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AGILITY IN GLOBAL CONNECTIVITY:

Re-Shaping the International Infrastructure Ecosystem

Mohamed Nasr, managing director and chief executive officer, Telecom Egypt

Empowering Submarine Cable Innovation in Asia Pacific

Bridging Continents Through the Transformative Power of Fiber Optic Cables

Sparkle's BlueMed and Beyond for Futureproof Submarine Cable Systems


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Mohamed Nasr, managing director and chief executive officer, Telecom Egypt

Agility in Global Connectivity: Re-Shaping the International Infrastructure Ecosystem

In an exclusive interview with Telecom Review, Mohamed Nasr, managing director and chief executive officer at Telecom Egypt, explains how the company is innovating in the digital experience and providing an attractive commercial model, delivering a new era for Telecom Egypt in the subsea cable market.

WeConnect, the new cross-connection ecosystem developed by Telecom Egypt, is enhancing the company's service offering and adding value on top of Egypt's geographic advantages to position it as a "go-to" destination for global digital infrastructure acceleration.

Throughout history, Egypt has been a key player in international trade and connectivity by virtue of its unique position and geographic diversity. What role does Egypt play in the international telecoms market?

Egypt has played a critical role in the international telecommunications and subsea cable markets since the 1870s. It sits at the nexus of large markets, namely Africa, Asia, Europe and the Middle East, and offers direct access to rapidly growing digital economies across the globe.

Today, Egypt has a large volume of international telecommunications traffic, 180 Tbps and growing, with the landing of 14 subsea cable systems, 10 subsea cable landing stations and 10 diverse routes crossing the country, connecting the Red Sea and the Mediterranean Sea. Egypt's long coastlines, spanning 1,941km on the Red Sea and another

995km on the Mediterranean Sea, enable it to offer diversity and resiliency in subsea cable landing points, as well as a growing number of subsea cable system options and varied landing points. That's a unique advantage for international network providers.

Global players that rely on digital infrastructure need greater levels of diversity and resiliency, as well as digital hubs that have geopolitical stability and an open business ecosystem. This is why mega-industry players feel comfortable selecting Egypt as a hub for their connectivity growth.

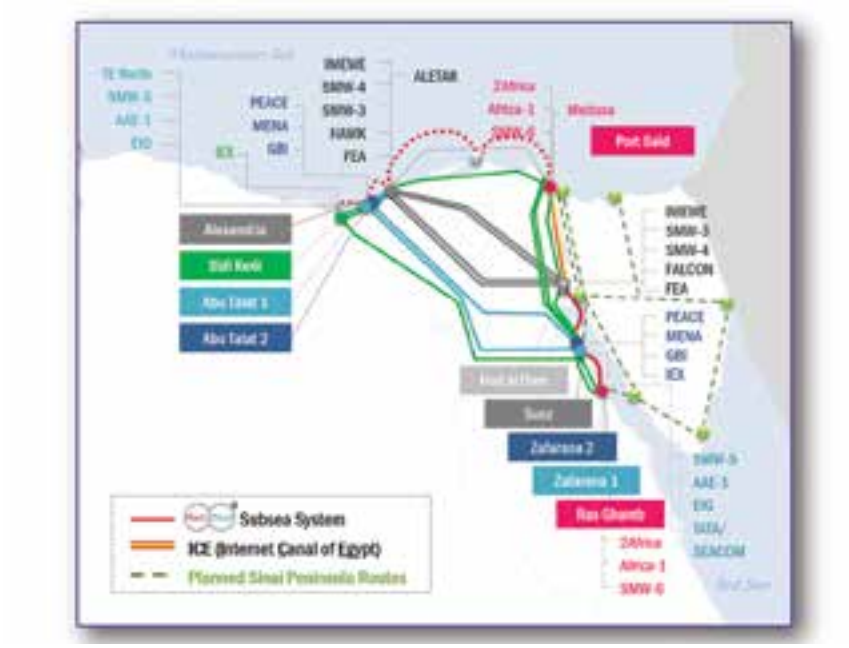
Egypt enjoys an exceptional geographic location and features, sitting at the center of the world and overlooking both the Red and the Mediterranean seas. How does Telecom Egypt leverage these strong advantages and build on them through its projects, products and infrastructure investments?

Telecom Egypt has built on Egypt's geographic advantages and made strategic digital infrastructure investments, enabling it as a global digital hub. When international players choose Egypt, they gain immediate access to a rich networking ecosystem that enables them to scale up efficiently and connect applications and services to reach potentially billions of users.

Egypt is not just a crossing point; it is rather a destination offering new opportunities for partners to " land and expand" in new markets and ensure smooth, rapid and continuous growth. The perception of Egypt in the international marketplace is evolving from being seen as a network hop or transit zone to a "global digital hub."

Telecom Egypt connects 14 subsea cable systems, with at least 5 more going into service in the coming years, and is continuously investing in new, cutting-edge systems. Together with the diverse landing stations that are connected by terrestrial networks spanning the country, we are also developing our connectivity with neighboring countries, which adds to the diversity and resiliency of our offerings.

Furthermore, Telecom Egypt has one of the most resilient crossing route



Telecom Egypt's digital infrastructure

SUMED oil pipelines

networks globally, diversifying from highway routes, well-secured routes and oil pipeline crossings. Telecom Egypt managed to leverage the robust Sumed oil pipelines as some of the most secure crossings to ensure its cables run end-to-end uninterrupted. Telecom Egypt built its 200km "ICE," the most reliable, shortest and fastest trans-Egypt route by far. It runs through the terrestrial route on the west bank of the highly-secured Suez Canal campus to Port Said. ICE is part of the Red2Med system, a crossing solution comprising three segments, which are detached from the conventional public roads. The first segment starts south of the Red Sea, linking Ras Ghareb, Zafarana and Suez; the second segment is ICE, running from the Suez Canal to Port Said; and finally, the third segment that connects to the planned Mediterranean subsea festoon cable.

When partners connect with Telecom Egypt and all it has to offer, they gain access to an array of digital infrastructure solutions, all in a single market. There is growing recognition of the role Egypt and, in turn, Telecom Egypt can play in new international connectivity strategies. That creates new opportunities for our business and supports the growth of Egypt as a key hub for international infrastructure connectivity and the global digital economy.

Telecom Egypt is a renowned industry leader in the telecommunications field. What kind of strategic investments, initiatives or projects is Telecom Egypt developing to serve growing demand in the international market and maintain its leading position?

We have launched WeConnect, a cross-connection ecosystem by Telecom Egypt backed by a digital platform, to accelerate how subsea cable systems are interconnected and simplify how our partners procure, manage and scale their digital infrastructure. It offers a simple, reliable and seamless solution to the procurement of cross-connection services between any of the cable landing stations, whether on the Red Sea or the Mediterranean Sea. WeConnect brings simplicity, agility and transparency to the subsea cable arena and provides web-based procurement of cross-connectivity across Egypt. Users can click-to-order from landing stations to a range of subsea cable options. They can mix and match connectivity to subsea cable systems across Egypt, which gives them greater agility, adaptability, diversity and resiliency.

WeConnect offers an attractive, commercial and cost-efficient model of interconnection. Partners benefit from greater cost-efficiency as well as transparent pricing and an open, neutral and attractive commercial model. This means that our partners can log in to the WeConnect cross-connection ecosystem and re-route traffic to different systems to scale up wherever they see an opportunity, giving them control over their subsea cable connectivity via a simple interface that they can access over the internet. WeConnect enables our partners to make the utmost return from the investments they incur in their international network expansions.

Telecom Egypt is always keen to invest in new products that cater to its partners' and international customers' needs. How is WeConnect transforming traditional subsea cable models and accelerating users connectivity and ease of doing business? What is the impact on the procurement of global digital infrastructure?

ICE: The terrestrial route on the west bank of the highly-secured Suez Canal campus

One of Telecom Egypt's cable landing stations

WeConnect is not a new product; it is a concept that simplifies connectivity amongst the different subsea cable systems from different sources going to different destinations. Egypt is an intersection point between three continents and has the advantage of full landing of all subsea cables among them. WeConnect is an accelerator to leverage this natural hubbing point by providing a neutral, transparent, simple and digitalized interconnectivity ecosystem.

WeConnect users have immediate visibility into their network services and can move with greater agility when connecting between Africa, Asia and Europe. WeConnect breaks silos in cable landing stations, terrestrial connectivity and subsea cable systems. It further provides an ecosystem of digital infrastructure enablement and acceleration.

To clarify the WeConnect concept, any capacity user on a subsea cable landing in Egypt in the Mediterranean Sea or Red Sea, can select from the other subsea cables landing in the other diverse cable landing stations to cross-connect with. WeConnect is a digitized ecosystem and is ready for subsea cable capacity users to orchestrate their network cross-connection. The cross-connectivity options are readily availed on the

web-based portal, and users can click-to-order in a simple manner, procuring services resembling those provided by public cloud providers, moving beyond traditional models.

Using WeConnect, it becomes commercially feasible to build, change, pivot and adapt with the freedom to grow at an unmatched pace. Commercial agreements are managed through the platform, enabling users to quickly access different cable systems. Similarly, international carriers can enter new markets and move quickly to scale up connectivity and serve demand. Agility, simplicity, neutrality and adaptability are the driving factors of WeConnect that catalyze growth.

By focusing on customers' experiences and presenting a seamless process to users, how does WeConnect change the dynamics in the subsea cable market? Why is the digital experience increasing in importance for players in international networking?
WeConnect is backed by a digitized platform, saving time and effort in the ordering process and assuring the transparency and agility of the product. The subsea cable market has seen minimal changes to how services are procured or managed over several decades, with a focus on A-to-B connectivity. WeConnect proves that it's possible to simplify, optimize and accelerate these processes with a cross-connection ecosystem.

As Telecom Egypt invests more in subsea cable systems like 2Africa, how do you think WeConnect will support and enhance such projects? How does it align with Telecom Egypt's growth strategy?
We are continually making strategic investments in subsea cable systems while making sure capacity cross-connection is available via WeConnect. The WeConnect ecosystem will continually evolve, with inventory, services and capabilities expanding over time. We have five subsea cable systems set to land in Egypt over the coming years, namely 2Africa, Africa-1, IEX, SEA-ME-WE-6 and Medusa cable systems, which will carry much more bandwidth than provided earlier on by other subsea cables and also add to our connectivity ecosystem, providing even greater diversity and agility.

Our investment in the 2Africa cable system is a great example of how WeConnect provides rapid access to new markets. Any player in our market can connect to Telecom Egypt, then access 2Africa and, in turn, the entire African continent, Europe, the Gulf and South Asia, as 2Africa offers direct connectivity to more than 45 locations across the three continents.

The timing of 2Africa is impeccable, as Africa accelerates digital adoption and we see traffic growing between markets and no longer just flowing east to west and west to east. 2Africa is coming into service at the right time to support the phenomenal growth regionally in Africa and around the world, with Port Said as one of our key gateways to the world. It has a large number of configurations for connecting internationally, whether that's Europe to Egypt or Egypt to Africa and Asia.

The World Economic Forum (WEF) notes that only 39% of Africa's population is using the internet, making it the world's least connected continent today. This represents a significant growth opportunity as digital adoption accelerates. The WEF also estimates that Africa's digital economy could contribute nearly $180 billion to the region's growth by 2025, another opportunity for economic growth for the continent and the companies investing in it.

Data center development across Africa also indicates the huge potential of local digital economies, and there have been a growing number of related announcements since the first half of 2023. It is encouraging to see digital infrastructure growing and recognition of the opportunity to host data, applications and services expanding in Egypt and across the continent.

How does WeConnect enable the digital evolution within the Egyptian domestic market as well as the enterprise and consumer markets?
WeConnect will attract global internet exchange points (IXPs) to use Egypt as an anchorage for their presence, benefiting from the huge traffic peering between East, South and West. In return, this will allow the ISPs and enterprises in Egypt and the region to connect to these IXPs, creating low latency, high availability and cost effective internet accessibility.

The Internet is a globally connected "network of networks." Telecom Egypt is proud to be a cornerstone enabling and supporting this global connected world, and WeConnect is a major driver to accelerate and achieve this.

> WeConnect offers an attractive, commercial and cost-efficient model of interconnection. Partners benefit from greater cost-efficiency as well as transparent pricing and an open, neutral and attractive commercial model

RDH data center

Data centers play a crucial role in supporting the growth of digital services. How will WeConnect support the growth of Egypt's own data center market?

There's a growing opportunity to attract more data center investments in Egypt. ResearchandMarkets predicts $365 million over the next five years, with a compound annual growth rate of just under 17.5%. I believe investment will definitely surpass these numbers.

As the adoption and growth of WeConnect continues to ramp up, more international players will see the advantage of having content, cloud services and applications hosted in Egypt with access to billions of users from a central digital hub. We anticipate that major international data center players will develop facilities in Egypt, and we'll also see niche players recognize the opportunity and break ground on sites in the country.

Data center operators will go wherever hyperscalers go, and with WeConnect offering agility, hyperscalers will naturally expand their presence in Egypt. Similarly, IXPs will see the advantage of having a peering ecosystem at a critical international crossroads. There are 105 million people in Egypt, which makes it an attractive market, but the exciting opportunity is to have an internet exchange point so close to so many major markets and a critical interconnection point.

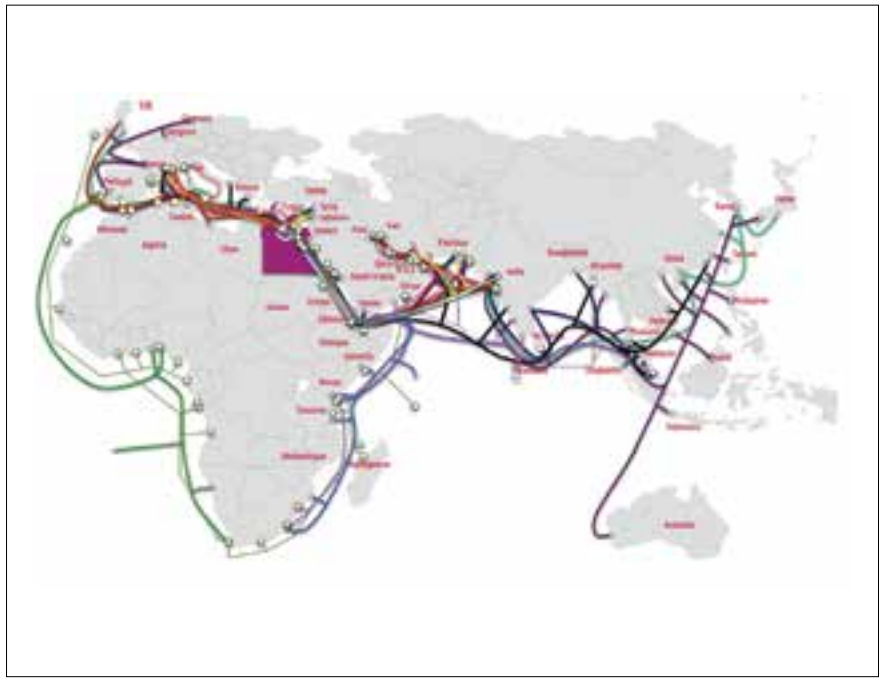
Speaking about being a leading player in the telecommunications industry, how will WeConnect support the growth of Egypt as a digital hub and international destination?

As WeConnect's user base grows, there are opportunities for users to transform how they approach their subsea cable planning and investments. WeConnect offers a flexible foundation and has the potential to change the role Egypt plays in international network development. As WeConnect achieves critical mass, shorter and increasingly niche cable systems can be built to connect to Egypt, knowing that onward connectivity is present and easy to access, which adds to the benefits of using WeConnect from a commercial viewpoint.

A subsea cable could be built from an underserved market to Egypt across the Mediterranean, enabling service providers in that country to gain new diversity and a growing number of options for connecting across the globe. It is just a matter of joining the WeConnect ecosystem and choosing how they want to route traffic, which is less expensive than joining a consortium or building capacity on a cable with only a few destinations. In this way, WeConnect promotes Egypt's role in the global market and increases opportunities for different kinds of systems to be developed.

Contemplating your strategies and goals over the coming years, how will Telecom Egypt support the evolution of Egypt's role in international connectivity in the future?

WeConnect immediately repositions Egypt as a critical digital hub between the three continents. We have the traffic



Egypt, the central hub with a far-reaching subsea cables infrastructure

volumes and digital infrastructure and are now offering digital experiences that differentiate us as a global destination, not just a point of transit. We have a growing number of connectivity options, in addition to neutrality and the ability to seamlessly deliver efficient services.

I see Egypt's role in the international telecoms landscape growing at an exceptional pace. Telecom Egypt has done a lot of the hard work behind the scenes, and now it is time to showcase its main role to the world. I want Egypt to be seen as the "go-to" destination for connecting across global markets and Telecom Egypt as an enabler for its partners' success. It is a new era for our business, and we are going to enhance and grow Egypt's role on the international stage.

Looking at the world map and the number of cables that fully land in Egypt, the massive capacity transiting Egypt, and the strategic investments in the digital infrastructure, it is clear that we aren't just talking about being a "hub." We are making strategic investments and developing digital experiences. You can't just say it. You have to be it. And we are it.

What are the measures adopted by Telecom Egypt to ensure it remains at the forefront of technological advancements and remains competitive in the global market?

Telecom Egypt will continually innovate and transform its operations to meet international customer needs. Launching WeConnect is not the end of our journey, but just the beginning. There are opportunities to expand our capabilities, grow our reach and replicate our model in new markets.

WeConnect kicked off its world-class digital journey, and the exciting part is seeing our partners use it, provide feedback, ask for new features, request additional capabilities and collaborate with us as it grows and evolves. We work with world-leading suppliers to deliver cutting-edge technologies and solutions to meet our partners' growing needs.

At the same time, we recognize opportunities to expand our partnerships with data center operators, IXPs and international network providers. Across our industry, we all have capabilities that we can contribute to the overall ICT ecosystem. Together, we can build a rich fabric locally, in Egypt, that benefits the entire global industry.

This is a starting point, and we invite the global players in this disruptive technology to avail their innovation to global network providers and users by enabling WeConnect to be more digitalized in the future. We would like to reach the point of providing bandwidth on demand on the early layers of the network.

The fastest way to innovate is to collaborate, and I look forward to working with our partners to further develop WeConnect and drive agility in global connectivity. TR

> Telecom Egypt is proud to be a cornerstone enabling and supporting this global connected world, and WeConnect is a major driver to accelerate and achieve this

HCLTech: Supercharging Innovation and Transforming Enterprises in ASEAN

For over four decades, HCLTech has played a pivotal role in the ASEAN information technology landscape. Recently, HCLTech Singapore commemorated 43 years with the launch of a year-long campaign centered on the theme of Tech + Community. This initiative aims to deepen the company's connection with the Singaporean community around the arts, corporate social responsibility and industry talent, as well as the prestigious Women Top 50 Leaders award, reaffirming its commitment to technology-driven progress and positive societal impact.

Sandeep Sarkar, ASEAN Senior Vice President, HCLTech

The ASEAN digital economy is projected to experience substantial growth, with projections suggesting it will reach US$1 trillion by 2030. Under the ASEAN Digital Masterplan 2025, the region is poised to make significant strides toward becoming a stronger digital community and economic bloc. Key to this transformation is accelerating 5G technology to unlock new digital possibilities.

In this exclusive interview with Telecom Review, Sandeep Sarkar, ASEAN senior vice president, HCLTech, sheds light on some of the digital challenges faced by companies across industries. Additionally, Ravishankar S, senior vice president and head of 5G engineering, HCLTech, provides insights into ASEAN's progress in 5G adoption and the pivotal role played by HCLTech in driving businesses' digital evolution.

What are some of the biggest challenges faced by enterprises as they navigate a fast-evolving digital landscape?

Sandeep Sarkar: Across industries, the digital challenges that businesses face are ubiquitous as they navigate a rapidly-evolving digital landscape. A prominent challenge is the need to adapt to a fast-changing technological environment. Traditionally, IT projects had fixed budgets and longer timelines, but nowadays, requirements undergo rapid changes. This can be observed in the telecom industry, for instance, where discussions about 5G and 6G have already commenced while still in the 4G phase.

Another significant challenge is overcoming resistance to change, particularly in large organizations, where people tend to resist new ways of doing things. Effectively addressing this resistance then becomes the crux of ensuring successful transformations. Moreoever, the skillsets required within organizations are constantly evolving. Skills that were once relevant may no longer be applicable, making it necessary for organizations to adapt their skills to meet newer market demands. Cultivating a culture that fosters change is important, but not without its challenges. Therefore, integrating agile methodologies and ways of working is a significant challenge.

At HCLTech, we recognize the importance of adapting to this dynamic business landscape. Our primary objective is to be the preferred digital partner for operators and enterprises.

Tell us about services and products that help HCLTech become the partner of choice for enterprises across industries and geographies.

Sandeep Sarkar: In Southeast Asia, Singapore is the leader at the forefront of digital transformation, demonstrating significant advancements in both business operations and government-citizen interactions. While countries like Malaysia, Thailand and Indonesia are also making substantial progress in their digital transformation efforts, Laos and Cambodia are still in the development stages.

In this region, the financial services and telecommunications sectors serve as primary catalysts for digital transformation, as displayed by the widespread adoption of digitalization during the pandemic and significant investments directed toward advancing digital banking and accelerating 5G deployment. Beyond these sectors,

many companies, including Keppel and Singapore Airlines, are heavily invested in digitalization to ensure future-proof operations. This demonstrates a broader trend across diverse industries, where the adoption of digital strategies is seen as critical for ensuring competitiveness and long-term success.

We strategically focus on four economies in Southeast Asia, namely Singapore, Malaysia, Thailand and Indonesia. This strategic approach allows us to harness the region's substantial customer base and access a pool of skilled digital individuals to cater to our global clients more effectively.

At HCLTech, our engineering culture sets us apart, allowing us to harness innovative technology and scale it effectively for clients. By adopting a client-centric approach, we deliver end-to-end digital solutions that entail building a robust digital foundation and infrastructure, developing cutting-edge applications and technologies, and integrating these elements seamlessly with operations to ensure a comprehensive digital transformation for our clients.

By aligning our focus and recognizing the widespread impact of digital transformation across various industries and geographies, HCLTech is well-positioned to deliver innovative solutions and support the digital evolution in the region.

Can you tell us about 5G adoption and trends in ASEAN, particularly in Malaysia and Singapore?

Ravishankar S: The global deployment of 5G standalone (SA) is experiencing significant growth. By December 2022, more than 50 operators had already deployed 5G SA, with more than 30 operators planning to do so this year. This growth is primarily driven by countries in the Asia-Pacific and Latin America regions.

In Singapore, for instance, approximately 55% of the cellular network is projected to be based on 5G technology by 2025. This showcases Singapore's leading position in embracing 5G as telcos introduce advanced enterprise offerings like private 5G networks and marketplace platforms, as well as diverse 5G use cases aimed to address business challenges and capitalize on 5G monetization opportunities.

In contrast, Malaysia's 5G rollout is taking place at a slower pace, with only around 20% of the cellular network expected to be based on 5G by 2025.

How does HCLTech help operators adopt 5G at scale and harness the full potential of 5G for a future-ready network?

Ravishankar S: Our 5G engineering strategy stands out due to our collaborative partnerships with ecosystem players. This unique strategy allows us to generate new revenue sources, provide solutions for critical missions, enhance operational efficiency, and create immersive experiences. Throughout the value chain, we offer an extensive range of 5G services, empowering operators to accelerate their 5G journeys.

Our approach includes comprehensive support for defining, integrating, deploying and operating 5G networks that are multi-cloud, multi-vendor, disaggregated and distributed. Leveraging automation, optimization, cloudification and containerization, our "as a service" offerings are seamlessly tailored to meet individual customer needs and address diverse industry use cases.

Furthermore, our 5G system integration framework is designed to significantly reduce network function onboarding time by up to 35% and certification time by up to 40%. We provide support for all target platforms, including public, private or hybrid cloud environments, and have invested significantly in establishing 5G labs worldwide to focus on testing, integration and proof of concept (PoC) development.

Our effort in driving industry advancement is reflected in our active contributions to the ORAN alliance, where we invest in and establish ORAN RU integration and test labs to expedite 5G SA deployments.

We also offer an extensive array of 5G product engineering services, specializing in domain-specific enterprise 5G use cases. Our expertise spans diverse areas, including enterprise IT, digital engineering, telco cloud, IoT, data engineering, AI/ML, and more.

With this comprehensive approach and industry-leading expertise, we stand as a trusted partner for 5G engineering solutions to lead clients into the future of connectivity and technology.

Can you share some success stories or case studies where HCLTech has enabled enterprises to supercharge their digital transformation efforts using 5G?

Ravishankar S: HCLTech has successfully implemented location-based services integrated with a public cloud platform for a Japanese client. This implementation includes deploying a 5G core Location Management Function (LMF) to monitor personnel movement and provide real-time alerts.

Additionally, we have developed a mission-critical enterprise 5G application aimed at ensuring a 99% safety compliance rate for personnel working in hazardous environments. This solution depends on geofencing technology to track and monitor movement, grant access based on roles, and issue alerts or block individuals from approaching hazardous areas. This involves interfacing multiple systems, such as location-based services for precise tracking, intelligent video analytics to identify individuals and authenticate their identity, and tracking device location to send notifications based on specific conditions.

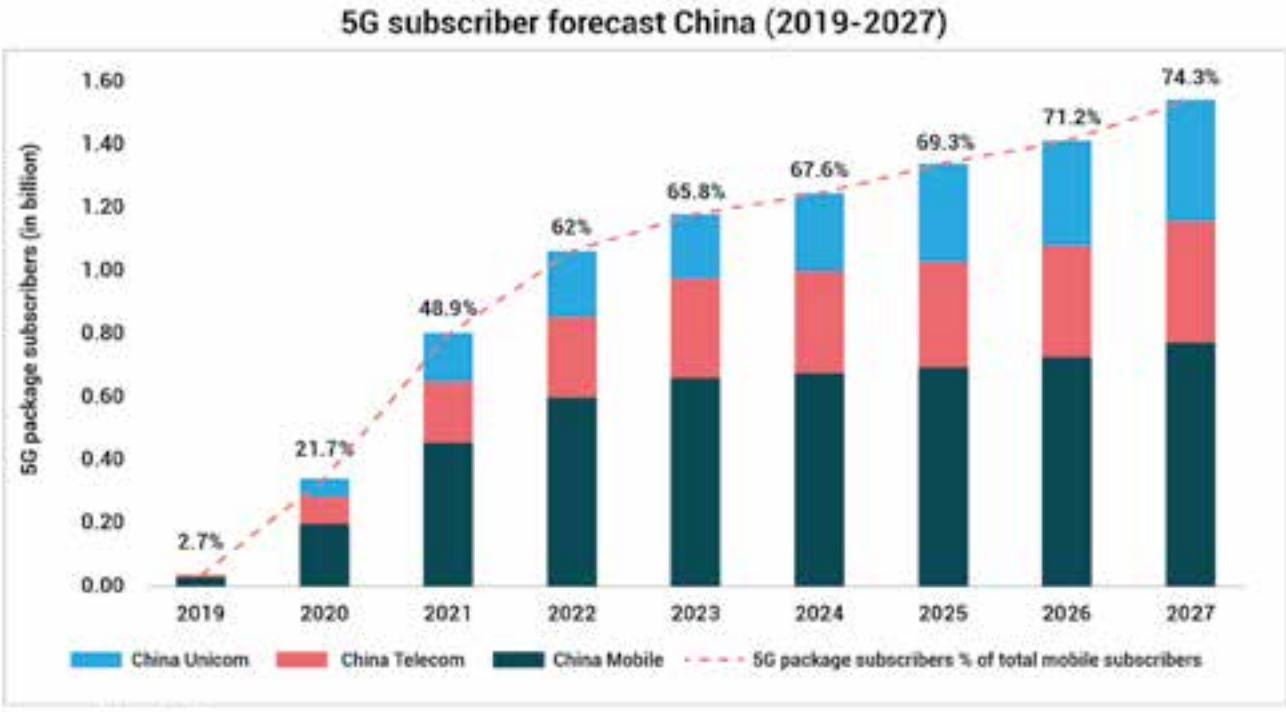
This innovative solution can be expanded to address other use cases, including verifying if personnel have the required safety gear before entering hazardous zones or promptly alerting them in case of incidents like fire. These use cases exemplify HCLTech's ability to leverage innovative technology to advance workplace safety and enhance operational efficiency to deliver value to clients.

For more information, please contact rhoda.dinesen@hcl.com TR

Connecting the Future:

5G Insights From the World's Largest Market

As part of its ongoing coverage series with Twimbit, Telecom Review seeks to provide useful insights into the trends that are driving the growth of 5G in China and how these trends will continue to boost 5G in the country in the coming years.



Source: twimbit analysis

Indeed, China has been at the forefront of the 5G revolution since its launch. The country has embraced this cutting-edge technology and set ambitious targets to advance economic digitization through its implementation, quickly attaining a remarkable presence in over 350 locations.

The extraordinary growth of 5G package subscribers has been one of the most notable successes of China's 5G journey. The term "5G Package Subscriber" refers to the overall number of 5G customers; this includes individuals who were previously subscribed to 4G plans but have now switched to 5G. This subscriber base is expected to increase from 1.07 billion in 2022 to a stunning 1.49 billion by 2027, surpassing all original projections.

According to Twimbit, 5G package subscribers in China have reached 65% and are expected to grow further to 74.3% in 2027. The surge in 5G adoption highlights the rapid evolution of China's digital landscape as well as customer demands for cutting-edge connectivity options.

Furthermore, the widespread adoption of 5G has resulted in a significant increase in data usage among consumers. In 2022, China Mobile users consumed an average of 21.2GB of data, while China Telecom users consumed slightly more, at 24.1 GB. This can likely be attributed to the rising popularity of immersive experiences such as live streaming.

Challenges and Impacts of 5G Deployment

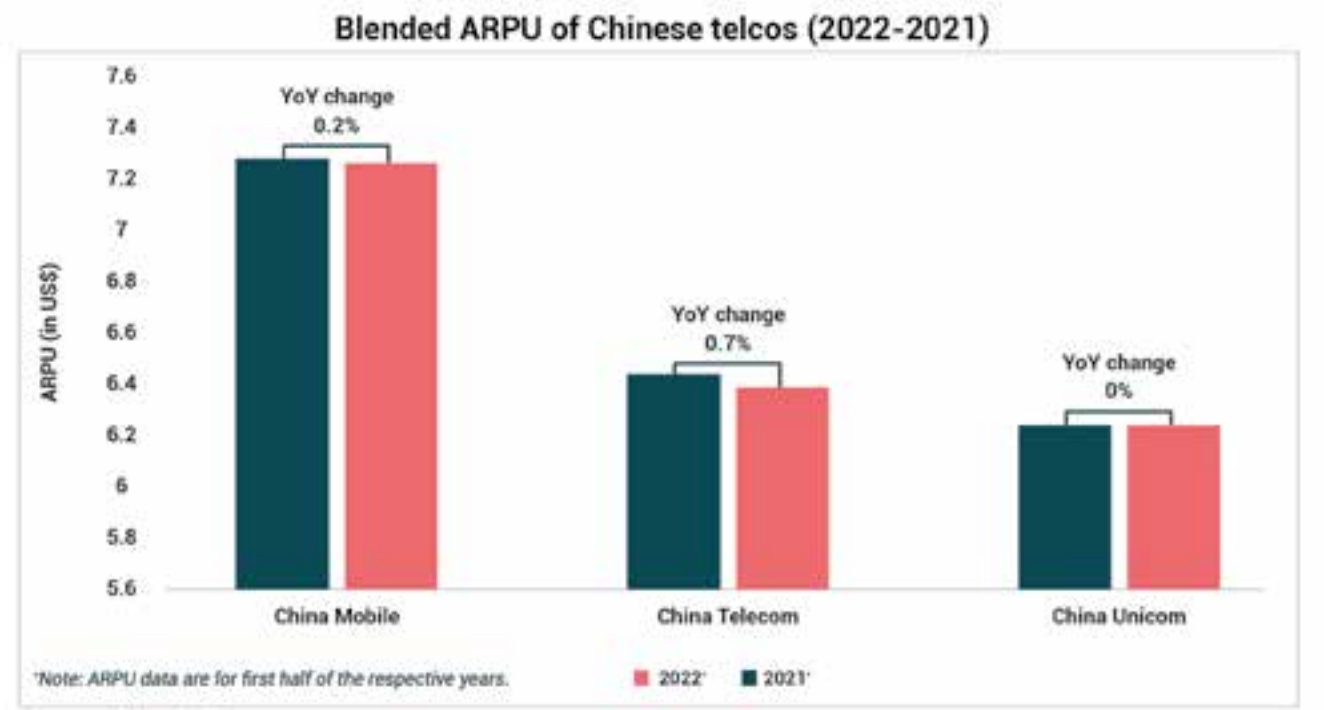
While 5G adoption in China appears to be thriving, it is not without some bumps in the road. On October 31, 2022, China completed three years of commercial availability with its 5G launch, a significant motivation for the industry worldwide. However, the impact of pervasive global logistics issues and a shortage of microchips, compounded by the COVID-19 pandemic, has been a barrier to network infrastructure deployments. Additionally, Chinese telco firms have had to deal with higher capital expenditures (CAPEX), which increased to a considerable $58.3 billion in 2022, a 12% rise over the previous year. This increase was largely due to greater technology expenditures as well as the necessity for an increase in new base stations to cater to the rise of higher-frequency radio waves.

Despite these challenges, the overall impact of 5G on China's GDP is expected to be significant. Collectively, 5G applications in a variety of areas, including smart utilities, healthcare, manufacturing, financial services, consumer apps and media, are expected to contribute $220 billion to the Chinese economy by 2030.

Market Forecasts and Trends

Twimbit analysis shows that in 2020, China recorded 119 mobile cellular connections per 100 people, exceeding the global average of 106. Future projections appear to be even more optimistic, estimating 125 cellular connections for every 100 people by 2030. This demonstrates China's consistent commitment to growing its digital infrastructure and ensuring widespread mobile access for its citizens.

Furthermore, China's 5G package subscriber base had reached a noteworthy penetration rate of 59% as of Q3 2022; in context, China had previously accomplished similar feats with its 4G users. Between 2013 and



2015, the country's adoption of 4G increased from 48% to a similarly distinguished 70%.

Trends in ARPU

Chinese telcos have seen considerable effects on their average revenue per user (ARPU) as the country's 5G package subscribers expand. Here are some key insights on how 5G subscribers have affected ARPU:

- Chinese telcos witnessed a stabilization in blended ARPU due to the large-scale penetration of 5G.
- China Telecom's 5G ARPU (US$7.4) is 15% higher, while China Mobile's 5G ARPU (US$10) is 37% higher than the blended ARPU.
- China Mobile's 5G ARPU decreased by 19.5% from the previous year, while China Telecom reported a decline of 8.2% in 5G ARPU.
- The base plan subscription for 5G gained popularity among subscribers, which increased blended ARPU but decreased 5G ARPU over the years.

Top Consumer Use Cases of 5G

Innovative use cases involving the rapid deployment of 5G have steadily evolved in China, where 5G has been rapidly deployed, augmenting the way consumers experience live events and engage with virtual reality.

With the capability of 5G, live streaming has taken a significant leap forward, enabling viewers to have more immersive and truly flawless experiences. China Unicom, in collaboration with Huawei, proudly demonstrated the latest potential of 5G at the 2022 Winter Olympics held in Beijing.

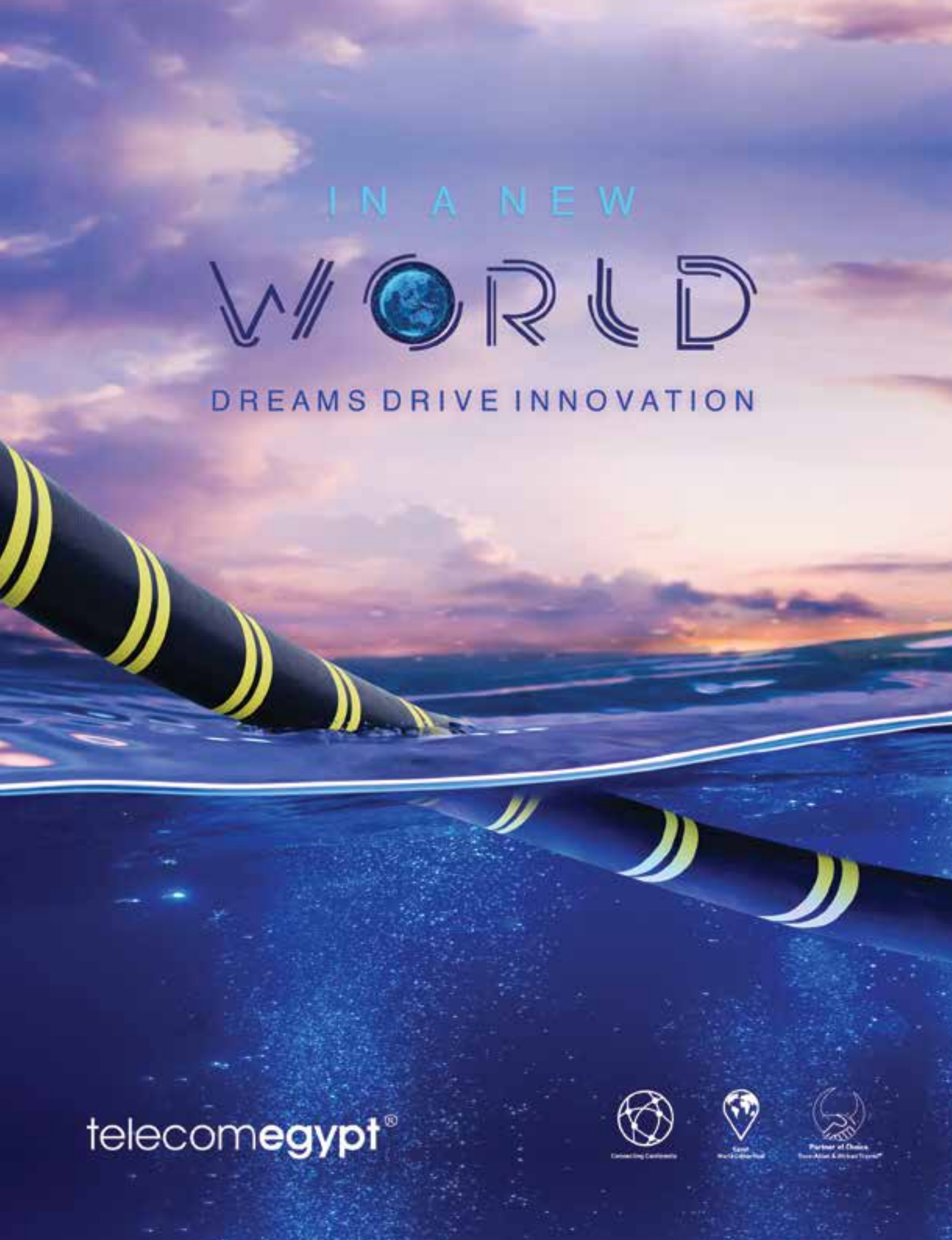
In this instance, China Unicom committed more than RMB 1.5 billion (roughly US$228.58 million) to developing and constructing 5G-powered internet for the Winter Olympics to offer an unsurpassed live streaming experience. This substantial investment paid dividends, as live streaming grew into a more realistic and enveloping experience for consumers.

Similarly, China Mobile, China Telecom and China Unicom have teamed up with Qualcomm to initiate 5G to deliver virtual experiences via Extended Reality (XR).

The emergence of vast 5G networks has enabled a wide range of devices to connect to the cloud, accelerating the expansion of the linked intelligent edge and cloud economy. Consumers may now enjoy virtual experiences like never before, thanks to the convergence of 5G and the Internet of Things (IoT).

Virtual reality (VR), augmented reality (AR) and mixed reality (MR) are all subgroups of extended reality that provide consumers with immersive and engaging experiences. The fast data transmission speeds and low latency of 5G play an important role in creating real-time, responsive XR experiences.

The results of the report show that China's mobile connectivity journey from 4G to 5G demonstrates the country's innovative approach to technological adoption. China is well-positioned to lead the way in the global telco industry for years to come, with a population eager to embrace the latest developments and a government committed to promoting digital transformation. As 5G continues to advance, it will serve as a driver for growth, innovation and improved quality of life, paving the way for a better and more connected future. TR


IN A NEW
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DREAMS DRIVE INNOVATION
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ZTE Exhibits Energy-Saving Green Networks for a Sustainable Future

ZTE exhibited its cutting-edge technological innovations, green and low-carbon visions, as well as its achievements in green networking, to visitors at MWC Shanghai 2023. The event was held at the Shanghai New International Expo Center, where ZTE presented its captivating green ecological island, fully in line with the theme "Green for All."

Achieving a green and low-carbon society is a long-term goal that requires ongoing dedication. As network traffic continues to grow, the challenge of realizing this objective becomes even greater. ZTE firmly believes that the solution lies in embracing technological innovation and constantly improving products and solutions to enhance the energy efficiency of each data unit in a more intelligent way. By prioritizing energy efficiency advancements, ZTE strives to contribute to the realization of a sustainable and environmentally friendly society.

During MWC Shanghai, ZTE exhibited its technological innovations in green energy-saving networks. In the area of radio access network (RAN), ZTE's PowerPilot solution, now in its Pro version, achieved significant advancements, enabling comprehensive energy savings of 35%. In the core network, ZTE introduced the industry's first intelligent green User Plane Function (UPF) based on R17, resulting in intelligent energy savings of 25% during periods of low traffic. ZTE also demonstrated comprehensive energy efficiency optimization solutions in the bearer network, covering boards, devices and networks. Furthermore, the exhibition showcased ZTE's innovative VC composite temperature equalization board technology, allowing customers to experience the tangible cooling effect using a temperature gun.

In the realm of telecommunication energy, ZTE unveiled its zero-carbon energy network solution V2.0. This innovative solution integrates cloud-based management for green power generation, high-efficiency power conversion, intelligent energy storage and precise power consumption. By encompassing the entire power supply chain, this solution achieves comprehensive energy savings, emission reduction and efficiency improvement, contributing to a sustainable and low-carbon future.

In its commitment to promoting green energy savings, ZTE's solutions are thoughtfully designed with mechanisms like minimum set wake-up and burst traffic protection. These features ensure a seamless user experience while establishing networks that are not only green and energy-saving but also reliable and resilient. By incorporating these mechanisms, ZTE aims to strike a balance between environmental sustainability and providing high-quality network services to its users.

ZTE is deeply committed to sustainable development and is taking strides to pave a road of trees for the digital economy, contributing to the global goal of carbon neutrality.

In 2022, ZTE achieved remarkable results in its green and low-carbon targets, achieving energy savings of 57.56 million kWh and a total carbon emission reduction of 7.48% compared to the previous year, all while maintaining revenue growth.

On May 24 of this year, at the "ZTE Innovation Day" event held in Shenzhen, ZTE announced its participation in the Science Based Targets initiative (SBTi) for establishing scientifically backed carbon reduction goals. In line with the initiative's requirements, ZTE will set near-term science-based targets and long-term net-zero targets. The aim is to achieve greenhouse gas emission reduction goals aligned with the 1.5°C warming limit within 5-10 years and attain net-zero emissions by 2050 at the latest.

As a global leader in integrated communication and information solutions, ZTE is actively engaged in green-related public welfare activities. ZTE collaborates with the China Green Carbon Foundation to establish the "ZTE Public Welfare Ecological Conservation Special Fund" and carries out tree-planting initiatives in the Baihu River Forest Farm, under the Tangwanghe Forestry Bureau of Yichun City, Heilongjiang Province, to help restore the local ecological environment.

During the Shanghai Exhibition, ZTE introduced its charitable program, "Forest Carbon Sink", which encourages tree planting through QR code scanning. This initiative was showcased at MWC Shanghai, aimed to raise public awareness about environmental protection and encourage active participation in ecological conservation.

During a media interview, Ms. Chen Zhiping, Vice President of ZTE and General Manager of Branding and Public Relations Strategies, highlighted the outstanding achievements of ZTE in embracing the principles of green and low-carbon practices. By the end of 2022, ZTE's green network energy-saving solutions had been successfully implemented in more than 30 networks worldwide, encompassing over 1.5 million sites and 250,000 cabinet data centers. These solutions have played a significant role in helping global operators conserve 10 billion kWh of electricity annually.

Ms. Chen emphasized ZTE's unwavering commitment to its ecological positioning as the "Driver of the Digital Economy." The company aims to extend its sustainable development concepts and innovative solutions to other industries, contributing to the digital transformation and advancement of society while prioritizing sustainability. Through collaboration with its partner, Anxing, ZTE has made further advancements in enhancing the transparency and accuracy of energy production control data as well as improving the intelligence of enterprise energy management.

Looking forward, ZTE is determined to continue promoting the sustainable development of the digital economy through ongoing technological innovation. The company will actively explore new and diverse application scenarios in collaboration with its partners, making substantial contributions to both society and the environment. TR

> ZTE's innovative solution integrates cloud-based management for green power generation, high-efficiency power conversion, intelligent energy storage and precise power consumption

SATRIA-1: How Indonesia's First Satellite Aims to Accelerate Internet Connectivity

The internet is undoubtedly one of the most exceptional innovations of the last half century, as it enables data sharing and communication regardless of location. However, despite the continuous development of technology, the digital divide remains a pressing issue. The term "digital divide" refers to the disparity between those individuals, businesses, demographics and regions that have unrestricted access to modern information and communications technology (ICT) and those that do not.

In 2019, Indonesia had around 94 million adults without mobile internet access, and fixed broadband internet was even scarcer. Nearly 80% of those who were unconnected resided in non-metropolitan rural areas of Sumatera, Java and Bali islands — among the country's most populous. Additionally, inadequate connectivity affected 60% to 70% of Indonesians in the eastern region due to the poor quality of service.

Despite having among the highest numbers of internet users worldwide, Indonesia's internet penetration rate still ranks among the lowest in all of Asia. In 2022, this stood at just 69.8%.

As of January 2022, an estimated 73.7 million people in Indonesia, or 26.3% of the total population, reportedly did not use the internet. Furthermore, over 12,500 villages and 104,000 schools across the nation still lacked internet access.

To address this issue, Indonesia is actively seeking to enable more reliable connectivity for its people. One such solution is the launch of SATRIA-1, Indonesia's first state-owned satellite, designed to improve internet connectivity.

Indonesia's SATRIA-1 for Improved Connectivity

Recently, Indonesia collaborated with Elon Musk's SpaceX to launch the country's largest telecommunications satellite from the United States in a $540 million project. The initiative aims to connect remote corners of the archipelago to the internet.

Presently, almost two-thirds of Indonesia's 280 million population have access to the internet. However, connectivity remains limited, particularly on the underdeveloped eastern islands.

"Satellite technology will accelerate internet access to villages in areas that cannot be reached by fiber optics in the next 10 years," announced Senior Indonesian Minister Mahfud MD in a statement ahead of the launch. The project is a public-private partnership between the government and PT Satelit Nusantara Tiga, an Indonesian satellite service provider.

The 4.5-ton SATRIA-1, developed by Thales Alenia Space (TAS), was deployed into orbit from Florida by SpaceX's Falcon 9 rocket.

The satellite will occupy an orbital slot above Indonesia's eastern Papua region, with the primary objective of providing equal internet access for public facilities in 3T regions, including schools, hospitals, community health centers, village offices, sub-district offices and security services. According to the Indonesian government, the system has a throughput capacity of 150 gigabytes per second and will supply internet access to 50,000 public service points.

Mahfud MD expressed that this project represents a significant step towards advancing internet access in disadvantaged regions. The internet speed at each point of contact is projected to reach 4 Mbps, a substantial increase from the initial calculation of 1 Mbps in 2018, when the project was initiated.

"It was a great achievement and success, thanks to the support of all Indonesian people," noted Arief Tri Hardiyanto, the acting President Director of the Telecommunication and Information Accessibility Agency (BAKTI). He gave this assessment at the Kennedy Space Center, Cape Canaveral, Florida, after the launch of the first Indonesian state-owned internet satellite.

Upon achieving the requisite orbit, PT Pasifik Satelit Nusantara and Thales Alenia Space will conduct In-Orbit Testing of the satellite for three weeks to ensure the proper functioning of the satellite. The next operational phase, called the In-Orbit Acceptance Review (IOAR), is scheduled for the first week of December 2023.

The Ministry of Communication and Informatics (KOMINFO) will continue monitoring SATRIA's internet service quality, with the expectation that Indonesians will gradually start to utilize SATRIA-1's internet capacity beginning in January 2024. TR

> Indonesia is actively seeking to enable more reliable connectivity for its people. One such solution is the launch of SATRIA-I, Indonesia's first state-owned satellite, designed to improve internet connectivity

Thomas Soerensen, VP of global submarine solutions, Ciena

Empowering Submarine Cable Innovation in Asia Pacific

With the Asia Pacific becoming a rising economic and technological epicenter, submarine cables have become pivotal in sustaining the region's growth and enhancing global interconnectivity. In an exclusive interview, Telecom Review Asia connects with Thomas Soerensen, VP of global submarine solutions, Ciena, to learn about ongoing developments and innovations within this dynamic and vital telecommunications ecosystem.

What recent trends have you observed in the Asia-Pacific region regarding the demand for submarine cable capacity, and how are these trends influencing the expansion plans of cable operators?

According to TeleGeography's Global Internet Geography research, Asia is the world's second-fastest-growing region for international traffic and remains a key hub of internet activity. Driven by the continued interest in internet and cloud-based services, both global hyperscalers and wholesale network providers are rapidly investing in the region, creating significant demand for more bandwidth.

According to the same research report, Intra-Asian internet bandwidth has steadily increased from 36% in 2012 to 60% in 2022.

To address the surging bandwidth needs from the Trans-Pacific corridor as well as intra-Asia demands, there's been a surge in submarine cable construction, both from global hyperscalers and wholesale network providers. Additionally, submarine cable operators in the region are constantly looking at how they can upgrade their cables to expand existing capacity and remain adaptable to change.

Due to geopolitical sensitivities and growth in emerging markets, we also see multiple new Trans-Pacific cables to other landing stations in Asia, including Japan, Taiwan, the Philippines and Singapore, for increased landing site diversity.

What are some challenges that submarine cable operators encounter, and how is Ciena addressing these challenges with its solutions?
Challenges submarine cable operators face include maintaining pace with voracious and ongoing bandwidth demand growth, driving down operational and capital costs while improving sustainability, and addressing inevitable submarine cable faults. The latter is particularly challenging in the Asia-Pacific region due to increased marine activity, which is the majority cause of cable faults.

To help our customers address some of these challenges, Ciena assists by developing a strategy to maximize the returns on investments of their existing submarine network assets, while at the same time developing more innovative solutions that offer analytics-driven automation and sustainability.

Can you elaborate on some key advances in submarine cable technology and how Ciena supports operators in catering to diverse market needs and use cases in the region?
The introduction of coherent optical modems over a decade ago was a pivotal moment for the network industry, both overland and undersea. Such innovations have enabled submarine cable operators of all types to transport ever-increasing amounts of data across undersea network assets. Ciena recently announced our latest generation of WaveLogic 6 optical technology, where the WaveLogic 6 Extreme variant will become the optical transmission foundation of our GeoMesh Extreme solution, which changed how submarine and terrestrial backhaul networks were designed, deployed, and operated over a decade ago. Compared to WaveLogic 5 Extreme, WaveLogic 6 Extreme will provide a 50% reduction in power and space. It will also enable 1 Tb/s per channel over transpacific distances of 12,000km and be supported on existing host platforms to further reduce waste. WaveLogic 6 Extreme will provide impressive performance gains in a highly sustainable manner.

Together, these revolutionary technologies enable capacity to be added flexibly to transoceanic corridors, extend the life of existing wet plant assets, open previously closed wet plants to best-of-breed vendors and enable unprecedented capacities on both existing and new submarine cables. Along with operations software, analytics, and automation, these advancements significantly improve submarine business agility and margins.

Looking ahead to the next few years, how do you envision the subsea cable landscape shaping up in the Asia Pacific, and what role will Ciena play in driving innovation and growth in this dynamic market?
We see the commercial model continuing to evolve to capitalize on giant technical gains. There will be fundamental changes to the competitive landscape because higher fiber counts and intelligent branching units in the water will create increased complexity that can only be addressed with the increased adoption of analytics-driven software control and automation.

And these needs and challenges from the submarine community are what drive Ciena on a relentless path to innovation. The submarine networking battle will be won by the best business planning, financial management and personal relationships.

Sustainability and the environment remain top of mind. The industry is taking steps to monitor its impact on the environment — its carbon footprint — and to make a significant positive impact going forward. And this will ultimately contribute to how vendors, like Ciena, innovate.

Ciena will feature the latest enhancements to its GeoMesh Extreme submarine network solution, including the recently announced WaveLogic 6, at Submarine Networks World, occurring September 27–28 at the Suntec Convention Centre in Singapore. TR

> WaveLogic 6 Extreme will provide a 50% reduction in power and space. It will also enable 1 Tb/s per channel over transpacific distances of 12,000km and be supported on existing host platforms to further reduce waste

SKT Partners With Polygon Labs to Build Web3 Ecosystem

SK Telecom and Polygon Labs have signed a strategic collaboration agreement to develop SKT's Web3 ecosystem.

The agreement signing ceremony was formalized at SKT's headquarters in Seoul, South Korea. It was attended by the Vice President and Head of Web3 CO of SKT, Oh Se-hyun, as well as the CEO of Polygon Labs, Marc Boiron.

Under the agreement, two companies will collaborate on a new Web3 ecosystem. SKT will add support for the Polygon blockchain to its NFT marketplace, TopPort and Web3 wallet, and will work with Polygon Labs to explore promising Web3 startups and offer incubation support.

"Polygon Labs has been developing optimal blockchain technology for Web3 popularization, and we see this collaboration with SKT as an important step in providing Web3 experiences to more consumers," said Boiron.

Since last year, TopPort has enabled its native creators to mint Polygon-based NFTs and will soon become compatible and scalable with all other NFT platforms in the Polygon ecosystem.

SKT's forthcoming Web3 wallet, scheduled for release in the second half of 2023, will also integrate support for the Polygon network, facilitating NFT trading.

By leveraging Polygon, SKT aims to provide its users with high-speed and cost-efficient transactions backed by Ethereum's security and decentralization. Currently, Polygon-based solutions are already being utilized by many major global brands for their Web3 initiatives.

The two companies will also jointly support the continuous growth of the Web3 ecosystem as a whole by discovering and nurturing Web3 startups advanced by SKT. In particular, Polygon Labs plans to consider investments in promising Web3 startups recommended by SKT through its subsidiary, Polygon Ventures.

Furthermore, the partnership intends to support the global entry of competitive Web3 startups in Korea and the introduction of leading decentralized apps (dApps) into the domestic market.

"By combining our experience in blockchain services and Polygon Lab's blockchain infrastructure and ecosystem, we will be able [to] create valuable business opportunities and boost the Web3 ecosystem," said Oh.

Thaicom's Space Tech Innovation Joins Forces With Eutelsat Asia

Asian satellite and space technology company Thaicom has announced a partnership agreement between its subsidiary, Space Tech Innovation Limited (STI), and Eutelsat Asia, a subsidiary of satellite operator Eutelsat. This partnership is focused on launching a new satellite in the orbital slot of 119.5 degrees east.

Under the agreement, Eutelsat will lease and operate 50% of the satellite's capacity for its 16-year lifespan. Thaicom is currently finalizing the satellite procurement process, and the launch date has not been announced yet.

Thaicom describes its satellite as part of a new generation of broadband software-defined high-throughput satellites (HTS). This means that the satellite will offer flexibility and instant reconfiguration to adapt to different service areas. This feature will provide confidence to Thaicom's customers and partners in the Asia-Pacific region.

Moreover, Thaicom's CEO, Patompob (Nile) Suwansiri, stated that this partnership is strategic for their new satellite project. It not only ensures the long-term and secure utilization of 50% of the satellite but also creates synergies between the two organizations to seize future growth opportunities.

Spark, University of Auckland Conduct Industrial 5G Trial

Researchers from the University of Auckland have collaborated with Spark, a leading telco in New Zealand, to explore the revolutionary potential of 5G technology in the field of industrial robotics. The partnership intends to open up new possibilities in automation and remote operations, paving the path for a more connected and efficient future.

Industrial robots are widely utilized in various sectors, including electronics, food production and medical manufacturing, due to their ability to perform precise and automated tasks. Dr. Yuqian Lu, who leads the research team at the Faculty of Engineering, recently conducted a trial to investigate the possibility of operating these robots via a cloud-hosted 5G network.

Preliminary findings from a six-month study at the Faculty of Engineering Laboratory for Industry 4.0 Smart Manufacturing Systems show great promise. Dr. Lu envisions a future in which a surgeon in Auckland might remotely perform surgeries on patients in Invercargill using tele-operated surgical robots, or fleets of manufacturing robots across New Zealand may be managed in real-time from a centralized location.

During the preliminary phase of testing, a cloud-based robot developed in the lab was used alongside a cloud-based platform to evaluate its controllability via a 5G network. By transferring data packets between Auckland, Sydney, London, Singapore and Oregon (USA) using various public and private 5G network settings, the research team analyzed network latency and jitter.

"After completing the first stage of testing, we learned that the key to achieving optimal speeds and reliability performance is to incorporate artificial intelligence (AI) algorithms to compensate for any issues during data transmission. What we concluded is that in the future, industrial robotics have the potential to be moved to the cloud and supported by 5G," said Dr. Lu.

Spark's network and operations director, Renee Mateparae, believes that harnessing 5G will drive business transformation across numerous industries. She pointed out that their connection with the University of Auckland enables them to develop unique use cases and business applications, notably in agriculture and ports, by integrating machine learning, the Internet of Things (IoT), 5G and other upcoming technologies.

"Some of our work around Multi-Access Edge Compute (MEC), private network and 5G network slicing, for instance, means you could deploy the cloud at your premises to run your automation over a dedicated network. Data transmission occurs at a shorter distance, decreasing latency and jitter, reducing congestion and delivering a better customer experience," added Ms. Mateparae.

Nokia offered network devices and private network equipment, while Spark provided public network access and cellular network expertise. The trial was funded by the Science for Technological Innovation National Science Challenge.

Tricentis Unveils 'Tricentis Device Cloud'

Tricentis, a global leader in continuous testing and quality engineering, has announced the addition of Tricentis Device Cloud (TDC) to its mobile testing product lineup. With Tricentis Testim Mobile and Tricentis Tosca Mobile, organizations can now manage, create, execute and analyze applications on physical mobile devices from Apple, Samsung, Google and more throughout the development process.

This eliminates the need to manage expensive and unreliable in-house devices. By detecting mobile failures and performance issues, teams can quickly fix defects and speed up high-quality releases. The Chief Technology Officer of DevOps at Tricentis, Mav Turner, stated that they are committed to addressing the pain points of mobile testing in a simplified and seamless way.

Tricentis Device Cloud expands access to testing on real mobile devices and tablets in the cloud. Using machine learning technology, the Mobile AI engine identifies potential issues early and tracks over 130 key performance indicators to help development teams identify and resolve problems quickly.

Key features of TDC include the ability to deploy devices globally, test on real devices, test across different devices and operating systems, perform user experience testing, optimize performance and utilize mobile AI for improved video and audio quality.

CCL Launches Managed Hybrid Cloud Service to Empower Businesses

Leading cloud specialist CCL has launched CloudIQ, a managed hybrid cloud service that promises to integrate and coordinate multiple cloud environments to provide enterprises with a comprehensive and adaptable cloud solution. Businesses may use CloudIQ to seamlessly blend on-premise, private and public cloud infrastructures, catering to their specific needs.

Richard Adams, CEO, CCL, explained that CloudIQ comes as a response to the growing demand for hybrid cloud solutions in the market: "Often we see cloud transformation discussions focus on a fixed choice between private and public cloud environments, but industry research shows that 77% of organizations actually prefer a hybrid approach. This allows them to use different clouds for different workloads while still being able to obtain a single view and level of orchestration across them all, and that's what we set out to deliver with CloudIQ."

CloudIQ's key offering is a unified platform that provides enterprises with extensive visibility and control over their multiple cloud environments. This would enable businesses to make informed decisions when allocating resources and selecting the best cloud solutions for various applications and workloads, eventually improving their cost efficiency.

Mr. Adams highlights the challenges that many firms encounter when migrating to the cloud, particularly those depending on legacy systems or with workloads that must be stored in New Zealand. CloudIQ provides an elegant solution by enabling businesses to install the proper mix of cloud platforms while providing a seamless transition path from old to new, removing the need for abrupt changes to all workloads or treating them consistently.

"At CCL, we are uniquely placed to support our customers with a managed hybrid cloud solution, with our own locally owned and domiciled data center network, our strong relationships with hyperscale public cloud providers, and our ability to provide local knowledge and expertise on the ground. We're looking forward to working with our customers to help them become more productive and sustainable through technology," Mr. Adams added.

As a trusted provider of cloud services and part of Spark Business Group, CCL has a proven track record of delivering successful cloud solutions to a wide range of New Zealand organizations. Spark Business Group owns and runs 16 local data centers, with an additional $250-$300 million in data center expansion planned over the next few years.

HCLTech, Schneider Electric Partner to Develop Sustainable Data Center Solutions

HCLTech, a leading global technology company, has partnered with Schneider Electric, a leader in digital transformation in energy management and industrial automation, to address the environmental impact of data centers by developing carbon-efficient solutions for data centers in the Asia-Pacific region.

The digital economy's exponential growth has resulted in increasing energy consumption in data centers, resulting in higher carbon emissions. In response to this problem, HCLTech and Schneider Electric have pledged to develop innovative sustainability solutions that improve efficiency, productivity and modernization while reducing the total carbon footprint.

Tan Boon Hien, senior vice president and head of APAC Sustainability at HCLTech, emphasized the importance of responsible energy management, saying, "With the growth of the digital economy, it is important that enterprises responsibly manage their data center energy consumption. We look forward to collaborating with Schneider Electric to develop sustainability solutions for data centers in APAC."

Sustainability measures are increasingly being prioritized by enterprises around the world in order to enhance their environmental, social and governance (ESG) ratings. However, siloed IT and OT processes have made optimizing the end-to-end supply chain of data centers difficult.

The collaboration plans to integrate HCLTech's best practices in information technology (IT) with Schneider Electric's operational technology (OT). Through this, both companies will be able to advance the convergence of the IT and OT sectors, allowing clients to achieve regulatory compliance and expedite decarbonization programs.

Cradlepoint Unveils Zero-Trust Solution for Cellular IoT Scenarios

Cradlepoint has launched the S700, a multipurpose IoT router designed to provide a rich zero-trust security service to enterprise customers. Coupled with Cradlepoint NetCloud Exchange Secure Connect, the S700 provides a comprehensive cloud-managed network solution to safeguard IoT devices as today's attack surface expands and adversaries increasingly target connected devices.

The S700 and NetCloud Exchange from Cradlepoint delivers a robust zero-trust solution for IoT that removes deployment complexity and is ideal for enterprise-lean IT scenarios.

Key benefits include connect-and-go zero trust, in which any IoT device connected to the router is immediately invisible to public scans and other internal sites. Access policies are easily defined so IoT devices communicate only with their authorized resources on a least-privilege basis; efficient WAN creation, which enables orchestration with only a few clicks through a cloud-based management system; and small routers with big security, in which IoT devices connected to a small router can still have access to full modern security services, including zero trust. The S700 adds simplicity by offloading the security processes to a services gateway, which holds the security policies, manages router updates (including security patches), and orchestrates processes.

Finally, another key benefit is third-party access protection. Over 60% of WANs are now serving outside customers and suppliers, so protecting third-party access to IoT equipment has broad implications. With the Cradlepoint solution, fine-grained policies can be added to the zero-trust services gateway, allowing third-party access to all or part of the management system of an IoT device behind the Cradlepoint router.

"As the network expands and we see more sophisticated cyber threats, it's evident that IoT networks will need to be rearchitected," said Chantal Polsonetti, vice president, industry analyst, ARC Advisory Group. "By off-loading security from the perimeter to a distributed zero-trust architecture, Cradlepoint is offering IoT devices access to a collection of robust security services that have traditionally not been available on typical IoT routers."

As a multipurpose IoT router designed for the enterprise, the S700 connects light industrial, smart city, IoT and portable devices over cellular, Wi-Fi and wired links. Offering a wide variety of connectivity options through LTE, two Gigabit Ethernet ports for wired connections and dual-band Wi-Fi 6 options, the S700 also adds advanced features, such as active GNSS/GPS for asset tracking, GPIO pins to control and monitor external sensors.

"IT teams have more responsibilities and less time, even as organisations deploy more connected devices," said Donna Johnson, senior vice president of marketing, Cradlepoint. "Last year, we launched NetCloud Exchange as an advanced security and SD-WAN extension to Cradlepoint NetCloud to make managing security threats easier for those teams. The S700 with zero trust capabilities shows our commitment to 5G — and security-first services to support enterprise WAN transformation — at scale."

Nokia Revolutionizes 5G Expansion in Oceania

Nokia, together with leading multiple service providers, is set to deploy its cutting-edge Interleaved Passive Active Antenna (IPAA+) solutions in an effort to accelerate 5G deployment and expand coverage across Oceania. This groundbreaking technology enables telcos to provide the benefits of 5G to even more local customers and enterprises. Notably, Optus in Australia has already started rolling out an 8T8R variant of Nokia's IPAA, while TPG Telecom and One NZ plan to commence deployments later this year.

The challenges encountered by service providers in finding additional space for 5G antennas on existing towers and roofs have hindered rapid deployment. Nokia's IPAA+ is a game changer because of its modular design, which supports a wide range of frequencies from 700 MHz to 2.6 GHz, including the key 3.5 GHz 5G band. This compact antenna design enables faster and more efficient 5G deployment.

Rob Joyce, chief technology officer at Nokia Oceania, expressed excitement over the trust placed by several service providers in Nokia's state-of-the-art products, saying, "Our latest solutions are designed in accordance with feedback from our customers. These products address a major pain point of our customers by allowing a single integrated 5G antenna to cover all sub-6 GHz 5G frequency bands."

Nicholas Collins, chief commercial officer, EXA Infrastructure

Bridging Continents Through the Transformative Power of Fiber Optic Cables

In the digital age, with ever-increasing connectivity demands, fiber optic cables are revolutionizing internet connectivity and global telecommunications to support innovation and growth. Telecom Review Asia interviews Nicholas Collins, chief commercial officer of EXA Infrastructure, to explore the pivotal role of fiber optic cables today and how EXA Infrastructure is at the forefront of providing Asian customers with reliable access to Europe's vast digital landscape.

What is the role of fiber optic cables today, and how does it transform internet connectivity and global telecommunications?

Fiber optic cables are the cornerstone of modern internet connectivity and global telecommunications, revolutionizing the way we communicate and connect in today's digital landscape. Digital infrastructure not only fuels economic growth but also creates new opportunities for change by enabling greater innovation across a range of sectors, from gaming and artificial intelligence to cloud, content and technology, as well as financial services and governments.

At its core, fiber optic technology provides the connectivity for high-speed, reliable, and secure data transmission, supporting the increasing demand for digital services. EXA Infrastructure owns and operates the most extensive fiber network across Europe and North America. We serve some of the world's high-growth, hyper-bandwidth businesses. We are the digital highway connecting countries and cities that powers the internet.

In an interconnected world, the transformative power of fiber optic cables is substantial. They enable the seamless transmission of vast amounts of data at the speed of light, transcending geographical boundaries and erasing physical barriers. This reliability and speed pave the way for innovation to thrive — digital infrastructure plays a role in almost every aspect of our lives today and will be pivotal for the future. If we think about autonomous vehicles, real-time communication through multi-channels for medical solutions in healthcare, and immersive experiences reshaping entertainment and education — digital infrastructure powers the tools necessary to drive innovation and enable the evolution of innovation.

At EXA, we connect continents, countries and cities at scale. Our state-of-the-art network has been built with leading optical technology, which means it assures lower loss of transmission, resulting in better long-distance communication links. EXA provides its customers with straightforward products that they need most, with solutions fit for the exponential data growth we're seeing today.

With the increasing demand for reliable connectivity in a rapidly expanding digital landscape, how does EXA Infrastructure stand out as a preferred digital infrastructure partner to help telecom operators meet new demands and scale effectively? Can you share the success stories of clients who have benefited from your offerings?
The demand for international bandwidth is more than doubling every two years, according to TeleGeography. This means that, as an industry, we need to be focused and committed to building the infrastructure that will support this demand and fuel further economic growth and innovation for years to come.

At EXA, we are seeing growth coming from four major trends, namely the ongoing adoption of and migration to the cloud; new technologies such as AR, VR and AI; the role of edge compute to support high-performance and low-latency applications; and intercontinental data traffic flows between different regions of the world.

EXA Infrastructure stands out as the preferred digital infrastructure partner by combining cutting-edge technology and our commitment to innovation, as well as by being easy to do business with. We empower our customers to seamlessly meet escalating data demands and scale with unparalleled efficiency in the dynamic digital landscape.

EXA has a rich 22-year legacy (from Hibernia Networks, Interoute, and KPN); we possess a wealth of subsea experience. Leveraging our extensive network coverage and diverse product portfolio, we stand out as one of the most experienced subsea cable operators in Europe.

Demonstrating customer success, we announced in May 2023, a partnership to connect our ultra-low-latency, high-speed connectivity digital infrastructure to Cinturion's TEAS — Trans Europe Asia System. Cinturion chose EXA to land one of its dual-path connections of the TEAS in Pescara, on Italy's Adriatic coast, to provide the lowest latency and most diversely routed links. Two separate open-access sub-sea and terrestrial links cross the Middle Eastern region, one via the Red Sea and the other via Jordan, continuing along the Arabian Peninsula and under the Arab Gulf and Indian Ocean. TEAS aims to provide an alternative to global data traffic patterns with cutting-edge digital infrastructure that strengthens connectivity between India, the Middle East and Europe.

In May 2023, we also announced our partnership with Digital Realty to extend connectivity across the Mediterranean. The Mediterranean region plays a key role in the global digital economy, interconnecting Europe with the Americas to the west, Africa to the south, and the Middle East and Asia to the east.

Additionally, in March 2023, we announced our commitment of €39 million of network investments to supercharging our digital infrastructure assets in the Iberian Peninsula, serving the growing traffic demands entering the Iberian Peninsula from Africa, Asia and the Americas.

How does the company's role as a major pan-European player enable seamless support for Asian-based customers with their connectivity needs in Europe and North America?
When we talk about intercontinental data traffic flows, we are referring to the data that is moving between Europe and other parts of the world. These traffic flows between Asia and Europe are growing in volume by more than 30% every year, on the back of the economic activity and innovation that digital infrastructure enables.

EXA serves a broad range of customers headquartered in the Asia region, predominantly across the telecoms, financial markets, cloud and technology sectors. These customers are looking for secure and reliable connectivity to support their needs across Europe.

EXA's portfolio of 18 Cable Landing Stations (CLS), many of which are well placed in key locations in Europe, has a critical role in connecting submarine and terrestrial routes from Asia to Europe. As traffic demand continues to increase, so does the need for greater optionality on CLS entry points into Europe, which is where EXA has been making further investments, including two new landing stations in Italy.

Furthermore, EXA's connected footprint of over 500 data centers across Europe and North America means customers from Asia have seamless access to one of Europe's largest networks.

Can you share with us strategic plans in the pipeline to grow EXA Infrastructure's partnerships and networks to value-add more industries?
Growth is at the absolute core of our ambitions and plans at EXA. We are hungry to strategically grow our network to serve more customers and ensure EXA is the leading connectivity provider in the market.

EXA's commitment of €210 million towards network investment is unparalleled in Europe. We will continue to provide mission-critical connectivity to our customers and lead investment across the industry.

Our intention is to continue to expand our capabilities strategically as a focused partner and infrastructure provider for our customers.

2023 has been a game-changing year for us in terms of network investment and expansion, and we will have much more to share as we look towards 2024. TR

Enrico Maria Bagnasco, CEO, Sparkle

Sparkle's BlueMed and Beyond for Futureproof Submarine Cable Systems

In the era of digital transformation, Sparkle, a leading player in the submarine cable industry that boasts an extensive network spanning Europe, the Mediterranean Basin and the Americas, is at the forefront of powering digital infrastructure that is pivotal for advancing business growth. Telecom Review Asia connects with Enrico Maria Bagnasco, CEO of Sparkle, to learn how the company is addressing the ever-increasing demand for bandwidth and efficiency in its submarine cable network and staying focused on delivering resilience and diversification in its offerings.

Can you provide an overview of Sparkle's submarine cable network, spotlighting its role in powering seamless connectivity in today's interconnected world?

Sparkle is an established player in the submarine cable industry, with 167 PoPs and an advanced proprietary fiber network of over 600,000 km of fiber across Europe, the Mediterranean Basin and the Americas.

The first international service provider in Italy and among the top global operators, Sparkle offers a full range of infrastructure and global connectivity services — capacity, IP transit, SD-WAN, colocation, IoT connectivity, roaming and voice — designed to meet the fast-changing needs of national and international carriers, OTTs, ISPs, media/content providers and multinational enterprises, among others. Its global IP backbone, "Seabone," ranks 4th worldwide and is the leader in the Mediterranean, Middle East, Africa and LATAM, according to information from CAIDA (Cooperative Association for Internet Data Analysis).

In these areas, Sparkle invests in cable systems and digital hubs to create new

digital corridors, expand capacity and create new interconnection ecosystems.

All infrastructural investments implement state-of-the-art technologies and are designed to improve the performance and security of services offered to customers and ensure diversification. In addition, we are committed to developing the wholesale sector as a whole and minimizing the impact on the environment, in line with the new trends and regulations in the field.

As the demand for higher data capacities continues to rise, how does Sparkle advance the bandwidth and efficiency of its submarine cable network?

The past two decades have been characterized by an explosion of data, the internet and digital. In the next decade, traffic will continue to increase, and digital gravity will need to further distribute across the globe, heading increasingly South and East to better serve the new streams of emerging markets and users. The center of gravity of international infrastructures is therefore moving further south, which puts Italy at the center of data traffic routes that cross the Mediterranean.

In addition, the growing demand for bandwidth is accompanied by a growing need for resilient solutions, and we are working to offer not only speed but also reliability and diversification.

Our BlueMed submarine cable system is an example of this strategy.

Equipped with four fiber pairs (within a system of overall 20 FPs) and an initial design capacity between 25 and 30 Tbps per pair according to the segment span, BlueMed creates a digital highway between Europe and the Middle East and Africa and, as a future extension of the Raman Submarine Cable, South Asia, establishing a new reference in terms of diversification, scalability and latency on this route.

BlueMed will stretch from the Middle East to Europe, with its main trunk connecting Italy, France, Greece, Israel and Jordan, and with additional branches into Algeria, Tunisia, Libya, Turkey, Cyprus and more in the future.

BlueMed introduces diversification in many crucial aspects: for the first time, an international system passes through the Strait of Messina rather than through the Sicilian Channel. In addition, the cable arrives in Genoa, whereas until now most cables from Asia ended up in Marseille. The final aspect of diversification is the corridor through Israel, which establishes a new route between the Red and the Mediterranean Seas, improving connectivity and fostering new perspectives.

The first segment connecting Milano, Genoa (where we have created a scalable multi-cable system landing platform) and Palermo is now in full operation, and we are now beginning to witness the outcomes of these efforts materialize.

Can you share the collaborative partnerships with other industry players that have aimed to enhance global connectivity and ensure future-proof submarine cable systems?

Today, much of the international traffic is handled by OTTs, such as Google and Meta, which are also building their own cables. Expensive and large-scale projects are hardly feasible at the present time for a single operator, and this leads to the proliferation of agreements between international carriers and OTTs.

In recent years, we have been collaborating with several industry players and with Google in particular; in May 2020, we worked out infrastructural asset synergies with them in Latam between the Atlantic and the Pacific submarine routes and more recently in Africa and the Med basin between Equiano and MedNautilus. However, with our flagship project, "Blue & Raman Submarine Cable System," which will stretch from Italy to India along a diversified path, we have brought the collaboration with Google to the next level, building a cutting-edge intercontinental infrastructure in the strategic route between Asia, Middle East and Europe.

Moving forward, how will Sparkle continue to support business growth and accelerate digital transformation?

In addition to highly performing traditional and Software Defined (SD) connectivity services, security has become an integral component of our offerings to enterprises. The increasing adoption of remote working and the growing migration of business applications to the cloud require corporate data, whether hosted in the cloud or in "on premise" systems, to be available to employees regardless of their location, at any time and in total security.

With our SD-WAN and SASE solutions, we enable flexible and secure access to the international corporate network, regardless of the physical location of the device or the connection used. Based on the Secure Access Service Edge concept, the solution applies a cloud-based approach to networking and security: the corporate network and its devices are protected from security threats directly at their sources of connection, or "edges," rather than at their data center. As a result, remote workers, IoT devices, branch offices and applications are protected before their traffic reaches a multitude of destinations.

Our multivendor approach is paying off, with several enterprises in the food, manufacturing, fashion, energy and tourism sectors adopting our solutions. TR

BlueMed creates a digital highway between Europe and the Middle East and Africa and, as a future extension of the Raman Submarine Cable, South Asia, establishing a new reference in terms of diversification, scalability and latency on this route

The Asia-Pacific Data Center: A Thriving Hub Driving the Digital Revolution

In today's fast-paced world of technology and digital growth, data has become crucial for the global economy. With the increasing reliance on cloud services, artificial intelligence, Internet of Things (IoT) devices and big data analytics, the need for strong and scalable data centers has skyrocketed. Surprisingly, Asia has become the center of this data revolution, with a remarkable increase in data center developments driving the region towards a digital future.

APAC's Data Center Market

The Asia-Pacific (APAC) data center market is projected to grow at a compound annual growth rate (CAGR) of over 6% from 2022 to 2027. By 2027, it is expected to reach a value of US$93 billion, compared to US$64 billion in 2021. APAC is considered one of the most dynamic global data center markets, attracting significant investments from colocation providers and hyperscale operators alike.

Moreover, the Asia-Pacific data center market continues to see steady growth, with major investments from industry giants such as AWS, Microsoft, Alibaba, Tencent and Facebook fueling such progress. Additionally, government agencies in several countries across the region actively support the expansion of data centers as part of their efforts to further digitize their nations.

Key Factors Shaping the Asia-Pacific Data Center

The APAC region, specifically Southeast Asia (SEA), is seeing a rise in IT consumption due to factors like a growing affluent population, young demographics and increasing industrialization. This makes it attractive for data center operators who want to bring data and cloud storage closer to consumers in the region.

The rise in mobile usage, particularly driven by a tech-savvy young population and the increasing popularity of social media, is also creating a demand for high-capacity storage solutions. Additionally, the region's internet penetration rate has improved significantly in recent years, with around 415 million people in SEA having internet access. This presents a huge potential for mobile usage expansion in the APAC region compared to countries like the United States and the United Kingdom, where internet penetration rates are already high.

Additionally, the demand for advanced IT infrastructure is increasing, particularly in the areas of IoT, AI and big data analytics. This is leading to sustained growth in the Asia-Pacific data center market, especially for hyperscale data centers.

Countries like India, Indonesia, Thailand and Vietnam are experiencing significant growth in digitalization, e-commerce and digital banking, which presents opportunities for data center operators in these locales. Vietnam's coastline also makes it an ideal location for sub-sea cables, connecting second- and third-tier markets to the global marketplace. Additionally, the deployment of submarine cables in Australia, such as the INDIGO projects, will contribute to the growth of data center facilities by increasing network traffic.

Moreover, countries in the APAC region are prioritizing sustainability in powering and cooling their data centers — a strong example for the rest of the world. Singapore accounts for 60% of Southeast Asia's total data center supply, with 7% of its energy consumption coming from data centers. Though this is expected to increase to 12% by 2030, Singapore remains at the top of the Data Centre Competitive Index for APAC. The country is investing in renewable energy sources such as solar power and exploring the use of hydrogen as an alternative fuel option.

In addition, tech giants like Apple and Microsoft are running their data centers in Singapore solely through solar power. And similar sustainable data center initiatives are taking place in India and Malaysia through joint ventures between companies like Adani Enterprises, EdgeConneX, GSPARX and NTT.

The demand for hyperscale data centers is increasing in the APAC region due to cybersecurity regulations, the growth of e-commerce and ride-hailing industries, and the need for on-demand cloud services. In the future, there might be a shift towards edge locations, like secondary markets and smaller nodes in major cities, as these architectures become more decentralized. This will lead to an increased demand for colocation data centers in secondary markets within APAC.

One thing is clear: with these current parameters as well as future expectations, the economic and societal impact of data centers is sure to grow. And the Asia-Pacific region will continue to embrace this evolution. TR

“The rise in mobile usage, particularly driven by a tech-savvy young population and the increasing popularity of social media, is also creating a demand for high-capacity storage solutions”

5G Trials Set to Fuel Innovation and Reshape Digital Landscape in India

India's telecommunications market has witnessed remarkable growth and innovation in recent years. As the country continues to evolve as a major player in the global tech landscape, key developments are significantly shaping the industry's future, not the least of which is the expansion of 5G trials. This latter strategic move is set to revolutionize India's digital landscape, presenting new opportunities for businesses, consumers and the overall economy as a whole.

In what is no less than a "technology revolution," India is aiming to become a true innovation partner for the world. The nation is achieving this through digital transformation initiatives, the development of intelligent platforms and products, and the adoption of emerging technologies such as analytics, Artificial Intelligence (AI), robotics, automation, blockchain, the Internet of Things (IoT), edge computing and AR/VR.

The implementation of 5G technology is expected to bring all of these advancements together and drive high-tech innovation in India. Importantly, success in the 5G era will require collaboration among various stakeholders, including enterprises, telcos, technology players, start-ups, academia and the government.

Furthermore, enhancing research and development capabilities and involving small and medium enterprises (SMEs) and start-ups in the 5G ecosystem will be crucial. SMEs/start-ups possess the agility and adaptability needed to develop, test and deploy innovative 5G solutions that cater to specific industries. India's vast start-up ecosystem provides ample opportunity for local expertise to contribute to an emergent and self-reliant 5G ecosystem in the country.

The Indian government has allowed telecom operators in the country to begin testing 5G technology. Trials have been conducted using different frequency bands, including the mid-band, mmWave band, sub-1 GHz band and existing spectrum, the latter of which can be used for 5G or any other technology covered by the Access Service License.

By June 2022, 496 operators in 150 countries had invested in 5G networks, with 218 operators in 87 countries already launching commercial 5G services. And prior to that, there were a total of 521 million 5G subscribers globally in December 2021. The aggressive advertising of 5G worldwide has focused on the technology's superfast speed, low latency and high capacity, which together stand to revolutionize businesses by enabling new levels of connectivity and complexity.

This opens up opportunities for IoT innovation and commercial use, such as driverless cars, drones, AI, robotics and virtual and augmented reality. Additionally, the fusion of 5G, AI and IoT will lead to intelligent connectivity and new disruptive digital services. And as a result of such impact, the benefits of 5G for businesses are sure to include automation, increased productivity, real-time data analysis, improved battery life, cost savings in IoT infrastructure, reliance on cloud-based software and easier collection and analysis of vast amounts of real-time data.

Moreover, Tech Mahindra, a partner of Rakuten, is looking beyond networks and exploring opportunities in medical devices and shopfloor modernization. They believe that 5G will play a significant role in the factory of the future, enabling connectivity in remote areas. The transformation to 5G will require changes in customer experiences, operating models and product designs, leading to open business models and partnerships across industries.

Cognizant identifies five key areas of transformation for 5G: software-defined infrastructure; agile technology offices; intelligent APIs for third-party capabilities; engineering products for futuristic demands; and rendering solutions through immersive touchpoints like IoT and AR/VR/MR.

Similarly, Jain from Pareekh Consulting sees multiple opportunities with 5G, with the initial phase focused on infrastructure creation and subsequent phases involving partnerships with telcos for enterprise use cases as well as with hyperscalers like AWS, GCP and Azure for edge use cases.

Meanwhile, Hexaware is not prioritizing the initial wave of opportunities but is instead focusing on infrastructure modernization and network rollouts. As they see it, the real opportunity for creating solutions is expected to come 12-18 months later.

While such promises to the technology seem boundless, 5G rollouts may indeed face delays due to challenges such as: high prices for 5G spectrum; limited availability in certain areas; and the maturity of the technology for business use cases. Only time will tell along this new and uncharted road.

Driven by these momentous 5G trials, India's telecom market expansion is poised to reshape the digital landscape of the country. While challenges exist, the opportunities for digital transformation and growth in the telecom sector are immense. Through proactive regulatory frameworks, supportive government initiatives, and collaborative efforts, India can pave the way for a digitally connected future. TR

“India's vast start-up ecosystem provides ample opportunity for local expertise to contribute to an emergent and self-reliant 5G ecosystem in the country.”

Huawei: Building Trustworthy Data Infrastructure for Carriers

Carriers have been at the forefront of the digital transformation over the past few years. The introduction of cloud services, B-to-B (business-to-business) technologies, and video streaming has created new growth potential for carriers. However, these new services place greater demands on IT infrastructure. Efficient data training, cost-effective data storage and robust data resilience have all emerged as key challenges for carriers, particularly as the threat of ransomware grows.

During his keynote speech at the Huawei Product & Solution Innovation Launch at MWC Shanghai 2023, Peter Zhou, President of the Huawei IT Product Line, highlighted Huawei's vision of building a more trustworthy data infrastructure for the carrier industry.

While the boom of the digital and intelligent era is fast approaching, it has brought forth new challenges for carriers in their data infrastructure construction.

Mr. Zhou said, "Massive unstructured data enters the production decision-making system, causing explosive data growth. Data resilience risks caused by human factors are becoming more and more serious." Huawei highlights five major challenges: managing multi-cloud ecosystems; the expansion of generative AI; cloud business; cross-cloud data scheduling and ransomware threats. Addressing these difficulties necessitates the use of innovative solutions and technologies.

Data Storage Support for Emerging Applications

The number of cloud-native applications that are migrating from the public cloud to on-premise data centers is on the rise. With this, traditional data center infrastructures are having a hard time meeting the demands of supporting these new applications. Huawei believes that the container ecosystem should be fully supported for it to be able to adapt to these emerging applications.

Mr. Zhou showcased what Huawei has to offer when it comes to storage: "Huawei storage provides the standard CSI interface and the extended container DR interface CDR, which can support the container ecosystem. When upper-layer applications are cloudified, storage can seamlessly interconnect with different data centers and build data persistence capabilities."

Currently, more than 40 carriers have chosen Huawei's container storage solution.

Carriers face both opportunities and challenges as generative AI booms this year. The surge in new applications and new data, coupled with growing AI capabilities that pose greater storage requirements, might be overwhelming for some, especially from a management perspective. To help carriers address this dilemma, Mr. Zhou shared that Huawei has to continuously adapt and transform to advance IT products and technologies whenever a new type of data or application emerges.

"Particularly in the area of data storage, we must adapt to such changes with innovative technologies and the best software and hardware. This drives our decision to adopt traditional SANstorage and NASstorage solutions," Mr. Zhou explained. "This year, we will vigorously develop scale-out storage to enable new applications of massive data as a strategic direction forward.

Addressing challenges to exponential increase of LLM parameters and data, time-consuming data preprocessing, and unstable training process, Mr. Zhou shared that Huawei's AI storage uses cutting-edge technologies, including efficient backup and recovery of checkpoints and near-data processing, to improve training preprocessing efficiency and enable training of trillion-parameter big models.

Resolving Problems From Data Gravity With Intelligent Data Fabric

Huawei OceanDisk, the industry's first professional storage system designed for diskless architecture, also took center stage. Mr. Zhou highlights how Huawei OceanDisk can address the challenges of data migration from traditional data centers' "server + local disk" architecture.

He said, "Through architecture innovation, professional storage capabilities help large-scale cloud data centers achieve energy saving, high performance, and high reliability. China Telecom Cloud uses OceanDisk to support services such as video, development and testing, and AI-based computing services, saving space and energy consumption by 40%."

A Focus on Resilient Data Storage

Moreover, Mr. Zhou also emphasized how Huawei's storage solutions incorporate numerous levels of protection features: "Huawei storage uses ransomware identification, secure snapshots, backup storage, and physical isolation areas to build multi-layer protection and internal security, ensuring that a clean copy of enterprise data is always available." Essentially, Huawei's IT Product Line provides comprehensive solutions for constructing dependable data infrastructure, drive digital productivity forward for carriers. Moving forward, Huawei will continue to pave the road for a resilient and competitive future in the carrier business with its innovative storage solutions.

By Issam Eid (Editor-in-Chief of Telecom Review Africa and Arabia) TR

"Currently, more than 40 carriers have chosen Huawei's container storage solution"

Globe Launches First Private 5G SA Network in Philippines

Globe, a leading telco in the Philippines, has teamed up with Hewlett Packard Enterprise (HPE) to launch the nation's first private 5G standalone (5G SA) network.

The private 5G SA network, powered by Athonet's superior 5G Core technology, provides corporations and organizations with an innovative alternative or supplement to Wi-Fi and public mobile technologies. The network is intended to improve cellular connectivity, unlocking the potential for higher productivity, efficiency and quality across multiple industries.

Athonet's 5G SA starter kit stands out with its all-inclusive solution, which includes SIM cards, a radio and a top-tier mobile core network, all housed in a compact briefcase. Through its N6 interface, the starter kit offers seamless connection with business applications while providing high-quality video and audio experiences at download speeds of up to 780 Mbps and upload speeds of up to 150 Mbps. This plug-and-play device can be easily installed and powered by a normal outlet.

What distinguishes the private 5G SA network is its potential to provide new benefits such as enhanced security, customization capabilities, ultra-low latency and significant capacity. This makes it perfect for supporting large-scale internet of things (IoT) deployments as well as mission-critical applications that require dependable and efficient communication.

"The breakthrough private 5G standalone network brings us closer to a digitally transformed enterprise landscape," noted Yoke Kong Seow, chief technical advisor at Globe.

The collaboration with HPE brings flexibility to the process of developing a private 5G network. Enterprises have the option of hosting the solution in the cloud, deploying a complete solution with HPE edge servers and Athonet software, or simply licensing the software to integrate into existing infrastructure. This versatility ensures that enterprises may modify the network to meet their evolving coverage and capacity needs.

Loh Khai Peng, vice president, APAC Sales at HPE, added, "With our Athonet technology, we are enabling a new era of connectivity for businesses. HPE is proud to partner with Globe on this groundbreaking endeavor, providing solutions that are not only tailored for specific needs but are also scalable, secure and highly reliable."

The successful demonstration of the private 5G SA network, together with Globe's unwavering commitment to digital transformation, signifies a turning point for Philippine enterprises. This new era of connectivity promises better productivity, cost efficiency and overall quality across various sectors.

Bharti Airtel Launches India's First-Ever 5G FWA Service

Bharti Airtel has launched Airtel Xstream AirFiber, making it the first Indian telecom operator to introduce 5G fixed wireless access (FWA) for consumers in Delhi and Mumbai.

Airtel Xstream AirFiber is India's first 5G wireless Wi-Fi solution that will offer internet to consumers in fiber-dark areas. It claims to address the last-mile connectivity issue in both rural and urban areas of the country where access to fiber infrastructure is difficult.

Xstream AirFiber is a plug-and-play device with in-built Wi-Fi 6 technology that will offer wide indoor coverage and can simultaneously connect up to 64 devices.

Director of Consumer Business at Bharti Airtel, Shashwat Sharma, announced, "India has seen the rapid growth of home broadband, but there still remain areas with no access to hi-speed internet at home due to the physical challenges of laying fiber in a country the size of India. While fiber to the home will always define the best experience of Wi-Fi at home, AirFiber helps bridge the experience gap for everyone else. Today, we are delighted to launch Xstream AirFiber for consumers in Delhi and Mumbai, with a pan-India rollout planned soon."

Airtel also plans to launch the service in multiple cities and scale up nationally. All Xstream AirFiber devices will be manufactured in India under the "Make in India" program.

Airtel Xstream AirFiber service is available on an affordable 799 plan, which offers up to 100 Mbps speed. The plan can be secured for a duration of six months with a one-time refundable security deposit of Rs. 2500.

Smart Revolutionizes Cellular Networks With 'Solar and Energy Storage as a Service'

Smart Communications, PLDT's wireless arm, has taken an important step toward a more sustainable future by embracing solar energy to power its cell sites around the country. The "Solar and Energy Storage as a Service" (SESaaS) model intends to improve power availability in places with little or no commercial electricity, promote a greener network and reduce carbon emissions.

Eric Santiago, first vice president and network head at PLDT and Smart, emphasized the potential of this groundbreaking initiative, saying, "The SESaaS model will improve availability of power supply, especially in areas where there is limited or no commercial power, allowing us to serve more remote communities. This will also reduce Smart's use of power from carbon sources. Once fully implemented, we're looking at a reduction of as much as 88% in greenhouse gas emissions in off-grid sites."

Smart has developed proofs of concept (POC) in two locations for four power source types: Good Grid, Poor Grid, Bad Grid and Off-Grid. The first is an off-grid location in Palawan, where the installation successfully powered the tower all day. The second location along the STAR Tollway is a commercial grid-powered installation. The facility demonstrated that it can effortlessly transition from being powered by the commercial grid to being powered by surplus electricity stored in batteries.

Based on the POCs, Smart sees opportunities for cost efficiencies. This will also allow Smart to provide mobile signal availability to consumers in rural places that are not connected to the power grid. It can help reduce reliance on diesel generators during power outages and emergencies.

This is the best example of the SESaaS business model, in which the chosen supplier installs photovoltaic cells and a battery storage system in Smart cell sites. The facility will help power assets during peak hours and store surplus energy during off-peak hours for future usage in facilities connected to the commercial power grid.

Given the market's scarce supply of non-conventional power, Smart continues to seek alternate power sources, particularly renewables. The PLDT group continues to test and integrate environmentally friendly technology as part of its decarbonization program, which calls for a 40% reduction in Scopes 1 and 2 GHG emissions by 2030.

President and CEO Alfredo Panlilio has identified sustainability as a major pillar supporting the PLDT Group strategy, and he continues to promote the increased use of renewable energy and green technologies in daily operations.

National Telecom Gears Up for 5G Expansion

Thai state-owned operator National Telecom (NT) has received approval from its board to invest THB800 million (US$22.5 million) in expanding its network to utilize spectrum in the 26 GHz band. The purpose of this investment is to provide fixed wireless access (FWA) services and connect enterprises to private 5G networks. According to the Bangkok Post, NT expects the project to be completed by March 2024. This is the first phase of a THB6.7 billion budget approved by the Thai government for NT's business development using the mmWave spectrum. The company has been granted a license for the 26 GHz band for the next 14 years.

The majority of the budget, approximately THB5 billion, will be allocated to network development, while the remaining funds will cover operational costs. NT management plans to start drafting terms for the purchase of network equipment next month, with completion expected early next year. The first phase of the network expansion is scheduled to be operational by March of next year.

NT is the result of a merger between TOT and CAT Telecom. As part of the merger, NT acquired a portion of its 26 GHz license from TOT, which had won 200 MHz of bandwidth in 2020.

Indosat, Noice Partner to Drive Creative Industry Growth in Indonesia

Indosat Ooredoo Hutchison (Indosat), one of the leading telcos in Indonesia, has partnered with Noice, a prominent local audio streaming platform in the country, to improve digital experiences for subscribers while supporting Indonesia's creative industry.

Ritesh Kumar Singh, director and chief commercial officer of Indosat Ooredoo Hutchison, emphasized the company's commitment to Indonesia's development as inspired by the Gotong Royong concept, saying, "This time, together with Noice, we want to collaborate to achieve that goal by driving the creative industry growth. Indosat services that spread throughout Indonesia will maximize Noice's content to be widely exposed and open infinite possibilities."

Indosat and Noice's partnership already comprises multiple programs in the works, including "The Collabonation Podcast" and "THIS" (The Indosat Show), which are available on the Noice app.

Subscribers of Indosat can now access a variety of featured podcast material from Noice via the myIM3 and bima+ applications. IM3 and Tri subscribers will also have exclusive access to joint projects such as workshops, concerts and other exciting activities as a result of this relationship.

Niken Sasmaya, chief business officer of Noice, stressed the importance of audio content platforms in the digital lifestyles of Indonesians, as more people rely on them for enjoyment and information during their everyday activities. "We are excited about the many opportunities this strategic collaboration will bring," Ms. Sasmaya said. "Noice wants to continue encouraging the development of positive content among the younger generation while expanding the audio content ecosystem in Indonesia's creative industry."

Both Indosat and Noice are dedicated to exploring additional collaboration prospects in order to best contribute to the development of Indonesia's creative industry. This collaboration is believed to be a key step towards empowering local talents, encouraging creativity and enriching Indonesians' lives through enhanced digital experiences.

Optus Gears Up for 5G Wearables in Australia

Optus has announced plans to develop 5G-enabled smart gadgets in partnership with leading telcos Ericsson and MediaTek.

The company said that it has conducted Australia's first over-the-air data call on its 5G network using Ericsson's pre-commercial Reduced Capability (RedCap) software. This accomplishment is considered to be a remarkable step toward allowing the implementation of 5G technology in a range of low-power and low-cost RedCap devices.

The innovation has the potential to usher in a new era of revolutionary wearable gadgets, such as smartwatches, health monitors and augmented reality (AR) glasses, all of which will benefit from the RedCap technology's efficiency and performance. This will also improve the capabilities of industrial applications such as video surveillance and industrial sensors.

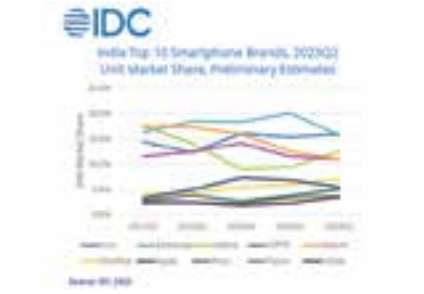
Moreover, Ericsson's RedCap is also capable of powering smart cities of the future with applications in smart grids, environmental sensors, predictive maintenance and utility meters.

Lambo Kanagaratnam, managing director of networks at Optus, said, "Optus is always pushing the boundaries on network technology to find ways to improve the experience of our customers. This announcement is about catering for 5G for wearable devices, like watches, so customers can benefit from accessing the most up-to-date technology in their daily lives. With this Australian-first data call on RedCap, we are paving the way for future 5G wearable devices."

RedCap may also boost operational savings with optimized cost structures for robust industrial IoT, accelerating the industry 4.0 revolution with 5G private networks for industrial applications. Ericsson's RedCap offers dependable wireless connections and seamless mobility for industrial and corporate devices. More equipment can be connected with fewer cables, process monitoring sensors for deeper operational insight, smart security cameras for worker safety and portable wearable devices for better human-machine interaction.

This milestone highlights the adaptability of Ericsson's RedCap software, which runs across low and mid-frequency bands using different 5G spectrum options, including both time division duplex (TDD) and frequency division duplex (FDD). This versatility allows Optus to explore and invent new applications across a wide range of sectors, from consumers to industries and businesses.

India Smartphone Market Declines in H1 2023, According to IDC



According to the International Data Corporation (IDC) Worldwide Quarterly Mobile Phone Tracker, the India smartphone market experienced a mix of shifts and growth in the first half of 2023. The report shows that the market shipped 64 million devices during this period, a 10% decrease from the same period last year.

The market displayed a contradictory trend in the second quarter of 2023 (2Q23). While it increased by 10% over the previous quarter, it decreased by 3% year-over-year (YoY), accounting for a total of 34 million units shipped. In anticipation of the upcoming festive season in the latter half of the year, market players, including vendors and channels, focused their efforts on inventory clearance, providing consumers with a variety of discounts, special schemes and price reductions.

The average selling price (ASP) of smartphones was one notable characteristic observed in market dynamics. After several quarters of ascension, the ASP fell by 8% quarter on quarter (QoQ), but still increased by 13% YoY, peaking at $241 in 2Q23. The share of cellphones priced under $200 fell from 70% to 65% in comparison to the previous year, representing an 11% drop YoY. In contrast, the mid-range category ($200<$400) maintained its 22% market share, while the mid-to-high-end segment ($400<$600) increased 34% YoY, accounting for 5% of the market. The premium segment ($600+) grew the most rapidly, increasing by 75% YoY to capture 9% of the market.

In the second quarter of 2023, a total of 17 million 5G smartphones were shipped, with an ASP of $366, representing a 3% YoY decrease. Samsung, vivo and OnePlus were among the industry leaders in the 5G sector, with a combined market share of 54%. Apple's iPhone 13 and OnePlus' Nord CE3 Lite were two notable 5G models with significant shipment numbers.

The distribution channels also underwent shifts in this dynamic landscape. Shipments via the online channel decreased by 15% YoY, while the offline route increased by 11%, claiming a 54% share. Notably, the drop in online shipments was attributed to firms such as Xiaomi and realme, which rely heavily on online sales.

Apple emerged as a major contender, with a 61% YoY increase and the highest ASP of $929. OnePlus had 61% growth, despite a 14% YoY decline in its ASP, which ended out at $346. POCO, with its low-cost C series models, has the highest growth rate among the top 10 brands. In terms of market leadership, vivo (excluding iQOO) took the lead, propelled by its V series devices, and was closely followed by Samsung, which focused on increasing its higher-end portfolio.

Telco Giants Unite to Promote Collaboration and Innovation in AI

Four of the most notable telcos, SK Telecom, Deutsche Telekom, e& and Singtel, have joined forces to form the ground-breaking Global Telco AI Alliance, which aspires to use the power of AI technology to transform customer experiences and improve the lives of consumers around the world.

The four founding member organizations have committed to driving the AI transformation of their existing telecommunications operations while also exploring new growth prospects through novel AI-powered business models.

"The launch of the Global Telco AI Alliance is meaningful in that it marks the beginning of a new journey to innovate our business models while growing together with our global partners," said Ryu Young-sang, CEO of SKT.

The alliance's main objective will be the creation of the Telco AI Platform, which is expected to serve as the foundation for a wide variety of new AI services, including those designed to improve existing telco services, digital assistants and super apps that offer a wide range of services.

"In order to make the most of the possibilities of generative AI for our customers and our industry, we want to develop industry-specific applications in the Telco AI Alliance. I am particularly pleased that this alliance also stands for bridging the gap between Europe and Asia and that we are jointly pursuing an open-vendor approach. Depending on the application, we can use the best technology. The founding of this alliance is an important milestone for our industry," said Claudia Nemat of Deutsche Telekom.

Khalifa Al Shamsi, CEO of e& life highlighted the immense potential of AI in reshaping the telecommunications landscape and beyond, saying, "The alliance signifies a strategic commitment to driving innovation and fostering collaborative efforts. Our shared goal is to redefine industry paradigms, establish new growth drivers through AI-powered business models and pave the way for a new era of strategic cooperation, guiding our industry towards an exciting and prosperous future."

Meanwhile, Yuen Kuan Moon of Singtel shared the company's advantage with an advanced 5G network and their readiness to leverage AI for innovation: "This alliance will enable us and our ecosystem of partners to significantly expedite the development of new and innovative AI services that can bring tremendous benefits to both businesses and consumers."

Vodafone Idea Foundation, TSSC Launch IoT Center of Excellence

The Vodafone Idea Foundation, the CSR arm of Vodafone Idea (Vi), has partnered with the Telecom Sector Skill Council (TSSC) to establish an IoT Center of Excellence at the prestigious Indira Gandhi Delhi Technical University for Women in Delhi. This is considered to be a significant step toward empowering India's youth with the latest technological skills.

The IoT Center of Excellence intends to close the skills gap in India by delivering hands-on training in cutting-edge technologies such as 5G, AI,ML, IoT, security and surveillance. The comprehensive program will largely focus on preparing engineering students, particularly women, to excel in the fast-changing tech sector.

P Balaji, director of the Vodafone Idea Foundation and chief regulatory & corporate affairs officer of VIL, expressed his enthusiasm for the effort, citing India's demographic dividend and the country's potential to lead the technological innovation wave.

"Among the top 5 economies in the world and as the fastest-growing major economy, India is set to further solidify its global position. The country's demographic dividend offers it the edge to be at the forefront of technology innovation, becoming a manufacturing hub and creating a talent pool for the world. For the youth to seize this opportunity, it is imperative that they acquire the right skills," said Mr. Balaji.

Moreover, Arvind Bali, CEO of the Telecom Sector Skill Council, highlighted the growing demand for telecom skill sets across industries and sectors, saying, "The telecom industry is growing at a staggering rate with use cases in practically all sectors and industries. The effectiveness of these interventions heavily relies on a substantial workforce that can support such a vast array of infrastructure and services."

This year, the IoT Center of Excellence intends to help 300 students through a combination of online and offline training programs. The center's projects will encompass a wide range of IoT applications, such as LED blinking, Arduino Module programming, Seven-Segment Display implementation, security and traffic management via a Boom Barrier Unit and data analysis from various sensors.

Dr. Amita Dev, vice-chancellor of Indira Gandhi Delhi Technical University for Women, emphasized the importance of empowering women in STEM professions, as well as connecting curriculum with industry demands and giving practical skills for successful jobs.

Dr. Dev explained, "By aligning our curriculum with industry needs, students gain practical skills for their careers. We're dedicated to fostering gender diversity and inclusivity, offering women enhanced opportunities, mentorship and hands-on training. Together, we propel STEM education, opening doors to exciting careers and driving societal progress. We extend our gratitude to the Vi Foundation and TSSC for their support.

The IoT-CoE is a result of the Vodafone Idea Foundation and Telecom Sector Skill Council's collaboration to stimulate technological innovation and the development of a trained workforce for India's digital economy.

Zoom Introduces 10-Minute Wait Period for Balanced User Experience

Zoom has become a household name in recent years as the go-to platform for virtual meetings, happy hours and family gatherings. With its user-friendly interface and reliability, it quickly became indispensable for remote work and social distancing — both vital during the COVID pandemic.

In an effort to balance the demand on their servers and ensure a smooth experience for all users, Zoom has imposed new changes on their free plans: a mandatory 10-minute wait period before restarting meetings.

Previously, users could disconnect and reconnect instantly after the 40-minute time limit, allowing them to have uninterrupted meetings. However, Zoom now requires a 10-minute wait before free-plan meetings can be restarted.

This change was not announced or rolled out officially, but users have noticed it since January. It is unclear which accounts are affected, but it is likely that this change will eventually be applied to all users.

Zoom's decision to implement new restrictions on its free plans stems from its aim to strike a balance between meeting the needs of its users and ensuring the sustainability and profitability of the company. As the demand for video conferencing services continues to skyrocket, Zoom has found it necessary to make adjustments to manage the sheer volume of users on its platform.

Lindsay Notwell, Senior Vice President, 5G Strategy & Global Carrier Operations

Lisa Guess, Senior Vice President, Solutions Engineering & Sales engineering at Cradlepoint

5G and SD-WAN Key to Traffic Steering and Optimized Network Slicing

Network slicing promises to be an enabler to unlock the full value of the 5G network. To adequately support an enterprise environment with thousands of cloud, SaaS or custom applications, traffic steering in network slicing is key. In an exclusive interview, Lindsay Notwell, senior vice president, 5G strategy & global carrier operations and Lisa Guess, senior vice president, solutions engineering & sales engineering at Cradlepoint, delve into 5G-optimized SD-WAN for traffic optimization to grow secure, scalable and future-proof applications.

With 5G adoption accelerating worldwide, how can carriers benefit from network slicing to provide value to enterprise customers?

Lindsay: A key advantage of network slicing is service differentiation. Operators can create tailored capabilities, leveraging 5G's high throughput and low latency attributes. As opposed to prior technologies like 4G, 5G network slicing creates a different class of service that is scalable and less time-intensive to deploy.

For instance, carriers can provision a network slice in as little as 25 minutes. This allows a carrier to readily turn up or down a service. This is particularly important in public safety use cases such as video surveillance for a festival held over a weekend as an example. In this case, network slicing provides carriers the agility to create a differentiated service, oftentimes with a guaranteed service level agreement (SLA).

What limitations does network slicing have in terms of supporting enterprise applications, and how can they be addressed?

Lindsay: A carrier's ability to support use cases such as real-time video capabilities or automated assisted driving is limited by available spectrum resources. Network slicing requires a 5G standalone network. When an operator transitions from non-standalone to standalone, we lose 5G + 4G (ENDC) carrier aggregation. Operators without an optimal spectrum position will result in slower performance for users. Having said that, we are far enough into the 5G development cycle that 5G can be stepped up given the right spectrum by using 5G NR carrier aggregation.

Lisa: More of a challenge rather than a limitation, operators must recognize that network slicing gives them a WAN technology that is not only flexible and agile but also capable of providing MPLS-like guaranteed SLAs, all leveraging a network's end-to-end capabilities. To fully tap into the potential of network slicing, carriers must leverage SD-WAN to effectively

steer traffic to the desired slice according to the application's bandwidth, latency and performance needs. This provides network flexibility and security to support enterprise and mission-critical operations.

Can you discuss the latest trends and innovations in SD-WAN and how carriers can leverage them?

Lisa: SD-WAN is evolving to accommodate technologies in IoT, vehicles, offices and stores. At Cradlepoint, we have enhanced traditional SD-WAN for optimal 5G networks and network slicing capabilities.

Last year, we introduced NetCloud Exchange (NCX) SD-WAN as the next-generation, 5G-optimized SD-WAN. An architectural extension of our NetCloud solution, NetCloud Exchange, is a unified network that extends agility and security from the enterprise edge to the cloud. NCX SD-WAN offers secured connections, zero-trust network access, as well as traffic steering and classification to simplify the 5G experience and ease the transition from wired to wireless WAN.

It integrates Cellular Intelligence, a collection of software features built onto wireless edge routers and adapters, to provide users with optimal performance in changing cellular conditions, analytics/insights, visibility of 5G networks and traffic management. Cellular-optimized SD-WAN enables real-time traffic steering based on cellular-centric attributes to improve the quality of service, automatically identifying, labeling and sending network traffic through the highest-performing WAN link, whether that be cellular, wired, WiFi, or satellite. So, when a vehicle enters a particular area where coverage and performance are sub-optimal, traffic can be steered to the best-performing, or in some cases, the least costly route.

Beyond connectivity, what is equally important is a robust cloud-based central management tool that simplifies the monitoring and management of all connected devices. As more people, places and devices are becoming connected, NetCloud offers a single dashboard for ease of management that reduces manpower and costs.

Lindsay: As more businesses are using container applications on our endpoints to leverage secured as well as high storage and compute capabilities, we are also working with several carriers to explore a wider range of applications that can be distributed throughout their network to the cell edge for SCADA systems and IoT use cases.

Can you share any success stories or case studies of customers who have adopted your solutions and the benefits they have seen?

Lindsay: There are many interesting use cases across verticals. For instance, Cradlepoint's NetCloud Service and 5G endpoints are deployed for autonomous vessels in Amsterdam's waterways. Vessels and connections are centrally monitored and managed, using endpoint's built-in GPS and cellular metrics to plot the route of vessels on a map. Another use case is the mining industry in Canada, where our endpoints powered by NetCloud connect 10-meter-high autonomous earth movers that can incur a downtime cost of $100,000 per hour if connectivity is disrupted.

Our solutions also allow retailers to pivot strategies with the emergence of pop-up stores. With wireless WAN, retailers can move locations with greater flexibility, ease and security without incurring costly rewiring. A wireless secondary connection can also help to maintain network uptime, should a store temporarily lose its wired connection. This results in a reduced risk of revenue losses.

Lisa: In Australia, a non-profit employment organization replaced wired with wireless connectivity, leveraging NetCloud for centralized management of 160 offices. The all-cellular approach led to increased Capex and Opex savings, improved network uptime and greater performance and IT agility. Similarly, in the US, our all-cellular approach allows a customer to manage more than 50,000 kiosks with just one IT employee. Using NetCloud Service with wireless edge routers, cloud-managed cellular also makes provision for remote management of digital signages in different scenarios.

More than just delivering connectivity, our solutions provide the ease of deployment and management of all devices.

How do you see the wireless communications space evolving in the next few years, and what role do you see Cradlepoint playing in this evolution?

Lindsay: The potential of wireless 5G is limited only by our creativity. Increasingly, we are seeing more creative use cases in terms of how and where wireless communications are deployed. Businesses are onboarding new use cases, and we are stepping up to bridge demands in a secured and managed approach that reduces the complexity of adopting new solutions.

Lisa: From a sensor that triggers a live stream when a police officer pulls out a gun to CCTVs that detect bullying behaviors on public transport, wireless 5G is serving more and more interesting applications each day. At Cradlepoint, we are focused on becoming the tech enabler that addresses diverse enterprise and public service requirements. TR

> A key advantage of network slicing is service differentiation. Operators can create tailored capabilities, leveraging 5G's high throughput and low latency attributes.

Brendan Press, chief commercial officer, GBI

Why the Subsea Cable North Route Opens More Possibilities

Everywhere you turn, there's someone using the internet to go about their daily lives. From video calls to using mission-critical technology in the workplace, the significance of connectivity in the modern world is obvious and potent.

To the everyday user, connectivity feels like it's entrenched in the atmosphere and naturally travels at the speed of light. However, none of this would be possible without submarine cables, which carry 98% of the world's internet traffic. You only have to experience some buffering when watching your favorite program online to be reminded of connectivity's complexity and that, in fact, low latency and capacity aren't always guaranteed.

The Global Content Revolution

Central to meeting the growing global demand for connectivity are over-the-top (OTT) service providers, including the likes of Google, Microsoft, Meta, and Amazon, who allow us to access streaming and downloaded content through internet-connected devices. They are on the frontline of connectivity and under mounting pressure to meet the needs of end users across the world.

However, such pressures go far beyond just data quantity. Modern consumers are increasingly looking for a hyper-personalized experience when using online services. Not only do they expect their connection to be delivered at high speed, but they also want smooth, uninterrupted connections guaranteed by low latency rates.

To remain competitive, content providers must continually invest in their infrastructure to maximize both the efficiency and reach of their services, of which the size, quantity, and location of their data centers are highly important. While collaboration with localized data centers is key, the importance of subsea cables must not be overlooked. They offer a last line of assurance that is vital for success.

Why Diversification is a Crucial Piece of the Puzzle

The continuity of connectivity is intrinsically linked to the routes that it takes. However, it isn't as simple as spinning a globe in front of you and choosing where you want the data to end up. There are many stakeholders and factors involved to ensure that content arrives seamlessly at the right place at the right time.

In the current ecosystem, almost all subsea cables and traffic from West Asia, South Asia and East Asia pass through Egypt and the Mediterranean Sea on the way to Europe. This means that they are heavily dependent on a single route for all Europe-Asia connectivity — via Egypt. This can

result in an overdependence, which can impact individuals, businesses and countries digital experiences. That's where the alternative North Route via the Gulf and GBI comes in.

The North Route Provides Assurance

Leveraging cables and assets in Asia, as well as Gulf countries such as Iraq and Qatar, to carry traffic via diverse terrestrial networks to Europe provides a multitude of benefits. For example, circumventing the Arab Peninsula completely can improve latency, availability and stability.

It can also provide redundancy, which means users remain connected in the case of an outage. In a sector dependent on the constant movement of and access to information, this cannot be taken for granted. It is vital to ensuring the continuation of mission-critical operations.

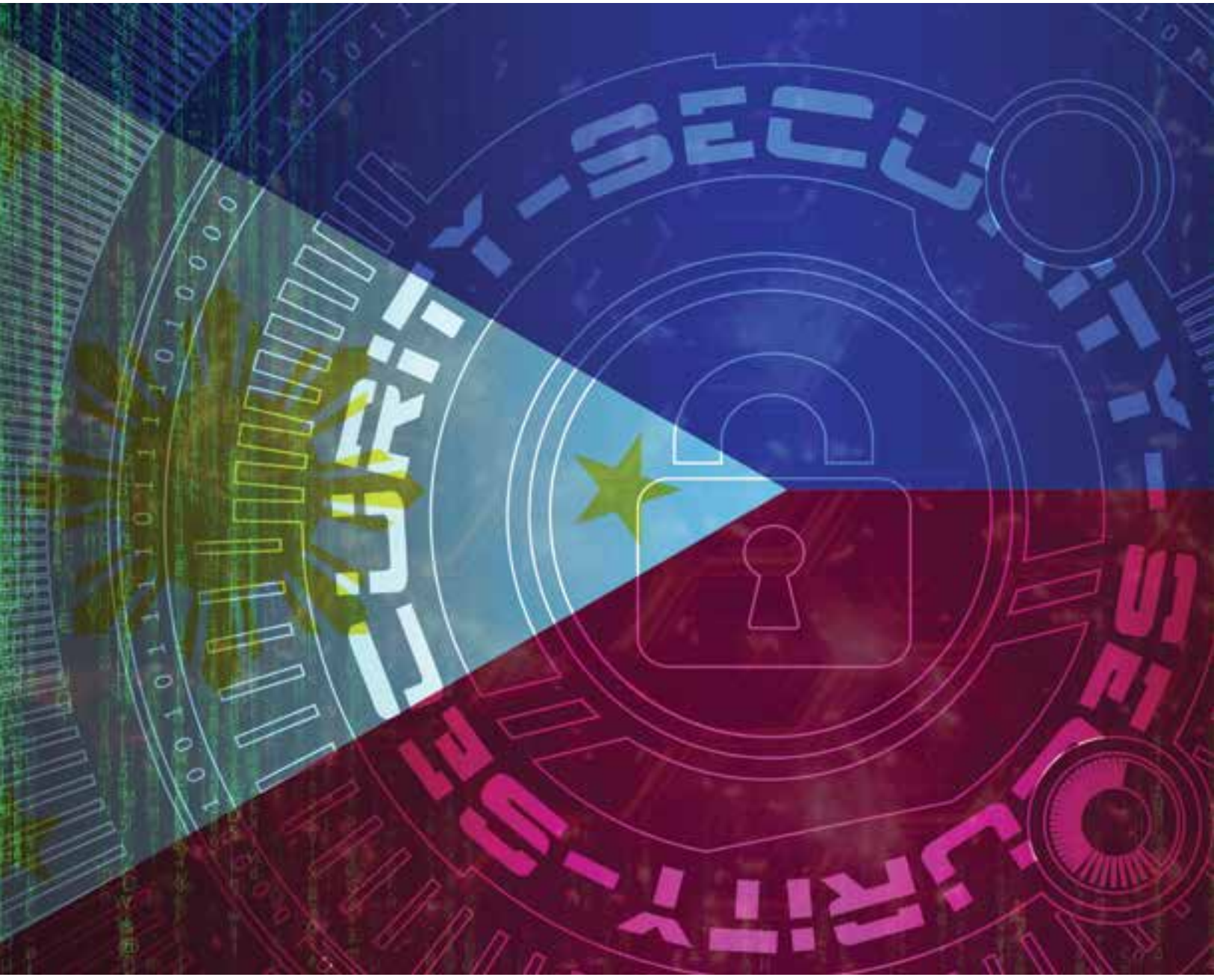
As pressures on data cables reach an all-time high and new low-latency-dependent technologies such as 5G, IoT and AI move into the mainstream, key players are therefore looking to invest in diversified routes and locally hosted data centers in the Middle East. For instance, end-to-end remote peering capability is now available by utilizing various Gulf networks and landing stations. This means that Internet Service Providers (ISPs) can enjoy hassle-free remote peering as network providers will be a one-stop shop, enabled by leveraging relationships with suppliers in the region.

Ultimately, companies should shift away from their overreliance on the same cable routes. They must work with providers like GBI that can provide diversification and, therefore, confidence that connectivity will always be available, whatever the situation.

By diversifying our North Route so that it now also passes through Iraq, we are providing that assurance. When you consider that we also have our South Route that runs through Egypt, we are certain that our Smart Network is playing a critical role in keeping the world connected. We are removing bottlenecks and opening the door to higher-quality content and digital transformation, showcasing the Middle East as an attractive commercial destination. TR

By Brendan Press, chief commercial officer of GBI

“Leveraging cables and assets in Asia, as well as Gulf countries such as Iraq and Qatar, to carry traffic via diverse terrestrial networks to Europe provides a multitude of benefits. For example, circumventing the Arab Peninsula completely can improve latency, availability and stability”



Ongoing Concern: The Continuing High Prevalence of Cyberattacks in the Philippines

In a telling 2022 report, Kroll, an independent provider of risk and financial advisory solutions, claimed that 75% of organizations in the Philippines have experienced some form of notable "cyber incident," which is much higher than the APAC average of 59%.

Cyberattacks are attempts to steal, illegally expose or destroy another's assets through unauthorized access to its computer systems. Such malfeasance can be conducted by individuals, groups or organizations alike.

Among the most significant concerns among organizations in the Philippines were data loss (70%), intellectual property (60%), business interruption due to cyberattacks (also 60%) and regulatory fines (29%).

Status of Cyberattacks in the Philippines

The Philippines ranked second among countries with the most cyberattack incidents worldwide in 2022, largely due to the increased use of social media or digital platforms during the coronavirus pandemic, cybersecurity company Kaspersky said.

"We have seen how adversity, such as the pandemic, hastened the digital transformation among local businesses and customers alike. In the same vein, cybercriminals saw it as an opportunity to take advantage of the cybersecurity weaknesses of those jumping on the digital wave," Chris Connell, Kaspersky managing director for Asia Pacific, added.

Kaspersky Security Network showed the 2022 global ranking, which was topped by Mongolia at 51.1%, followed by the Philippines at 49.8% — up two spots from the year before. The ranking was based on the number of web-based cyber threats detected and blocked by Kaspersky products.

For the first half of 2022 alone, Kaspersky products found almost 14 million threats from users in the Philippines. Though mobile malware attacks dropped from 2019 to 2021 by 69%, there were indications that Trojans were injected into third-party ad modules on top of new Trojan discoveries.

According to Department of Information and Communications Technology (DICT) Assistant Secretary Jeffrey Ian Dy, almost half of the recorded "high level cyberattacks" were systems and networks of government agencies and emergency response teams.

Actions Against Cyberattacks

The DICT Acting Secretary, Emmanuel Rey R. Caintic, previously announced that there is still a lot of work to do to strengthen the country's defenses against cyber threats and attacks. "Rome wasn't built in a day," he lamented in one such virtual interview.

Of the five levels of maturity in cybersecurity, Caintic believed that the Philippines is still at level 1 in terms of awareness, communication and cybersecurity expertise. DICT aims to reach maturity level 5, or the "resilient enterprise" level, in the next several years.

Last year, the DICT announced a budget of up to P600 million intended for cybersecurity, which was bigger than the previous budget of P300 million. Among the government's proposed plans was to upgrade the Security Operations Center (SOC), which was acquired in 2019.

Meanwhile, President Ferdinand R. Marcos Jr. recently welcomed the signing of the memorandum of understanding (MoU) between the National Grid Corporation of the Philippines (NGCP) and the National Intelligence Coordinating Agency (NICA), emphasizing its importance in fending off cyberattacks on energy infrastructure.

The signing demonstrated the country's continuing effort to protect itself against any cyberattack, Marcos said during the event held at Malacañang Palace. "Since NGCP is a critical part of our security of our ability to continue to function as a society, then this is an important day because now we have made more robust the defenses against any possible attacks on our power systems," he stated.

NICA's task is to integrate collected intelligence information from various government instrumentalities, analyze and assess the data, and recommend actions to safeguard NGCP's transmission assets. At the same time, the NGCP can share information on energy-related security issues and provide technical advice to the NICA. TR

"For the first half of 2022 alone, Kaspersky products found almost 14 million threats from users in the Philippines"

Data Streaming: Effectively Empowering Businesses in Asia

Data streaming has evolved into an essential component of vital business operations in today's digital landscape, enabling personalized consumer experiences and real-time decision-making. Confluent, Inc.'s recently released 2023 Data Streaming Report emphasizes the growing relevance of data streaming in attaining business objectives. The report highlights the critical importance of data streaming in running efficient, responsive and competitive organizations in the digital-first era, based on a comprehensive survey of 2,250 IT leaders, with over 30% of respondents from the APAC region.

Data streaming allows businesses to capture and handle massive amounts of data in real time, providing significant insights into customer behavior, market trends and operational performance. Businesses then utilize this information to improve their decision-making processes and gain a competitive advantage. E-commerce enterprises, for example, can analyze consumer browsing behaviors, track purchasing activity and provide customized recommendations quickly, resulting in improved conversion rates and satisfaction among consumers.

Advantages of Data Streaming

The 2023 Data Streaming Report incorporated the Data Streaming Maturity Curve, which maps out organizations' adoption journeys from pre-production activities at Level 1 to

data streaming as a strategic enabler for all aspects of a company at Level 5.

According to the survey, the more a company invests in data streaming, the more benefits and profits it generates. In fact, 68% of organizations in Level 2 of the Data Streaming Maturity Curve have achieved or anticipate 2–5 times returns, and this increases to 75% with Level 3 companies.

Meanwhile, Asia's growing manufacturing and logistics sectors rely largely on effective supply chain management to remain competitive. Data streaming is critical for supply chain optimization because it provides real-time visibility into inventory levels, shipment monitoring and demand forecasting. Businesses can discover bottlenecks, cut lead times and increase overall operational efficiency by continuously monitoring data from sensors, RFID tags and IoT devices. This proactive strategy not only ensures easier operations but also saves money and improves customer satisfaction. The report shows that 73% of IT leaders find data streaming beneficial, particularly in terms of greater product or service profitability.

Even in the financial services sector, data streaming proves advantageous. Real-time data is used by banks and financial organizations to monitor transactions, detect fraudulent activity and make immediate judgments. Financial institutions are now able to securely share client data in real-time, stimulating innovation and enabling the development of personalized financial products and services, thanks to the introduction of Open Banking. Furthermore, data streaming enables algorithmic trading and automated risk management systems, giving traders real-time market information and improving investing methods. The 2023 Data Streaming Report revealed that 69% of IT leaders are using data streaming to power critical applications, while 57% indicate that five or more of their organization's critical systems rely on this technology.

Investing in Data Streaming

While data streaming has huge potential, it also brings significant limitations. To manage and analyze massive amounts of real-time data, a solid infrastructure, strong analytical capabilities and data governance frameworks are each required. Furthermore, when working with sensitive information, protecting data privacy and security becomes critical. Asia's governments, corporations and regulatory organizations must work together to create comprehensive data protection frameworks that balance innovation and privacy.

"In an increasingly digital APAC, data is the lifeblood to driving innovation and helping organizations stay ahead of the curve. To fully harness its potential, data streaming holds the key to unlocking real-time, data-driven business decisions. At the same time, organizations can look forward to reducing operational complexities and bolstering resource efficiency while adding value to rich and responsive customer experiences," said Kamal Brar, senior vice president, Asia Pacific and Japan, Confluent.

With the deployment of data streaming, organizations frequently encounter common obstacles.

Many of these hurdles are similar to those that precede any big technology-led transformation, such as skills shortages, legacy system limits and the need for more financing. Fragmented projects, uncoordinated teams and insufficient funds are also cited as challenges or major impediments by 74% of IT leaders, with 72% citing a lack of required skills, inconsistent usage of integration methods and standards, and legacy-related constraints.

Overcoming such challenges is essential for realizing the full potential of data streaming. And businesses are prioritizing investments in a wide range of areas to eliminate these barriers. In the coming months, 91% of IT leaders foresee as a medium to high priority the increasing awareness regarding the advantages of data streaming, as well as more of its integration and reuse. Improved visibility into streaming-related behavior, stronger governance and compliance controls, as well as system standardization, are also on the agenda.

The rise of data streaming is transforming the corporate landscape, allowing firms to quickly and effectively turn data into action. Data streaming solutions enable businesses to stay secure, agile and ahead of customer expectations by providing quick and dependable access to continuous streams of real-time data. By utilizing data streaming, companies can maximize the value of their data, improve operational efficiency and provide great customer experiences, distinguishing themselves in a highly competitive market. TR

Data streaming is critical for supply chain optimization because it provides real-time visibility into inventory levels, shipment monitoring and demand forecasting

Revolutionizing Customer Experience in Asia Through Generative AI

The rise of new technologies has driven digital transformation in various industries around the world. Businesses in Asia are no exception, as they continuously develop methods to improve their services in order to provide better customer experience and thus remain competitive in their respective fields. Generative artificial intelligence, also known as GenAI, has emerged as a strong technology that can potentially transform customer experience (CX).

Generative AI focuses on creating new and unique material rather than simply analyzing current data. Unlike traditional AI, which depends on pre-programmed rules and organized data, generative AI uses advanced algorithms, such as deep learning neural networks, to discover patterns from massive datasets and then generate new content with human-like creativity.

A recent report by the International Data Corporation, or IDC, titled "Applications of Generative AI in Customer Experience," delves into the Gen AI environment and its implications for customer experience. According to the survey, 70% of c-suite executives in the Asia-Pacific region are either considering or already investing in Gen AI use cases, indicating a substantial shift toward embracing this technology to generate improved customer relations.

"Gen AI holds immense potential for CX. Experimenting with this technology will also help determine which use cases — customer-facing or employee-facing — constitute the greatest value for a specific business model. Those technology vendors who identify and iteratively test these factors early with the right metrics will become the game changers," said Lavanya Jindal, market analyst, customer experience and enterprise applications, IDC Asia Pacific.

Implications of GenAI for Customer Experience

According to IDC, the top five use cases of GenAI in the region are knowledge management, code generation, marketing, conversational apps and design. While each of these apps has advantages, information management, marketing and conversational applications have the greatest impact on improving CX.

Generative AI provides a number of advantages that can improve customer experience and boost commercial success, including a hyper-personalized customer experience. Because GenAI can deliver customized insights, firms can design experiences tailored to specific customers. Companies may give individualized product recommendations, services and content by evaluating customer data and behavior, boosting brand loyalty and satisfaction.

For example, businesses use chatbots and virtual assistants that are able to engage customers in more natural and personalized discussions. Through machine learning, these AI-powered assistants can understand context, adapt to individual preferences and continuously improve their responses. Customer encounters become more efficient and informative.

GenAI can also enhance employee productivity and efficiency by automating manual processes, allowing employees to focus on more vital and creative aspects of their roles. This improves not only operational efficiency but also the quality of service given to clients.

GenAI in Retail

When it comes to retail, GenAI has also emerged as a substantial technology that is revolutionizing the industry not only in customer support but also in supply chain operations. GlobalData, a leading data and analytics company, emphasizes GenAI's impact in retail, enabling businesses to respond to individual requirements and create long-term relationships with customers.

Kiran Raj, practice head of disruptive tech at GlobalData, commented, "In a retail environment where the product-to-experience shift is increasingly significant, GenAI can enable the creation of immersive, personalized experiences, integrating virtual and physical retail spaces in a manner that resonates with modern consumers' expectations. Moreover, it is no longer about a one-size-fits-all engagement; rather, it is about a tailor-made experience catering to individual needs."

GlobalData's latest Innovation Radar report, "Cognitive revolution: GenAI meets retail," provides a detailed look at how GenAI is being applied across the retail value chain. The possible applications of GenAI range from inventory management and targeted marketing to customer experience and assistance.

GenAI can optimize inventory planning for retailers by evaluating data on product demand, seasonal trends and supply chain logistics. This results in more efficient stock management with fewer stockouts and overstocks. Moreover, retailers can create highly focused marketing campaigns thanks to GenAI's ability to evaluate client behavior and preferences. Customized promotions and product recommendations make shopping more enjoyable for customers, boosting their likelihood of purchasing.

Investing in GenAI

Despite economic difficulties, companies in the Asia-Pacific region continue to invest in CX improvements, understanding the essential role it plays in customer retention and growth. Zendesk, Freshworks, Intercom, Salesforce and Baidu are among the technology companies that have focused their GenAI efforts on conversational apps. These businesses see the untapped potential in customer journeys that can be enhanced by AI, thereby enhancing the overall value of customer experience.

According to IDC, by 2025, 45% of Asia-based 1000 companies will use AI and machine learning (ML) to elevate context and guide clients into unexpected and novel experiences. This forward-thinking approach promises to improve customer experience and lead enterprises to greater success.

Generative AI surely has tons of benefits and potential. It does, however, provide issues, such as the possibility of biased or unsuitable material, which necessitates thorough ethical considerations and appropriate safeguards during development and deployment. TR

The Challenges and Growth of Southeast Asia's Data Center Market

The strong global demand for digitalization drives rapid growth in data centers across Southeast Asia.

A report by Technavio, titled "Data Center Market in Southeast Asia by Component and Geography - Forecast and Analysis 2021-2025," claims that the market will experience a total growth of $12.60 billion between 2020 and 2025. This research report covers data center market segmentation in Southeast Asia, including information technology (IT) infrastructure, electrical construction, mechanical construction, general construction and security solutions. It proves that the Southeast Asian market is highly competitive, as many vendors are competing to increase their market shares.

Factors Influencing Data Center Market Growth

The remarkable growth of the data center market has been fueled by several different factors, such as cloud computing, artificial intelligence (AI), e-commerce, the Internet of Things (IoT), edge computing and 5G.

The need for high-performing IT infrastructure is increasing as more companies adopt IT infrastructure into their operations to ensure their business continuity; this increased implementation would strengthen the data center market in Asia further, especially for hyper-scale data centers due to organizations' desire to ensure the scalability of their business as well.

Another key factor driving market growth in the data center market in Southeast Asia is the relationship to connectivity gateways as well as the existence of solid submarine cable networks.

Internet landing stations, also called connectivity gateways, are locations where submarine cables connect to the network infrastructure of a specific region. Stations like these are strategically located in areas where marine traffic is minimal to eliminate the risk of damage to cables by objects like ships' anchors.

A lot of colocation service providers and cloud service providers (CSPs) are establishing data centers near internet landing stations to reduce connectivity costs and overall latency. This shows the influence of internet landing stations in driving the growth of data centers in various regions. A good subsea cable network has also been one of the essential factors in increasing investments in data centers.

Southeast Asia Data Center Hubs

The MHI magazine Spectra published an article on how Johor, Malaysia and Batam, Indonesia, are becoming interesting destinations for data center operators because of the rising demand for digital services in Southeast Asia. The consistent adoption of cloud services, as well as the importance of digital services during the COVID-19 pandemic, fed this demand. Its large population, particularly tech-savvy youth, also drives organic growth of 10-15% in the data center sector.

A moratorium on new data centers in Singapore, has resulted in operators expanding into its neighboring countries. Indeed, the collaboration between governments and industry has facilitated the development of data centers in Johor and Batam, benefiting from their proximity to Singapore.

Still, it's important to note that Singapore's undersea cable connectivity has also been a contributing factor that has allowed it to become a popular location for data center operators despite its land constraints. As of May 2020, the comprehensive network of 24 undersea cables linking Singapore to many key areas globally makes Singapore the prime location to connect the region to the rest of the world.

Indonesia is also emerging as a leading data center hub in Southeast Asia due to its growing digital economy. The government's active industry promotion has also led to many projects underway. Among the factors driving this growth are the increasing demand for cloud computing services and Indonesia's large population, which offers a market for data-intensive applications.

The government's supportive regulations and incentives have also attracted investment in the industry. Despite the challenges faced by the data center industry in Indonesia, which include a lack of skilled talent, power outages and developing regulations, the country is still well-positioned to become an essential data center hub in Southeast Asia.

Also, the explosive growth in digitalization, e-commerce and digital banking in India, Indonesia, Thailand and Vietnam will likely present massive opportunities for data center operators in those countries.

In the future, we might even witness demand for data centers shifting to additional locations in Asia. The growing entrepreneurial power across different markets means new organizations with innovative new technologies may place unique demands on data centers. These consistent developments simply mean that data center markets will continue to grow. TR

The remarkable growth of the data center market has been fueled by several different factors, such as cloud computing, artificial intelligence (AI), e-commerce, the Internet of Things (IoT), edge computing and 5G

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27 - 28 SEPTEMBER

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Cloud Expo Asia is the leading cloud technology event in the region that connects technologists and business leaders to explore the latest cloud innovations, solutions, and trends.

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Place: Dubai World Trade Center, Dubai, UAE

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