facebook and Google recently announced plans for their latest cable project, Apricot, to expand connections in the APAC region.

While there is no question about the pivotal role of subsea cables in today's economy, will such investments alone be sufficient to prevent a bottleneck in network capacity?

Challenges of uninterrupted submarine network connectivity

The ramifications of any disruption to the critical infrastructure are costly, and subsea cable networks are no exception. Earlier this year, the submarine network carrying data traffic to Jayapura in Indonesia was severed, resulting in more than 500,000 people losing internet access.

While the submerged plant of a submarine cable network is designed and manufactured for very high reliability, the risk of damage still remains as these cables are located on the sea floor. Most incidents of serious cable damage occur either due to human activities like anchoring and sand-mining, or natural causes such as undersea earthquakes and landslides. This can make it difficult to predict or control service disruption. In particular, the APAC region presents one of the most challenging environments for submarine networks. Besides being the world's most disaster-prone region, it is also home to some of the busiest shipping ports like Hong Kong and Singapore. Wide-scale network disruptions affecting millions due to damaged submarine cables are not unheard of.

Designing future-ready intelligent submarine networks

In an increasingly interconnected world, global network connectivity has become essential to the economies and security of most nations. Regardless of the environment, operators need to be able to proactively protect submarine networks, improve network resilience and provide continuity of service. On top of it all, submarine network infrastructure is expensive to build, maintain, and operate. Cable owners and operators need to monetize their assets and extract the maximum value from their investments

This is where intelligent networking technology comes into play. Ensuring end-to-end availability and optimized performance of network assets– overland and undersea – requires traditional physical route diversity and intelligent traffic routing, alongside analytics-driven preventive maintenance capabilities. For example, any disruptions caused by damage to a subsea cable can be mitigated by rapidly and autonomously rerouting connections around the cable fault, allowing almost seamless restoration of services in a matter of minutes. As such, innovations like flexible, instrumented photonics and advanced software control can help operators not only scale their network and boost capacity, but also protect traffic and service delivery.

Afterall, submarine networks do the heavy lifting when it comes to interconnecting continents at the capacity, reliability, and latency required to keep the Internet humming. This vital fact means that subsea cable operators must leverage the latest technologies to ensure their networks can keep pace with our voracious appetite for content and applications in a highly reliable manner. TR

By Rick Seeto, vice president & general manager APJ, Ciena

“We are already in the midst of a cable construction boom that is projected to reach US$8 billion by 2024. Besides investments from traditional carriers, hyperscale content providers have also been driving projects and route prioritization for submarine networks all over the world to support the connections between their data centers”

Benson Yeo, senior vice president, IDEMIA Mobile Operations Business, APAC

How the telecommunications industry is on the cusp of a green, sustainable revolution

Earlier this year, the World Economic Forum (WEF) called a failure to tackle climate change "an existential threat to humanity." Today, carbon emissions are on a rapid rise, with the telecommunications industry projected to account for 2 percent of emissions by 2030, driven by increased energy consumption. With the Asia-Pacific region emitting more than half of the world's greenhouse gases and with technology playing a large role in national climate action plans, there is an increased incentive for companies and organisations in the telecommunications sector to "act, not react."

While companies in the region can proactively innovate with products and services that positively impact or complement the environment, this is only part of the equation. Alongside actively engaging consumers from businesses to individuals with environmentally friendly products, these efforts should be complemented by strategic collaborations outside the industry to make a real impact. Companies can actively seek out and form collaborations with like-minded companies that prioritise and implement their environmental, social, and governance (ESG) goals.

By working together symbiotically, these efforts can help drive the entire industry and related ecosystems forward to reduce the overall impact of climate change and achieve the sustainable development goals (SDGs).

Greener, more conscious, environmentally friendly products that are also customer-centric

The telecoms industry's main environmental risks are emissions from base towers and e-waste landfills, with the latter expected to generate around 74 tonnes of e-waste by 2030, almost double the amount in 2014.

Solutions such as the use of recycled and biodegradable materials are therefore welcome and increasingly appealing to today's environmentally conscious, modern consumers. GREENCONNECT by IDEMIA, for example, presents a suite of solutions that allow telecom partners to easily switch from traditional products to green materials resulting in less plastic and paper waste.

Driven by the world's transition to the Internet of Things (IoT) generation and the fourth industrial revolution, the rise of 5G has strong potential to positively impact overall sustainability by linking with IoT, to enable decarbonisation and reduce energy consumption and emissions. Its large-scale rollout has already catalysed innovation and a surge in popularity of complementary and more environmentally-friendly products. There are also initiatives driven by this transition. eSIMs, for example, are easy to setup and able to connect to a mobile network without having to replace or reinstall anything. Along with reducing physical waste, this attracts and enables the savvy and sustainability minded customer, as it not only future-proofs devices and usage, but overall impresses with

its compatibility with the increasing digitalization lifestyle – especially in the post-pandemic world.

Products like these are recommended by the regulatory bodies as they simultaneously help national operators achieve their corporate and social responsibility (CSR) goals which in turn intersect with environment, sustainable goal (ESG) approaches or strategies. Once these are consciously applied, this opens the way for further conscious partnerships and collaborations, as well as innovations that reduce environmental impact. Many offerings from the larger information and communications technology (ICT) sector can then enable business customers, clients and individuals to reduce their own energy consumption, contributing to an overall reduction in waste.

A holistic ecosystem drive for the industry

Still, the onus is not only on the ICT industry if real change is to be achieved - but supporting stakeholders also have a role to play. After all, the modern, climate-conscious consumer demands 'greener' accountability when making consumption decisions, and in the ICT industry, this cannot be a 'one-off' product, but a consideration of the whole societal impact (TSI).

Innovative products, such as eco-friendly SIM cards show that factors beyond the product alone, such as packaging and transport, have been considered. For instance, paper blisters and raw fibre cardboard kits that are free of glue and varnish demonstrate that circular economy principles have been considered along with responsible waste management. This serves today's consumer's search for environmental commitments that extend beyond the product life cycle.

Initiatives such as these also provide the opportunity for collaborations between the private and public sectors that focus on reducing overall climate change. This way, telecommunication businesses in the Asia-Pacific region can proactively use their influence in the industry to reach beyond their immediate sectors and seek opportunities that have a positive impact on the environment.

The need for shared responsibility and effort between companies and individuals

To maintain a liveable climate, it is estimated that greenhouse gas emissions must be reduced to net-zero by 2050. Because the power needed to drive change in the industry goes beyond just governments and corporations, it is critical that employees and individuals act as well. In addition to changing personal habits and choosing to use more sustainable products, corporates, employees, and individuals can take collective action such as beach-clean-ups, planting trees, or using more public transport. By actively advocating for the '3Rs' (reduce, reuse, recycle) approach and responsible choices, these efforts can work in tandem with corporate ESG and CSR commitments such as aligning with the United Nations Global Compact to result in even greater impact.

With growing customer awareness and attention to sustainability issues, the risks to companies that do not proactively seek ways to reduce environmental impact could affect long-term reputations and drive consumers to switch to more conscious competitors. For telecommunications companies in the Asia-Pacific region, there is both an opportunity and an incentive to help drive the global transition to a low-carbon, sustainable global economy. Given that sustainable solutions are projected to be an economic boost in the post-pandemic era, creating new roles for a new, sustainable, circular, and profitable economy all-around can benefit not only the planet but also those who re-invest in its resources, creating a path for an overall, sustainable future. TR

By Benson Yeo, senior vice president, IDEMIA Mobile Operations Business, APAC

“With growing customer awareness and attention to sustainability issues, the risks to companies that do not proactively seek ways to reduce environmental impact could affect long-term reputations and drive consumers to switch to more conscious competitors”

Post-Covid period: Consumer behavior change and the importance of becoming a one-stop-shop

Telecom Review held a virtual panel on October 5, titled "Digitizing the capacity". The panel explored various options and shared insights on the importance of wholesale services while industry experts discussed in depth the latest developments in the wholesale industry, digital infrastructure, and on-demand services.

The esteemed panelists sharing their views and expertise were as follows: Cengiz Oztelcan, CEO of GBI; Ali Amiri, chief carrier and wholesale officer, Etisalat Group; Frédéric Schepens, CEO, MTN Global Connect; Emmanuel Rochas, CEO, Orange International Carriers; Eric Cevis, President, Verizon Partner Solutions; Eric Handa, CEO & Co-Founder, AP Telecom.

The session was chaired by Toni Eid, CEO, Trace Media and founder, Telecom Review.

During the session, the panelists responded to the various questions addressed by Eid. One of the questions was related to how digital acceleration and consumer behavior changed on the long run and impact the wholesale and capacity industry during the 18 months of pandemic.

Ali Amiri was the first to answer this question saying that indeed, customer behavior has changed after 18 months as everyone today is much more involved in the online world, learning to use new platforms which as Microsoft Teams or Zoom, which weren't used as regularly before. In addition, Amiri shared a document showing the change in people's behavior, in terms of buying, stating that during these 18 months, pre-Covid-2019, only 13.6% of global purchases were made online, whereas post-Covid-19, online purchases grew to 19.5%, recording a 43% growth in just two years.

Cevis noted that in order to keep their connectivity going, they had to increase their network capacity, adding that Verizon also invested in platforms like BlueJeans which allowed a lot of distance learning. "All the investments made paid off because we had been on this customer digital transformation journey, for several years now," Cevis added.

Schepens stressed that the pandemic was important as it shows again that telecoms and the services offered are essential. "If we weren't there as an industry to fuel and help overcome this situation, it probably would have been a totally different world. We at MTN GlobalConnect and our partners, did a great job in building a reliable world."

Eric Handa CEO & Co-Founder, AP Telecom, had a different point of view on this subject seeing that they don't own and operate a network, but consult and offer advisory services. "We've heard the expression that data is the new oil, and that certainly is prevalent. We've seen networks during the Covid period bend but not break but the importance of subsea and terrestrial is very important for digital infrastructure." In addition, Handa mentioned that wholesale will change post-Covid. "We're already starting to see that change maybe not in the Middle East yet, but in the GCC."

Furthermore, Eid asked about how important is it for operators to become a one-stop-shop that provides digital experiences for its customers and what are the expectations from the market and customers.

On this note, Rochas stated that, "Everything will become digital, and this is exactly what we are living today. If we want to provide our customers what they expect, which is quality over capacity, more reliability, more simplicity, and more responsiveness, we need to digitize."

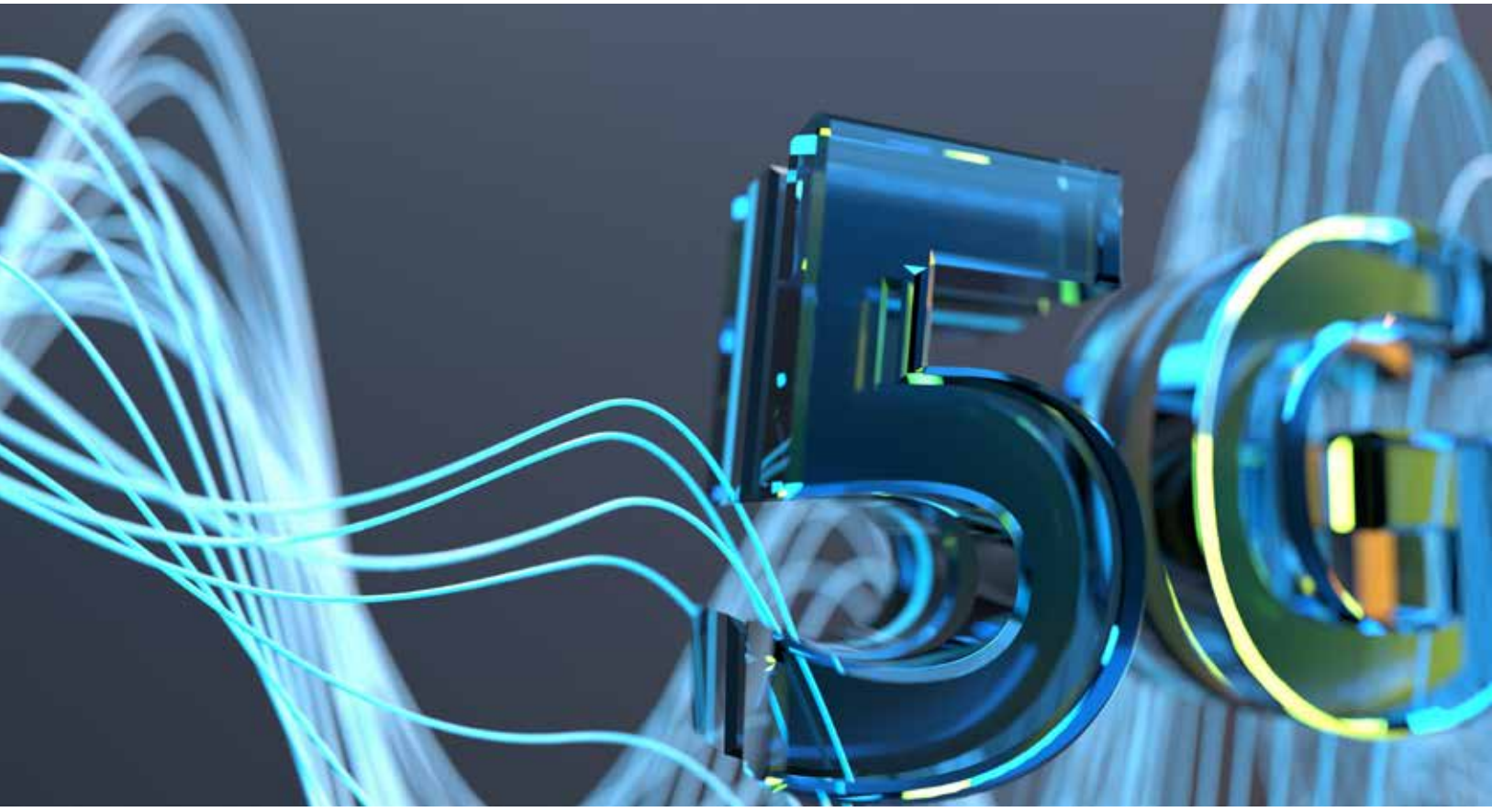
The stop and shop approach will emerge in the industry, and will enable customers to focus on their business and have at their disposal a proposal which does not oblige them to manage a number of different providers and services. So this approach is really a requirement in the industry and needs to be built together by interconnecting different approaches and offers that will answer all the customer needs.

Schepens also commented on this subject, saying, "We started by consolidating our activities as a one-stop-shop. I still remember negotiating many years ago on individual roaming agreements with many companies, and today, we've now consolidated all of that. This indeed will help streamline, digitize, and simplify a lot of this end-to-end capability." He added, "We took a strategic decision to build state-of-the-art PaaS enablements, thus offering new ways of interoperability and driving more efficiency. What we are doing now is completely converting the capacity business where we are driving it as a zero-touch network with top-notch end-to-end capabilities."

Eric Cevis, President, Verizon Partner Solutions, gave his opinion about this question by stating, "We're operators in this one-stop-shop environment today, and as operators, clearly we have to perform scenario planning to make sure we're caring for those needs today. At Verizon, we put a lot of investment in roadmaps relative to make customer experience become a reality and provide customers a superior digital experience."

Ali Amiri, chief carrier & wholesale officer, Etisalat Group commented that, "The experiences that people had are somehow quite advanced compared to some telcos and I think that's really important for customer service so that when they approach any telco, they are offered a one-stop-shop: they can order online, they know where their orders are, they know the prices, etc. We have to be really on the top of it." TR

> The stop and shop approach will emerge in the industry, and will enable customers to focus on their business and have at their disposal a proposal which does not oblige them to manage a number of different providers and services



Powering 5G and beyond with satellites

The development of 5G and its applications in the Internet of Things, where 1.8 billion active 5G connections are estimated by 2025, is generating greater interest in satellite solutions to fulfill the criteria of reduced network latency, increased data volume, and connection density. In areas where terrestrial networks are absent or found lacking, satellites can fill the gap to provide ubiquitous connectivity in an increasingly connected world.

In powering the next wave of technological innovations, satellites offer coverage that surpasses terrestrial networks, delivering high-powered reliable connectivity and secure global mobility. Satellite connectivity plays a particularly significant role in maritime and aeronautical industries, as well as use in critical disaster relief and emergency response missions.

Without a doubt, satellites are emerging as integral components in 5G networks to address the unprecedented surge in connectivity demand to ensure that consumers and enterprises have access to data anytime, anywhere. Advances in this field have also been rapid to keep up with the global digital evolution. Satellite connectivity, once synonymous with high costs and high latency, is now viewed in a new light with recent advancements.

For instance, low earth orbit (LEO) constellations have gained momentum as a more cost-effective alternative to improve coverage area, improve quality and deliver low-latency connections, particularly for remote populations. Next-generation LEOs are launched to significantly increase bandwidth to benefit all rungs of societies.

With satellite playing an important role in the global connectivity ecosystem to connect the unconnected and provide backhaul connectivity for mobile network operators, both satellite communications startups and giants are pushing boundaries to deliver innovation and seamless solutions. For instance, UK satellite operator Immarsat recently announced the launch of Orchestra, a new and innovative multi-orbit global narrowband network that combines geostationary (GEO), low earth orbit, highly elliptical orbit (HEO), and terrestrial 5G. Building on existing connectivity capabilities, Immarsat also launched ELERA to accelerate IoT development and support humanitarian missions.

SES also unveiled its O3b mPOWER constellation of 11 satellites to deliver multi-gigabit connectivity services to industries including telecommunications, aviation and maritime. This system is capable of providing intelligence-driven connectivity services with optimised global bandwidth availability and resiliency.

Adding satellite connectivity to 5G network architecture

To support intelligent 5G networks, satellite connectivity must be embraced to empower consumers, enterprises, and governments. For communications providers and mobile network operators, this means that satellite solutions are becoming important features to enhanced 5G networks to keep up with increased broadband demand. Satellites will complement terrestrial networks through traffic offloading, harnessing satellite's multicasting or broadcasting functionality for new uses, enabling verticals such as smart mines, ports, and farms. It also opens up opportunities for the use of cloud in industries such as offshore marine and fisheries, where activities are conducted predominantly in remote areas.

However, mobile network operators tend to place emphasis on 5G upgrades in highly-populated cities. Because of this, satellite-based broadband is critical to increasing the reach to often neglected, underserved populations in rural areas, where connectivity can close a digital divide already aggravated by the pandemic to raise overall digital inclusion levels.

In Asia Pacific, for instance, countries comprising tens of thousands of islands, such as Indonesia and the Philippines, are well-positioned to benefit from satellite as a viable and affordable alternative to connect the country and underserved geographies, as opposed to incurring high economic costs from building terrestrial network infrastructure.

In the industry, some providers are primarily focused on providing 5G services to smartphone users – serving as mobile roaming partners to offer connections to hard-to-reach precincts. In view of this, 3GPP is currently looking into introducing non-terrestrial networks in 5G standards, to be published in the 3GPP Release 17 in 2022. This could signal new collaboration opportunities between mobile network operators and satellite operators in the near future.

As countries accelerate digitalisation ambitions, connectivity will become the new driver of economic growth and social cohesion. Citing Indonesia as an example, where its digital economy is predicted to triple to US$124 billion by 2025, the government is already looking into launching its largest telecommunications satellite in the near future. Clearly, the rise of satellites can be transformative. It is the vision of many for the region to witness faster digitalisation and stronger economies. TR

Satellites will complement terrestrial networks through traffic offloading, harnessing satellite's multicasting or broadcasting functionality for new uses, enabling verticals such as smart mines, ports, and farms.

Growing importance of digital identity verification in the telecom industry

The world is experiencing quantum leaps in digitalization, as technology is embraced in ways never before prior to the pandemic. At the same time, digital fraud poses a bigger threat as digital transaction volumes increase, with annual losses amounting to $10.5 trillion by 2025 globally. With further developments in technology, we can only expect greater risks to data privacy and security and growing pressure for enterprises and industries to ensure compliance.

As governments are passing legislations to safeguard customers amid this backdrop, digital identity is a promising start to detect and prevent fraud. In the financial sector, financial institutions are pressured to stay vigilant and maintain higher security, and hence trust levels between banks and customers. Financial institutions are some of the first to rely on digital identity verification for secured and compliant onboarding of customers and other processes.

As the backbone to providing connectivity essential for sectors such as the financial and even governments, telecom operators require a robust digital identity verification process to build resilience and allow the vast majority to assess various services. This will have a profound impact on other sectors.

In the banking sector, for instance, many institutions depend on a customer's mobile phone to provide verification. SIM swapping is a common threat when a

user's personal information can be accessed without the user's knowledge, and hence misappropriated to authenticate fraudulent transactions.

Automating digital identity verification

Today, there are more than 5 billion individuals with a mobile subscription. This number is projected to reach 6 billion by 2025. As mobile subscribers hike globally, it comes as no surprise that SIM card fraud is escalating. Other threats include call transfer accounts and vishing calls. As telecom operators turn to online onboarding of new customers, online identity verification is a big stride toward preventing potential fraud and even money laundering.

Across industries, remote or digital onboarding is quickly becoming the norm. Digitalization provides opportunities for innovative and automated onboarding processes that are smarter, more secure, and faster to offer customers a seamless online identity verification experience.

Such onboarding solutions rely on sophisticated AI algorithms backed by large data sets to make informed decisions. As compliance demands increase, authenticity of global IDs can be automatically verified through myriad checks using unique security features such as watermarks or holograms. Biometric technology is also embedded in a strong identity verification system to fortify security. Complex algorithms can also better detect document fraud to ensure that there is no foul play.

For customers who have grown accustomed to seamless and convenient customer digital journeys, automated digital identity verification better bridges the physical and virtual worlds.

Putting your customers first as a diversified growth strategy

Telecom operators that focus on a customer's journey and cater to their needs and expectations that cover all touchpoints are more likely to find success. Through a seamless, automated, and error-free onboarding process, for instance, the benefits are reduced identity fraud, compliance with security regulations, as well as reduced acquisition time and cost, which according to a report from McKinsey, reduces onboarding costs by up to 90%. Furthermore, digital identity verification raises customer experience levels.

Through digital identity systems, telecom operators can gain a higher degree of trust in customers' identities. They also obtain a richer profile of customers, which in turn helps them to provide tailored solutions and services around their needs and preferences. Similarly, these advantages apply when customers onboard and manage their third-party OTT subscriptions using mobile devices, allowing telecom operators to tap into various strategies to support growth and move up the digital services value chain.

A sign that digital identities are taking off, governments around the world are developing digital identify ecosystems. One of the latest to launch a digital identity authentication on smartphones, Pakistan has introduced a digital identity verification app to facilitate banking and other services.

Essentially, the benefits of shifting towards digital identity verification are twofold. Apart from being regulation-driven to stamp out fraud, telecom operators can go beyond providing connectivity to seize opportunities as a valued partner in delivering seamless and secure digital services. TR

Through a seamless, automated, and error-free onboarding process, for instance, the benefits are reduced identity fraud, compliance with security regulations, as well as reduced acquisition time and cost

CSG acquires DGIT Systems to support ease of delivery and monetization of digital ecosystems

CSG is transforming the way companies engage with their customers by arming today's leading brands with future-ready, innovative solutions that drive extraordinary customer experiences.

The company has announced the acquisition of DGIT Systems, a provider of configure, price and quote (CPQ) and order management solutions for the telecoms industry. The acquisition brings together industry leading solutions specifically designed to streamline the complexities of commercializing the next era of multi-party digital offerings that will drive business growth for communications service providers (CSPs).

Order processing and management is often the root of frustration for CSPs when delivering complex data and digital services to B2B and multi-play B2C customers. As CSPs push to leverage the massive bandwidth and low latency of 5G and edge architectures, order processing demands will continue to rise alongside customer service expectations. By extending CSG's solution footprint with DGIT's CPQ and order management capabilities, CSG is primed to help operators tackle one of their greatest challenges and enable them to easily deliver multi-party digital offerings through an ecosystem of partners to all customers so that they can increase customer acquisition, loyalty and satisfaction.

"CSG's acquisition of DGIT Systems uniquely positions us to help CSPs win in their quest to deliver next-gen, 5G digital offerings that will excite both consumers and enterprises," said Ken Kennedy, COO and president of revenue management and digital monetization, CSG.

"With consumer services at the peak of commoditization, the greatest opportunity now lies in the B2B and B2B2X sectors. This paradigm shift means operators need integrated technologies, like CSG's monetization suite, that can ease the complexities of delivering dynamic, interoperable ecosystems across a multitude of partners. With this acquisition, CSPs can easily deploy CSG's end-to-end solutions to seamlessly deliver multi-party digital offerings to all customer segments and, in parallel, automate onboarding, innovation and settlement with a rich network of partners."

The combined CSG and DGIT solution provides a TM Forum Conformance Certified, modern, open and decoupled architecture that provides the flexibility for CSPs to innovate and implement new digital services.

Additional capabilities include an active, rules-driven catalog based on TM Forum's Open APIs that visually builds offers from components in design time, including service and resource layers, then drives system behavior at run time; a powerful CPQ solution completely automates configuration, pricing and quote management for the most complex products and services, including live pricing, pricing policies, discounts and workflow driven approval processes; a catalog-driven order management system with reusable processes and visual configuration provides proactive communication, transparent fulfillment, trouble-free activation and order orchestration that includes manual and third-party system hand-offs, jeopardy management and automated escalation processes; and sophisticated monetization processes simplify the management of complex rating, charging, payments and settlements.

SES partners Sirius TV to broadcast satellite TV channels across Malaysia

Sirius TV, a brand of Smart Digital International Sdn Bhd – the second DTH (Direct-to-Home) operator in Malaysia – has signed a multi-year contract with SES to deliver a new bouquet of satellite TV channels across Malaysia.

The Sirius Basic subscription package launched with 13 initial channels, five of which are broadcast in HD. Sirius TV will be using high-powered capacity on the SES-12 satellite – SES's advanced geostationary satellite at 95 degrees East – to support the distribution of channels to over 7.5 million satellite TV equipped homes across Malaysia.

In addition, Sirius TV has adopted SES's Cloud Playout services, which provides a cost-effective solution while enabling an agile and scalable business model as the broadcast and media industries move toward a cloud-focused landscape.

"We are pleased to be delivering Sirius TV's services via the latest broadcasting and content delivery technology from our partners at SES. Their high-powered SES-12 satellite and end-to-end cloud video solutions have empowered our business model and workflow with flexibility and scalability," said Khairuddin Abdul Rahman, CEO of Smart Digital International, Sirius TV. "More importantly, it has enabled us to reduce our costs through streamlined operations, allowing us to offer our customers endless entertainment at a competitive price."

"Our commitment to the Asian market is reinforced by our partnership with Smart Digital International. We are proud to deliver Sirius TV's bouquet across Malaysia and to showcase the benefits of cloud technology in the broadcasting space," said Deepak Mathur, Executive Vice President of Global Sales at SES Video. "Through our SES Cloud Playout solution, this partnership will move away from traditional business models and workflows, toward a more integrated, flexible, scalable and cost-effective cloud-based ecosystem."

Huawei and ASEAN Foundation partner to bridge digital talent gap in Asia Pacific

Huawei and the ASEAN Foundation signed an MoU to jointly bridge a digital talent gap through the ASEAN Seeds for the Future program. Held on 3 November 2021, the Asia Pacific Innovation Day – Digital Talent Summit 2021 was an online summit where policy-makers, researchers and industry experts convened to discuss best approaches to build a digital talent ecosystem in the region.

Jointly, the partnership between the ASEAN Foundation and Huawei aims to expand the digital training footprint in the region. To be launched in 2022, the 'ASEAN Seeds for the Future' is a scaled-up version of 'Seeds for the Future', a global CSR flagship initiative undertaken by Huawei to provide world-class digital skills training to youth in 131 countries and regions. Since its inception in 2008, the program has benefitted about 9,000 students from over 500 universities.

The ceremony was attended by executive director of ASEAN Foundation Dr. Yang Mee Eng; vice president of Huawei Indonesia Albert Yang; and witnessed by permanent representative of the Kingdom of Cambodia to ASEAN H.E. Amb. Yeap Samnang; deputy secretary-general of ASEAN for ASEAN political security community H.E. Robert Matheus Michael Tene; deputy permanent representative of the Philippines to ASEAN Elizabeth Te; deputy permanent representative of republic of Singapore to ASEAN Tham Borg Tsien; and Huawei Asia Pacific vice president Jay Chen.

"Our partnership with Huawei signifies another important milestone for ASEAN in regards to bringing in committed partners from the private sector to contribute to youth development effort in ASEAN," said executive director of ASEAN Foundation Dr. Yang Mee Eng.

This marks the ASEAN Foundation's first partnership with the private sector to lay a solid digital foundation as countries embrace digitalization. Through the 'ASEAN Seeds for the Future', the ASEAN Foundation collaborates with Huawei to design custom needs for the region. For instance, nearly half of the program's participants will be female to address a prevailing gender gap in the region. Yang highlighted that the program is also designed to address rural-urban and infrastructure gaps to elevate digital readiness of societies.

"Access to education is vital to create opportunities and support sustainable development. Our cooperation will contribute to achieving the objectives of ASEAN Digital Masterplan 2025, which aims to increase the capacity of youth in the region to participate in the digital economy and to create a digitally inclusive society in the region," said Jay Chen, vice president at Huawei Asia Pacific.

Microsoft's LinkedIn to exit China amid censorship woes

Microsoft's professional social network, LinkedIn is exiting China by the end of the year. LinkedIn attributed its decision to harsher internet censorship imposed by the Chinese government.

"While we've found success in helping Chinese members find jobs and economic opportunity, we have not found that same level of success in the more social aspects of sharing and staying informed. We're also facing a significantly more challenging operating environment and greater compliance requirements in China," LinkedIn released in a statement.

LinkedIn has amassed over 54 million users in China, its second largest market after the US. Launched in China in 2014, LinkedIn is the only major foreign social media platform operating in China. To adhere to the Chinese government's requirements on Internet platforms, LinkedIn has a localized version in China. Previously, LinkedIn had expressed that "While we strongly support freedom of expression, we took this approach in order to create value for our members in China and around the world."

With the sunset of the localized version of LinkedIn, a new jobs-only China-specific site, called InJobs, will be launched.

"Our new strategy for China is to put our focus on helping China-based professionals find jobs in China and Chinese companies find quality candidates. Later this year, we will launch InJobs, a new, standalone jobs application for China. InJobs will not include a social feed or the ability to share posts or articles. We will also continue to work with Chinese businesses to help them create economic opportunity."

This decision is made following a series of events. In March 2021, LinkedIn paused new member sign-ups in China to ensure that the platform was compliant with the Chinese government. In recent weeks, LinkedIn had been in the spotlight for blacklisting the accounts of three US journalists who had written content that was labelled prohibited by the Chinese government.

PCCW Global Console Connect expands to mainland China through DCConnect

Console Connect by PCCW Global has extended its collaboration with DCConnect, a Hong Kong-based innovator of on-demand connectivity to data centers and cloud service providers, to offer businesses extensive reach to data centers across mainland China using on-demand, high-performance connectivity.

Console Connect and DCConnect have enabled network-to-network interconnection via API between the two software-defined platforms, allowing Console Connect users to instantly provision dedicated on-demand network services to mainland China from their existing Access Port.

The collaboration adds 45 on-net data center locations to the Console Connect Software Defined Interconnection® platform. Through the platform, users can instantly access leading data centers in some of mainland China's largest financial, retail and manufacturing hubs, including Beijing, Guangzhou, Shanghai and Shenzhen.

Underpinned by PCCW Global's high-performance network, Console Connect provides enterprises with a single end-to-end Service Level Agreement (SLA) for direct connections to mainland China from Europe, the Americas, Asia Pacific, Africa and the Middle East. Users of the platform can experience lower latency and higher availability of bandwidth, as well as increased visibility and control over their network connections.

Mr. Jordick Wong, Senior Vice President of Innovation, Planning and Procurement, PCCW Global, said, "More of today's businesses are looking for seamless and secure access into key markets across mainland China. Through our latest collaboration with DCConnect, Console Connect can help enterprises connect faster into key markets across the country using our unique self-service management portal."

Console Connect is now accessible from more than 500 data centers in over 50 countries worldwide, and offers direct access to a large ecosystem of local and global cloud, SaaS, IX and IoT providers. Through the platform's MeetingPlace feature, users can order and provision partner services, such as remote peering, colocation, SaaS and business applications, as well as access a range of home-grown features and solutions from PCCW Global.

Console Connect and DCConnect first collaborated in 2019, when Console Connect began providing DCConnect customers with on-demand access to PCCW Global's extensive international network footprint via the Console Connect API. DCConnect is a leading software-defined enterprise and carrier platform in Asia, covering every major data center and cloud vendor in mainland China.

ZTE iCube solution provides one-stop digital infrastructure

With the acceleration of 5G commercial use, a new wave of global 5G construction is ushered in, accelerating the integration of 5G and various industries, bringing strong impetus to the digital transformation of industries. Emerging markets require that the digital infrastructure includes connectivity and high-quality cloud services to achieve a digital economy. ZTE iCube is a new type of cloud network infrastructure, and integration with vertical industries application to become a new economic growth point for operators and industries in the future.

Compared with traditional independent cloud solutions, ZTE iCube is a one-stop digital infrastructure solution which can support a long-term target architecture, helping operators provide both network and cloud services in emerging markets. It proposes diversified product forms to meet different demands of large, medium and small industry scales. It includes standard cloud-network dual-cabinets, AIO cloud-network cabinet, single-server device and embedded type, integrating 5G RAN, PON access network for fixed users, optical & IP bearer networks, industry 5GC (i5GC), industry IMS (iIMS) and edge cloud, to empower 5G capabilities and on-demand cloud services for emerging markets.

At the same time, software functions can be selected on demand. Based on componentized network functions and cloud native ICT cloud foundation, ZTE iCube converges 2G/3G/4G/5G NSA/5G SA/Fixed networks, providing a fully-converged dedicated network for industries. It features subscription of menu-based modules and functions, plug-and-play hardware, one-stop delivery, flexible customization of SLA, and high security, throughput and autonomy degree. It allows different function combinations and deployment modes to enable a precise and ultimate service experience for the industry in minimal space, ultra-low power consumption and simplified O&M conditions. This reuses operators' power supply, equipment rooms, and maintenance personnel at sites, thus greatly reducing costs and shortening the time-to-market (TTM) of cloud and network services. It helps operators transform from communication service providers (CSPs) to diversified digital service providers (DSPs), effectively promoting the sustainable development of emerging markets.

Up to now, ZTE has worked with operators and over 500 industry partners to explore nearly 100 innovative 5G application scenarios in 15 fields, such as industry, energy, transportation, government and finance. ZTE iCube helps operators develop new business models of network-as-a-service (NaaS). At present, this solution has been deployed in many emerging fields to effectively promote the development of the mobile market economy.

Tech innovations for humanitarian relief and assistance

Technology has the potential to create transformative impact on lives, not only in the way we work and study, but also in humanitarian relief and assistance activities carried out in crisis-afflicted and disaster-affected regions in the world.

According to a research by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the number of people requiring humanitarian assistance has increased by about threefold from 78 million in 2015, to 235 million in 2021. In the Asia Pacific, a region which accounts for about half of global natural disasters, millions have to cope with eroded lifestyles and hardship that compound from being displaced owing to conflicts and violence. Add to this the woes of COVID-19, extreme weather, and poverty, the region is home to a growing group of vulnerable in urgent need of humanitarian relief and assistance.

As humanitarian crises become more debilitating and complicated, there is a need for the world to take on more effective humanitarian efforts, leveraging innovative technology to assist the vulnerable.

Mobile applications, chatbots, and social media

There is no doubt that technology serves as an enabler for improved humanitarian actions. The pandemic has highlighted the role of technology in response, recovery, and coordination, where efforts towards outbreak mapping and contact tracing helped countries reduce the spread of the virus. Similar support can be delivered to help the world's vulnerable through faster and more effective actions to other crises.

> “Blockchain is now being used by the United Nations in humanitarian response to facilitate information management, manage crowdfunding, and coordinate aid delivery”

> Supportive policies and frameworks, with governments playing a central role must be complemented with partnerships in the private sector to advance the use of technology to achieve humanitarian objectives for the common good

Since connectivity is key to ensuring that critical information is disseminated, digital access allows the affected to call out for help. Especially in the current pandemic, when assess to affected populations can be limited, communication through mobile applications and social media is critical for crisis information to be disseminated to humanitarian bodies in the shortest time. This information is useful in securing the right resources to respond and extend a lifeline to those affected. With the proliferation of mobile applications and social media, more people can provide information to provide relief workers a better picture of what is going on. Similarly, chatbots provide an effective channel for two-way communication. The WHO and UNICEF are some international organizations that have turned to chatbots via messaging platforms to connect people and government in the wake of COVID-19.

Blockchain

Blockchain is now being used by the United Nations in humanitarian response to facilitate information management, manage crowdfunding, and coordinate aid delivery. It can be used to effectively close funding gaps, as funds can be distributed directly to the recipients without having to go through banks or other financial services. Blockchain can also be used in creating digital IDs for vulnerable groups such as refugees. However, the use of blockchain in humanitarian efforts is still relatively new. There is also a need to address concerns about potential data breaches.

Drones

Drones are used widely in emergency management and disaster risk prevention. Fitted with sensors and cameras, drones are used as an inexpensive way to collect aerial images to offer relief workers real-time information of emergencies. They can also be used to deliver medical supplies to crisis areas, restore temporary connectivity, and assist search and rescue operations. UNICEF launched its first drone corridor in 2017 to support humanitarian use, in particular delivery of vaccines. However, many countries still lack regulations on the use of drones or have set limitations regarding altitudes and proximity to urban areas or facilities such as airports.

Artificial intelligence and machine learning

Artificial intelligence (AI) is also used in addressing humanitarian crises. To accurately predict an impending food crisis, for instance, data collected from various sources such as satellite imagery, weather forecasts, and food prices are analyzed using machine learning (ML) models to help relief workers identify and assess needs, raise emergency preparedness, monitor situations, and review relief effort. AI is also used to predict the spread of vector-borne diseases through geolocation breakdowns. It can be used together with other technologies such as mobile applications, chatbots and social media to enhance relief efforts. In India, which accounts for 20% of global flood fatalities every year, Google uses AI and ML to help predict the time, location and severity of impending floods. Warnings are sent promptly via Google Maps and Search to reduce fatality rates.

Internet of Things

During this pandemic, the Internet of Things (IoT) has helped to bring healthcare relief to overwhelmed hospitals and reduced in-person consultations via teleconsultations. It is also used in vaccine cold chain monitoring where IoT sensors are placed on vaccines, and cold chain data information are sent to the cloud to support real-time logistics management for vaccines. Applications that track vaccine location, temperature, and stock levels are connected to the IoT sensors to provide reliable information on vaccine supplies.

Humanitarian crises undermine growth and stability. Using tech-driven digital solutions, the world can better intervene and respond to humanitarian crises to positively serve affected populations. Supportive policies and frameworks, with governments playing a central role must be complemented with partnerships in the private sector to advance the use of technology to achieve humanitarian objectives for the common good. Especially in times when humanitarian efforts are hampered by the overarching responses to COVID-19, countries need to work together to safeguard countries and lives to reduce death and destruction. TR

8 DECEMBER

Telecom Review Leaders' Summit 2021

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

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TELECOM Review
virtual panels

Telecom Review's virtual panels' series continues in 2021

In light of the huge success achieved in 2020, *Telecom Review announces that the series of virtual panels will continue in 2021* with new and updated topics.

The 2020 series saw the participation of top notch speakers representing the industry's leading brands and registered a record number of online viewers.

The 2021 series features the following topics:

- 5G benefits to operators
- Network automation and SD-WAN
- Next generation service providers network
- IPv6 enhanced innovation
- Revolutionizing connectivity through innovation (powered by SES)
- Digitizing the capacity industry

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