squire technologies

CORE NETWORK
OPTIMISATION
2025

Agile signalling solutions bringing order to complex multi-generation networks

REVENUE CHALLENGES
OF 5G SA ROAMING

EVERYTHING, EVERYWHERE
ALL AT ONCE WITH KORE

MOBILE FINANCIAL
OPPORTUNITIES IN RWANDA

SUSTAINING MOBILE
CONNECTIVITY IN AFGHANISTAN

What's inside...

Introduction

The signalling specialists to the telecoms industry

Based in the UK and founded in 2001, we have spent over two decades providing innovative core network signalling solutions. As telecom networks have evolved, so have we.

Squire Technologies' core optimisation solutions underpin the networks of some of the world's most enhanced communications service providers, like Vodafone, AT&T, and GMS.

Over 400 global telecom operators experience reduced operational costs, enhanced flexibility, and fast-to-market services thanks to our cutting-edge core network signalling solutions.

With over two decades of experience in the telecoms signalling sector, our customers know they will get the highest quality project delivery, suited to their unique needs.

We know the importance of having forward-facing and backward-facing telecom networks to deliver services across the growing mix of complex technologies and standards that make up our global communications networks.

"Telecommunication infrastructure is too important to compromise on quality and reliability. At Squire Technologies we have been gathering knowledge and expertise, working with global partners and customers, and conducting research, to ensure that our solutions are the best our customers and partners can get. We are committed to delivering high-quality solutions.

"We recognise the important role our products play within Telecom Operators' Core Network and in giving them the flexibility they need to meet market demands from onboarding new inter-connect partners to ensuring uninterrupted services to end users. It is a critical component, and we are proud to work with so many innovative partners and pioneering customers to deliver the User Experience that end consumers can benefit from.

I hope you enjoy the 2025 edition of Core Network Optimisation, which features industry insights, case studies and product information."

Sanjeev Verma, CEO at Squire Technologies
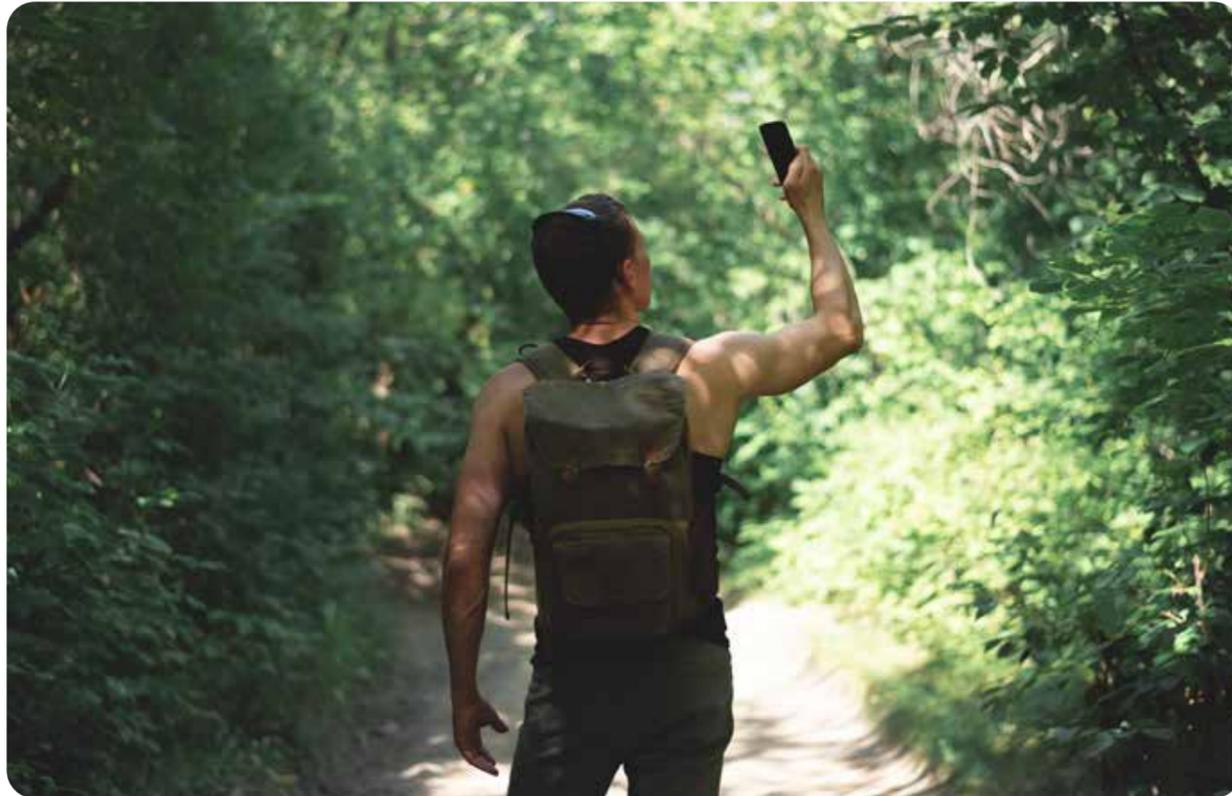
Solving the revenue challenges of 5G SA roaming

Operators have an opportunity to boost revenue, reduce costs and retain customers by leveraging 5G SA roaming. However, there are challenges that MNO's need to address.

Monetisation worries, deployment costs and multi-generation network concerns present significant obstacles for mobile network operators (MNOs). The arrival of standalone (SA) 5G creates further complexity.

To protect their investments from market turbulence and other factors, MNOs need flexibility built into their networks. Doing so will enable easier deployment of new revenue-generating offers, efficiency savings and future-ready functionality.

Flexible 5G SA roaming components
For 5G SA Roaming to work, MNOs will need:
- An HTTP/2 Signalling Controller (HSC) with:
  - Security Edge Protection Proxy (SEPP)
  - Service Communication Proxy (SCP)
- 5G Interworking Function (IWF)
- A Binding Support Function (BSF)
- A VoLTE network fallback solution

With 5G SA Roaming, operators will manage 5G HTTP/2 protocol signalling via an HSC, routing with an SCP, and securing communications using Transport Layer Security via SEPPs. Unlike 4G, 5G is secure by design. SEPP's encrypt communications across a 5G core, limiting identity spoofing, information manipulation, snooping, and even minimising signalling storm damage.

The BSF links sessions together across the network. It correlates Diameter and HTTP/2 sessions and enables Policy Control and Charging Function scaling. A network needs a BSF as soon as it has more than one Policy

Control Function (PCF) and a Voice over NR or AF/NEF use case.

Naturally, MNOs must establish new roaming agreements with other 5G SA carriers. Additionally, VoLTE is a prerequisite for deploying a 5G SA core, as 5G SA cannot use a Circuit Switched Fallback of 2G/3G systems.

All these criteria make 5G SA roaming a significant investment for any operator. However, it might be a necessary investment.

Why is 5G roaming critical for operators?
Highly competitive markets, thin margins and 5G monetisation issues are challenging for operators. Simultaneously, governments and industries are looking to telcos to deliver the communications infrastructure necessary for Industry 4.0.

Additionally, good-quality connectivity is a high priority for customers. Up to 20% of roaming customers will change networks or use a local SIM card to ensure they have a good quality connection. Research from OpenSignal also shows that roamers will spend disproportionately longer on WiFi than local citizens in their search for better connectivity than their mobile service.

There are also financial incentives for operators to implement 5G roaming facilities. The market for 5G roaming is expected to boom. Juniper Research anticipates 5G roaming connections to jump from 53 million

in 2023 to 526 million by 2027.

Standing in the way of grasping these opportunities are two overarching challenges that mobile network operators face. The first concerns revenue. The second concerns the complexity of legacy networks.

Revenue challenges of 5G SA roaming
There are substantial revenue challenges for mobile network operators to deal with, beyond the cost of deploying 5G SA roaming.

MNOs that don't integrate 5G roaming into their existing networks, will:

- Fail to retain subscribers if the moment they step out of their home networks their service no longer works.
- Lose revenue if they're unable to successfully charge prepaid subscribers dynamically credit-checked over legacy protocols.
- Find it hard to maintain existing price points as customers will increasingly expect 5G SA roaming to be standard with their contracts. Already this is an issue for operators who don't offer 5G subscriptions.
- Lose subscribers unless they can seamlessly roll out new services that work as they roam outside of their home network.

Existing multi-generation networks also pose a significant challenge for MNOs.

Network complexity challenges of 5G SA roaming

Though operators are turning off 2G/3G, it's wise not to do so before 5G is deployed in their network. Otherwise, in nations without full 4G coverage, subscribers face a loss of connectivity. As such, many operators face the complication of having to interop several protocols.

Added to the complexity of multi-generation network interop is the versatility and functionality of 5G. Massive IoT, AI and network slicing are just some of the ways that 5G will diversify mobile networks creating evermore convoluted systems.

The flexibility solution

Operators need flexible, future-ready networks that can adapt to market changes.

At the heart of the problem is that a bridge is needed between SS7 and Diameter protocols of 2G/3G/4G LTE networks and the HTTP/2 protocol of 5G. Bridging the protocols will enable seamless sharing of policy, charging and authentication information while allowing easy integration of future network components.

The industry has developed a set of standard HTTP/2 signalling-based network products. Included in this product set is the 5G SVI-IWF (HTTP/2 Interworking Function), a sub-component of the HTTP/2 Signalling Controller.

The 5G SVI-IWF provides 3GPP specified HTTP/2 to SS7 CAMEL, MAP, and Diameter interworking. So, you can leverage 5G SA roaming and other new revenue streams while extending network functionality and lifespan.

Open Gateway by Squire Technologies

The Open Gateway (SVI-OGW) enables the rapid delivery of converged services across IMS, NGN and Legacy SS7 networks. The SVI-OGW enables operators to leverage existing infrastructure, increase return on investment and rapidly deploy new services.

The extremely flexible, service-driven SVI-OGW Open Gateway allows operators to rapidly devise, test and deploy services.

Whether interworking HTTP/2, DIAMETER or SIP with legacy SS7 CAMEL/INAP/MAP, or interfacing subscriber database over SQL/SOAP/HTTP into your incumbent networks, the SVI-OGW provides the flexibility to achieve this.

The SVI-OGW operates over defined APIs that present an abstracted version of the underlying HTTP/2, DIAMETER, SIP, CAMEL, MAP etc signalling. It can act as an integration layer between existing APIs and the Camara APIs derived from GSMA's Open Gateway project.
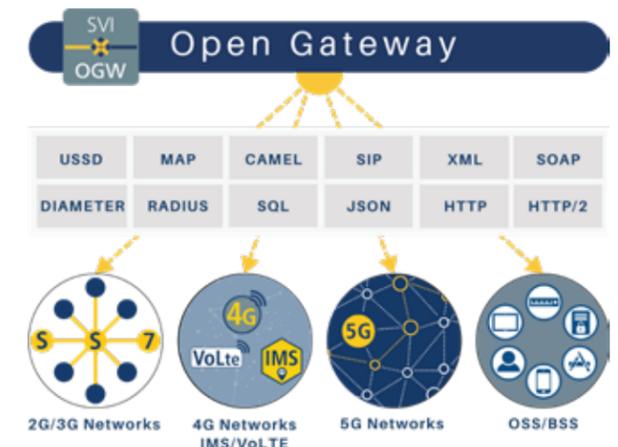
Key benefits

- **Cost savings**
  Deliver only those services that you require instead of paying for a full application suite that you will never use.

- **Powerful**
  Services built using industry-standard Python scripting language.

- **Extendable**
  Extend services using in-house resources or let our experts develop at a fixed cost.

- **Flexible**
  Allows monitoring, termination and transmission over APIs for service creation.

- **Speed**
  Script-based delivery removes compilation and upgrade cycle.

- **NFV**
  NFV-ready technology.

Kore Wireless

UNITED STATES OF AMERICA

Everything, everywhere all at once with Kore

The world of telecommunication and IoT moves fast, but KORE is always one step ahead. Known for its innovation and reliability, KORE is helping businesses stay connected and thrive in an increasingly digital world. From fleet management to healthcare, KORE's solutions make complex connectivity simple and scalable.

Who is KORE?

KORE is an IoT and connectivity powerhouse, providing businesses with the tools they need to connect, scale, and optimize their operations. Whether it's IoT connectivity, managed services, or security solutions, KORE offers global reach across industries like healthcare, fleet management, industrial IoT, and telecommunication. With operations in over 190 countries, KORE is a key player in ensuring businesses have reliable, secure, and efficient connectivity.

Recognition and success

KORE's dedication to innovation hasn't gone unnoticed. The company has earned several prestigious industry awards, including the 2024 IoT Platforms Leadership Award from IoT Evolution for its ConnectivityPro™ platform. This recognition highlights KORE's expertise in simplifying and optimizing IoT connectivity, helping businesses manage their networks seamlessly. From connected health to fleet management, KORE continues to set the standard for excellence in the IoT space.

Key focus areas and achievements

KORE is constantly expanding its capabilities to ensure businesses have access to top-tier solutions. Some key areas where KORE is making a big impact include:

- **Connected health:** Powering remote patient monitoring, telehealth, and healthcare asset tracking with seamless, reliable connectivity.
- **Fleet and logistics:** Providing advanced telematics and connectivity solutions to help fleet operators track vehicles, ensure safety, and improve efficiency.
- **Smart infrastructure:** Supporting smart cities and industrial automation by powering IoT solutions that enhance operational performance and sustainability.

Real-world impact

A great example of KORE's impact is its partnership with Medical Guardian, a leader in personal emergency response systems (PERS). Medical Guardian needed a secure, reliable connectivity solution to support its life-saving devices for seniors. By leveraging KORE's robust IoT connectivity, Medical Guardian enabled seniors to live longer and more independently, ensuring emergency services are just a button press away. KORE's reliable connectivity plays a critical role in transmitting real-time alerts, providing peace of mind to seniors and their families, and ultimately improving healthcare outcomes. This case study showcases KORE's ability to deliver impactful IoT solutions that enhance lives.

Trusted partnerships drive growth

KORE's success isn't just about innovation, it's about strong partnerships. One of the company's longest-running collaborations has been with Squire Technologies, a trusted telecom signalling solutions provider. For nearly a decade, Squire Technologies has played a crucial role in helping KORE maintain its industry-leading service quality.

As KORE continues to grow and expand its capabilities, partnerships with trusted suppliers like Squire Technologies will remain essential to driving the next wave of IoT and telecom innovation. With a strong track record and a commitment to pushing boundaries, KORE is set to make an even bigger impact in the years to come.

"Squire Technologies has been a valuable partner in helping us drive seamless connectivity solutions for our customers.
"Their expertise and commitment to excellence align perfectly with our mission to provide best-in-class IoT and telecom solutions."

Rogier van Leeuwen, VP of Core Enablement at KORE

What is Open Gateway?

In this 'All about telecom' interview Squire Technologies' Sales Manager, Ben Teversham explains the benefits and possibilities of Open Gateway.

GSMA launched Open Gateway at MWC Barcelona in 2023. Since then, service providers have taken interest. But there's still a bit of mystery about what Open Gateway is, how it can benefit users, and how service providers can capitalize on it.

Ben, what is Open Gateway?
Open Gateway is an industry initiative that's driven by the GSMA to provide a standardized framework of APIs.

It gives universal access to operator core networks, and it follows a similar principle to an interconnect concept that you see between operators globally for things like roaming and essentially applies a uniform set of APIs to create an easy access layer for service providers.

It's a framework that formalizes API's so that service providers and developers have easy access to core networks if they choose to use it. This cuts out the need for hundreds of bilateral agreements.

What's the problem that this fixes?
It's mainly intended to address the problem of network complexity and global communications, which is a large hurdle for new businesses to jump over when looking to leverage services from mobile operators. So, it's making life a lot easier for operators and developers.

Where is Squire Technologies' in all of this?
Squire Technologies offers a product called the OGW or SVI Open Gateway. It's essentially an API toolkit that's designed to offer the ability to integrate APIs covering standardized and customer-specific APIs.

It can be used to leverage existing protocols and APIs, allowing an easy-to-use flexible layer, which is applicable to all service providers, mobile operators, and that can be for both north and southbound interfaces.

It takes all of the complexity of the APIs that have been developed by operators, and it standardizes them all so that the operators can leverage them a lot more easily.

It's going to make life a lot easier for developers.

What is a use case for Open Gateway?
A major factor for the GSMA Open Gateway to be a success is the adoption of the APIs that are derived from the initiative.

One significant use case for the Squire Open Gateway, which addresses this is that it's intended to act as a layer between the existing APIs and the Camara APIs that are derived from the initiative.

This means if an operator or service provider doesn't wish to or doesn't have the capabilities to develop against these new standardised APIs, Squire Technologies' product can act as an integration layer for them.

It gives them the flexibility to easily support APIs when they desire without fundamentally changing any of their existing interface configurations.

How is this flexibility going to strategically benefit operators in a market sense?
It gives operators the ability to decide as and when they wish to adopt certain APIs very, very easily depending on the use case or the market type, and then enables a quick time to market for their customers as the standardised APIs already exist in Squire Technologies' product.

There is growing interest in APIs and GSMA's open gateway. Where is this all leading to?
As the adoption of standardized APIs grows within operators, monetization opportunities will expand.

This will tie in heavily with the steady but growing adoption of 5G standalone, which will highlight many more unique monetization opportunities beyond the traditional validation and fraud prevention services.

5G service-based architecture can be seen as quite complex, therefore it's going to be essential for operators to consider a solution like Squire Technologies' Open Gateway to enable an easy API layer for northbound customer integration and this is going to give a very quick onboarding process.

The real benefit is a shorter time to market thanks to flexibility, correct?
Yes. From my perspective, that's one of the major benefits. Time to market with new revenue-generating offers is always a key factor for operators.

Having a solution like Squire Technologies' Open Gateway in their arsenal will drive operator's ability to jump into new services quickly and flexibly for their customers.

"As the adoption of standardised API's grows within operators, monetisation opportunities will expand".

KTRN

RWANDA

Major KTRN network upgrade extends mobile financial opportunities to Rwandans

KT Rwanda Networks (KTRN) is a 4G LTE infrastructure company. It offers the wholesale provision of a universal mobile broadband network built on 4GLTE technology. KTRN aims to promote healthy competition for advanced retail services and solutions, benefit consumers & enterprises, and transform Rwanda into the ICT hub of East Africa.

KTRN transformed Rwanda's telecommunication infrastructure, taking 4G coverage from 5% in 2014 to 98.5% in 2018. Their efforts have changed countless lives, and the achievement is huge considering Rwanda is the "land of a thousand hills". However, KT Rwanda Networks isn't done, their latest project promises to transform society even more.

Launched in 2013, KTRN, a Korean Telecoms and Rwandan Government project, introduced high-speed broadband internet – 4G LTE to Rwandans. It was an immense change for citizens unaware of the speed and content benefits of 4G.

What is behind Rwanda's digital transformation?
Besides the investment in ICT infrastructures, the Government of Rwanda has done tremendous work in fostering public-private partnerships and setting up various government policies encouraging the use of ICT in the country's digital transformation.

In partnership with the Government of Rwanda, KTRN has installed over 700 base stations across Rwanda, covering more than 98% of the population. Also, it continually enhances its network to give the best experience to 4G users in Rwanda.

With 4G internet access nationwide, private and public sector service delivery has been revolutionized, making them more accessible and efficient. Today, Rwandans in urban and rural areas are increasingly connected to affordable, high-speed internet; empowering them with access to information, education, and economic opportunities. As KTRN continues to write history through enhancing broadband solutions, more projects are being implemented to promote innovation and entrepreneurship.

KTRN's network upgrade
Recently, KTRN engaged Squire Technologies to deliver transformative value-added services through their 4G LTE network. The project deploys a Short Message Service Centre (SMSC), USSD Gateway, and SMS campaign portal, part of Squire Technologies' Mirus messaging platform.

The SMSC integrates with KTRN's IMS core via IP-SM-GW and supports SMPP, SMS over DIAMETER, and SIGTRAN towards customers and other network operators. The web campaign portal offers bulk SMS functionality with custom labelling for KTRN's customers and support for A2P Messaging.
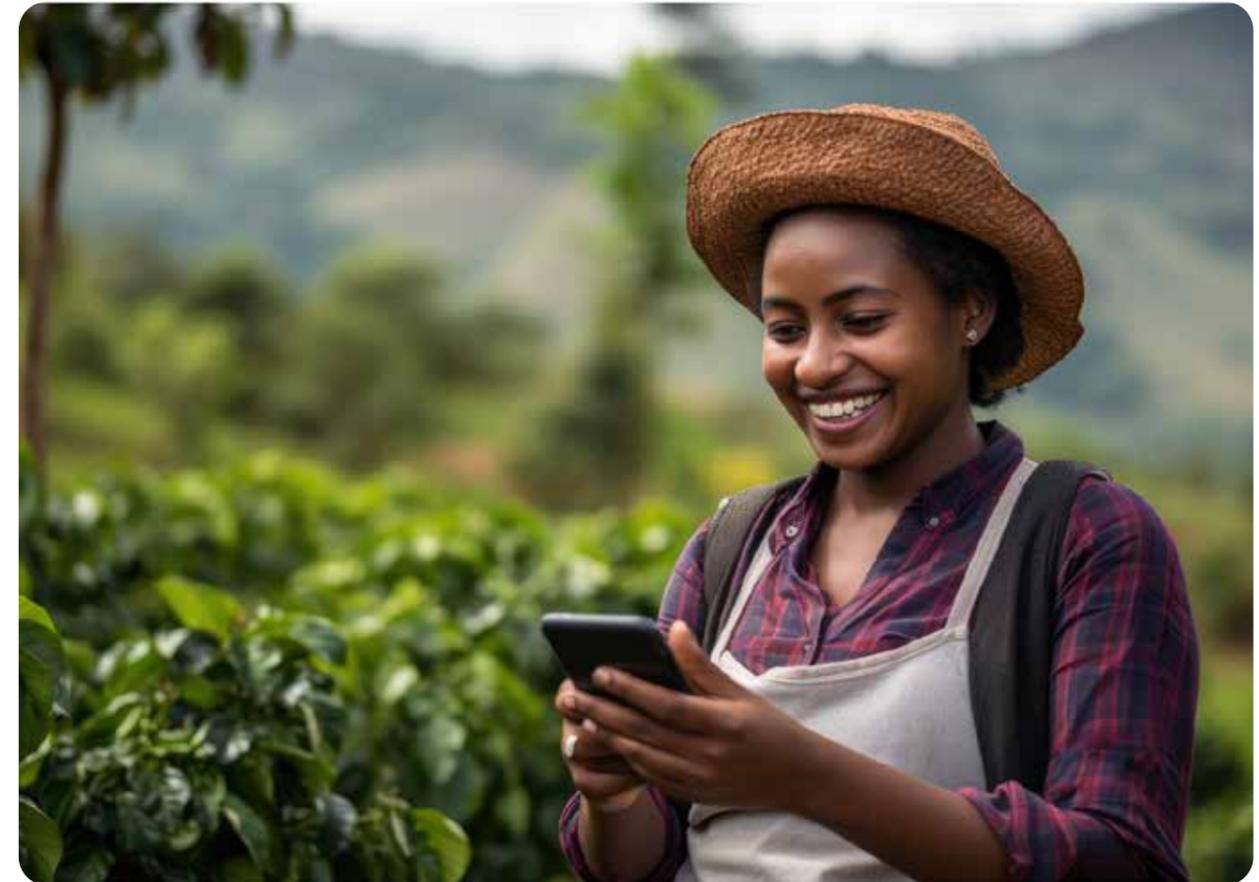
Utilising a USSD gateway simplifies mobile financial services for private, public and government entities, like voucher recharging, and balance enquiries, etc. Combining bulk A2P messaging with mobile financial services with the enablement of the USSD gateway will open new business options for Rwandans.

The change won't just be transformative for business sectors. It will also impact other areas as communication between individuals and organisations like schools and hospitals becomes much easier. If properly embraced, it could catalyze socio-economic advancement in Rwanda.

"We are proud to deliver this network upgrade which presents the opportunity for massive change for Rwandans in how they do business, communicate and engage with digital services. "The skill and expertise of the Squire Technologies team is of the highest level. Their dedication to the project was critical in achieving our network goals".

Rogers Muganga, Director Core Networks at KTRN

3 reasons why focused vendors are best for 4G and 5G mobile network upgrades

Telecom operators are searching for efficient and cost-effective ways of rolling out 5G. The supposed simplicity of having one big vendor like Ericsson, Nokia, or Huawei to supply network solutions is tempting. Unfortunately, 5G isn't evolving that way. The last 15 years have shown it's the same for 4G.

The truth is that focused vendors routinely beat big vendors on price, features, and flexibility.

We've worked with telecom operators in over 100 countries for over two decades. These telcos range from large Tier 1 operators like Vodafone, AT&T, and Deutsche Telekom to smaller Tier 1's like Sure Guernsey, Telesur, Africell, and Telesom. We also work with Mobile Virtual Network Operators like Lebara, Wireless Logic, and many more.

In the core network segment, the telcos we work with have all tired of working with a single vendor who supplies all the elements. Eventually, they encounter the same

challenges and opt for a multi-vendor core network, every single one of them.

The challenges of big vendors that operators face are threefold:

Pricing
There are only a few vendors (Nokia, Ericsson, Huawei) who provide all the elements, but they are more expensive than a multi-vendor solution. Sometimes it may seem initial CAPEX is low but if you add up the change request and OPEX it's always higher in the end.

Features
While some of the core network elements of big vendors have a few good features,

operators must compromise on the features of all the other elements.

Comparatively, a multi-vendor ecosystem gives telcos the freedom to choose the elements with features that will all compliment their ideal network.

Choosing a Business Support System from one vendor and an Online Charging System from another allows operators to build a core network that meets their consumers' unique needs. It also creates differentiation, which is fundamental to beating competitors. With the variety of network solutions, from messaging platforms to firewalls, operators can build strong networks with offers that competitors find difficult to replicate while avoiding the limitations of big vendor solutions.

Flexibility
The variation of networks from region to region is enormous. That's why the inflexibility of big vendors is the biggest drawback of working with them.

Telcos must interconnect and allow roaming with as many networks as possible if they want to be competitive. Therefore, vendors must be flexible, making changes for different variants and standards and sometimes allowing deviations from specifications.

Unfortunately, big vendors aren't willing to make these changes. Expect a big price tag and a long timeline if you ask them, neither of which is helpful to telcos. Focussed vendors, like Squire Technologies, can make changes quickly and cost-effectively.
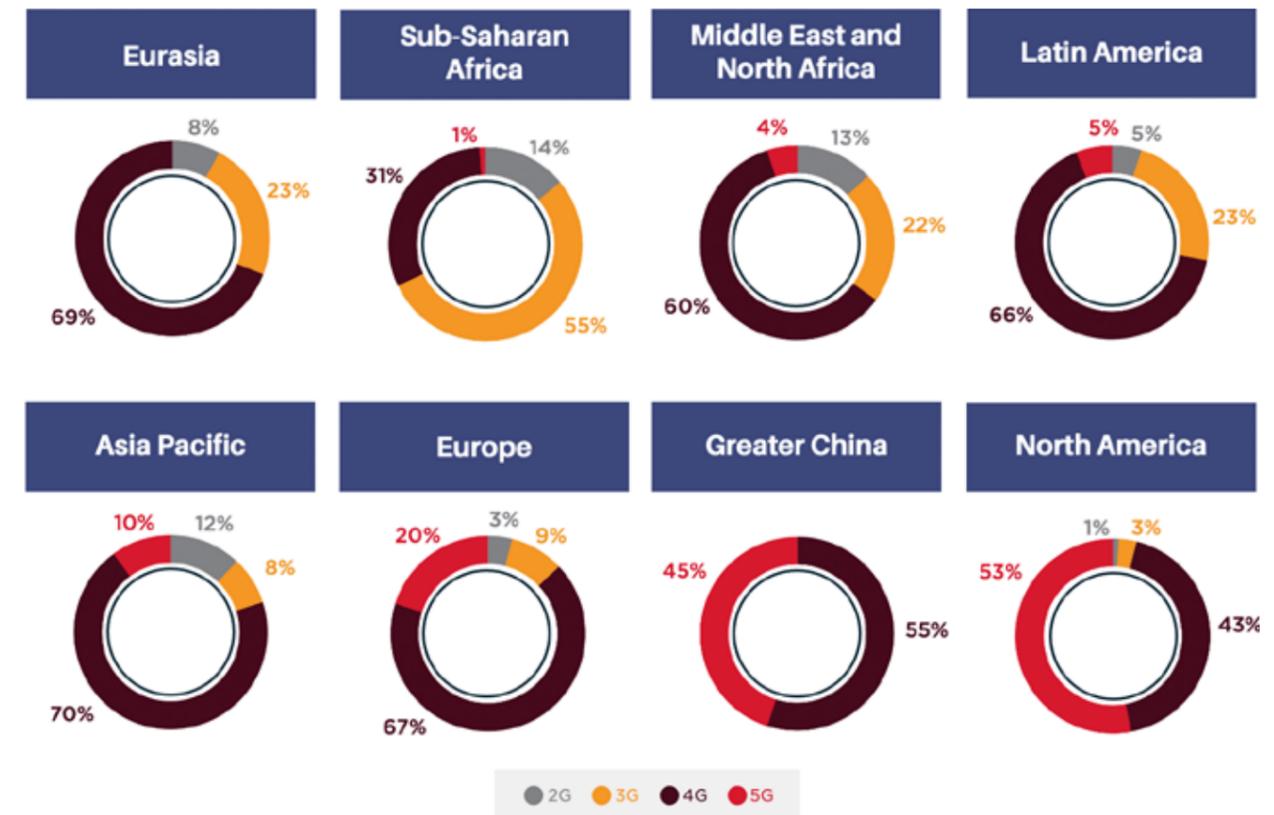
Source: GSMA – Mobile Economy 2024

Roshan

AFGHANISTAN

Enhancing Afghanistan's telecommunication infrastructure to accommodate upcoming technologies

Corporate social responsibility is part of the DNA of Roshan, Afghanistan's leading communications provider, an Aga Khan Development Network (AKDN) company. Roshan's enhancement of Afghanistan's telecommunication connectivity isn't a business strategy; it's a moral driving force and one of the reasons why Afghans love Roshan.

As an AKDN member, a group supporting nations' socio-economic objectives, Roshan Telecom employs over 1000 people. Women constitute 19% of their employees and 97% are Afghan nationals. Indirectly, the company creates jobs for more than 35,000 people. Since its founding, Roshan has invested nearly $1 billion into its network. It provides mobile coverage to 287 districts and cities in Afghanistan's 34 provinces, reaching more than 70% of the country's population.

Afghanistan's telecommunication infrastructure
For over a century, Afghanistan has endured internal conflicts and foreign invasions. These wars have hampered infrastructure development and socio-economic progress.

Before Roshan arrived in 2003, telecommunication connectivity in Afghanistan was almost non-existent. Most people had to travel to Pakistan to make a call. Telecom services were expensive and only 100,000 people had access to a phone. Due to a lack of reliable fixed-line infrastructure, Roshan's mobile network deployments have been critical to citizens' communication needs.

Beyond telecommunication, Roshan has also delivered many fantastic community projects. Their actions have brought health and economic freedom to countless people during the last two decades of conflict.

Roshan's history of giving
Roshan's initial investment in 2003 was not just about deploying a new network. At the time, a significant portion of the population of Afghanistan had never owned a mobile phone. So, Roshan took on the role of educator and facilitator, providing citizens with mobile phones and SIM cards and teaching them how to use their phones. In so doing, they created massive societal behaviour change. Now, the telecommunication market is one of the best economic drivers in the country.

From there, Roshan continued to expand their community work. They opened the country's first internet cafes, created social spaces for children to play and learn in, and launched energy initiatives and a programme to help lift women out of poverty. Another Roshan project, Telemedicine, enables doctors in foreign countries to operate devices in Afghanistan, treating patients and saving lives.

These and many other acts of corporate social responsibility have earned Roshan several awards and plaudits. In 2014, BLab, a company spearheading global socio-economic transformation, recognised Roshan as one of the best companies for the world. It's a well-deserved accolade.

Improving Afghanistan's telecommunication connectivity
Recently, Roshan selected Squire Technologies to help them enhance Afghanistan's telecommunication connectivity. The project required the replacement of an end-of-life signalling transfer point (STP) from a Chinese vendor and a Diameter routing agent (DRA) implementation. However, the project was not just about an upgrade but also about making the network future-ready.

Today, the ability to customise networks is critical for operators. Unfortunately, vendor lock-in is an expensive hindrance to network upgrades. Roshan sought to avoid this scenario, requesting a solution compatible with multiple existing and future vendor components.

Squire Technologies' versatile, forward and backwards compatible DRA and STP, deployed in this situation, can interop with just about any vendor solution. The result was that 3G and 4G services across two locations were improved, enhancing connectivity and solidifying geo-redundancy in a region vulnerable to ecological disasters.

"Connecting Afghans with reliable and innovative telecom services has always been our priority at Roshan. We believe in empowering individuals, businesses, and communities across Afghanistan through seamless communication and digital connectivity. Squire Technologies was chosen by Roshan to assist with this initiative. The project involved replacing an end-of-life STP from a Chinese vendor and implementing a DRA. It was not only about upgrading the network, but also about ensuring it is prepared for future technologies."

Najib Hotak, CTO at Roshan

Why is 5G a big problem for big vendors?

Medium-term, big vendors face a big challenge as operators incorporate 5G into their systems. For decades, the inflexibility of big vendor solutions and the limitations of 3G and 4G have forced Mobile Network Operators (MNOs) into low-cost strategies. The resulting commoditisation has shrunk margins, and MNOs should rightly be annoyed. However, all of that could soon change.

Thanks to 5G, for the first time in decades, if MNOs and Mobile Virtual Network Operators (MVNOs) reduce their reliance on big vendors, they can adopt real diversification strategies. Otherwise, if they continue to rely on inflexible, high-cost, one-size-fits-all solutions from big vendors they risk sustained commoditisation, low-cost strategies, and tight margins.

In a Telecoms.com article about the challenges of 5G, the Head of UKTIN, Nick Johnson, pointed out that a lack of high-value 5G monetisation use cases is pushing MNOs to cut costs, saying: "...my view is that we need to be focusing on things that reduce the cost." This sector-wide issue is a huge problem for big vendors like Nokia, Ericsson, and Huawei, which have high prices

and are inflexible. These are counteractive traits in 5G, which is extremely versatile and expensive to roll out.

Consolidate and extend end-of-life of existing infrastructure to reduce costs and increase revenue.
Due to large capex investments in 5G rollouts, MNOs need to extract the highest possible returns from 5G rollouts and reduce operating costs where possible. Until the elusive 5G 'Killer app' emerges, reducing operating costs will be fundamental to MNO strategies.

One of the quickest and easiest ways to do this is to streamline and extend the life of existing network infrastructure components.

This method contrasts with the costly network overhaul methods of big vendors.

The monolithic behaviour of big vendors is unsuited to current agile core network infrastructure needs. The refusal of big vendors to adapt their solutions to work with existing multi-generation network configurations forces operators to make unnecessary network overhauls. Cash-strapped MNOs are unlikely to appreciate these tactics in future.

Flexibility is essential for 5G network success.
Diversification will be central to 5G strategies, and MNOs will need flexible solutions and agile vendors to support those strategies. Each generation of mobile networks has delivered something new, but until 5G, all of them have concentrated on the functionality of mobile devices for subscribers. The Internet on our phones was 3G's main accomplishment, and 4G allowed us to use our phones to download content faster and live stream.

5G is different. Its utility goes far beyond mobile phones. Private networks, network slicing, ultra-reliable low latency communications (URLLC), and Fixed Wireless Access (FWA) through enhanced mobile broadband (eMBB) are just some of the emerging technologies, services, and applications. In the past, the limited

applicability of 3G and 4G networks supported the inflexibility of big vendor solutions. MNOs could also achieve some efficiency by utilising big vendor solutions to run entire networks due to having fewer vendor standards to adhere to. However, this limits their ability to adapt to market changes and costs a lot.

In fluid markets, where consumer trends change frequently, the one-size-fits-all solutions of big vendors won't deliver the flexibility MNOs require to leverage the versatility of 5G. Therefore, MNOs need agile vendors with the capability to integrate 5G technologies into existing networks rapidly.

What can operators do?
Replacing existing network components isn't always necessary. By utilising flexible solutions with forward and backward compatibility, operators can extend the life of their systems while introducing new revenue-generating channels. This approach is vital if operators want to make the most out of 5G rollouts.

MNOs and MVNOs must reduce their reliance on big vendors and adopt agile vendor solutions. Squire Technologies' Sigla platform unifies all mediation, routing and interworking, security, and measurement between multi-generation networks, reducing network complexity and operating costs.

Awasr

OMAN

Bridging the connectivity gap:
Awasr and Squire Technologies drive connectivity in Oman

Bridging the connectivity gap is a global telecommunication priority, and partnerships like Awasr and Squire Technologies' are making a difference. Recently, Squire Technologies' unified signalling solution went live in Awasr's network, and the impact is already being felt.

Awasr Telecom Oman, the internet service provider, recognizes the vital role of telecommunication in connecting communities and fostering economic development. The company's response to increasing demand for faster and more reliable internet has grown Oman's telecommunication landscape, and Oman is now a mobile network leader.

Oman's telecommunication regulatory framework
Oman has a highly regulated telecommunication sector. Operators follow strict guidelines on interconnection, VOIP, firewalls, remote access, and more. So, operators require robust solutions to avoid falling foul of these rules. The country operates a cloud-first policy, placing data centre operators at the heart of Oman's telecommunication infrastructure.

Furthermore, the Oman Telecommunication Regulations Authority stipulates that data centre operators shall create a carrier-neutral environment by treating Omani ISPs uniformly. So, there is tremendous pressure on operators to deliver high-quality services.

Bridging the connectivity gap
Following the award of an IGW license, Awasr began exploring ways to connect operators. In April 2024, Awasr launched Oman-IX, a collaboration with regional operators, to revolutionise regional digital infrastructure services.

Oman-IX connects organizations, networks, data centres, and cloud services across the Middle East. The hub aggregates local and global network IP peering traffic, enabling peering traffic exchange with other international internet exchanges.

Awasr opted for two data centres to deliver enhanced connectivity, creating redundancy. Using their on-premises data centres allows granular control of infrastructure and data. The control and failsafe are critical for industries and organizations with high security and regulatory requirements.

Better connectivity through partnerships
In their drive to provide superior connectivity, Awasr partnered with Squire Technologies. Squire Technologies' expertise in signalling interworking proved instrumental in helping Awasr optimise its network performance.

To streamline Awasr's systems, improve connectivity and security, and ease installation of their Voice IGW, Squire Technologies implemented their robust Session Border Controller (SBC). The project removed Awasr's previous reliance on third-party telecom operators when sending and receiving international traffic.

Awasr saved money and created a physical redundancy by using their own on-premises data centres and physical COTS server instead of virtual machines. Having the redundancy architecture also facilitated a smooth installation of their Voice IGW.

By working together, companies like Awasr and Squire Technologies are paving the way for a more connected future in Oman. Enhanced connectivity benefits individual users, empowers businesses, fuels innovation, and contributes to economic growth.

"Once we understood Awasr's IGW voice network and security challenges and the need for one smart billing system, we provided our unified signalling solution, including an SBC. In this way, we facilitated fraud prevention and billing, enabling AWASR to cater to wholesale, retail voice markets with interconnects to multiple operators and the ability to support prepaid/post-paid customers."

Srikanth Rajarao, Business Development Manager at Squire Technologies
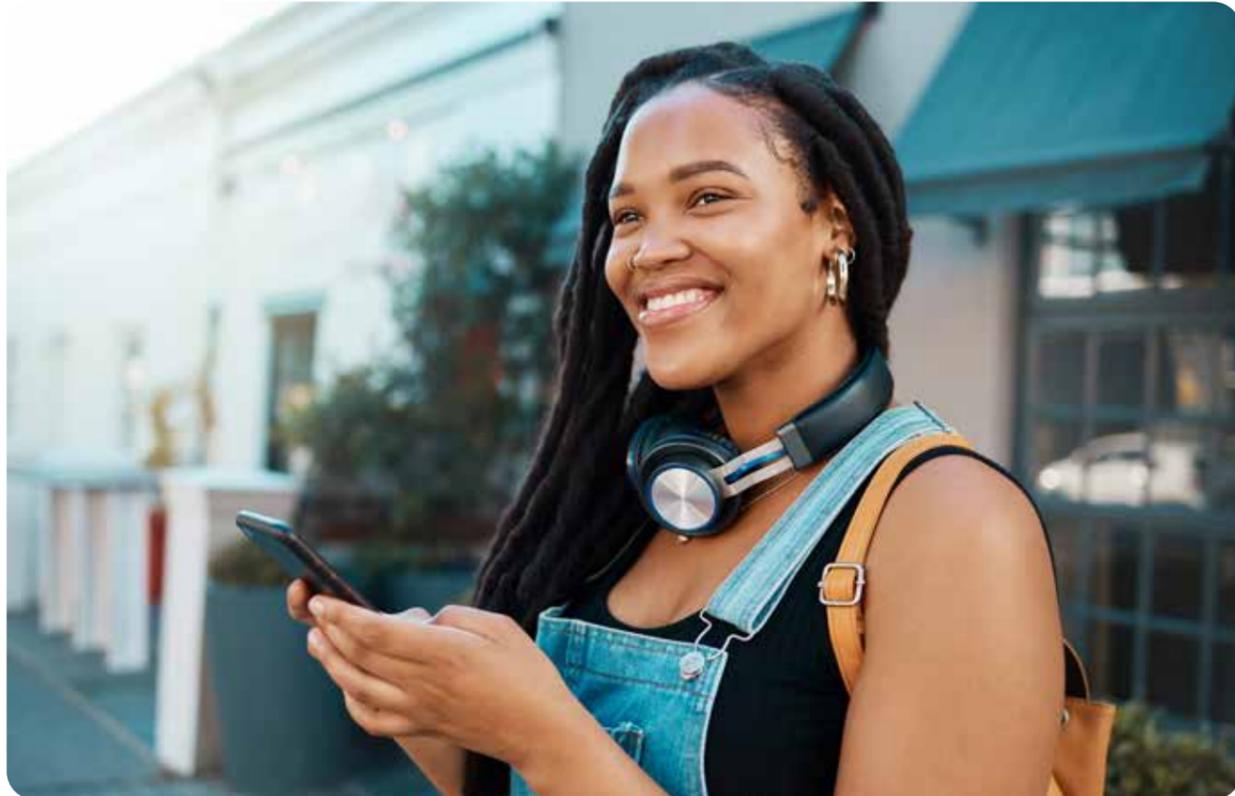
iMobility supercharges South Africa 5G access

5G rollouts are creating a stir in some developing nations. While governments are eager to have the latest generations of mobile technology, not all nations are ready for 5G. That's leading to some innovative solutions to meet consumer 5G needs.

Recently, we spoke to two innovators in this field, Nazeer Adam and Trevor Steyn from iMobility.

iMobility has been conducting wonderful work. How did iMobility start and what are its aims?

Nazeer
iMobility started business in December 2016. So, it's just over 8 years now that iMobility has been running. Time goes by so quickly.

We've predominantly been a provider of wholesale telecom services in the market, in the South African market and we have multiple platforms within the business, predominantly focusing round voice.

These platforms range from your standard SIP trunking to your unified

communications, CKS contact centre etc.

iMobility has always had a vision to differentiate in the market in everything that we do from how we engage with our partners to how we treat our staff, and it's an amazing journey.

And like I said, time flies by so fast and we're loving it. And we're looking to take the business to that next level.

Trevor
On a systems point of view, we just like to differentiate ourselves by having 100% uptime and quality of service on all of our products.

"iMobility has always had a vision to differentiate in the market in everything that we do from how we engage with our partners to how we treat our staff, and it's an amazing journey".

iMobility's new 5G project enables 5G SIM distribution in South Africa. 5G rollouts have picked up pace in SA, but the country is a patchwork of mobile network generations. What is contributing to 5G's progress or lack of progress and what market do you see in 5G SIM deals?

Nazeer
It's positive. There's been some, massive rollouts with regards to 5G in the South African market.

According to an article published on data from Africa Analysis, the country now has 50% of South Africans with access to 5G coverage and this is a significant number.

There are still some challenges around devices being supportive of 5G and that's one of the biggest challenges.

We've been very fortunate with regards to load shedding. Previously, this was a big challenge, but in recent months it stopped. We had a bit of a scare over the weekend where it started again.

So, we're just hoping that will not continue and power won't be a challenge. But overall, yes, related to Africa Analysis, there's now about 10.8 million subscribers that are active on 5G in South Africa.

I think the more that the coverage grows, according to Africa Analysis, by 2029 we're

looking at about 73% of 5G coverage in South Africa and potentially 42 million subscribers.

So, there's huge growth predicted in this sector and we're really excited to be part of it and look forward to what's coming.

Having a 5G network is one thing but delivering it to customers who are often operating on legacy protocols is a big technical undertaking. What were the challenges of connecting your customers to the 5G network?

Trevor
One of the biggest challenges service providers in South Africa face is they've invested a lot of money into their current billing systems, which haven't kept up to the current technologies.

As a result, we needed a solution to bridge the gap between these legacy technologies and the newer 5G standards like CHF integration into Radius and Diameter, so that our current service providers can keep using the billing systems and deploy these products quickly and efficiently in the networks.

With Squire's help, we've managed to accomplish this goal, and it's working well for us.

**Nazeer Adam,
Founder of iMobility**

**Trevor Steyn,
Technical Manager**

Is 5G signalling congestion threatening mobile operators?

High availability and low latency don't win new subscribers but dropped calls and slow download and upload speeds definitely impact revenue. Mobile operators know that they must constantly manage network congestion. It's nothing new.

However, some people are worried about exponentially increasing 5G data volumes and the ability of networks to handle it. Transactions from everything AI, gaming, streaming, and device proliferation are all adding up. So, should operators take note?

Is network congestion a real threat?
The GSMA has implored operators to invest heavily in their networks to manage huge data demands. They predict global mobile data traffic will hit 5,400 exabytes by 2030.

Their concerns appear to be founded. CTIA reports traffic in the US jumped by 89% between 2021 and 2023, breaking the 100 trillion MB mark. Simultaneously, investment in 5G rollouts is slowing while operators offer greater amounts of data at a lower cost

for consumers.

Yet, we've heard this network congestion fearmongering before. In 2019, Ian Fogg, VP of Analysis at OpenSignal stated:
"The mobile industry needs 5G, or congestion and a declining mobile experience will make it hard for operators to maintain existing revenue levels, let alone increase them."

Now, in 2024, a similar view is being taken. Julia King from Fierce Network suggests:
"AI is increasing 5G traffic. Signs point toward 6G as the answer."

Is 6G the best answer for network congestion?
Due to how networks vary from region to region, and the rate of device adoption in

different countries, the threat of network congestion isn't uniform. So, 6G is far from a cure-all.

6G will likely help ease network congestion in some areas, but it's a future solution. Till then, operators can use core network optimisation to reduce OPEX, boost revenue, prevent congestion and improve network efficiency.

Operators can also use throttling to manage congestion, but it risks impairing customer experience. Increasing the cost of data could be another way of managing congestion, but this is an unlikely path in highly competitive markets where operators are pushing unlimited data plans to gain market share.

Conclusion
In the same way that 5G was heralded as the 4G congestion solution, 6G will inevitably be seen as 5G's saviour. It will continue like this in perpetuity with each new generation.

Core network optimisation will likely remain the best means of managing congestion across various network generations and regions. So long as operators continue to monitor their networks and adapt to changing trends, congestion is unlikely to be a threat.

"There is growing pressure on mobile operators to deliver consistent, high-quality 5G service. Those who proactively address these challenges around signalling will not only improve their current offerings and reduce OPEX, but also position themselves as leaders in the next era of connectivity. Infrastructure investment, network optimisation, spectrum allocation and traffic management technology are all vital elements in addressing congestion".

Douglas Bryce, Marketing Communication Specialist at Squire Technologies

Supporting Saudi Arabia's complex 5G network transformation

Since the start of the millennium, the Middle East has greatly expanded its telecom networks. Now, 5G advances are supercharging parts of the region. However, the rapid deployment of 5G has also left mobile network operators (MNOs) juggling increasingly complex, multi-generation network infrastructures.

Market liberalisation and elaborate strategic partnerships are critical to the Middle East's digital transformation but also create complicated networks. Squire Technologies has supported several network efficiency and upgrade projects in Middle Eastern countries, including with Awasr in Oman, Zain in the Kingdom of Saudi Arabia (KSA), and another in Afghanistan.

Recently, the team at Squire Technologies discussed the region's development, what underlies the digital transformation, and how our solutions can support the region's ambitious goals.

The Middle East's phenomenal 5G success
In 2022, three of the top five 5G leaders

were from the Middle East. Therefore it's understandable why Technavio estimates that the Middle East telecom market will hit a value of $29.57 billion by 2026.

GSMA, Economy Middle East and others suggest privatisation, regulatory bodies, and mobile technology are driving the region's rapid telecoms growth. Though, there could be more to it than that. Macro-level sociological, global economic and even geographic forces have also enabled countries like the Kingdom of Saudi Arabia (KSA) to race ahead.

What underlies Saudi Arabia's 5G success?
Historically, the consolidation of populations around water sources in KSA makes it easier

today to achieve high levels of coverage. It also makes network deployment and updating easier. Furthermore, climate conditions are keeping people in cities, where 90% of their time is spent indoors. This is driving the need for better indoor coverage through 5G.

Being a mobile-first society likely helps 5G adoption, and for over a decade, mobile technology has dominated the Middle East. In 2009, when 4G was launched, only 11% of the Middle East's population had a fixed-line service, but most citizens had a mobile phone. So, the region was primed to leverage 4G and is showing similar intent with 5G.

The efficient and timely allocation of spectrum is fundamental to the success of 5G deployments in Middle Eastern countries. Delayed allocation of 4G spectrum was detrimental to the UK's 4G rollout costing businesses up to £730 million a year.

The sustainability agenda and competition for foreign direct investment are also significantly influencing 5G's advancement in the region. KSA and the United Arab Emirates are both diversifying and competing to be global business hubs with leading digital assets. It's a not-so-secret battle between these oil-rich nations that is driving huge digital growth.

All of this has contributed to rapid 5G expansion in the region. However, the 5G rollout has revealed some interesting multi-generation network infrastructure scenarios, such as with Zain in the KSA.

Managing multi-generation 5G and future 6G network integrations
KSA's committed to global technology leadership by 2030 and investing 2.5% of GDP into R&D and innovation by 2040. The nation's targets include boosting non-oil exports and achieving 19.2% of GDP from its digital economy by 2025.

A major part of KSA's goal is to enhance telecommunication to make business easier. However, while telecoms market liberalisation is growing partnerships and delivering huge technological advancements, networks are also becoming more complicated.

For example, to accelerate 5G monetization and improve customer experience Zain needed to integrate several network components from different vendors. Its 3G, 4G and 5G cores, a new cloud-based Digital BSS and Customer Engagement solution and a replacement Online Charging System all needed integrating.

In these situations, big vendors will often refuse to adapt to an MNO's requirements without a king's ransom. So, updating these complex, multi-vendor networks can lead to unresolvable, time-consuming, and expensive negotiations.

Zain faced a situation with two rival big vendors, refusing to adapt their solutions. Squire Technologies' Unified Signalling Platform, Sigla, solved the problem, acting as an interworking function, harmonising protocol conversion and ensuring accurate routing. Client data was correctly managed and accurately charged during the migration between Zain's legacy 4G OCS and the 5G OCS.

Sigla normalized and overcame compatibility issues between the existing DRA and the new OCS, routing billing to the new OCS. It harmonized legacy and proprietary signalling protocols and ensured transactional data was routed to the correct OCS depending on where the subscriber was residing at the time.

Squire Technologies works with several Business and Operations Support System (BSS/OSS) vendors like CSG, Cerillion, and Netcracker. So, the company has considerable experience in multi-generation and multi-feature integrations.

About us

Optimising your core network to reduce operating costs

Squire Technologies provides agile core network solutions for Telecom Operators, enabling converged connectivity across multi-generation networks to deliver greater control and reduced operational costs.

Working with operators all over the world, we understand the importance for their networks to be both forwards-facing and backwards-facing, enabling the delivery of services to customers across the complex mix of technologies and standards that make up our global communications networks.

Our mix of evolved network intelligence and converged multi-generation signalling delivers a high degree of agility to our customers and makes us the ideal partner to provide signalling interworking solutions that enable previous, current and future networks to interoperate smoothly.

As operators have had to manage increasingly more complex and varied networks, our converged signalling solutions are helping them to more easily manage signalling across multiple networks and provide their services to new and existing customers.

Trusted by customers worldwide

We work with

400+
Telecom Operators

In over

150
Countries

Our products make

11tn
Transactions per year

Why customers choose Squire Technologies

Expertise

Over twenty years of specialist signalling interworking expertise and an enviable reputation for solving complex networking challenges.

Converged

Converged platforms and services that manage signalling and routing, network fraud and messaging across multi-generation networks.

Agility

Solutions designed to scale and adapt to your network demands and provide an environment where you can innovate and drive growth.

Savings

Creating networks that enable operators to make savings on CAPEX and reduce OPEX with flexible deployment and managed services.

International Accreditation ISO9001

Following in-depth evaluation by an independent assessor, Squire Technologies has been successful in achieving ISO 9001 Certification. This prestigious award is internationally recognised as a benchmark of standardised and quality procedures and systems within the operation of an organisation. This certification assures customers that the production processes in place at Squire Technologies have been measured and achieved a standardised award.

ISO 9001
CERTIFIED QUALITY MANAGEMENT SYSTEM

Our platforms

State of the art
unified signalling platform

Sigla is a smart centralised signalling platform that unifies all mediation, routing and interworking, security and measurement between multi-generation networks, reducing core network complexity and operating costs.

For operators to drive digital transformation in their customers they must first undergo core network transformation. Sigla provides a solid foundation from where operators can consolidate network infrastructure, reduce complexity, and simplify the orchestration of signalling across multi-protocol networks.

As 5G presents new opportunities Sigla prepares operators' core networks so they can effectively integrate and deploy new revenue-generating services and ensure seamless interop between existing networks and 5G infrastructure.

Sigla brings a homogenous layer to the management and operation of multi-generation networks, freeing operators from the burden of managing multiple core networks, and reducing network complexity and operating costs.

ROUTING & INTERWORKING

MEDIATION

MONITORING

SECURITY

Complete message processing with
full campaign management

Mirus is a flexible and robust messaging platform with carrier-grade functionality that combines complete message processing with full campaign management.

Mirus is an all-inclusive, fully virtualised Messaging Platform that offers superior scalability, advanced routing, high availability, and real-time provisioning to operators through on-demand modules.

For operators to support multi-generation P2P services and capture increasing A2P SMS revenue growth before OTT players do, they need a messaging platform that fits their strategy. Mirus grows with your business, scaling to meet your needs and those of subscribers.

The flexibility of Mirus allows customers to rapidly evolve to meet the demands of A2P and MVNO applications, providing full campaign management with rapid, real-time provisioning of new value-added services.

ADVANCED ROUTING

CAMPAIGN MANAGEMENT

BILLING & MEDIATION

FRAUD PROTECTION

Our 5G core products

Seamlessly integrate new and legacy components into your 5G core network, creating new revenue and bringing down costs.

Complex multi-generation networks need flexible, scalable and efficient solutions. Squire Technologies' forwards- and backwards-compatible network components unify all mediation, routing and interworking, security and measurement between multi-generation networks, reducing network complexity and operating costs.

SVI-HSC HTTP/2 SIGNALLING CONTROLLER

The 5G HTTP/2 Signalling Controller delivers comprehensive 5G New Radio (NR) services, IP Multimedia Systems (IMS) management and network security with forward and backwards compatibility with legacy 2G/3G/4G network components.

SVI-SEPP SECURITY EDGE PROTECTION PROXY

The secure-by-design SVI-SEPP provides future-ready authorisation, authentication, and subscriber policy security across 5G SA core networks. Enable topology hiding, message normalisation and filtering, DOS and DDOS protection, load balancing and congestion control functionality for 5G PLMNs.

SVI-SCP SERVICE COMMUNICATION PROXY

The SVI-SCP provides scalable, seamless routing and comprehensive carrier-grade traffic management of 5G SA core networks. Utilise dynamic load balancing, throttling and multi-vendor onboard mediation.

5G SVI-IWF INTERWORKING FUNCTION

The SVI-IWF Interworking Function enables HTTP/2, Diameter, LTE and SS7 network interconnections to implement new revenue streams and extend network functionality and lifespan.

SVI-SMSF SHORT MESSAGE SERVICE FUNCTION

The SMSF, a module of our Mirus Messaging platform, is essential for SMS traffic on standalone 5G networks and bespoke network slicing. Its forward and backwards-compatibility connects 2G/3G/4G/IMS networks with future SMS interworking for 5G/6G and beyond.

SVI-BSF BINDING SUPPORT FUNCTION

Scale your policy/charging function (PCF/CHF) network with the SVI Binding Support Function, and enhance traffic prioritisation, and reduce session delay, packet drops, and network downtime. Support 5G core network capabilities for third parties using network exposure functions (NEF), and more.

SVI-CHF CHARGING FUNCTION

Customise subscriber contracts and diversify your offer using session or event-based charging across multiple applications, integrating with multi-generation networks using forward and backwards compatibility.

Customers & partners

TIER 1 TELCOS

vodafone	zain	Globalstar	Digicel
cablenet	AT&T	epic	africell
sure.	T Mobile	open serve	Aussie Broadband
pivotel. connected everywhere	Telesom The Reliable Choice	smile	Our Telekom
SETAR	manx telecom	TEL NA.	CABLE & WIRELESS
ROSHAN	kt RWANDA NETWORKS 4G LTE & BEYOND	américa móvil	TELESUR Keeping us in touch

MVNE / MVNO'S / IoT

wireless logic	LEBARA
cubic telecom	OXIO
renna mobile	izzi telecom
CIRCLES.LIFE	KORE
iMOBILITY	JOYTEL
ventocom	RingRing

AGGREGATORS / ASP's

ANASR	GMS
365 DataCenters Technology Humanized	grapevine
enreach	INTELLICO
IDT global	link mobility
sify	CM.
DB	VOLKSWAGEN GROUP

squire technologies