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TELECOM EDITION

SECURING CELLULAR IOT

KIGEN

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CIO Review 10 MOST PROMISING TECHNOLOGY SOLUTION COMPANIES FOR TELECOM INDUSTRY 2021

COVER STORY

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CEO

KIGEN

SECURING *CELLULAR* IOT

It's 10 p.m. on a Saturday. A burglar enters the premises of a private building, cuts the main power supply, and disables the Wi-Fi-based alarm system to sneak into the facility unnoticed. However, he is unaware that the alarm system has a backup cellular connection, which has triggered an alert to the building owner through an app on his mobile phone. Battery-powered security cameras around the building have detected the motion of the trespasser and automatically uploaded the camera footage to the cloud, where the owner can view the movement of the burglar remotely, in real-time, and alert the police.

This is but a simple instance of how cellular IoT is transforming daily life. From self-driving cars to smart parking to autonomous farming equipment to consumer wearables like smartwatches, cellular IoT is used everywhere and in everything. The GSMA predicts that by 2025, there will be about 25.2 billion connected devices in circulation. Today, many deployments prefer cellular technology as the backbone of their connectivity because it is ubiquitous, reliable, cost-effective, and can support multiple devices. Cellular connectivity also provides a high level of built-in security.

Typically, IoT applications that rely on cellular networks for connectivity require SIM cards. Network providers use SIM cards to store profiles that authenticate a device and provide secure identification and storage. Yet, despite their efficacy and sheer numbers, the traditional SIM card design

presents problems for a cellular future. Conventional SIMs are discrete cards that plug into the mobile device, which means they take up space; the mobile device needs a SIM slot (increasing costs and providing an ingress for dust and water), and if a SIM upgrade is required, each card must be replaced¬—something that isn't practical for potentially millions of devices. Besides, the traditional SIM technology ties each SIM card to a single mobile network operator. To change network operators, users need to swap out SIM cards—reasonably easy for a mobile phone but more challenging for small form-factor or widely deployed IoT devices with built-in SIMs, such as smart meters used in thousands of households.

Addressing all of these limitations of the traditional SIM is Kigen, a UK based telecommunications company that enables businesses to grow their IoT capabilities rapidly by integrating trust and security through embedded SIM (eSIM) and integrated SIM (iSIM) technologies. Vincent Korstanje, CEO, at Kigen, says, "We are making the future of secure connectivity simple. Our mission is to make it more accessible and easy for Telco companies and service providers to go cellular. Together with our partners and customers, we are creating new opportunities as eSIM and iSIM become the cornerstone of trusted IoT."

KIGEN'S EVOLUTION

Kigen is the result of incubation and investment after being acquired by Arm holdings, a Softbank Group Company, in 2017 from eSIM pioneers Simulity Labs Ltd, which was incorporated back in 2009. Kigen spun out into a standalone company in 2020 as a subsidiary of Arm. The Arm acquisition brought an element of scale and investment that was key to the growth of Kigen and its focus on iSIM technology. "We pioneered the iSIM—which is truly a leapfrog technology—back in 2019 through a partnership with our first mobile operator partner, Vodafone IoT alongside chipset makers and module makers," reveals Korstanje. "The collaboration enabled us to see what we could do in terms of driving security into low power, battery-efficient IoT that can be scaled down to a much smaller size and form factors. This will truly disrupt the supply chain by bringing more players and witness the new era of IoT take off."

Today, Kigen delivers trusted and secure enablement technologies and services for remote subscription management into cellular IoT industries globally. The business works with partners across an extensive technology ecosystem, including chipset makers, device manufacturers, mobile network operators, solution and application providers, offering a broad portfolio of solutions that simplify SIM delivery and management throughout the connected device value chain.

ESIM AND ISIM: DRIVERS OF INNOVATION AND OPPORTUNITY

"No matter which industry a business operates in, connectivity and security are significant pain points for the development of IoT. By using Kigen technology to virtualize SIMs on-chip, companies can create efficiencies and performance gains in how their IoT devices are produced, auto-provisioned, and managed in the real world. Besides reducing deployment complexity, our standards-based eSIM and iSIM technology enable greater interoperability based on a secure foundation" explains Vincent.

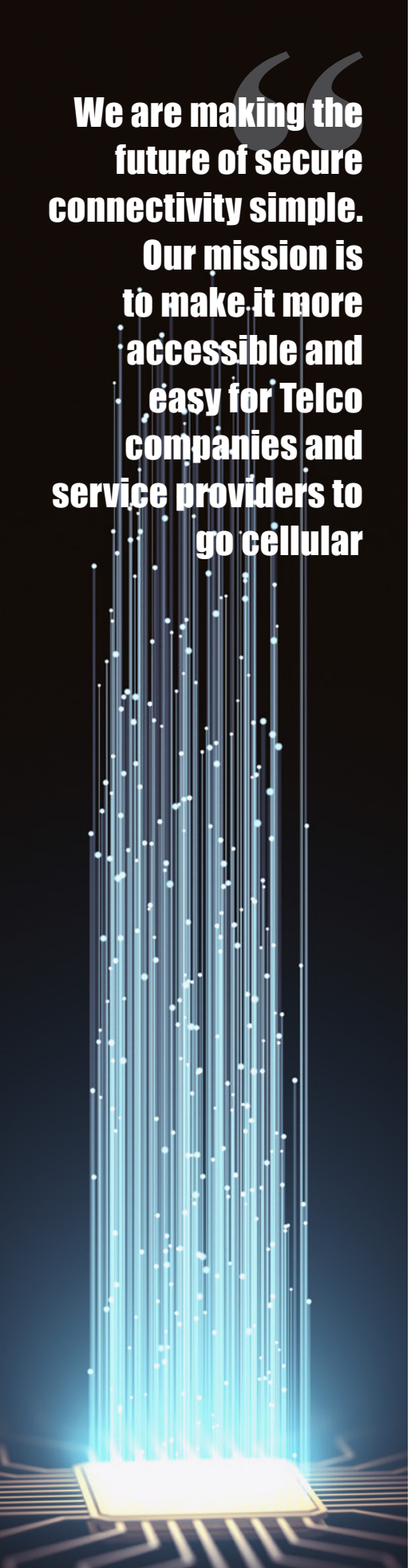
Kigen's SIM portfolio is built on the latest cellular standards and specifications; its products are optimized for 2G / CDMA / 3G / 4G and 5G networks, not to mention low powered wide-area networks such as NB-IoT and LTE-M. Through its secure SIM operating system (OS), data generation, and professional services, the organization is driving a standardized path to secure products for device-makers, highly flexible eSIM services for SIM vendors and connectivity providers, and ultimate security with iSIM for power-efficient IoT. Hardware and device makers can leverage Kigen's SIM OS for chipsets and modules, diversifying manufacturing and leveraging interoperable chip-to-cloud solutions. The Kigen OS offers the highest level of logical security when employed on any SIM form factor. "What makes it unique is the fact that it has the smallest footprint; the SIM OS runs natively, allowing OEMs to select compact, cost-effective tamper resistant hardware to run it on.

Furthermore, it is hardware agnostic and offers the highest level of logical security when employed on any SIM form factor, including a secure enclave," informs Korstanje.

Kigen's range of eSIM OS, remote SIM provisioning (RSP) solutions, and data generation services balance power, total cost of ownership optimization and defense-in-depth requirements by providing the flexibility that fast-moving SIM manufacturers and IoT service providers require. The eSIM offers the ability to store multiple profiles and remotely provision them. Subscriptions can also be switched easily, without discrete SIM physical handling involved. "Moreover, because of their size (eSIMs are less than half the size of nano SIMs), eSIMs don't require a socket; they easily fit in very small devices," adds Korstanje.

Kigen's iSIM, on the other hand, expands on eSIM benefits through silicon integration, significantly reducing space on the device and offering lower power consumption and reduced costs. To a large extent, iSIM technology leverages the existing eSIM ecosystem and back-end infrastructure while simplifying SIM logistics. It can massively reduce the standby power consumption compared to multi-chip designs, a real game-changer for devices with built-in lifetime battery. However, a notable aspect of iSIM is its flexible subscription deployment models:

iSIM supports both a classic SIM OS providing a fixed network subscription and an eSIM OS with the flexibility to have the subscription modified for a manufacture-once ship-anywhere model. "Our iSIM is compliant enough to support either a single profile or remote SIM provisioning mechanisms, with the latter enabling out-of-box connectivity, and secure and remote profile management; even for the tiniest of IoT devices," says Vincent. The Kigen iSIM can offer the same level of logical protection for the network credentials



as a certified eSIM; a secure enclave reinforces chip-level security. iSIM is fully compliant with GSMA Remote SIM Provisioning standards as well as ETSI SIM specifications. In contrast to eSIM technology, the iSIM gives chipset makers and OEMs more control over-optimization, differentiation, and security.

A notable example of the efficacy brought by Kigen's iSIM is best exemplified by the iSIM enabled printable tracking device, which is used by one of the world's largest pharmaceutical companies to understand the supply and use of their critical products in agriculture and life sciences. The product has gone from prototype to full industrial/ commercial product quickly given the complexities of the solutions and the novel developments.

SIMPLIFYING AND DEMOCRATIZING DIGITAL SECURITY

For telecom operators, Kigen's iSIM, eSIM and secure services with remote SIM provisioning bring new ways to grow services and applications—particularly as the need for safe and trusted services that can revolutionize remote healthcare, smart cities infrastructure, urban mobility, and connected car industries imminently rise. In particular, the Remote SIM Provisioning (RSP) service enables seamless generation, management, and hosting of operator profiles in line with the GSMA remote SIM provisioning specifications. That being said, the business also offers an extensive array of professional services to fit any business' requirements. "As an industry, we are at a watershed moment. The world is digitizing most human interactions, and the pandemic has accelerated this. This is the industry's collective opportunity to re-imagine how we ensure that our digital futures are built on security and trust. Via our innovative solutions and services, we are democratizing trust for IoT," states Vincent.

Currently, Kigen has 135 employees, and their most significant strength lies in Engineering and Product. Kigen's product teams have over a decade of experience innovating around data generation and making security integration simple for telecom operators and IoT connectivity providers. "We are led by a leadership team that brings decades of experience and expertise to the table. Our team combines best technical expertise with deep relations with the ecosystem, without heavy legacy. We are a strong, diverse team of curious, creative people who enjoy challenging the status quo," mentions Korstanje. "Values in our culture are lived and they help us drive for collective positive impact: passion for customer success, thinking big, acting fast, and above all, being excellent to all." Another notable facet of Kigen is its fabless approach; the business is customer-driven and build's solutions alongside them. "We engage as a trusted partner," adds Vincent. Kigen is the trusted partner to eight of the top ten leading chipset and module vendors. Leading companies like AT&T, Vodafone, KORE, Qualcomm Technologies, Sequans Communications, and Softbank International Group of companies ride on Kigen's coattails to grow their cellular connectivity.

As a part of its plan for the future, on one end, as the demand for low power, battery-efficient devices grow, Kigen is looking to lead in evolving the plastic, replaceable SIM to new levels of integration into the cellular chipset. On the other end, the team intends to leverage technologies like 5G, ML and AI to secure connected things as simple as possible. "Alongside, we are looking to offer additional trusted services that will differentiate and revolutionize multiple industries. After all, in the days to come, security will be equivalent to how critical e-commerce became to all businesses to survive and thrive. And we are at the helm of unlocking growth with new ways of securing connectivity," Korstanje concludes. CR