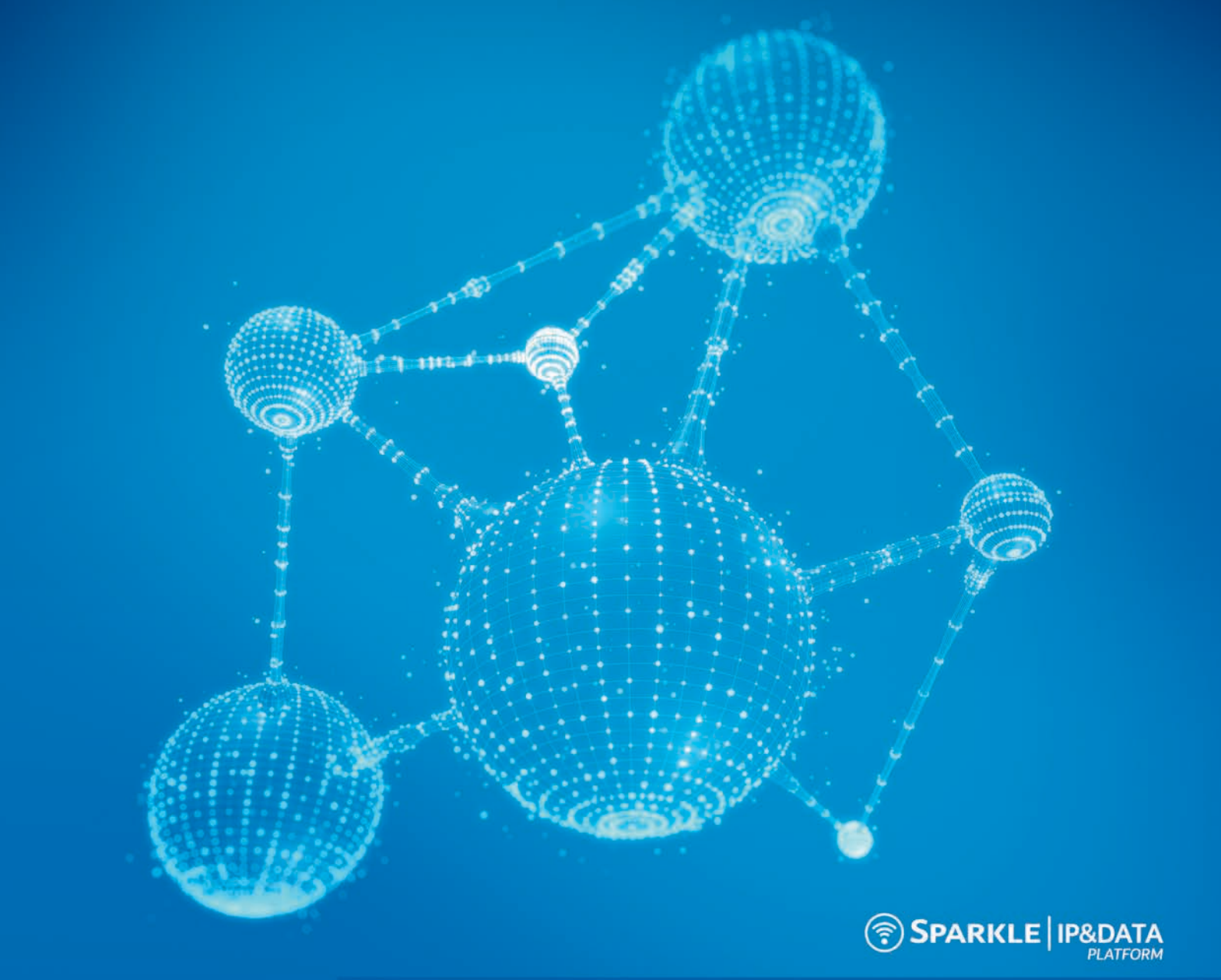
Q4 2017
Volume 10
Number 4

south asian wireless COMMUNICATIONS

For wireless comms professionals in the Southern Asian region

- How South Asia is leading the world in LTE
- Industry 4.0: welcome to the fourth industrial revolution
- Should telcos adopt open source solutions?



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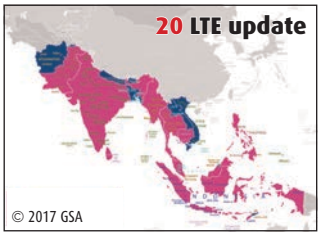

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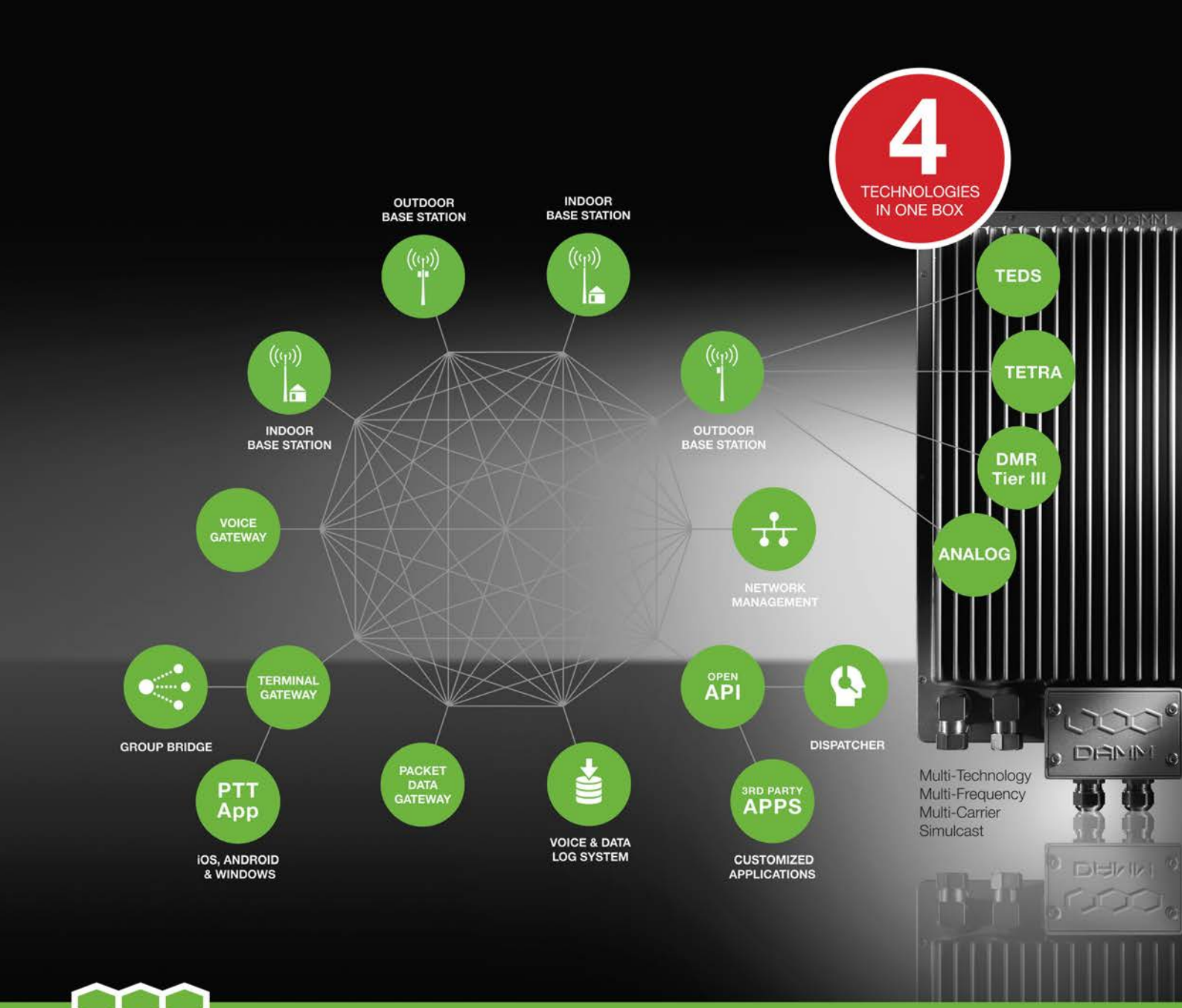

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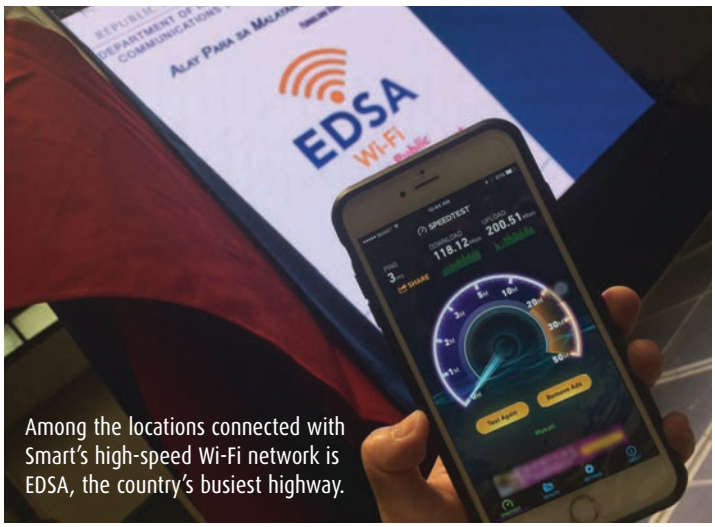
Rapid roll out of *Smart Wifi* carrier-grade Wi-Fi across Philippines

Smart Communications is ramping up the rollout of its carrier-grade *Smart Wifi* network across the Philippines.

The PLDT wireless subsidiary says Carrier Wi-Fi is one of the components in its three-year expansion programme that aims to make the internet accessible to all.

It adds that *Smart Wifi* complements its ongoing nationwide expansion of 3G and LTE services. The latter includes re-equipping cell sites to use low-frequency bands such as 700MHz and 850MHz to provide better indoor coverage, and deploying high-frequency bands like 1800MHz and 2100MHz to increase the sites' capacity to handle more calls, texts and data traffic.

Smart claims its Carrier Wi-Fi network has a backhaul capacity of up to 100Mbps which is expandable to 1Gbps. It adds that the rollout took a "big bulk" of PLDT's ramped-up capex programme of PHP42.8bn (USD851m) for 2016, which included the utilisation of the new frequencies freed-up with the acquisition of San Miguel Corporation's telco assets.



Among the locations connected with Smart's high-speed Wi-Fi network is EDSA, the country's busiest highway.

Over the year, the operator says it has connected "hundreds of establishments" nationwide with its *Smart Wifi* network.

For instance in June, Smart worked with the Department of Information and Communications Technology to launch the service in metro stations and along Epifanio de los Santos Avenue (EDSA) to improve the mobile experience of commuters travelling on the country's busiest highway. In mid-December, the company also announced that the service was now available in the 13 stations of the Manila Metro Rail Transit System, enabling around 230,000 daily commuters to connect.

Other nationwide deployments include the four terminals of the Ninoy Aquino International Airport as well as key domestic airports and seaports, bus terminals, various local and central government offices, more than 40 schools and colleges, plus hospitals and medical centres.

The operator adds that more than 60 entertainment hubs called *Smart Spots* have also been launched, providing Wi-Fi to more than 500 restaurants, resorts and other entertainment establishments across the country.

"By rolling out carrier-grade *Smart Wifi* and providing fast connectivity to our local government partners across the country, PLDT continues to lead the country's digital transformation into a Smart Nation," says Jovy Hernandez, SVP and head of enterprise for PLDT and Smart.

"With *Smart Wifi* now available in more regions throughout the Philippines, high-quality connections are now within the reach of more Filipinos, who can use them to access important government services, and stay connected via their social media while on-the-go."

Digi launches e-wallet in bid to replace cash

Malaysian operator Digi has made its debut in the financial technology sector with the launch of a mobile payment system.

vcash is offered in partnership with Valyou, an e-money issuer authorised by Bank Negara Malaysia (BNM).

Once users have downloaded and installed the free app on their *Android* or *iOS* smartphones, they set up and add money to their *vcash* account, and can then purchase goods by scanning QR codes at any one of 500 physical touchpoints nationwide. Digi says it merchant line-up includes "notable" brands such as Astro Go Shop, Life Juice, TR Fire Grill, amongst many others. Its aimed to grow these touchpoints to 2,000 by the end of 2017.

The operator says *vcash* also enables fund transfers, facilitates cash deposits and withdrawals at any time, as well as purchases from the in-app *vcash* store.

It adds that the platform is supported by an "extensive" network of deposit points consisting of more than 300 Digi stores and dealerships, and the internet banking platform of 21 retail banks in Malaysia via FPX and JomPAY.

"There is currently more than MYR85.5bn cash in circulation, and an early aspiration for *vcash* will be how much of cash-based transactions we can convert to digital," says Praveen Rajan, Digi's chief digital officer.

"There is a cost to using physical cash, and in a study by BNM, total costs incurred by the banking industry, business community and BNM in cash handling and management was estimated at around MYR4.8bn in 2012."

Tech Mahindra partners with Dialogic for VNF

Dialogic has joined Tech Mahindra's *VNF-Xchange* platform for end-to-end solution integration and pre-certification of VNF designs.

According to India-based Tech Mahindra, its platform brings together "best-of-class" VNFs in a vendor-neutral environment along with key functional orchestration and management components. The firm says it is being used to validate network element cloud-native capabilities, including VNF onboarding and automated lifecycle management, as well as functional interoperability for services like VoLTE, VoWiFi, and real-time voice and video-enabled applications.

Dialogic's cloud-ready contributions to *VNF-Xchange* will initially include its *PowerMedia XMS*, *PowerMedia Media Resource Broker* (*MRB*), and *PowerVille Load Balancer* (*LB*) products The company claims these solutions are "important components" in putting together end-to-end, NFV-ready VoLTE and mobile core solutions for service providers. It says they enable the delivery of media rich services in IMS/VoLTE environments, and provide the basis for developing new and innovative VAS focused on RCS, WebRTC, or OTT applications requiring media processing, transcoding, or media recording.

"Service providers are looking for NFV-ready solutions that are already pre-certified, ready to deploy, and reduce the need to do lab trials and complex proof of concepts," says Jim Machi, SVP of product management and marketing at Dialogic.

"We've continuously geared our solutions to be cloud-optimised and NFV-ready, and are continuously working with Tech Mahindra to help service providers realise their SDN/NFV goals."

Eutelsat sets fastest EOR record for electric satellite

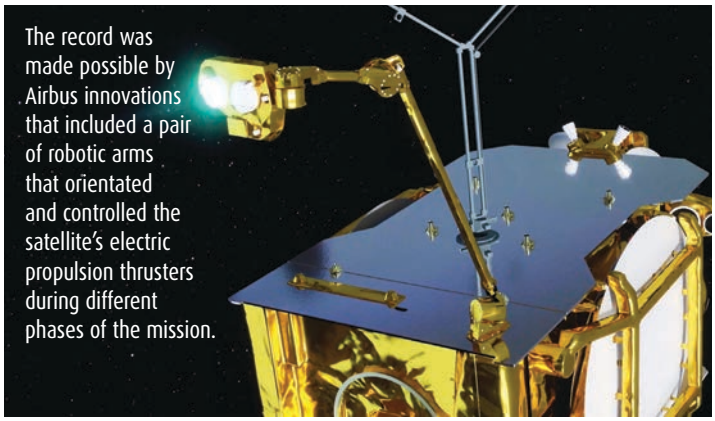
Eutelsat's latest satellite for Asia has now entered commercial service after claiming to break the record for the fastest satellite electric orbit raising (EOR).

EUTELSAT 172B was launched from Kourou on 1 June. After the solar array and electric propulsion arms had been deployed and initial testing had been completed, the EOR phase began on 8 June. Eutelsat says that during this stage the satellite consumed almost six-times less propellant mass than a spacecraft with chemical propulsion.

EUTELSAT 172B took just four-months to reach its orbital slot of 172°E before going live in November.

The satellite was built using the latest EOR version of the Airbus' *Eurostar E3000* platform and had a launch mass of only 3,550kg.

"We are the first company to demonstrate full electric propulsion for satellites of this size and capacity, enabling their launch in the most cost-efficient manner," said Airbus' head of space systems, Nicolas Chamussy.



The record was made possible by Airbus innovations that included a pair of robotic arms that orientated and controlled the satellite's electric propulsion thrusters during different phases of the mission.

"Furthermore, with our system design, operation strategy and the plasma thruster technology we implement, we have completed the fastest electric orbit raising ever from transfer to geostationary orbit, which will allow Eutelsat to put their electric satellite in service in a record time."

EUTELSAT 172B has a triple mission that includes: a trans-Pacific C-band payload to help reach new growth markets in South East Asia and for delivering increased power and broader coverage to enhance the service previously provided via *EUTELSAT 172A*; a regular Ku-band payload which doubles capacity at 172°E and connects North Pacific, North East Asia, South East Pacific, South West Pacific and South Pacific; and a high throughput Ku-band payload designed for in-flight broadband with multiple user spots optimised to serve densely-used Asian and trans-Pacific flight paths.

PCCW Global connects Hong Kong and Thailand air navigation service providers

PCCW Global has connected Hong Kong and Thailand air navigation service providers via the Asia Pacific Common Regional Virtual Private Network (CRV).

The CRV is specifically provisioned by PCCW Global as a robust and secure regional aviation network for the International Civil Aviation Organisation (ICAO), a UN agency established to manage the administration and governance of international aviation.

The Hong Kong Civil Aviation Department, which is said to be a pioneer air navigation service provider (ANSP) that has actively steered the ICAO CRV project, and Thailand's AEROTHAI have carried out a successful trial of the network between the two countries. The connection of the first city-pair in the APAC region to the CRV now paves the way for the ANSPs to exchange high volumes of aeronautical information over the CRV.

The key stakeholders celebrate the successful trial of connecting Hong Kong and Thailand air navigation service providers via the CRV. From left to right: Li Peng, ICAO regional officer; AEROTHAI president Sarinee Angsusingh; Simon Li, DG of Civil Aviation; and Frederick Chui, SVP of global data sales, PCCW Global.

According to PCCW Global, regional ANSPs have previously lacked a shared common network. This has resulted in "tangled" networks belonging to multiple service providers, which in turn led to network management challenges concerning technology upgrades, security, operations, etc.

Frederick Chui, SVP of global data sales at PCCW Global, says: "The success of the trial demonstrates our proven network services which is critical for the growth of aviation industry. PCCW Global CRV is providing secure closed-user network capability between ANSPs. The CRV also provides for various contingency routing scenarios across PCCW Global's extensive network, ensuring that the service will always be up and running securely."

Chui says cyber security is at the CRV's heart. The network's other benefits are said to include supporting various functions of ICAO's Aviation System Block Upgrades, better voice quality, and enhancing the aeronautical information exchange between APAC and other regions. The CRV service also provides users with performance tracking capabilities and proactive monitoring to ensure network health.

Dialog claims South Asian "firsts" with IoT network and 5G

Sri Lankan cellco Dialog has launched a NarrowBand-Internet of Things (NB-IoT) network across Sri Lanka.

In making the announcement in mid-October, the Axiata Group subsidiary claimed it had become the first operator to launch NB-IoT in South Asia. However, Singapore's M1 also launched a commercial nationwide NB-IoT network earlier this year in August *(see News, Q117 issue)*.

Dialog has activated the technology on its nationwide network via a software upgrade to existing 4G base stations. The company says the launch of the network will enhance the functionality of its IoT related services such as the connected home and connected car applications that were launched as part of its *Smartlife* platform in early July.

"NB-IoT provides a great springboard for us to further leverage IoT in introducing revolutionary services that will enrich Sri Lankan lives," says Pradeep De Almeida, group CTO, Dialog Axiata. "The network will amplify opportunity for solutions such as smart metering utilities, smart parking systems, smart garbage collection, logistic solutions, as well as other applications in agriculture and farming."

In a separate development in August, Dialog worked with its technology partners Ericsson and Huawei to trial 5G. In what it claimed was another first for South Asia, its says the demonstration established the capabilities of 5G to deliver throughputs in excess of 35Gbps on the air interface.

During the trial, Dialog and its partners showcased 5G technology solutions such as Massive MIMO and cloud radio, together with what the operator described as "futuristic" applications such as IoT-based smart parking, real-time 4K video streaming, industry automation and augmented reality using robots, as well as other digital business solutions.

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Telkomsel CEO Ririek Adriansyah (centre) received a Certificate of Operation Eligibility from the General Director of Post and Telecommunication.

Telkomsel strengthens 4G service using TDD

Following a spectrum auction held at the end of October 2017, Telkomsel has secured 2.3GHz frequencies and will use TDD technology to strengthen and maximise its LTE services in Indonesia, especially in areas of high data traffic such as Jabodetabek (Greater Jakarta).

At the time of writing, the operator said that as many as 500 LTE TDD base stations will be deployed by mid-December. This will include not only Jabodetabek but also Palembang and Bandung. Telkomsel added that in early 2018, base stations that support the technology will also be deployed in other cities across Indonesia that have high mobile data usage.

According to the operator, 2.3GHZ LTE TDD can provide better downlink throughput services due to the large bandwidth used. CEO Ririek Adriansyah said: "This additional spectrum will enable our customers to enjoy broadband services and digital services with better quality and access speed. In the long run, this additional spectrum also enables us to continue to provide the best data services to the community competitively."

From approximately 50 million LTE devices that are currently being used on its network, Telkomsel said around 85 per cent are able to support 2.3 GHz TDD LTE service.

The operator's spectrum allocation now comprises: 2.3GHz with 30MHz bandwidth; 2.1GHz with 15MHz bandwidth; 1.8GHz with 22.5MHz bandwidth; 900MHz with 7.5MHz bandwidth; and 800MHz with 7.5MHz bandwidth.

LTE: taking South Asia by storm – feature, pp20-24.

ESCO monitors power in Myanmar with *esite x10*

Nordic Tele Services (NTS) is using Flexenclosure's power systems at telecom sites in Myanmar.

The energy service company (ESCO) ordered 22 *eSite x10* hybrid power systems that have already been manufactured in Sweden, shipped to Myanmar, and deployed.

All of NTS' sites are now commissioned and operational, and Flexenclosure says they are preconfigured to maximise the best harvesting of solar energy. It adds that NTS will also be using the "powerful" set of remote management capabilities available with *eSite Tools* to monitor, control and accurately report back to its NOC on each site's power system performance.

According to Flexenclosure, NTS' sites are in remote rural areas with particularly difficult access but had to be deployed in a record time. The firm says the rollout was a "simple" operation thanks to the *eSite x10*'s compact and easily transportable size, and because its local team has already installed hybrid power systems in more than 1,200 sites across Myanmar.

Flexenclosure CEO David King reckons Energy as a Service (EaaS) is a fast-growing market, and one that demands the highest levels of performance and reliability from hybrid power systems. He adds: "Our *eSite x10* offers the lowest total cost of ownership in the most challenging operational environments and is the perfect ESCO solution."

The *eSite x10* is claimed to be the world's first hybrid power system purpose-built for outdoor telecom sites.

Flexenclosure has also agreed an ongoing services contract with NTS.

Telekom and edotco team-up in bid to accelerate telecoms in Malaysia

edotco has agreed to provide Telekom Malaysia's (TM) next-generation services to help mobile operators expand LTE. Under the collaboration, both parties say they will use each other's core expertise and capabilities to accelerate the country's digital ambitions.

A wholly owned subsidiary of the Axiata Group, edotco was set up in 2012 and is said to be Asia's first integrated telecoms infrastructure services company. It will provide TM's *Next Generation Backhaul* services to connect mobile operators' cell sites and their core network to edotco's towers in selected areas.

The two partners will also explore opportunities to provide common infrastructure via Smart Centralised RAN (Smart CRAN) services. They say this will enable operators to expand their mobile coverage by leveraging the strength of a capable local partner in identified dense urban areas (other than Putrajaya).

Both TM and edotco claimed to have been key players in enhancing connectivity in Malaysia through the development of telecoms infrastructure.

Earlier this year, TM deployed its Smart CRAN solutions to provide common infrastructure and BST nodes for operators in Putrajaya, while edotco launched its BST hotel services in Cyberjaya.

The collaboration is subject to a definitive agreement that will be finalised within six months.

Ericsson IoT to protect critical eco habitat

Smart Communications and Ericsson have launched an IoT project to help conserve the marine ecosystem of the Sasmuan Bangkung Malapad, a critical habitat and eco-tourism area in the Philippines.

Ericsson first launched its *Connected Mangroves* project in Malaysia where it has been helping the local community in Selangor to better manage the growth of new mangrove saplings.

Smart is the vendor's exclusive mobile network partner for the initiative in the Philippines where it is the first project of its kind to be implemented in the country.

The IoT solution uses wireless connectivity to capture data relevant to mangroves' survival such as water level, humidity, soil moisture and temperature, and other hazards in the environment.

The information, which is collected by waterproof solar-powered sensors attached to mangroves, will be transmitted over a cloud system to a dashboard accessible to concerned stakeholders, such as local authorities, fisherfolk and communities within the area.

Mangrove forests are said to be important in the protection of seaside communities from typhoons, flooding, erosion and other coastal hazards, and serve as habitat for various aquatic life. In the Philippines, Sasmuan Bangkung Malapad is home to several mangrove species and also hosts more than 80 species of migratory birds. The area is also seen as a critical source of oxygen for the Manila Bay.

However, based on information by the International Union for Conservation of Nature, scientists estimate that 50 per cent of the world's mangroves have disappeared in the last five decades, and that another one per cent is lost every year.

Cambodia launches new satellite initiative

Cambodia is aiming to develop its first satellite again, this time with Chinese help.

While the government has always been keen for the country to launch its own spacecraft, previous plans have been considered costly and subsequently stalled. Royal Blue Skies, a subsidiary of Cambodian conglomerate Royal Group, was granted a state concession in 2011 but the project failed to materialise.

Local reports now say Royal Group and the China Great Wall Industry Corporation – which helped Laos launch its first satellite in 2015 – have now begun a year-long feasibility study for a digital broadcasting and communications satellite. Telecommunication Regulator of Cambodia spokesperson Im Vutha said: "It will take a lot of time – seven years by international standards. "But [China Great Wall Industry Corporation] said they may take three years only because they have experience with Laos already."

Vutha reportedly said the government wants to invest in satellites as an alternative to fibre to increase broadband penetration in urban and rural areas.

He added the costs had yet to be finalised or approved, but estimated them to reach USD150m.

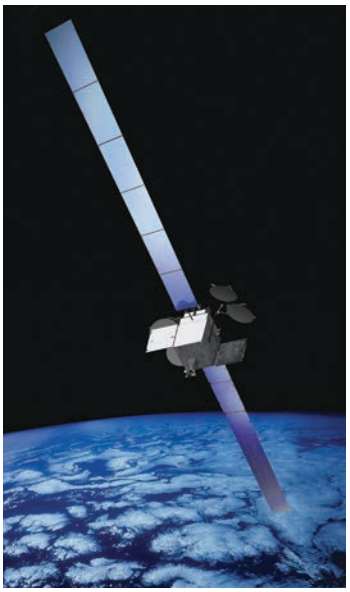
Digi aims to cover Malaysia with satellite backhaul

CompuDyne will use satellite capacity to help Digi, Malaysia's market leading mobile operator, connect underserved areas and boost its mobile broadband offering.

The Kuala Lumpur-based telecoms solutions provider has signed a multi-year, multi-transponder agreement to lease Ku-band capacity on SES' largest satellite dedicated to serve Asia-Pacific, *SES-9*. It's claimed this will bring "high-quality" cellular backhaul to service both East and West Malaysia and its surrounding islands.

According to SES, by making a shift from a C-band to Ku-band system, CompuDyne can now deliver more cost-effective and reliable satellite connectivity. This will enable Digi to extend its cellular network to underserved consumers in rural areas and in the far reaches of Malaysia. At the same time, Digi also plans to use the capacity to introduce mobile broadband services and packages for an increasingly connected population.

"In the eastern and western parts of Malaysia, there is incredible growth in mobile broadband usage today from both business and consumers," says CompuDyne MD Mohd Hanafiah A Jalil. "Utilising Ku-band capacity on *SES-9*, our customers have the opportunity to tap into this rising demand and offer improved services and greater value for end-users."



SES claims *SES-9* offers "high-powered and comprehensive" Ku-band coverage over Malaysia.

Aircel to close operations in six circles

Aircel is reportedly planning to shut down operations in six loss-making circles in India.

In early December, *The Economic Times* said quitting its 2G networks in UP (West), Haryana, Gujarat, Madhya Pradesh, Maharashtra and Himachal Pradesh will help the "debt-laden" company to boost its annual operating profits to more than INR12bn (USD186m) per year. It added that sources "familiar with the matter" say Aircel will hand back its 2G spectrum to the government for these circles.

The company is said to have around four million users in these circles, along with network-sharing agreements with Tata Teleservices and Reliance Communications. It will continue to run services in its other circles, such as UP (East), Tamil Nadu, Kerala, Kolkata, Rajasthan, North East, Jammu and Kashmir.

Aircel was acquired by Malaysian telco Maxis in 2006 which was said to be one of India's biggest overseas investors after pumping more than INR35,000cr (USD5.2bn) into the operation. Despite this, Aircel was hampered with debts of around INR15,500cr, according to *The Economic Times*.

The company was planning to merge with RCOM *(see Wireless Business, Q117)* but this was abandoned in late September following regulatory uncertainty and opposition from some RCOM creditors.

PLDT to open new cable system to link three continents

PLDT is set to open another international submarine cable link to connect the Philippines to three continents before the end of the year.

The telecoms and digital services provider is investing an initial PHP500m (around USD10m) through a partner in the consortium that owns the new 25,000km *Asia-Africa-Europe 1* (*AAE-1*) submarine cable system that went live earlier this year (*see News Q3 issue*).

In tandem with the other international cable systems that land in the Philippines, *AAE-1* will connect the country to 19 destinations: Hong Kong, Vietnam, Cambodia, Thailand, Singapore, Malaysia, Myanmar, India, Pakistan, UAE, Oman, Qatar, Saudi Arabia, Djibouti, Yemen, Egypt, Greece, Italy and France.

PLDT says the investment will enable it to serve more customers, not only at home but also across Asia, Africa and Europe. The company also claims *AAE-1* will further bolster the resiliency of its overseas links, as well as expand the capacity and enhance the quality of its data and internet connections.

PLDT international network VP Gene Sanchez adds: "This submarine infrastructure, with its state-of-the-art 100Gbps transmission technology and deployed with minimum design capacity of 40Tbps, will reinforce PLDT's international links to Europe and the Middle East via its PoP facilities in Hong Kong and Singapore. It will also provide new network diversity and resiliency in these regions.

AAE-1 covers Asia via diverse terrestrial routes across Thailand connecting Vietnam, Cambodia and Hong Kong, where it was landed in July (pictured).

"With *AAE-1*, the PLDT Group's total international capacity will be over 4Tbps, significantly greater than that of competition."

The new system will become part of PLDT's global network of 15 cable systems, including four which land in the Philippines: *Asia Submarine-Cable Express* which has a landing station in Daet and is described as the "largest" capacity international submarine system in the Philippines; *Camarines Norte; Asia Pacific Cable Network 2* and *Southeast Asia-Middle East-West Europe 3* which both land in Nasugbu, Batangas; and the *Asia-America Gateway* that lands in Bauang, La Union.

MCMC to sell 700MHz

The Malaysian Communications and Multimedia Commission plans to sell spectrum in 700MHz next year. In October, it said the frequencies will become available as from 2019 after analogue TV signals are switched off by the end of 2018. Operators will be able to purchase eight blocks of 2 x 5MHz for a fixed fee of MYR494m (USD121m). This includes a single payment of MYR216m plus the annual charge of MYR18.5m for 15 years. The spectrum will mainly provide mobile broadband services using LTE.

5G boost for Singapore

Singtel and Ericsson will jointly establish a Centre of Excellence for 5G development and deployment in Singapore. Starting with an investment of SGD2m, the centre will be based on upskilling, demos, live field trials, and collaborations with other institutions. Activities will begin with Ericsson providing its 5G expertise to equip Singtel engineers with critical competencies. In 2018, a 5G test bed will be deployed to carry out live field trials with key customers.

Sicap to help MVNOs

Sicap has joined the Virtual Network Operators Association of India (VNOAI). The mobile device and SIM management specialist says 61 VNO licenses have so far been granted in the country across various communication services. VNOAI director general R.K. Upadhyay adds that the market has the potential to reach a combined revenue of USD4bn. He says: "We need associate members like Sicap to provide their wealth of technology experience from the international MVNO markets and help us to facilitate a healthy growth of our telecom industry."

Countries need to work more closely on spectrum

Pakistan's IT minister for Information Technology has called for greater international collaboration in managing spectrum.

Speaking at the *2017 Commonwealth Spectrum Management Forum* organised by the Commonwealth Telecommunications Organisation (CTO) and held in London in October, Anusha Rahman Ahmad Khan said: "As we in Pakistan become more successful in connecting our citizens to the internet, so the demand on the spectrum increases. We are also looking to the future deployment of 5G and new technologies, so the use of new bands and spectrum sharing are ideas we will need to initiate."

Pakistan's IT minister Anusha Rahman Ahmad Khan said the CTO should lead the way in sharing good practices.

Speakers and delegates at the forum agreed that new technologies offer increasing opportunities for efficient spectrum sharing and use. They added that with all the good work on spectrum management taking place throughout the international community, countries will benefit from a collaborative platform to share effective techniques. They also agreed on the need for greater collaboration in international processes. They said the guidance offered by the ITU in the form of the WRC and radio regulations will benefit from national, regional and pan-commonwealth views.

CTO secretary-general Shola Taylor said: "We will increase our role in this important area as the international community strives to ensure that spectrum facilitates socio-economic development throughout the commonwealth."

Asia's first fall prediction IoT application

St Luke's ElderCare (SLEC) in Singapore is co-developing an innovative IoT solution that predicts the likelihood of its patients falling down.

It leverages Nokia Bell Labs' proprietary video analytics technology to create an unobtrusive and continuous monitoring system. It's claimed the personalised and predictive solution will analyse information about walking speed, gait and step width, and predict and send an alert when there is an increased risk of the person falling.

SLEC is said to have an extensive network of senior care centres around Singapore, and also offers community- and home-based medical, nursing and therapy services. As part of an MoU signed with Nokia, it will provide guidance and feedback on the IoT application's software development process.

SLEC CEO Dr. Kenny Tan says the partnership is in line with the organisation's long term vision of transforming community care. He adds: "We hope that by trailing this solution with Nokia, it will enable significant improvements on fall risk prediction, early intervention, and care provision before seniors suffer an injury."

The application will be integrated into Nokia's *IMPACT* IoT platform to allow the caregiver to view and collect information from the solution and other sensors that are being used. Among its key features, the platform is said to manage all data collection, event processing, analytics and applications for more than 1.5bn devices, as well as any protocol across any application.

According to a study on IoT innovation for elderly care carried out by the Eden Strategy Institute and Nokia, one-in-three aged Singaporeans is likely to experience a fall once a year, with resulting injuries contributing at least SGD1bn to total healthcare costs.

ASC lands in Indonesia on track for launch

The *Australia Singapore Cable* (*ASC*) arrived in Indonesia in early December with landing partner XL Axiata.

Currently being built by Australia-based network and ICT service provider Vocus Communications, the 4,600km *ASC* will link Perth in Australia to Singapore via Indonesia.

Speaking at the launch in Indonesia, Vocus Group chairman Vaughan Bowen said: the network has been designed specifically with Indonesia in mind. He said: "Through Vocus' transmission network and long-term capacity rights with trans-Pacific cable systems, the *ASC* will provide the missing link connecting Asian customers to global internet and cloud content located in the US via an alternative Great Southern Route. Indonesia is soon to be a key hub in the middle of these traffic flows, rather than an end-point of the region's fibre optic networks."

Vocus says *ASC*'s four-pair fibre network will deliver a minimum of 40Tbps of capacity – a first for the region – and will offer around 30 per cent reduction in latency from Sydney to Singapore compared to alternative routes.

Alcatel Submarine Networks is installing the cable which was 57 per cent complete as of November 2017.

Alcatel's *Ile de ReVocus* will lay the main cable from February to March next year with a final splice in April. Commissioning will then begin in May and June ready for commercial services the following month.

Sri Lanka Telecom and ZTE complete LTE-A Pro test

Sri Lanka Telecom (SLT) has worked with ZTE to complete a proof of concept verification test for LTE-A Pro in Colombo.

Since building its TD-LTE networks in 2014, SLT said it needed to expand its network capacity and quality. As a result, it has deployed ZTE's *eWBB* solution in its existing networks. It's claimed this can increase network capacity and performance "dramatically" using a wide range of key technologies such as 256QAM, 4x4 MIMO, CA, MU-MIMO, and Pre5G Massive MIMO.

The LTE-A Pro test was carried out in a network environment with real-world scenarios. According to ZTE, it showed that the *eWBB* solution greatly lowered network transport requirements, making it possible to enhance 4G inter-cell performance. It said that the platform offered a peak rate of 720Mbps per carrier which is six times faster than a traditional TD-LTE carrier.

The company adds that compared to ADSL and FTTx, *eWBB* offers a higher transmission rate and a more cost-effective tariff.

"The *eWBB* deployment is a landmark in the broadband construction history of Sri Lanka, and also a milestone in the government's National Broadband Policy," stated ZTE. "Tens of thousands of people now have access to wireless broadband services and enjoy the benefits of mobile internet."

SLT says it will continue to partner with the vendor to bring broadband services to more households and boost Sri Lanka's economy.

LTE update in South Asia – feature pp20-24.

UHP unveils 'Functionality-as-a-Service'

UHP Networks has launched what it describes as a 'Functionality-as-a-Service' (FaaS) broadband data platform. Called *RUN*, the service is said to be optimised to take advantage of the maximum efficiency offered by Intelsat's *EpicNG* high-throughput satellite fleet.

RUN will initially be available in Central and South Asia, Africa and the Middle East. Canada-based UHP says the platform uses low capex, universal routers to provide an easy-to-operate system. It claims to have come up with the industry's first fully software-defined, high-throughput VSAT router, and say this can be used in a network of any size and any topology either as a remote or component of a VSAT hub.

Vagan Shakhgildian, president and CEO of UHP Networks, says *RUN* is designed to lower the barrier of entry for deploying high-throughput, in-country VSAT services.

"Combining Intelsat *EpicNG*'s improved performance with UHP's software-definable VSAT platform addresses the initial cost for private network hardware and makes the service easier to manage. This enables service providers to cost-effectively deploy solutions to support both existing and emerging applications."

In a separate development, ABS will also expand its VSAT technology using equipment from UHP.

Over the last five years, the satellite operator says it has rolled out several UHP-based networks across APAC and Africa providing internet and VSAT connectivity.

ABS now plans to deploy new services in the Middle East, and will use multiple high-density redundant *UHP-HTS* hubs and *UHP-100* remote routers for the expansion.

It's claimed the technology will provide a high-availability, bandwidth-efficient and cost-effective service to ABS customers.

Ooredoo Global services partners with iPass to offer worldwide Wi-Fi access

Ooredoo Global Services, the wholesale division of Qatari telco Ooredoo, will provide global Wi-Fi services to its customers across Southeast Asia, the Middle East and North Africa using the *iPass SmartConnect* software development kit. The service is set to launch in 1Q18.

Ooredoo is said to have 138 million subscribers across 10 countries, and in South Asia it has operations and interests in Indonesia, Laos, Maldives, Myanmar and Singapore.

The company plans to offer its customers access to global Wi-Fi, either as a standalone service or as part of existing mobile roaming packages. Ooredoo says the new service will provide "simple, secure and unlimited" Wi-Fi access to millions of hotspots worldwide.

iPass provides always-on Wi-Fi access on any mobile device using a cloud-based SaaS platform. It claims the *SmartConnect* SDK makes it "incredibly easy" for network operators to integrate global Wi-Fi into their existing services.

By using patented technology, the company adds that its platform takes the "guesswork" out of Wi-Fi, automatically connecting customers to the best hotspot for their needs.

iPass also claims to run the world's largest Wi-Fi network with more than 62 million hotspots in more than 180 countries and territories.

Ooredoo Global Services COO Khalid Al Mansouri says: "With iPass, our customers will have unlimited Wi-Fi access to millions of hotspots around the world at affordable rates, which will definitely enhance their digital experience and allow them to enjoy the internet even more."

India smarter with Zetron

Zetron Australasia will provide mobile command-and-control systems for a smart city project in India. The company says its digital console systems integrate telephony with digital and analogue radio control to meet a range of applications. It claims its system's high availability architecture provide the flexibility, scalability and resilience mission-critical applications demand. The Indian government has launched the *Smart Cities Mission*, an urban renewal programme that aims to develop almost 100 cities, making them citizen friendly as well as safe and secure.

Roshan likes Facebook

Roshan has signed a partnership agreement to have Facebook servers placed in its data centres in Afghanistan. It's hoped this will provide faster and higher quality access to the social network for the cellco's nationwide customers. There are said to be around six million *Facebook* users in Afghanistan. Roshan says its official *Facebook* page has more than 1.3 million followers, the largest in Afghanistan's private sector and the fastest growing Facebook brand page in the country.

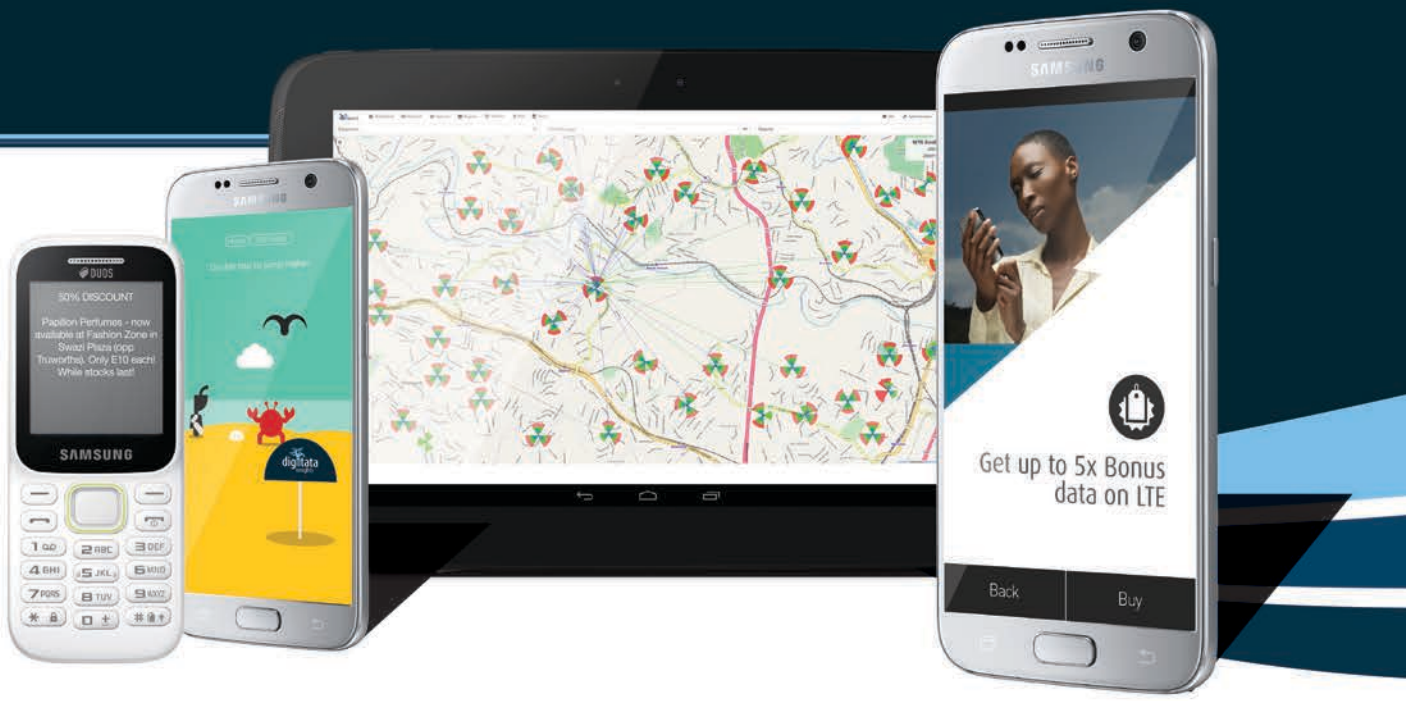
Amdocs AI for Airtel

Airtel is hoping to introduce cutting-edge technologies and practices to enhance its customers' service experience in India with the help of Amdocs. The OSS/BSS specialist says it will deploy machine learning and advanced AI-based technologies across Airtel's multiple lines of business. It claims this will help it to pre-empt and self-heal operational issues, introduce smartbots into digital channels, and quickly launch and activate new services, thereby enabling a "seamless" customer experience.

digitata

Multinational technology company, Digitata Limited focuses on delivering intelligence in the mobile telecommunications and digital media arenas, enabling mobile operators, brands and agencies to offer their customers greater value and an enhanced user experience.

This is achieved through the application of Machine Learning (ML) and Artificial Intelligence (AI).



Digitata Limited is a subsidiary of 4Sight Holdings Limited, an international technology holding company that focuses on investing in Industry 4.0 companies.

4Sight creates value for its shareholders by enabling its entrepreneurial subsidiaries to share ideas, partners, resources, knowledge, skills and technologies across industries.

4sight Holdings Limited

In October 2017 4Sight Holdings Limited was listed on the JSE AltX board.

Digitata Insights' Mobile Media platform offers mobile operators a revenue-generating opportunity to further their transformation in the digital arena.

Now brands can reach subscribers on any mobile phone, targeted by time and location, at no cost to the subscriber. Our sponsored gamification allows brands to educate subscribers on their products and engage with them.

Dynamic Tariffing™, trusted by operators to smartly price data, calls, and SMS, now applies this intelligence to provide segmented and personalised offers.

Our smart app, SnapTariff, puts data control and management in the hands of the user, and enables the operator to present near real-time offers such as smart bundling, triggered "on the edge".

Digitata Networks offers operators intelligent network configuration management, performance monitoring, asset tracking and customer experience management.

Digitata Networks provides vendor-independent software products developed to control, monitor and automate all major mobile technologies (2G, 3G, 4G and WiFi) across the different domains within a telecoms network.

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OTT players can expect "rosy days ahead" in Asia-Pacific region

The OTT market is set to boom in Asia-Pacific, according to GlobalData.

The analytics and consultancy firm says a number of key factors will collectively spur the region's OTT video market. These include: faster bandwidth; ever-increasing smartphone and pay-TV penetration; improving payment options; falling data tariffs; and rising per capita income.

It also cites growing 4G coverage and says the market is expected to witness further traction with higher investment on LTE networks and the availability of content variety. The firm believes the forecasted growth in 4G subscribers (*see feature, pp20-24*) will offer "ample opportunities" for OTT in the years to come.

"OTT players can expect rosy days ahead in the APAC region," says Malcolm Rogers, telecoms market analyst, GlobalData. "Apart from expansion of 4G, the availability of low-priced smartphones and a sizable population of internet users in the region will also support the growth of the OTT video market."

GlobalData says international players like Netflix and Amazon have already entered the region in 2016 to tap the market. It adds that local players – such as Viu from Hong Kong-based PCCW Meda, Star India's Hotstar and Malaysia's Iflix – are also looking at possible strategies to expand their user base by combining international content to their local and vernacular content for low-priced monthly subscription plans.

Along with LTE expansion, the firm believes the introduction of 5G will give a further boost to the market, as the OTT players will be able to provide enhanced user experience in terms of HD/UHD, linear and AR/VR content. Rogers says: "Consumers can expect premium content at competitive prices from OTT players as the competition intensifies. The premium content will be on offer along with the vernacular content."

In emerging Asian countries, the firm says OTT players are trying to come up with innovative solutions, including the option to download content to address poor broadband connectivity. It says they are also using suitable video streaming technology to optimise streaming based on bandwidth availability and to reduce buffering at lower internet speeds.

GlobalData points out that the abundance of free content on the internet and low income levels are the "major challenges" for the monetisation of OTT video in all markets.

It says most players have adopted a hybrid model of AVOD and SVOD/TVOD, where AVOD is aimed at attracting users while SVOD drives monetisation. "Some OTT players are even partnering with telcos to offer both benefits, which are believed to help OTT players in addressing billing challenges," states the firm.

ATC to acquire towercos in India

ATC Telecom Infrastructure (formerly Viom) has agreed to buy Idea Cellular's and Vodafone's respective standalone tower businesses in India for an aggregate enterprise value of INR78.5bn (USD1.2bn).

Idea's tower business is run via its wholly owned subsidiary, Idea Cellular Infrastructure Services Ltd. (ICISL), while Vodafone's Indian tower interests are held by Vodafone Mobile Services and Vodafone India. When combined, their portfolio is said to comprise around 20,000 towers with a tenancy ratio of 1.65 (as at 30 June 2017). Idea will sell its entire stake in ICISL while Vodafone India will sell a business undertaking to ATC.

All the companies have agreed to treat each other as long-term preferred partners, subject to existing arrangements, with ATC as a mobile network infrastructure provider and Vodafone India and Idea as customers. The parties also plan to work together to further expand high-speed mobile networks in India.

Idea and Vodafone India are currently going through the process of a merger *(see News Q1 issue)*. Once this is completed, around 6,300 co-located tenancies of the two operators on the combined standalone tower businesses will become single tenancies over a period of two years without the payment of exit penalties. In the event of the completion of the sale of the standalone tower businesses preceding the completion of the two operators' proposed merger, Idea will receive INR40bn (USD615m) and Vodafone India will receive INR38.5bn (USD592m), subject to customary closing adjustments including debt and cash.

The receipt of these proceeds prior to completion was anticipated and provided for in the merger agreement. It will therefore not affect the agreed terms of the Idea-Vodafone India merger, including the amount of debt that Vodafone will contribute to the combined company at completion. It will contribute INR25bn more net debt than Idea at completion excluding the impact of tower sales, subject to customary closing adjustments.

Completion of the transaction is expected to take place during 1H18.

Telkom acquires TS Global Network

Indonesia's Telkom has agreed to buy a majority interest in Malaysian satcoms services provider TS Global Network (TSGN). Telkom is carrying out the transaction through its subsidiary, PT Telekomunikasi Indonesia International (Telin). Financial details have not been disclosed.

A conditional sale and purchase agreement to transfer the majority ownership of TSGN to Telin was signed by Telkom CEO Telin Faizal R. Djoemadi (front left) and TSGN shareholder Dhrmarajah AT Thiagarajah (front right) in late November.

TSGN is said to be Malaysia's largest VSAT service provider with corporate customers from various industries such as plantation, mining, government and banking. It also has affiliated companies in Brunei and Myanmar.

Telin says the acquisition is in line with its vision to become a global digital hub. The company adds that it was looking for an experienced partner to help it expand the satcoms market across the APAC region.

Telkom director of wholesale and international service Abdus Somad Arief says: "This synergy will further open opportunities for Telkom Group to realise the goal of becoming a major player in the satellite business, in line with the company's strategic objectives to become [one of] the top three satellite service providers in Asia."

India now second largest smartphone market

After what it describes as a "wobble" in 2Q17, Canalys says India's smartphone market recovered quickly, with shipments growing 23 per cent YoY in 3Q17 to reach just over 40 million units. It says the country has now overtaken the US to become the world's second largest smartphone market after China.

According to data from the analyst's *Smartphone Analysis* service, Samsung and Xiaomi accounted for almost half of India's total market *(see graph overleaf)*. Canalys says Samsung's smartphone shipments for 3Q17 (9.4m units) are almost 30 per cent more than in 3Q16, while Xiaomi's shipments of 9.2m units increased by more than 290 per cent.

"Xiaomi's growth is a clear example of how a successful online brand can effectively enter the offline market while maintaining low overheads," says Canalys analyst Rushabh Doshi. "But Xiaomi focuses on the low end. It struggles in the midrange (devices priced between INR15,000 and INR20,000 [USD230 and USD310]), where Samsung, Oppo and Vivo are particularly strong. Nevertheless, we predict Xiaomi's continued go-to-market innovations will allow it to overtake Samsung within a couple of quarters."

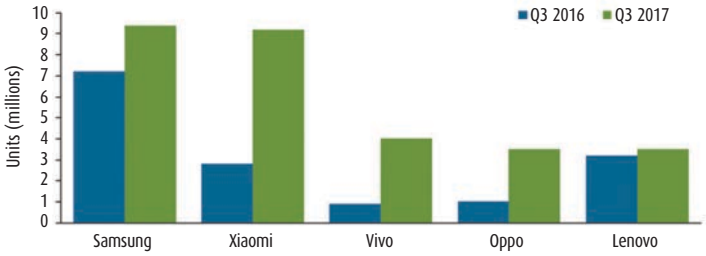
Apple began local production in India earlier this year, and its

shipments more than doubled to 900,000 units during the quarter compared with 3Q16.

In March of this year, India's parliament agreed to replace many indirect taxes with a new Goods and Service Tax (GST) Act. This came into effect on 1 July. Canalys says after a "rocky" start to GST, the market showed strong signs of stability during the third quarter, with most of the channel adapting to the new rules on time.

"The Indian economy is proving very strong in the second half of 2017, now that the twin shocks of GST and demonetisation are behind it," says Doshi. "Reduced indirect taxes have added new equity to the market, with distributors and retailers able to serve areas beyond their home regions as inter-state operations become easier. As the infrastructure matures, consolidation in distribution is inevitable."

Canalys believes that doubts about the country's market potential are "clearly dispelled" by this latest data. "There are close to 100 mobile device brands sold in India, with more vendors arriving every quarter," says research analyst Ishan Dutt. "In addition, India has one of the most complex channel landscapes, but with low barriers to entry. Growth will continue. Low smartphone penetration and the explosion of LTE are the main drivers."



India smartphone estimates by vendor for 3Q16 and 3Q17. Researchers say Xiaomi is closing in on Samsung as the country's overall market grows 23 per cent.

SOURCE: CANALYS ESTIMATES, SMARTPHONE ANALYSIS, OCTOBER 2017

Critical comms control room market transitioning from voice to data

The global market for command and control room technologies and services was estimated to have been worth USD4.99bn in 2016, according to research carried out by IHS Markit.

The analyst says the global installed base of control rooms is approaching 240,000, and forecasts that the transport and utilities sectors will grow steadily.

In terms of regional growth, IHS says Asia-Pacific continues to expand its installed base of control rooms across sectors, including public safety. The Middle East and Africa are said to be experiencing a similar trend as countries in these regions build up and advance their emergency response infrastructure to handle more demands on call-taking software. This is said to be due to increasing emergency incidents coming from expanding populations, and education surrounding the role of emergency services.

But overall, the analyst predicts low global growth in public safety because of efficiencies, both in cost savings and operations, leading to an increase in the consolidation of public safety control rooms.

The benefits of consolidation are said to result in saving both personnel resource costs and time needed to address incidents. They include improved emergency response due to better collaboration, enhanced technology because of bigger budget pools and increased visibility into operations.

IHS says the focus on voice has begun to change in favour of more computer-aided dispatch (CAD) and data focused solutions. More data such as incident information, video, images, etc., can be made available to resources in the field via tablets or ruggedised smartphones.

Additionally, such devices, which run on a broadband network, can be significantly cheaper than their radio counterparts, says the analyst. For this reason, especially in particularly price-sensitive regions such as APAC, it says there has been a strong preference for broadband devices and CAD systems over radio and voice dispatch.

Meanwhile in Western Europe, IHS says there is a strong need for services and consulting, especially as the transition to digital communications continues and broadband LTE takes place. In addition, the integration of analytics technologies, social media and digital evidence management are supporting the market.

The research also reveals that North America has the biggest installed base of public safety control rooms with almost 6,000 public safety access points in the US alone.

Nokia and StarHub collaborate on Singapore IoT development

Nokia and StarHub have signed an MoU to jointly drive IoT momentum in Singapore.

The partners claim their alliance will enable easier and more rapid development of IoT services that will help enterprises discover and capitalise on *Smart Nation* opportunities and capabilities to propel their businesses.

At the end of November, the two companies agreed to develop new IoT use cases and applications in the areas of connected living, vehicles and buildings, with plans to offer commercial services to customers during 1Q18.

Nokia will support StarHub and its partners in the development of use cases such as for smart parking, environmental sensors and video analytics. The Finnish firm will also help StarHub promote the benefits

INVESTMENTS, MERGERS, ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
6/9/17	Shareholders	Redknee Solutions	Rights offering	CAD0.63 per share	Under the Rights Offering, an aggregate of 108,519,936 subordinate voting shares were issued for gross proceeds to Redknee of around CAD68m. Net proceeds will be used to fund a restructuring of the business to further a previously announced strategic plan.
4/10/17	Ekinops	OneAccess	Company acquisition	EUR60m (estimated)	It's claimed the combination creates a "major player" in transport, Ethernet & corporate routing solutions for telecoms networks. Merged entity generates combined revenues of approximately EUR76m & EBITDA margin of 6.3%. Market capitalisation of the new group amounts to around EUR119m (as of 29 September 2017).
5/10/17	TIBCO Software	Cisco	Data virtualisation business (formerly Composite Software)	NA	The acquisition specifically includes Cisco's Information Server for enterprise-scale virtualisation & associated consulting & support services. TIBCO says the move strengthens its portfolio of analytics products, & claims it will enable businesses to get analytic solutions into production faster than alternatives, while continuing to adapt as data sources change from traditional databases and Big Data to cloud & IoT.
16/10/17	CITIC Telecom CPC	Linx Telecoms	Company acquisition	NA	The Hong Kong telco says the completion of its acquisition of Europe-based Linx's telecoms business gives it 140 points of presence in 130 countries across the so-called 'Digital Silk Road' that links Asia, Europe & Africa. Merged company is named CITIC Telecom CPC Europe.
23/11/17	Marlink	OmniAccess	Majority stake	NA	Marlink's investment is backed by Apax Partners but financial details have been withheld. Marlink says OmniAccess' existing management team will remain unchanged & continue to keep a "significant shareholding". It adds that the new combined maritime VSAT services company generates almost USD500m in revenues, employs about 1,000 people, & operates global infrastructure supporting an install base of more than 4,000 VSAT vessels.
1/12/17	ARRIS International	Broadcom Limited	Ruckus Wireless & *ICX* switch business	USD800m + extra cost of unvested employee stock awards	Originally announced in March 2017, ARRIS has now completed its acquisition of both Ruckus Wireless & the *ICX* switch business from Broadcom. Dan Rabinovitsj – previously COO of Ruckus – will lead a new ARRIS Enterprise Networks business segment.

of IoT technology through various activities, including developer outreach programmes and participation in IoT-related events. Nokia Bell Labs will provide added consultancy services to the operator and its enterprise customers to accelerate Singapore's IoT market momentum.

Dr. Chong Yoke Sin, chief of the enterprise business group at StarHub, says a large component of the Singapore government's *Smart Nation* initiative involves the deployment of IoT devices in the environment, such as along streets in homes, offices, parks, etc. She adds: "The granular data derived from these sensors will allow enterprises to understand and gain insights from their customers, improving operational efficiencies and aid in long-term planning. We will leverage Nokia's IoT technology to help address urban challenges faced by our government and commercial customers."

Satisfying data hunger paying-off for Globe Telecom

Globe Telecom's data-related income accounted for more than 53 per cent of its top line revenues in January to September.

The Philippines operator is now reportedly the country's most popular cellco after pushing ahead of PLDT's mobile division Smart at the end of last year. In its year-to-date results published in late November, Globe said it is seeing growing data demand brought about by the popularity of streaming and VOD services.

The company's data-related revenues in the first nine months of 2017 came in at around PHP51bn (USD101.54m) against total service revenues of PHP95.1bn (USD1.89bn), a six per cent increase YoY.

Mobile data revenues for the period reached PHP31.3bn (USD623.18m, a 20 per cent rise from PHP26.1bn (USD519.65m) a year earlier. As well as higher data usage, Globe said this was driven by continued growth in smartphone penetration. Mobile data traffic over the nine months grew 73 per cent to 430PB from 249PB over the same period in 2016.

The operator said corporate data revenue reached PHP7.6bn (USD151.31m), a four per cent YoY rise from PHP7.3bn. It added that increasing demand for data connectivity, managed service solutions and cloud-based services resulted in the expansion of its customer base.

Globe president and CEO Ernest Cu pointed out that the company's capex in the first nine months of the year reached PHP36.8bn. Around 84 per cent of this was spent on enhancing data capacities and addressing the data service needs of customers. Cu said capex allocation for data-related requirements have been steadily increasing over the past several years, from 49 per cent in 2014 to 65 per cent in 2016, increasing further to 84 per cent for the year to date.

DragonWave acquired by Transform-X

DragonWave has been acquired by Transform-X for an undisclosed sum. The firm will operate under the name DragonWave-X with Hans B. Amell as its new CEO and Marcus Andersson as executive vice president of marketing and sales.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
20/10/17	Ericsson	Sweden	3Q17	SEK	47.8 (bn)	NA	-1.43	Reported sales decreased by 6% YoY. In MEA, sales were flat YoY, negatively impacted by currency movements & declining sales in Africa. CEO & president Börje Ekholm said: "As communicated in the Q2 report we have identified an increased risk of further market & customer project adjustments, considering the current market environment & our focused strategy. In total, the negative impact on results was then estimated to be SEK3 to 5bn until mid-2018."
25/10/17	Telenor	Norway	3Q17	NOK	30,735	12,976	3.84	Total organic revenues increased 1% and record high EBITDA margin of 42% represents a YoY increase of 3%. Has met 2017 target of NOK1bn cost savings.
26/10/17	Intelsat	US	3Q17	USD	538.8	420.5	0.26	Net loss of USD30.4m reported for three months ended 30 September 2017. CEO Stephen Spengler said revenues & adjusted EBITDA "reflect the ongoing transition of our business". Company now expects to come in at the bottom of the previously disclosed revenue guidance range of USD2.15bn to USD2.18bn for 2017.
26/10/17	Nokia Corp.	Finland	3Q17	EUR	5.5 (bn)	NA	-0.03	Reported net sales during quarter represent 7% YoY decrease (4% decrease on a constant currency basis). Networks division saw 9% YoY net sales decrease (6% decrease on a constant currency basis), primarily due to ultra broadband networks, reflecting challenges related to market conditions & certain projects in mobile networks, mainly in North America & Greater China.
26/10/17	Eutelsat	France	1Q17-18	EUR	349.1	NA	NA	Reported income for quarter down 9.3% & 6.7% like-for-like but in line with expectations. Delayed availability of contracted capacity on *Al Yah 3*, Yahsat's third satellite, impacting Eutelsat's Konnect Africa broadband programme.
27/10/17	SES	Luxembourg	3Q17	EUR	478.5	307.5	NA	Earnings for the period down 8.6 per cent compared to 3Q16 which saw EUR533.3m. Underlying growth impacted by *AMC-9* "health issues" & lower wholesale capacity revenue for fixed data.
9/11/17	Singtel	Singapore	2Q18	SGD	4.37 (bn)	1.292	0.6	Up 6.9% YoY. Net profit of SDG2.9bn boosted by gains of divestments of 75.2% stake in NetLink Trust in July 2017. Operating revenue for quarter rose 7% and included contributions from digital marketing company Turn which was acquired in April 2017.
9/11/17	VEON	Netherlands	3Q17	USD	2,456	993	NA	YoY revenue increased 4%. Total revenues in Pakistan up 6.2% compared to 3Q16 but Bangladesh down 7.9% due to "continued pressure", 3G "spectrum disadvantage" & "adverse weather conditions" during the quarter.
14/11/17	Gilat Satellite Networks	Israel	3Q17	USD	69.9	7.1	NA	Income for the period increased compared to USD66.2m in 2Q17, but fell compared to USD78.6m in 3Q16. One of the highlights reported for the quarter include a five-year, multimillion 4G backhaul deal with Globe in the Philippines.
15/11/17	Cisco	US	1Q18	USD	12.1 (bn)	NA	0.48	YoY decrease of 2%, with product revenue down 3% & service revenue up 1%. Earnings in AJPC, EMEA & Americas down 1%, 3% & 1%, respectively. Infrastructure platforms income fell by 4%
20/11/17	Sri Lanka Telecom Group	Sri Lanka	3Q17	LKR	19,005	5,122	0.40	During the nine month period ending 30 September 2017, group reported revenues of LKR56.4bn, YoY increase of 1.3%. Marginal increase of mobile related revenues, mainly due to tax rises, resulted in lower than expected growth.
23/11/17	Axiata Group	Malaysia	3Q17	MYR	18.1 (bn)	2.5 (bn)	NA	QoQ revenue increased 2.4% while EBITDA grew 8.9% with "strong contribution" from main operating companies in Indonesia (XL), Sri Lanka (Dialog), Bangladesh (Robi), Cambodia (Smart) & Nepal (Ncell). Turnaround for Celcom in Malaysia said to be "on track" but "lot more effort" required. Forex issues & losses at Indian affiliate Idea Cellular led to 33.4% fall in net profit to MYR319.1m for quarter.

US-based Transform-X is a privately held company and claims to own "advanced" waveform, software and hardware technologies for high-capacity microwave radio, satellite radio, broadcast and other RF communications. Its acquisition of DragonWave follows months of uncertainty.

Earlier this year, the Canadian microwave backhaul specialist de-listed from the Toronto Stock Exchange (TSX) and NASDAQ, and saw a number of board resignations. The Ontario Superior Court of Justice appointed a receiver and approved an expedited sale process for the firm's business and assets. Transform-X announced its takeover in early October and finalised the deal by mid-month, thereby concluding the receivership process.

DragonWave CFO Patrick Houston pointed out that the company continued to operate "business as usual" during the sales process, and expected all current orders and new orders to be delivered as usual.

According to reports earlier this year, DragonWave had been struggling to repay debts of CAD17.2m, and had been trying to pursue alternative financing. On 28 July, the TSX suspended trading of the company's shares and KSV Kofman was appointed as receiver on 31 July. The following day, the board of Peter Allen, Claude Haw, Cesar Cesaratto and Lori O'Neill resigned their board director positions with immediate effect. In the US, DragonWave was de-listed from NASDAQ on 2 August.

According to James Bagnall of the *Ottawa Citizen*, two "seismic events" stripped DragonWave of 60 per cent of its annual revenues in just two years. He claimed one of these was a "technical glitch" that led to the vendor stopping shipments to a customer in India. The other was Nokia's acquisition of Alcatel-Lucent, which was a major competitor, effectively killing more than half of DragonWave's sales.

IN BRIEF...

VEON's has entered into an agreement to sell its 78 per cent stake in VimpelCom Lao to the local government for gross proceeds of USD22m. Following the sale, which is subject to all customary approvals, the state will own 100 per cent of the share capital of VimpelCom Laos. VEON says the sale is in line with its group strategy of disposing of non-core assets. As at 30 June 2017, VimpelCom Lao had 289,000 customers.

Tata Teleservices is selling its consumer mobile operations across 19 of India's 22 telecoms circles to Bharti Airtel. According to local reports, the deal includes 178.5MHz of spectrum across the 850MHz, 1800MHz and 2100MHz bands. Airtel will also gain the right to use some of Tata's fibre network. While financial details have not been revealed, the merger is said to be on a debt- and cash-free basis but with Airtel taking over part of Tata's unpaid spectrum acquisition debt. Tata plans to retain its stake in towerco ATC (formerly Viom).

Viettel Global is planning to launch operations in Indonesia and Nigeria. At its AGM earlier this year, the military-owned telco said investments in the countries would create conditions for it to continue to grow its interests elsewhere. It is aiming to begin in 1Q18. The telco currently runs networks in Burundi, Cambodia, Cameroon, East Timor, Haiti, Laos, Mozambique, Myanmar, Peru and Tanzania. It reported a 21 per cent YoY decline in revenues last year.

State-run VNPT will spend next year preparing for a scheduled IPO in 2019. As part of the government's plan, the telco has restructured into three companies that include VinaPhone as a service provider, VNPT Net as the network operator, and VNPT Media as a VAS provider. A new company that develops software and hardware technology components for the government will also be set up under VNPT's management. Meanwhile MobiFone, the cellco which split from VNPT three years ago, is also expected to be privatised next year.

The OT-Morpho group now wants to be known as 'IDEMIA'. The name change is the result of the merger between Oberthur Technologies and Safran Identity and Security (Morpho) completed on 31 May 2017. According to the authentication specialist, IDEMIA is a reference to identity, idea and the Latin word 'idem'. The company is supported by a workforce of 14,000 employees from all over the world, including 2,000 in R&D.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
1/6/17	Dr. Lih Shyng (Rick) Tsai	MediaTek	Co-CEO	Chunghwa Telecom	Chairman
23/8/17	Troy Mattern	Motorola Solutions	Head of cyber security for products & services	Zurich Insurance Company	VP of cyber security
24/8/17	Reza Ghaffari	Coriant	EVP global services & operational excellence	Coriant	SVP global services
19/9/17	Colin Sabol	Xylem	SVP & president of *Sensus* & analytics	Xylem Analytics	President
2/10/17	Alam Ali	Motorola Solutions	VP, records & evidence systems, software enterprise	Tersai Corporation	Founder & SVP of product & operations
2/10/17	Iain McDonald	Motorola Solutions	VP, software deployment & integration, software enterprise	Microsoft	GM & partner engineering manager
3/10/17	Dr. Graeme Milligan	CyanConnode	Global head of integration	UK Smart Metering Implementation Programme	Consultant
9/10/17	Ronnie Leten	Ericsson	Chairman	Atlas Copco	President & CEO
19/10/17	Samir Marwaha	Sandvine	CMO	Netscout	VP & GM of new markets business
13/11/17	René Obermann	Telenor	Member of board of directors	Ziggo	CEO
14/11/17	Ammar Alkassar	NA	NA	Rohde & Schwarz Cybersecurity	Stepping down as MD & CEO
14/11/17	Reik Hesselbarth	Rohde & Schwarz Cybersecurity	Acting CEO	Rohde & Schwarz Cybersecurity	CFO & second executive director
22/11/17	Ras Scollay	Colt Data Centre Services	APAC head of sales & marketing	CenturyLink Business	Country manager & regional sales director Japan
4/12/17	Nils Katla	–	–	VEON	Supervisory board member. Stepped down following Telenor's decision not to have a board representative.
20/12/17	Samer Halawi	Intelsat	CCO	OneWeb	CCO
21/12/17	Jim Simpson	ABS	CEO	Aerojet Rocketdyne	SVP for strategy & business development

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www.sicap.com

Niagara claims first with high-density, multi-speed visibility solution

Niagara Networks has launched what's claimed to be the industry's first modular 100Gb product that supports bypass, TAP and network packet broker functionality. The *284x* products are designed for a mobile operator's LTE infrastructure needs, hyperscale data centres, and massive IoT networks.

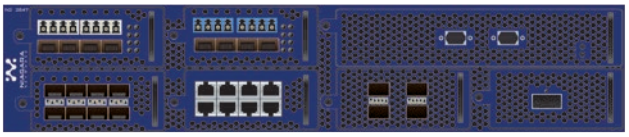
MANUFACTURER:
Niagara Networks

PRODUCT: Niagara 284x

MORE INFORMATION:
https://niagaranetworks.com

Niagara is a spin-off company from network equipment supplier Interface Masters Technologies. It believes that as security tools and appliances' speeds increase, there is a critical need for high-speed network packet brokers.

The company says its new modular *284x* products can be customised to enable network engineers to efficiently secure their networks by sending the right traffic to the right tool. The hardware now shipping includes the 2U form factor *Niagara 2847* and 1U *Niagara 2845*. Each can be customised using 1, 10, 40 and 100Gb modules for network packet broker functionality, TAP and bypass. The latter supports bypass fail open or fail close with customisable heartbeat configurations, and bypass on link loss.



The hardware also features up to 64 1Gb/10Gb ports, 16 40Gb ports or eight 100Gb ports, and hot-swappable redundant power supplies for what Niagara says is "maximum reliability".

Smart cellular modems combine features for IoT

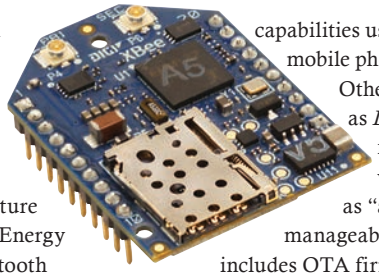
Digi International's new lineup of *XBee* embedded cellular modems include designs to support LTE–M and NB–IoT connectivity. Billed as smart devices, local intelligence can be programmed on the modem itself. Digi says rules engines and application logic can transform data, control local I/O, connect to Bluetooth sensors, actively manage utilisation of the cellular link and optimise cellular data plans.

MANUFACTURER:
Digi International

PRODUCT: XBee

MORE INFORMATION:
www.digi.com

Each modem is said to support a wide range of applications, from basic to more complex LINUX-based systems, as well as direct USB communication for apps with native control requirements.



They also feature Bluetooth Low Energy (BTL) and Bluetooth Mesh connectivity. Digi says this allows simple and quick local setup, provisioning and troubleshooting capabilities using modern mobile phones and tablets. Other features are listed as *Digi TrustFence* for security, and what's described as "advanced manageability". The latter includes OTA firmware upgrades, Digi's XCTU RF management and configuration tool, and remote management.

Hytera adds new radio to entry-level DMR range

Hytera is expanding its DMR product range with the new *PD485* handheld radio.

Thanks to what's described as its "robust housing and versatile functionality", it's claimed the *PD485* is the optimal radio for a very wide range of application areas.

It features a Bluetooth interface which means it can be used with audio accessories while kept hidden from view, says Hytera. It adds that data exchange and convenient programming is also supported via Bluetooth.

The *PD485* also has an integrated GPS module and GPS antenna which enables real-time positioning of subscribers using various AVL applications.

Alongside a wide range of communication options, Hytera says the radio offers a full-sized keypad that also allows simplified programming. For instance, settings such as current frequency, time slot or colour code can be quickly and easily changed via the keypad without needing to connect the unit to CPS.

The *PD485* weighs 308g and measures 117 x 55 x 37mm.

MANUFACTURER:
Hytera Communications

PRODUCT: PD485

MORE INFORMATION:
www.hytera-mobilfunk.com

Carrier Wireless Service Certification programme

The Wireless Broadband Alliance (WBA) has launched a *Carrier Wireless Service Certification (CWSC)* programme to enable the independent testing and certification of devices, initially, for Wi-Fi roaming and Wi-Fi offload.

The alliance says that as the number of devices purchased from sources other than the mobile operator proliferates, established in-house testing methods are no longer enough.

It claims *CWSC* will enable carriers to test Wi-Fi services from end-to-end (provisioning and billing) against different equipment and credentials. The WBA reckons this removes issues prior to commercial release, ensuring a better customer experience.

For vendors, the programme means the end of "endless" testing with different carriers. Instead, they will now be able to test multiple devices across multiple carrier networks, gaining time to market. The WBA adds they can also gain interoperability certification to validate carrier requirements in order to facilitate sales and save testing resources.

Going forward, the alliance plans to introduce new services such as: NGH in-line provisioning (secure SSID); policy interworking (ANDSF and HotSpot 2.0); QoS (end-to-end); Wi-Fi calling; and 5G interoperability (unlicensed integration).

MANUFACTURER:
Wireless Broadband Alliance

PRODUCT: Carrier Wireless Service Certification

MORE INFORMATION:
www.wballiance.com

NEC Bluetooth device enables objects to 'talk' to users

NEC has developed acoustic augmented reality technology that gives a 'voice' to objects that can only be heard by users of specialised wireless earphones. The company says these advanced Bluetooth devices enable users to easily identify the direction and location of the voices, making the technology "ideal" for marketing purposes or guide services.

According to NEC, the earphones create a "realistic" soundfield that virtually produces a three dimensional sense of direction and distance. There are nine axis motion sensors mounted on the device, and localisation fixes the position of a sound regardless of the user's facial orientation or direction of travel.

The company is aiming to commercialise the technology as an audio platform service that combines ear acoustic authentication with indoor positioning, vital sensing and other technologies by the end of 2018. Going forward, NEC says it aims to continue proposing new approaches to computing that utilise auditory devices without the need for screens.

MANUFACTURER: NEC

PRODUCT: Acoustic AR technology

MORE INFORMATION: www.nec.com

Airgain's miniaturised embedded LTE antennas for LPWAN applications

Airgain has introduced a new series of ultra wideband miniaturised antennas to provide LTE connectivity to smart home and LPWAN applications.

The *Profile Contour* embedded series is targeted at Industrial IoT applications (including CAT-M1, LoRa and NB-IoT) as well as set-top box and gateway deployments.

Airgain claims the antennas utilise an efficient flexible polymer-based low profile design optimised for confined spaces and robust assembly variations. It says they require minimal incremental integration effort, minimising the cost and complexity typically associated with embedded antenna system integration.

This latest series of embedded antennas expands Airgain's existing *Profile Contour* product line and builds on its patented smart antenna technology. This features switching algorithms that, according to the firm, can be applied to almost any type of antenna structure. Airgain says the algorithms power intelligent switching between elements in multi-element or single element antenna systems, whereby switching can be used to dynamically re-configure antenna patterns to maximise throughput and coverage for a given environment.

MANUFACTURER: Airgain

PRODUCT: Profile Contour Embedded series

MORE INFORMATION: www.airgain.com

GL adds powerful features to GSM emulator

GL Communications has enhanced its *MAPS* GSM A over IP interface emulator.

The company describes the emulator as an advanced protocol simulator/tester that can exchange BSSMAP and DTAP messages and signalling specification as defined by 3GPP. It has been designed to support testing of the MSC and BSC, error tracking, regression, conformance, load testing/and generation of high volumes of GSM traffic. GL adds that it supports simulation of different types of calls such as mobile originated voice, SMS, location updates, and more.

Some of the new enhancements highlighted by the company include support for handling handover management procedures. *MAPS* can now emulate the procedures involved when a subscriber travels across two different cell coverage areas and is handed from one BSC to another via the MSC.

It also now supports CSV-based profiles in order to emulate bulk call generation. Here, GL claims it is possible to define up to 20,000 subscriber entries with unique called/calling numbers and other user related information.

All call handling scripts are assessed by *MAPS* to provide statistical information. GL says corresponding graphs can be generated for monitoring signalling and traffic performance.

MANUFACTURER: GL Communications

PRODUCT: MAPS

MORE INFORMATION: www.gl.com

ALSO LOOK OUT FOR

Using light bulbs to supplement Wi-Fi won't lead to the dark side

Energy-saving LEDs could help meet demand for wireless communications without affecting the quality of light or environmental benefits they deliver,, according to new research.

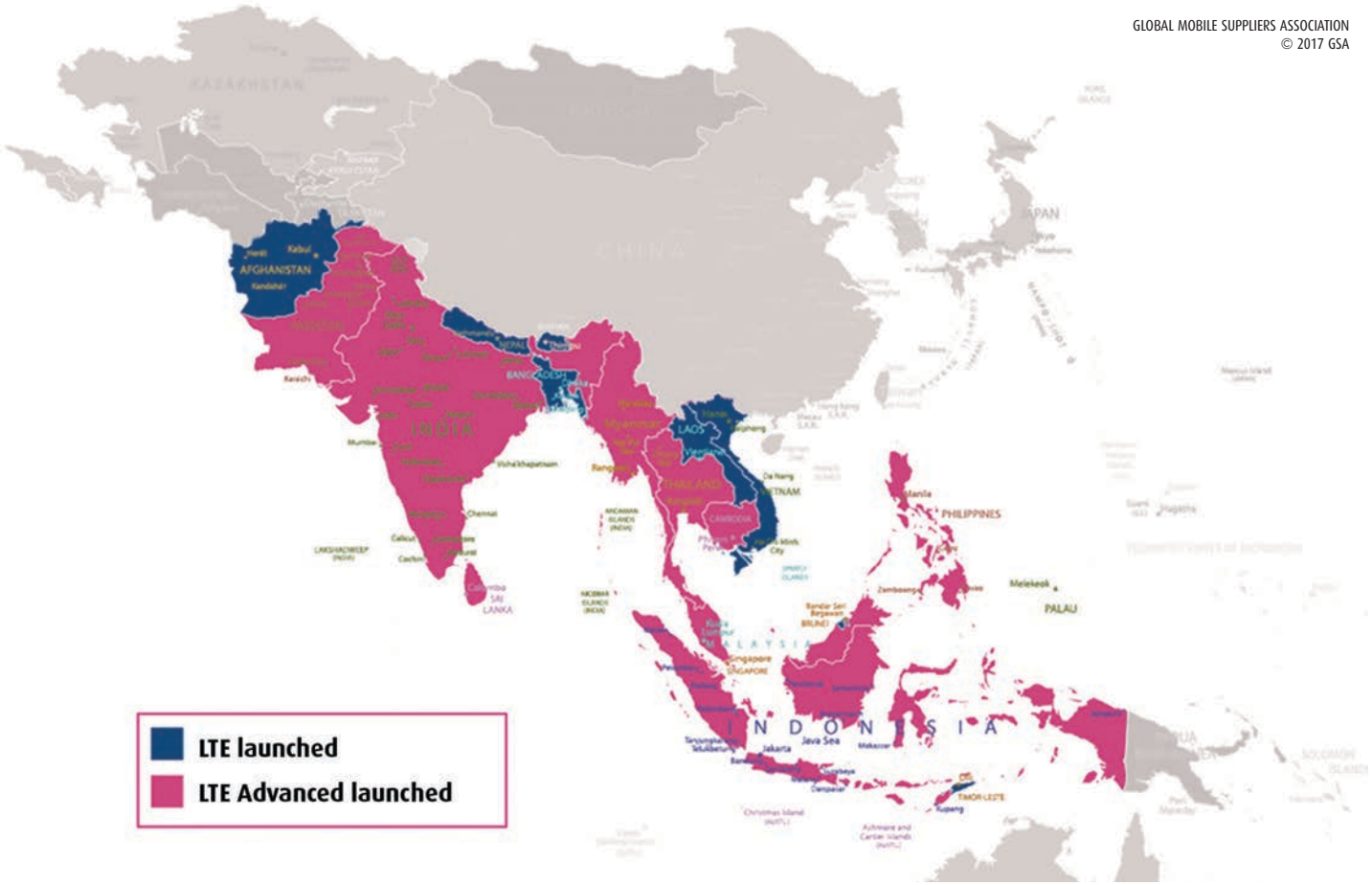
The of idea of 'Li-Fi' – using off-the-shelf LEDs for super high-speed data transmission – initially came from research carried out at Edinburgh University around five years ago. Although it has long been known that LEDs can be 'piggy-backed' to transmit data to and from mobiles, tablets, sensors and other devices, questions have surrounded the ability to do this without affecting the LED bulb's core capabilities or the money-saving and 'green' benefits that make them so popular.

But now, a University of Edinburgh team lead by Dr. Wasiu Popoola, say their research findings help eliminate key hurdles to using LEDs to help satisfy the increasing global thirst for wireless communications.

Focusing on LEDs producing 'warm white' and 'cool white' light, the team looked at two different data transmission techniques: on-off keying, where the LED works like Morse code, switching on and off extremely rapidly and imperceptibly to human eyes; and continuous signalling, where imperceptible changes in light intensity are used to achieve the same goal.

According to the researchers, neither technique was found to significantly reduce the light bulbs' brightness, life expectancy, or cause any significant change in the colour of the light.

They say that both techniques also produced only a negligible change in the heat generated by the LEDs – a key consideration as any temperature increase would indicate the LED using more electricity to produce light, making it less energy-efficient and less carbon-friendly.



Global conquest

RAHIEL NASIR looks at the monumental rise of LTE and discovers that South Asia is leading the mobile broadband vanguard – with much more yet to come.

In October 2017, the Global mobile Suppliers Association (GSA) published a list of 53 countries that lacked any LTE networks providing full mobile services. Amongst those highlighted were several island nations, including Cuba, as well as larger states such as Ukraine. The most prominent countries were all African – 16 are named here, including, among others, Burkina Faso, Mozambique and Senegal. Remarkably, the only Asian territory listed by GSA is North Korea. And as the association's map shown above shows, not only have all the countries covered by this magazine launched commercial LTE services, many have now moved to LTE-Advanced (LTE-A. Also known as 4.5G or 4G+).

So when it comes to mobile tech in developing markets, why is South Asia forging ahead where others are still struggling? There is no one answer here. Fuelled by socio-economic desires and consumer demand that continues to sky rocket, a number of factors have combined over the years to get the region to where it is today; liberalised markets, a generally supportive regulatory regime, successful public and private partnerships, affordability, rapid network rollouts, etc., have all played their parts.

But of course, it would be wrong to suggest that South Asia has the elixir to guarantee success. Furthermore, as the GSM Association (GSMA) points out, 4G adoption can take time. In its *Global Mobile Trends 2017* report released by its Intelligence division in September, the association said LTE take-up patterns are mixed, and it described India, for example, as an "anomaly" where coverage is out of sync with consumer demand. "With operators only able to reduce pricing so much in an already competitive market, the risk is that 4G becomes a 'white elephant'," warned the report.

The predominant mobile technology

For now though, it is clear that 4G subscriptions are on an upward trajectory across the world. According to GSA president Joe Barrett, LTE is

now on the verge of becoming the predominant global mobile technology. "It overtook WCDMA/HSPA in mid-2017 and, given current rates of growth, GSA predicts that the number of LTE subscriptions (including LTE-A and LTE-A Pro) will exceed three billion next year. 2018 will also be the year that LTE overtakes GSM to become the most subscribed mobile technology worldwide."

In early December, GSA confirmed that 32.4 per cent of all mobile users across the world are now LTE subscribers. In analysing the information provided to it by Ovum, the association said the growth of nearly 838 million new subscriptions in the year to September 2017 represented a 49.2 per cent year-on-year rise. By the end of September 2017, there were 2.54 billion LTE subscribers compared to 1.70 billion in September 2016. Asia continues to lead adoption with a 61 per cent market share after a "very strong" 57 per cent growth rate year-on-year.

Ericsson corroborates all this in the latest version of its highly influential *Mobility Report* that was published in November 2017. It said the number of overall mobile subscriptions is growing at almost six per cent YoY, reaching 7.8 billion in Q3. China had the most net additions during the quarter (30 million), followed by Indonesia (seven million), the US (four million), Angola (four million) and Pakistan (three million).

As well as LTE, Ericsson defines mobile broadband as HSPA, CDMA2000 EV-DO, TD-SCDMA, 5G and Mobile WiMAX (WCDMA without HSPA and GPRS/EDGE are not included). Globally, it said the number of mobile broadband subscriptions is growing at around 20 per cent YoY, increasing by 210 million in 3Q17 alone to reach a total of five billion. Of these, 2.5 billion are LTE. The report said that 170 million LTE connections were added during the quarter, while the net additions for WCDMA/HSPA were around 60 million.

As with GSA above, Ericsson predicted that LTE will become the dominant mobile access technology and expected this to happen by the end of 2017. It went on to estimate that there will be 5.5 billion subscriptions by the end of 2023, accounting for more than 60 per cent of all mobile connections.

According to the *Mobility Report*, the most common way to access the internet for users across the world is over a mobile network, and the strong uptake in mobile broadband means mobile data traffic continues to grow. For example, it said the high average usage in India – estimated to reach 3.9GB per month per smartphone at the end of 2017 – is mainly due to Reliance Jio's introductory LTE offer during the latter half of 2016, which included free voice and data traffic. Total mobile data traffic per month in the country is expected to increase by 11 times in the coming years to exceed 14EB in 2023.

In its *Global Mobile Trends 2017* study mentioned above, GSMA Intelligence pointed out that while 5G is attracting hype as the "next big thing in mobile", 4G will dominate in volume terms for at least the next 10 years. The association said for much of the world, the 4G era has "only just begun", and between 2016 and 2025, it forecasted that a net 3.6 billion LTE users will be added, versus 1.2 billion for 5G.

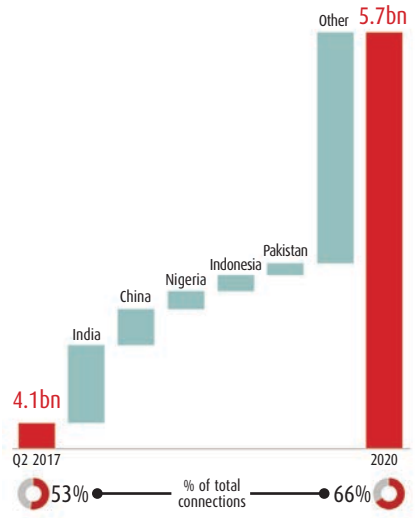
"Emerging markets are driving growth: India, Indonesia and Brazil will represent 35 per cent of the 4G increase, underscoring the geographic shift in internet users," stated GSMA Intelligence. "Although most LTE auctions happened four to six years ago, 4G still only accounts for around a quarter of mobile phone users worldwide, with 3G and even 2G servicing the vast feature phone and low-end smartphone market in large emerging markets such as India."

Smartphone growth

All commentators agree that growing smartphone adoption is helping to drive mobile broadband growth (it could be argued that the two have a mutual dependence) and is increasing average data volume per subscription.

The GSMA said smartphones account for more than half of total connections globally and, as with subscriber growth, their rise is being driven by developing regions. The association identified five markets – four of which are Asian – that will account for more than 40 per cent of its forecasted 1.6 billion new smartphone connections by 2020 *(see graph below)*. It said lower cost smartphones from local manufacturers are helping to address the affordability barrier; according to separate research carried out by Canalys, India is now the world's second largest smartphone market after China *(see Wireless Business, p13)*.

However, the GSMA continued by saying that despite the fact that smartphone adoption is near saturated in many advanced markets and data usage continues to grow exponentially, half the world is still not on the internet at all. In population terms, this equates to 3.7 billion people, mostly in lower income developing countries. For instance, it said India and sub-Saharan Africa account for 42 per cent of the world's unconnected, with more than 60 per cent of their respective populations not yet online.



Asia dominates the countries forecast to contribute most to global smartphone growth in the next few years.

SOURCE: GSMA INTELLIGENCE

"The largely rural populations and lack of fixed line infrastructure make extending coverage a longstanding challenge for many developing countries," said the *Global Mobile Trends 2017* report. "Of the 3.7 billion not yet on the internet, around a third (1.2 billion) live outside a 3G or 4G signal and so could be considered excluded because they don't have fast enough coverage."

So what are South Asia's mobile operators doing to extend their networks and bring mobile broadband connectivity to more people?

Afghanistan

Afghan Wireless Communication Company (AWCC) – launched 4G in May 2017 and operates the only LTE network currently available in the country. In September, it deployed the second phase of its LTE transmission infrastructure, doubling the number of transmission points which are positioned throughout Kabul. AWCC said it aims to provide 4G service throughout the country with other major cities coming going live during the next few months.

Etisalat created controversy in early 2013 when it claimed to be the country's first operator to start LTE trials. This prompted the ICT ministry to issue a statement saying that it had not issued any 4G licenses or further spectrum to the operator *(see News, Q113)*.

Roshan is planning to launch 4G but since announcing its intention earlier this year in May, the cellco has yet to publicise any further developments.

Bangladesh

In early December 2017, the Bangladesh Telecommunication Regulatory Commission invited offers from both existing mobile operators and prospective new entrants for running LTE services in the country.

In the meantime, Banglalion Communications has been providing fourth generation wireless broadband services throughout the country using WiMAX for several years now. As an existing license-holder, it recently began introducing LTE after signing a network upgrade and expansion deal with Huawei in 2014.

Ollo is another broadband wireless access service provider. It is part of Bangladesh Internet Exchange Limited (BIEL) which was granted a BWA license in November 2013. Ollo is now reportedly providing LTE services in Dhaka, Jessore, Gopalganj, Sylhet, Mymensingh, Barisal and Rangpur, and plans to invest more than USD20m on its LTE network expansions.

Bhutan

B-Mobile, Bhutan Telecom's mobile arm, started trialling 4G in Thimphu in 2013 but was unable to expand services as the country's "ecosystem was not ready", according to company chairperson, Tenzin Dhendup. But earlier this year the telco started rolling

out services across 70 sites in Thimphu, Paro, Wangdue, Punakha and Phuentsholing.

TashiCell officially launched LTE services in three districts in 2016, including Thimphu, Paro and Phuntsholing.

Brunei

DST (Datastream Technology) claimed to have become the country's first 4G operator after introducing its LTE network in April 2014.

Progresif Cellular submitted an official request to the local regulator in July 2017 to start trialling its LTE network. Subject to approval, the firm said its first 4G sites could go online within the next three months. However, at the time of writing in December 2017, Progresif had not made any further announcements about this.

Cambodia

Axiata group's Smart company said it became the country's first mobile operator to provide LTE in 2014. In 2016, it launched 4G+ using CA, and then claimed another first when it offered 4G in all provinces. 2017 has seen commercial launches of VoLTE and 4.5G.

Cellcard launched its LTE network in May 2016, as did MetFone, a subsidiary of Vietnam's Viettel. SEATEL (Southeast Asia Telecom) – introduced LTE services initially in 17 provinces in July 2015. It later went on to complete what was claimed to be the country's "biggest and fastest" VoLTE network.

India

Aircel's proposed merger with RCOM collapsed in September 2017 *(also see News, p9)*. Had it gone through, it was claimed that the merged company's subscribers would have had access to nationwide 'gold standard' LTE services on the sub-1GHz band, under RCOM's existing nationwide spectrum sharing/inter-circle roaming arrangements with Reliance Jio Infocomm.

With a 24.21 per cent market share in terms of subscribers, Bharti Airtel is currently India's biggest MNO (October 2017 figures from the Telecom Regulatory Authority of India). As part of its nationwide network transformation programme, the operator said earlier this year that it had now doubled its overall transmission capacity and increased backhaul capacity by eight times to roll out high-speed broadband with 4G and 3G coverage in all 22 telecom circles.

In a separate development also earlier this year, Airtel agreed to buy Tikona Digital Networks' 4G business, which include its BWA spectrum and 350 sites. Tikona has 20MHz in the 2300MHz band in five telecom circles, and the takeover means Airtel will be able to combine its capacities in TD-LTE and FD-LTE.

State-owned Bharat Sanchar Nigam Limited (BSNL) offers fixed and mobile services including WiMAX and CDMA as well as GSM. It has previously announced it will use part of its 3G spectrum to launch 4G services.

COUNTRY	TOTAL MOBILE CONNECTIONS 4Q15	PERCENTAGE OF CONNECTIONS THAT ARE 3G/4G 4Q15	POPULATION (UN WORLD POPULATION PROSPECTS, 2012) 4Q15	SIM PENETRATION 4Q15
Afghanistan	24m	10%	32.9m	73%
Bangladesh	133.3m	13%	162m	82%
Bhutan	676,400	65%	779,500	86%
Brunei	463,400	53%	426,000	109%
Cambodia	25.8m	37%	15.7m	165%
India	1.0bn	15%	1.3bn	76%
Indonesia	339.4m	36%	259.1m	131%
Laos	5.4m	30%	6.9m	78%
Malaysia	43m	69%	30.5m	141%
Maldives	751,600	30%	366,700	205%
Myanmar	37.5m	49%	54.1m	69%
Nepal	28.3m	14%	28.7m	99%
Pakistan	127.9m	19%	190.9m	67%
Philippines	121.1m	46%	101.5m	119%
Singapore	8.2m	98%	5.7m	146%
Sri Lanka	24.7m	39%	20.8m	119%
Thailand	84.8m	97%	68.1m	125%
Vietnam	129.9m	25%	93.9m	138%

In its *Global Mobile Trends 2017* study, the GSMA forecasted that a net 3.6 billion LTE users will be added worldwide between 2016 and 2025.

SOURCE: GSMA INTELLIGENCE

In May, Idea Cellular announced the launch of LTE services in Mumbai and declared that it had now become a pan-India mobile broadband operator. The cellco said 4G was now available in 20 circles, excluding Kolkata and Delhi, covering 350 million people across nearly 50,000 towns and villages. Idea is currently going through the process of a merger with Vodafone India (*also see Vodafone India below*).

Reliance Communications – RCOM is no longer planning to merge with Aircel *(see above)*. Meanwhile earlier this year, the company launched what it said was India's first 4G enterprise VPN solution. *Branch Connect* has been designed to provide wireless connectivity in the last mile to help businesses quickly extend their corporate network to branch sites virtually anywhere in the country.

Since launching services in early September 2016, Reliance Jio Infocomm said it now has more 100 million users of its all-IP network that supports VoLTE. The operator cited a number of factors for its success, but much of its appeal has centred around giving subscribers the ability to make free voice calls to any network across the country. This lead to the Telecom Regulatory Authority of India advising Jio to curb its promotional activities.

Vodafone introduced its LTE services in Kochi in December 2015 and said it now has a total of 106,000 3G and 4G sites across the country. The company is currently India's second largest cellco in terms of subscribers with a 17.68 per cent market share as at October 2017, according to data from the regulator. But once its merger with Idea Cellular is finalised, the combined company is likely to knock Airtel off the top spot; Idea's market share is currently 16.2 per cent.

Indonesia

By December 2015, Hutchinson 3, Indosat Ooredoo, Smartfren Telkomsel and XL Axiata had all launched full LTE services. Indosat Ooredoo had introduced and commercialised services at 900MHz in major cities a year earlier, while Smartfren went on to claim a first for the country with LTE-A in 2015, and then again in early 2016 with VoLTE. Telkomsel has recently strengthened its LTE service using 2.3GHz TDD spectrum *(see News, p8)*. In April 2017, XL Axiata said it had expanded its 4.5G network beyond Jakarta to outlying territories and that it now covered around 53 per cent of the national population. It planned to expand its 4G BSTs from 8,200 in 2016 to 17,000 nationwide by the end of 2017.

Launched by Internux in 2013, BOLT! describes itself as the "Ultra LTE operator". In June 2017, it announced that three million people

now subscribed to its 4G network. BOLT!'s target was to add 450 4G BSTs and 4G+ technology by the end of this year.

Part of Indonesia's Berca Hardayaperkasa, Hinet previously operated a BWA service under the brand name WiGO using WiMAX at 2.3GHz. In July 2015, Berca announced plans to switch from WiMAX to TD-LTE.

Net1 is owned by Sampoerna Telekomunikasi Indonesia (STI) (which in turn is owned by AINMT Holdings). It offers LTE using used 450MHz spectrum which, it said, can reach more than 100km. As a result, the operator believes it will be able to provide 4G network access to 260 million people who live on more than 14,000 islands across the archipelago.

Laos

Unitel is a joint venture between Lao Asia Telecom and Vietnam's Viettel Group. It officially launched 4G in 2014, starting in four major cities and provinces of Laos: Vientiane, Savannakhet, Luang Prabang and Champasak. The cellco is currently the market leader with around 2.5 million subscribers. Its network covers 95 per cent of the country with roughly 4,000 BSTs.

Malaysia

ALTEL began operations in July 2012 and is a part of the Albukhary Group. It has been running as a prepaid MVNO utilising Celcom's 2G/3G network. Since being allocated 2.6GHz spectrum to build an LTE network in 2014, the firm has set aside MYR1bn to invest in its infrastructure working with Huawei, and become a full-fledged telco with its own network.

In April 2017, Axiata subsidiary Celcom became the first operator in the country to unveil a LTE-A Pro service which it has branded as *Lightning Fast LTE*. Speaking at the time, deputy CEO of business operations Azwan Khan Osman Khan said: "As of now, the Celcom 4G service is live in 268 major cities and towns across the country." He added that the targets for the end of 2017 were 85 per cent national population coverage for 4G, 40 per cent for LTE-A, and 10 per cent for *Lightning Fast LTE*.

Part of the Telenor Group, DiGi currently has 5.7 million LTE subscribers. It claims to reach 86 per cent of the population in 295 cities and major towns, while its LTE-A network is said to cover 45 per cent of the population in 80 cities and towns. At the start of July, Digi switched on its new 900MHz spectrum. It said mobile signals on these frequencies will not only reach further from BSTs to bring its high-speed 4G+ network to more rural parts of Malaysia, but also offer stronger indoor coverage thanks to improved wall penetration.

Maxis runs the unique 1Network which combines 4G and fibre.

Telekom Malaysia commercially launched its 4G service, TMgo, in Kedah in August 2014. Its dedicated mobile arm, Webe, introduced LTE in June 2016.

U Mobile launched in 2007 and by 2015 it claimed to have more than 10,000 sites comprised of 2G, 3G and 4G sites. Its main shareholders are ST Telemedia and U Telemedia.

Yes is owned by YTL Communications and claims to be a "global frontrunner" in 4G internet. Its LTE mobile and broadband networks are said to cover 85 per cent of Malaysia.

Maldives

Dhiraagu currently provides a 100 per cent mobile broadband service to all inhabited islands. In 2014, it claimed to have launched the country's largest LTE network, and in December 2016 it said that this now covers 60 per cent of the population. Dhiraagu said its focus is now on delivering LTE services across the Maldives and aimed to complete its expansion within 2017.

Earlier this year in February 2017, Ooredoo announced the successful expansion of what it said was the first 4G+ network across the Maldives. This followed upgrade work that had begun just two months earlier.

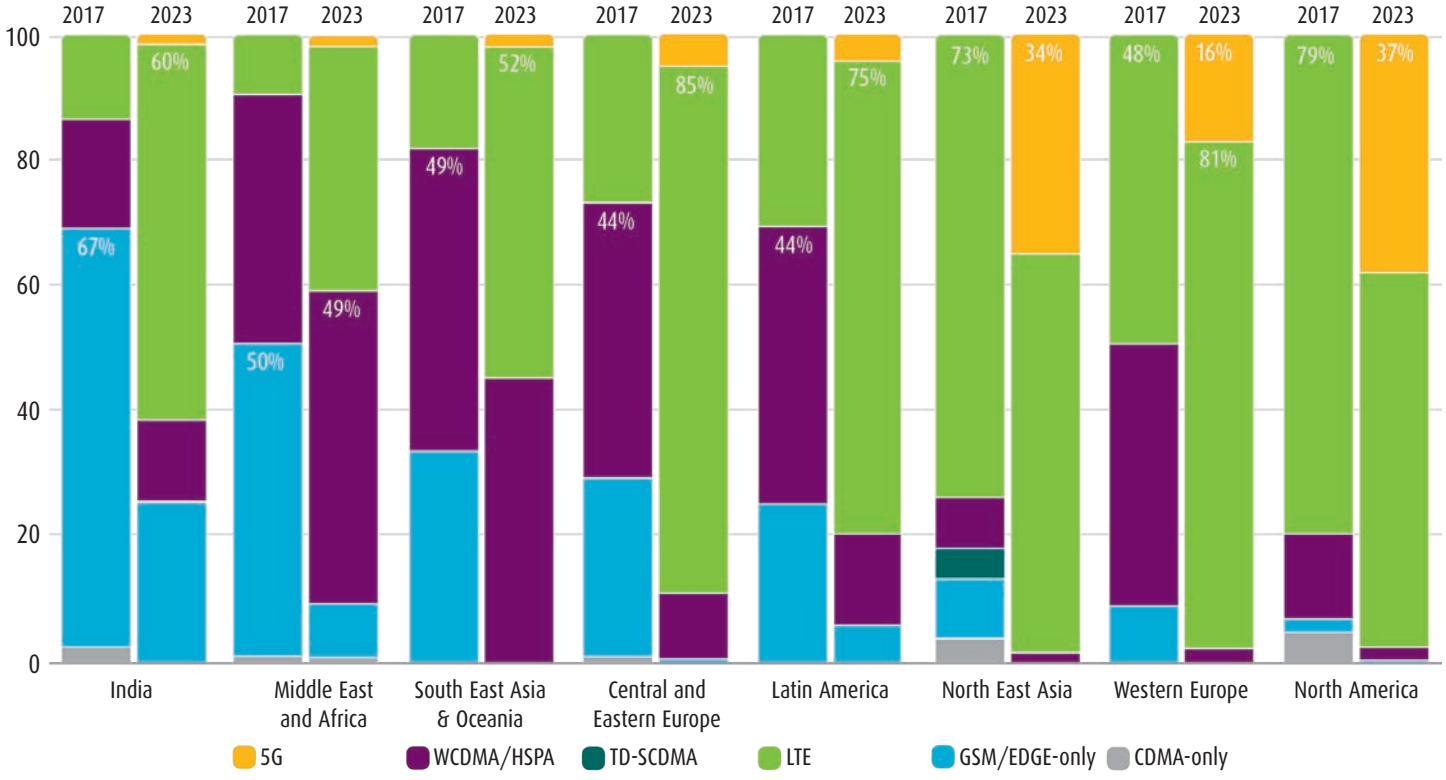
Myanmar

In October, state-backed provider Myanmar Post and Telecommunications (MPT) soft launched LTE services in parts of Yangon and Nay Pyi Taw. Its local rivals, Ooredoo and Telenor, had introduced commercial 4G services in 2016.

Nepal

Nepal Telecom became the country's first LTE provider after launching services in Kathmandu and Pokhara valleys in January 2017.

At the start of September, Axiata Group subsidiary Ncell announced that its 4G network had now reached the cities of Kohalpur in Banke and Birendranagar in the Surkhet district of mid-western Nepal. Since launching services earlier this year, the operator has now connected 19 cities across the country. Ncell is further planning and testing LTE in other cities with a target of connecting 40 by 2018. Fifteen per cent of the population were expected be able to access its 4G



Mobile subscriptions by region and technology.

SOURCE: ERICSSON MOBILITY REPORT, NOVEMBER 2017

network by the end of 2017.

Smart Cell launched 4G in October 2017, initially in Kathmandu and Pokhara, before extending coverage to other cities.

Pakistan

During the 3G and 4G auction held in 2014, the Pakistan Telecommunication Authority (PTA) was unable to find a buyer for the 1800MHz spectrum block. At the time, the PTA said it included the frequencies to promote the early introduction of LTE services, but failed to attract a buyer due to what was considered to be a high reserve price of USD210m *(see News, Q114 issue).*

Earlier this year, the PTA again auctioned 10MHz of paired spectrum in the 1800MHz band. This time, it was purchased by the country's market leader, Jazz, for a net sum of USD295m. Previously Mobilink, Jazz is now part of a merged company that includes Warid Telecom and is a subsidiary of Global Telecom Holding and VEON (formerly Vimpelcom).

The PTA had also failed to sell a block of 850MHz in the 2014 auction. This was sold separately to Telenor Pakistan last year which was the only bidder for the frequencies *(see News, Q316 issue).*

Earlier his year, ICT and broadband provider PTCL (Pakistan Telecommunication Company Limited) claimed a first with an LTE launch in Azad Jammu and Kashmir. Its *CharJi* branded 4G service is already available in Karachi, Lahore, Islamabad, Rawalpindi and Faisalabad.

FWA provider Qubee originally started in 2009 offering services using WiMAX, initially in Karachi before expanding to Lahore. It now also offers an LTE Pro service for enterprise users in Hyderabad, Sialkot, Peshawar, Multan and Faisalabad.

Telenor began rolling out 4G in August 2016 in selected areas of Karachi, Lahore, Islamabad, Multan, Peshawar and Swat. Has subsequently introduced services to other cities.

Wi-Tribe signed a USD15m deal and strategic partnership with Huawei earlier this year to upgrade its LTE network in at least five cities including Islamabad, Rawalpindi, Lahore, Karachi and Faisalabad. As part of its USD50m investment plan, the WISP said it is already piloting Pakistan's first of LTE-A network. It installed 4.5G supported hardware at its head office in Islamabad, and aimed to roll out the technology across the city following successful tests.

China Mobile subsidiary Zong planned to upgrade all of its sites in Pakistan to 4G by the end of 2017. The operator claimed it already has the country's largest number of LTE sites and that these will reach a total of 10,600 by year end.

Zong also has the country's highest number of 4G subscribers. According to PTA data published for March 2017, it had 3.37 million users while its nearest rival, Jazz, recorded 799,519, followed by Telenor with 323,823.

Philippines

Broadband Everywhere (BE) is a subsidiary of AINMT Holdings which also owns STI which runs Net1 in Indonesia *(see above).* BE has secured the exclusive right to use 10MHz in the 450MHz frequency band. AINMT CEO JD Fouchard reportedly said: "BE is now in a great position to build a profitable 4G network that provides wireless internet access for business and residential customers as well as the M2M/IoT market."

Globe Telecom recently signed a deal with Gilat Satellite Networks and will use satellite to support transmission capacity in its 4G network *(see news Q317).*

Smart, PLDT's mobile arm, is planning to double its LTE capacity *(also see News, p5).*

Singapore

Singtel became the country's first telco to introduce commercial LTE services in June 2012. It is now beginning to focus on 5G.

M1 launched LTE in September 2012, with LTE-A following in 2015. StarHub announced the completion of its nationwide LTE deployment in October 2013.

Sri Lanka

Axiata Group subsidiary Dialog claims to operates Sri Lanka's widest mobile 4G network based on FD-LTE technology and a fixed 4G network based on TD-LTE. Launched VoLTE in September 2016.

Etisalat claimed a first for the country after deploying an LTE-ready network in 2011. Went on to commercially launch a DC-HSPA+ service on 15 August 2012, stating that it was the first operator in South Asia to do so.

In September 23017, Sri Lanka Telecom's mobile division Mobitel said it had enhanced its LTE network coverage by deploying its existing 900MHz spectrum to make 4G services available to "all citizens at affordable prices".

Thailand

AIS (Advanced Info Service) has developed a new multipath platform to deliver speeds of up to 1Gbps. The *NEXT G* system uses AIS' LTE network which is said to offer the largest 4G footprint in Thailand with 49,000 sites, and the company's *SUPER WiFi* high-speed internet network that covers more than 80,000 spots nationwide *(see News, Q317).*

While Vietnam's operators are not allowed to commercialise 4G services until 2018, many have built the infrastructure and are ready to launch today.

In 2016, dtac increased the bandwidth of its *Super 4G* service on 1800MHz to 20MHz. Speaking at the time, CTO Prathet Tankuranun (*pictured*) said this made it the largest single-carrier bandwidth in Thailand. *Super 4G* covers the greater Bangkok area.

Telenor subsidiary dtac (Total Access Communication) first launched 4G in central Bangkok in May 2014. State-owned TOT will work with dtac to build a 4G network using 2300MHz spectrum.

my (CAT Telecom) planned to launch 4G in October 2017. The new service will mainly utilise TrueMove's network following a recent network-roaming deal. TrueMove became Thailand's first LTE operator when it launched services in May 2013, although these were only initially available in parts of Bangkok's central business district before being rolled out to major provinces later that year.

Vietnam

In 2016, Vietnam's Ministry of Information and Communications (MIC) awarded 4G licenses to VinaPhone, Viettel, MobiFone and Global Telecommunications (Gtel) *(see News, Q416).*

According to the Department of Radio Frequencies, the winners could only commercialise their 4G as from 2018. However, the telcos said they were ready to officially launch as soon as they received their licenses.

VinaPhone, which is owned by the Vietnam Post and Telecommunication Group (VNPT), planned a wide rollout of 4G services in 2017 with 21,000 BTS to be installed nationwide. It had been commercially testing 4G since January 2016. By November of that year, it had installed 100 4G BSTs on Phu Quoc Island and announced it become the first area in Vietnam to be fully covered with LTE.

Viettel, which is run by Vietnam's military, had been testing 4G equipment in Ba Ria-Vung Tau and Hanoi since late 2015. It said the aim was to implement 4G services with the most widespread coverage throughout the country in the shortest period of time.

At the time of writing, MobiFone announced 4G coverage in Hanoi, Danang and Ho Chi Minh City.

Gtel has so far not disclosed its plans. ■

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Welcome to the fourth industrial revolution

Against a backdrop of Industry 4.0 trends, PROFESSOR ANTONIE VAN RENSBURG discusses the importance of understanding AI's role in realising self-adaptive cognitive communication networks.

The world is standing at the cusp of the next great industrial revolution. This phase of transition builds on the third industrial revolution, when information and communication technology was introduced, bringing digital capabilities to billions of people and fundamentally altering global industry.

Digitisation has also accelerated the rate of technology-mediated innovation and advancement. This has been the catalyst for the exponential pace at which mankind has ushered in the fourth industrial revolution.

Also referred to as 'industry 4.0', this next phase of transition will fundamentally change the way we live and work by weaving technology into every sphere of life, with the fourth industrial revolution characterised by a blurring of the lines between digital and physical systems.

Our view, from an analytical perspective, is based on the premise that in the new digital economy, companies will need to convert their physical world – processes and operations – into digitised variants. In this digitised future, machines will talk to machines, helping to make complicated decisions and manage day-to-day operations.

This revolution has, of course, been sensationalised a great deal, with fears that artificial intelligence (AI) will advance to such an extent that technology will surpass mankind's collective intelligence and pose a risk to our existence.

While the potential certainly exists that industry 4.0 technologies will replace many jobs, we cannot yet exactly forecast how this new industry paradigm will unfold. It's important to understand that industry 4.0 is being shaped and driven by humans. We therefore have the opportunity to determine how people and technology will fuse together to enhance business and drive innovation.

Professsor Antonie van Rensburg, Co-founder & CEO, 4Sight Holdings

In its current state, the fourth industrial revolution is unfolding as an iterative process whereby humans continue to combine computers, robotics and automation in entirely new ways, driven by data analytics, smart devices and big data. This is what is generally considered to be the contemporary understanding of AI, rather than the sci-fi inspired vision of anthropomorphic machines taking over the world.

In this latest iteration of industrial evolution, connected computer systems have been equipped with algorithms that are able to learn and control equipment and hardware in various industries, with very little input from human operators, outside of the initial programming requirements. This has created great potential to optimise the workplace in every vertical industry, including wireless communications.

However, what companies need to understand is that industry 4.0 technologies are not a catch-all for businesses on the path to digital transformation. Often, only certain technologies are applicable, even AI. That's because at present, AI operates most effectively within its defined parameters and trained boundaries. This renders it ineffective when dealing with unknowns that it has not been trained on, such as the unpredictability of human behaviour.

Furthermore, AI at its core is a classification algorithm. As such, it is not capable of predicting time-based events. In this case, network operators need to select machine learning algorithms that can deal with big data forecasting requirements so that the system can, for example, pre-empt shifts in the demand for network capacity.

However, AI is already capable of autonomously determining optimal system configurations based on prevailing conditions. With this real-time input, an intelligent network system can then quickly access and compute millions of historical data points to determine the most appropriate decisions and actions to improve network efficiency. The system is even capable of notifying the network operator when certain hardware or software components are most likely to fail.

'Intelligent pricing'

Based on these capabilities, the real and present business problems that AI can solve in the wireless communication industry are the issues of enhanced operational performance and revenue optimisation. These are particularly pertinent in the face of growing mobile data demand and dwindling airtime revenue.

In terms of revenue optimisation, this can be achieved through a real-time decision-making technique called 'intelligent pricing'. This is a combination of AI and machine learning which assists next-generation wireless networks through the intelligent adaptive learning of customer behaviour. It supports network operators by helping to better manage growing data throughput rates and accommodate trends such as application abundance to meet the rapidly evolving requirements of mobile users.

However, intelligent pricing requires revenue optimisation to be balanced against network performance. AI is capable of resolving the conflict between revenue and performance with smart solutions that deliver optimised quality of experience. It can shift traditional network management models, like load balancing, to ensure low latency and application and content provisioning, thereby accommodating data-intensive applications, services and rich multimedia digital content.

Current implementations have shown that these AI-driven machine learning capabilities can deliver immediate improvements for mobile network operators, with a three to five per cent lift in revenue, and a 25 per cent reduction in customer churn.

Machine learning is also being touted as one of the most promising industry 4.0 tools for its ability to maximise resource utilisation. By supporting smart infrastructure, machine learning algorithms have the ability to autonomously assess and optimise spectral efficiency through analysis and learning, and subsequently control transmission power and adjust protocols.

COBANETS

With the number of wireless internet-enabled devices expected to exceed 50 billion by 2020, it is imperative that mobile network operators find flexible ways to better manage the scarce resource that is spectrum and utilise it more efficiently. Improved network efficiency through machine learning can also prolong the lifespan of current and future networks, ensuring infrastructure capex delivers a greater return on investment to further bolster the balance sheets of mobile network operators.

Beyond these immediate applications, mobile network operators are already working to combine machine learning and neural networks to build cognitive radio and bio-inspired networks. These self-adaptive cognitive networks will perceive current network conditions and will be capable of dynamically reconfiguring themselves to plan, decide and act on those conditions.

Referred to as cognition-based networks or COBANETS, the systematic application of advanced machine learning techniques used in the development of this network architecture leverages unsupervised deep learning and probabilistic generative models for system-wide learning, modelling, optimisation, and data representation. When combined with emerging network virtualisation capabilities, COBANETS make it possible to actuate automatic optimisation and reconfiguration at the system level.

Other compelling applications of industry 4.0 technologies in intelligent wireless networks include cognitive radios, MIMO antenna technology, small cells, hetnets, smart grids, energy harvesting, and device-to-device communications.

However, before any of these capabilities are realised, it is important that companies first tackle the greatest impediment to industry 4.0, namely human bias and our fear of the unknown. Currently, executives may be hesitant to hand over the responsibility for even small aspects of decision making to machines.

Whether this hesitancy is based on rational concerns around a company's digitisation strategy, or an irrational fear of AI that is predicated on a lack of understanding of the concept, the fact remains that the fourth industrial revolution has begun.

Those companies that embrace relevant industry 4.0 technologies stand to benefit greatly from their abilities to make complex decisions much faster, based on a computer system's ability to analyse more data points and process a great deal more information.

Of course, there are still limitations to what artificial intelligence can enable in the current context, and an AI engine will only be as good as the data it is fed. However, these capabilities are rapidly advancing, and any company that isn't at least considering its roadmap to an AI-enabled future risks being disrupted and rendered irrelevant in the modern digital economy. ■

4Sight Holdings is a diversified holding firm that invests in industry 4.0 technology companies.

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Should you open up to open source?

ROBIN KENT finds out if open source solutions are set to take the high ground in the telecoms industry.

Open source solutions are cost-effective and offer flexibility, freedom and innovation. But questions remain over their security and who is ultimately accountable when problems occur. So how is the technology shaping the telecoms industry?

With open source solutions rapidly growing across the telecoms industry, we're now starting to see a major shift with the migration from voice and data services to an encompassing set of networking tools. While open source software may still be a new model for the industry, with both advocates and sceptics, we're seeing operators moving away from traditional, proprietary-based hardware and software systems, with such solutions now viewed as a key enabler of transformation and innovation.

In a recent survey by research house Heavy Reading, 84 per cent of operators said OpenStack (a leading open source software platform) is essential or important to their company's success.[1] Open source software has shaken up and disrupted the computing industry, and it now looks set to do the same for the telecoms world. The argument remains as to whether this is for better or worse, and how the industry will develop with such technology at the heart of innovation.

While open source solutions do have clear advantages, such as allowing third-party deployment without having to solely manage or develop the software, a number of challenges still remain which are likely to cause concern for operators. For example, if there's a bug that causes reliability problems or a crash in the network, how long does it take to fix the bug and who is accountable for it? Until such industry issues are identified and properly addressed, it seems that open source solutions will not be taking the high ground in the telecoms world anytime soon.

Open source advantages and disadvantages

Open source solutions have gained traction over the years, as operators witness the benefits these solutions bring. We are told by analysts and media experts alike that cloud-centric solutions, for example, can transform businesses, improving efficiency and revenue.

[1] https://www.openstack.org/telecoms-and-nfv/

Ingrained within this model is a competitive driving force that is fuelling the shift to open source solutions. Yet for this shift to successfully take place, operators themselves need to take the lead and encourage transformation and collaboration across the industry.

While some operators are beginning to move away from proprietary solutions and towards extended collaborative open solutions, there is a lot more work that needs to be done in propelling integrated open source software. In order for vendors to successfully achieve this, they need to overcome the inherent challenges and pitfalls that potentially lie ahead.

In broad terms, open source solutions have many benefits. There are fewer operational issues and generally speaking, open source solutions are less expensive than traditional software systems. Both of which result in higher capital efficiency and scalability on demand.

Yet, vendors that are still using proprietary solutions, i.e. in-house hardware and software systems, pride themselves on having differentiated products and services that enable them to compete effectively with OTT players of all shapes and sizes. Thus, a more entrepreneurial and creative approach is taken when leveraging these technologies and it is not just based on what large vendors are providing. Having said that, deploying new services within the open source community is very competitive and operators may feel competitively constrained within these confines.

In order to overcome this competitive hurdle, operators need to start adopting agile and service-aware software to allow for new services and compete with web-based companies also targeting the sector. With this in mind, open source software will require the specific solutions vendor to provide end-to-end QoS and to also interwork the network's most critical functions.

Alongside this, operators must also adopt Stream Control Transmission Protocols (SCTP) and GPRS Tunnelling Protocols (GTP) that can provide a reliable QoS for the end-user with regards to network connectivity. Additionally, new open source companies need the financial capability to transform the market. Which begs the question: is open source software truly free like we are led to believe?

A thriving open source community requires an investment of both time and money to maintain the software sufficiently. Typically, investment of time comes in the form of community membership, which are referred to in the industry as subscribers. These subscribers can contribute in numerous ways. Whether this is delivering technical support, writing reviews, providing code, improvements to fix bugs, the time invested can be viewed as a form of currency itself. By utilising tools that others in the community have developed for free, members can overcome common constraints and save time and ultimately garner a return on investment.

However, open source does not imply free of charge. Yes, open source may have changed the way in which many of us think about software and operating systems, but there's no such thing as a free lunch.

Although open source applications have become more readily available and widely used, *OpenOffice* and the Linux kernel are just two examples, the majority of applications can't be relied upon to perform critical tasks. As such, there is no guarantee of quality and/or security when it comes to so called 'free' applications in the open source space and most require paid subscription for access to updates and support services. For example, Red Hat Linux users must pay for support, or instead opt for Fedora and rely on support from the community.

Robin Kent, Director of European operations, Adax

So what are the positives from this new world of so-called 'free' software? It's clear the big enterprises, which have been leading the way and dominating for years, now have less of a monopoly on the industry. They are now faced with the challenge of having to adapt their systems to keep up with end-user demand or risk falling behind more technologically advanced 'cloud native' competitors, who are threatening to leave them in their wake. These younger creative companies, who all have a more entrepreneurial outlook, are beginning to leverage open source technologies and put end-user satisfaction and reliability at the forefront.

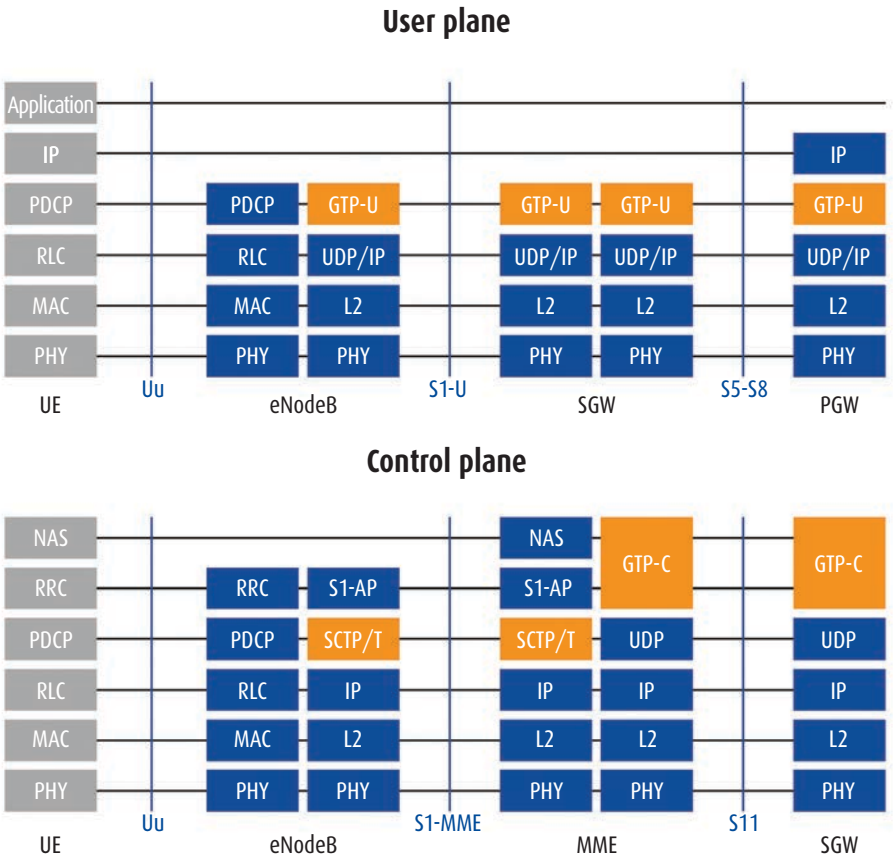
However, if such companies are to truly reap the rewards that this new technology has to offer, they must consider the underlying protocols they adopt. For example, the lksctp provided as part of the Open Source Linux kernel may seem like the more convenient and economical solution but it cannot keep up with the multitude of connections and constant user activity in today's advanced networks. They need SCTP and GTP protocols in place that work alongside each other to ensure reliability is not compromised for the end-user.

Key barriers to adoption of open source solutions

Accountability and reliability in the open source space are still very much in their infancy though it will certainly be an evolutionary process over the next few years. And indeed, the tolerances of who is responsible for accountability and who is responsible for reliability are two separate concerns at this moment in time.

While it is clear that vendors can leverage and contribute to open source communities through integrating platform capabilities into their products and services, accelerating open source solutions, and how they are maintained and developed remain less so.

Open sourcing their networks may seem like the new, innovative step for operators to take, but until all creases are ironed out, it seems unlikely that open source solutions will be taking the high ground in the telecoms industry anytime soon. ■



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Atlas is using the *TW1m* as an integral part of its next-generation electronic verification system. PHOTO: © AIRBUS

TETRA modem aids security in the Emirates

Atlas is using TETRA to transmit information about vessels located off the UAE coast as an instrumental part of its next-generation electronic verification system.

The telco is using Airbus' latest *TW1m* TETRA modem to integrate confidential data, such as GPS positioning and text messages, into its vessel identification system which is run by a government agency. The system consists of radars, long range cameras, e-passport trackers, location and correlation servers, as well as command and control systems. Atlas has been operating the first generation of this technology since around 2007 and is planning to establish a new scheme soon.

The *TW1m* contributes to the tracking and identification of registered and un-registered ships off the UAE coast. Airbus claims it is an "extremely secure" solution, especially when other communication systems are not in operation. The company says the modem transmits voice and data safely thanks to end-to-end encryption and can be incorporated in supervisory systems, custom telemetry and position tracking.

"Our components meet all the essential specifications set by the UAE government institutions", says Selim Bouri, head of Middle East for Secure Land Communications at Airbus.

He also points out that Middle Eastern markets are increasingly "pathbreaking" for the entire professional mobile radio industry worldwide.

Openwave helps Zain with "darkening" networks

Zain Saudi Arabia has deployed an NFV-based solution from Openwave Mobility to manage rising levels of encrypted mobile data traffic on its network.

According to Openwave, encrypted data from OTT services is "darkening" networks. It says this is preventing operators from being able to gain insight into mobile traffic to manage QoE. The firm adds that in some parts of the world, more than 60 per cent of data is encrypted and that this could reach 80 per cent before the end of 2017.

Khalid Charaa, core planning senior manager for Zain Saudi Arabia, says: "We have seen a sharp rise in HTTPS and QUIC traffic over the past few months, and proactively took steps to find solutions that could ease congestion and deliver superb QoE."

By using Openwave's virtualised solution, the operator aims to manage and monetise encrypted data including streaming videos, and deliver what the vendor describes as "outstanding" quality of experience for customers.

Indranil Chatterjee, SVP of product and sales at Openwave Mobility, says more than 50 per cent of data travelling on mobile networks is video. He believes that this is straining networks and, along with encrypted data, adversely impacts QoE.

"Our research has shown that subscribers will only tolerate six seconds of buffering before they abandon their video and even consider leaving their operators," says Chatterjee. "In a highly competitive mobile landscape, carriers can ill-afford to overlook quality."

Coriant to enhance Vogel national network

Vogel Telecom has selected an integrated OTN switching and coherent optical transport platform from Coriant to scale its nationwide backbone network. The Brazilian 'carrier's carrier' also expects the system to enhance the delivery of flexible end-user services, including Ethernet, MPLS-TP and SDH.

Vogel's national network infrastructure spans more than 21,000km of fibre and supports high-capacity connectivity services across more than 600 cities in 13 states as well as the Federal District of Brasília.

The new national backbone project covers over 4,000km of fibre transmission and connects the states of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Minas Gerais and Rio de Janeiro. Coriant says the end-to-end solution, which extends from metro to long haul network segments, supports up to 5Tbps of capacity and is designed to support up to 1Tbps in the future as demand evolves.

Products deployed include: Coriant's *7100* pico packet optical transport platform for metro access; *mTera* universal transport platform for agnostic service aggregation and OTN switching; and the *hiT 7300* (*pictured*) multi-haul transport platform for long haul coherent DWDM transmission.

According to the vendor, its system will provide Vogel with "seamless interworking and efficient service hand-offs" between metro, core and long haul domains. The firm also claims its platform will lead to "significant improvements" in network operations, while enabling "faster and more cost-effective" creation of resilient, high-speed services optimised for end-user application demands.

Ericsson helps steer solar race car to victory

Solar Team Eindhoven (STE) once again used Ericsson's technology for its sun-powered race car in the World Solar Challenge 2017.

At the time of writing, this year's competition had just ended and saw 17 teams race 3,022km through the Australian outback with the sun as the only source of energy for their cars. STE came top in the Cruiser Class with their *Stella Vie* solar car, making it their third victory in a row at the biennial event.

STE is a multidisciplinary team of 21 students from the Technical University Eindhoven. In 2015, they worked with Ericsson on their *Stella Lux* car which was built using the vendor' IoT platform. The vehicle used Ericsson's *Solar Navigator* application to aggregate in-car, traffic and weather data to perform in-depth analytics and optimise the route.

For 2017, *Stella Vie* was upgraded with a re-designed *Solar Navigator* application. Ericsson says this now takes height profile maps into account, finds the most-efficient route, and shows drivers how much energy is saved compared to a standard, fossil fuel-powered car.

According to the company, its technology helped STE to stay ahead by ensuring that unnecessary acceleration was avoided by optimising routes around traffic congestion and by taking traffic flows into account.

By considering local weather conditions along the route, the application also enabled the best energy contribution of the solar panels and lowest resistance from rainfall, as well as suggesting an optimal route to harness the power of the sun.

Ericsson adds that in-car energy levels were also continuously monitored to predict the range and energy levels at destination.

Solar Team Eindhoven claimed a third victory in the World Solar Challenge in their sun-powered car, *Stella Vie*.
PHOTO: TU EINDHOVEN/BART VAN OVERBEEKE

Facial recognition app aims to help tackle slavery

Credas is a new app which has been created to help companies in the construction industry ensure that their employees and sub-contractors are verified to work in the UK.

A UK government report earlier this year estimated that there are between 10,000 and 13,000 modern slaves in the country. And in a 2015 study conducted by the European Union, construction was second on the list of economic sectors in the EU most prone to labour exploitation.

Since the UK introduced the Modern Slavery Act in 2015, all companies with an annual turnover of more than GBP36m must detail what they have done to ensure modern slavery is not present in their business or supply chain.

It's claimed *Credas* uses real-time facial recognition technology to quickly process and validate more than 4,000 different types of ID to help construction companies recruit ethically.

The verification process consists of three simple steps: a selfie, an image of the photo ID, and a 'liveness' test. The liveness test involves the user taking a second selfie whilst copying a simple action, and confirms that he or she is completing the verification in real-time.

The app is compatible with all mobile devices, and Credas claims its facial recognition software is 97.7 per cent accurate. All data captured by the app is held in a *Microsoft Azure*-based cloud platform.

Credas' CEO Rhys David says labour demand is currently outweighing supply in the construction industry which relies on sub-contractors and is therefore an easy target for traffickers.

He adds: "The main issue for construction companies is ensuring that all employees – regardless of where they are on the supply chain.

Bravo helps secure Hajj pilgrims with Airbus TETRA

Bravo and Airbus provided local and independent critical communication radio networks during this year's Hajj pilgrimage.

Public telecoms company Bravo is the only licensed operator in the Kingdom of Saudi Arabia providing the government, industrial and commercial sectors with services and solutions to address instant collective wireless communications.

As part of this year's Hajj event, the operator supported a governmental client in the western part of Saudi Arabia from 30 August to 4 September. It supplied Airbus' TETRA infrastructure technology, such as its *DXT* switches, base stations and devices. Bravo's client and other governmental entities used the latest network from Airbus, while engineers and experts supported Bravo to monitor and operate the secure radio infrastructure and the applications successfully.

Engineers and experts supported Bravo to monitor and operate the secure radio infrastructure and applications.

PHOTO © BRAVO CRITICAL COMMUNICATIONS

As well as working with Bravo, Airbus says it also successfully contributed to the smooth running of this year's pilgrimage to Mecca with resilient radio communications technology.

The Hajj is one of the largest gatherings in the world, and its organisation entails growing logistical challenges as the number of pilgrims has increased in recent years. This has led the Saudi government to arrange new security measures to protect the faithful. This year, more than two million Muslims gathered in Mecca.

MediaTek and SoftBank test NarrowBand-IoT

MediaTek and SoftBank plan to conduct a series of interoperability tests in 1Q18 to pave the way for the development of NarrowBand-IoT commercial applications in Japan.

MediaTek claims to have played a "pivotal" role in the formulation and implementation of the 3GPP LPWA specification for NB-IoT. The company recently unveiled its highly integrated and ultra-low-power MT2625 NB-IoT SoC (System-on-Chip), and announced its collaboration with China Mobile to build the world's smallest NB-IoT module (16mm X 18mm) around the chipset.

The *MT2625* chipset has been built to meet the needs of cost-sensitive and small IoT devices and uses MediaTek's power consumption technology which is said to enable IoT devices to work with batteries for years.

The firm adds that its "highly integrated" SoC combines an Arm *Cortex-M* microcontroller, pseudo-static RAM, flash memory and power management unit into a small package to lower the cost of production while also speeding up time-to-market.

The *MT2625* is also said to support a full frequency band (450MHz to 2.1GHz) of 3GPP R13 (NB1) and R14 (NB2) standards for a wide range of IoT applications including smart home control, logistics tracking and smart meters.

MediaTek Japan GM Yoshitaka Sakurai says: "NB-IoT technology innovation [has] the potential to deliver new ways to connect that are both cost effective and power efficient."

SoftBank started out in 1981 as a distributor of computer software.

ProRail turns to Intracom Telecom for security network

ProRail, the Dutch national railway infrastructure operator, is using Intracom Telecom's radios to backhaul its network of CCTV and security/surveillance systems.

Utrecht-based ProRail manages around 7,000km of track, 404 stations, 15 tunnels, and more than a thousand viaducts and bridges.

It claims the Netherlands has Europe's busiest rail network, and says more than 3.3 million journeys were made using the country's tracks in 2015.

As part of its commitment to provide secure transportation services while dealing with high passenger flows, ProRail has installed what's described as an "advanced" CCTV solution incorporating Intracom Telecom's *StreetNode* wireless transmission equipment at 26GHz. The solution includes point-to-point/multipoint SDRs which are claimed to offer quick installation, high reliability, and "massive" capacity for HD video surveillance.

The first phase of the project has seen the deployment of 21 hubs and 78 terminals. These have been installed at 16 railway stations throughout the Netherlands, from Groningen to Maastricht.

ProRail is using wireless technology to connect hundreds of IP cameras at its railway stations.

ProRail is using the technology as the transmission infrastructure in and on the station platforms and surrounding areas as a complement to fibre. The system is used to connect hundreds of IP cameras. The units relay all the collected video, data and alarm signals from the CCTV cameras to each of the station control rooms while preserving HD picture quality at all times.

First steps to DTH

Ukraine's State Space Agency, UkrKosmos, is now offering satellite transponder services for content sharing to the country's regional broadcasters. Utilising Spacecom's *AMOS-7* satellite at the 4°W prime orbital position, the agency is starting with an initial 19 regional channels on the bouquet, which includes 13 SD and six HD, reaching throughout Ukraine. Spacecom says that joining the bouquet will enable most of the region's broadcasters to take the first step towards creating a digital DTH platform.

NB-IoT smart meter

Huawei says it has developed the first NB-IoT smart meter. EDP Distribuição is using the technology for a pilot project in the Parque das Nações area in Lisbon as part of the UPGRID project of the EC's *Horizon 2020 Programme*. The area is already covered by NB-IoT and has been equipped with two base stations provided by NOS, which becomes the first operator in Portugal to test 4.5G-IoT technology on its network infrastructure. Around 100 customers will take part in the pilot which runs until the end of the year.

TETRA on Titicaca

Hytera is delivering a turnkey video surveillance and mission critical network in Puno. The Peruvian city is on the shores of Lake Titicaca at an altitude of over 3,800m, and one of its greatest attractions are the Uros Floating Islands. This and its proximity to the Bolivian border means that it is a regular stop on the South American tourist trail. To ensure security, the city authorities will deploy Hytera's *DIB-R5* outdoor TETRA base station, *PT580H Plus* portable and *MT680 Plus* mobile radios, as well as a command and control centre equipped with AVL/APL and dispatcher consoles.

IoT and GPS enable Mobike to manage smart cycles

Cycle sharing service Mobike will use IoT solutions to support its station-free smart bikes in the US.

AT&T's 4G connectivity combined with Qualcomm's LTE IoT modems and Mobike's smartphone app will enable users to locate, unlock and securely pay for the nearest available cycle. At the end of their ride, they will be able to return the bike to a designated Mobike location or any regular cycle parking area.

Mobike says it currently manages more than seven million smart cycles across more than 160 cities globally. They feature the company's smart lock which is enabled by Qualcomm's *MDM9206* global multimode modem. It features LTE IoT connectivity and GNSS position-location capability to help customers identify an available bike, quickly unlock the smart lock, and assist with real-time management.

Mobike's bicycles feature a smart lock that is enabled by Qualcomm's *MDM9206* LTE IoT modem.

Since the entire fleet is GPS-enabled, Mobike says it can get cycles to locations where they are needed most. During high demand, it can even offer app users incentives to move bikes from remote areas to more populous parts of the city.

The entire system also provides continuous monitoring of the bike's status, and AT&T's network will enable Mobike to capture detailed usage data from every bike.

"By providing IoT connectivity for Mobike, we're advancing both the sharing economy and the future of smart cities in a meaningful way," says Chris Penrose, president, IoT solutions, AT&T.

G+D enables finance group to provide mobile payment for savings banks

The German Savings Banks Finance Group has begun to test a mobile payment solution ahead of its planned launch in 2018.

The platform has been developed by S-Payment, a subsidiary of the Deutscher Sparkassen Verlag (DSV) group. A two-month pilot programme with ten issuing savings banks went live in September with G+D Mobile Security providing token aggregation as a managed service and the mobile wallet.

The firm connects the banks with the Mastercard Digital Enablement Service (MDES). Test users have a wallet app installed on their smartphones. After registration and authentication, the selected Mastercard credit card is tokenised using G+D Mobile Security's *Convego CloudPay* service connected with MDES. This manages the OTA provisioning of the virtual card (token) to the wallet and can support any subsequent lifecycle management requirements, says G+D.

Once authenticated, users can make mobile payments at any contactless POS terminal that supports Mastercard.

G+D Mobile Security describes the Savings Banks Finance Group's rollout of mobile payment as "ground-breaking".

It also claims that the use of its technology has enabled S-Payment to provide its service to the banks selected for the pilot with "minimum efforts".

Emergency system trials as volcano erupts

Mobile phone software that allows communication without relying on network coverage had its first real world trial at the end of September following a volcanic eruption on the island of Ambae in Vanuatu.

Serval Software was developed by a team led by Dr. Paul Gardner-Stephen at Flinders University in South Australia. It doesn't require tower infrastructure and instead harnesses a 'meshed' network of phones connected to small extender devices.

When Gardner-Stephen and his team arrived in Ambae to put *Serval Software* to the test on 29 September, Manaro Volcano continued to spurt plumes of smoke, ash and rock. A full evacuation was ordered, and the eruption left the island almost completely disconnected from the rest of the region.

The team had installed five mesh extenders in the Efaté Island village of Pang Pang on a previous trip. The small village is only around a kilometre long and lacks mobile phone coverage. Gardner-Stephen and his team are now working to test the devices in real conditions. He says: "The mesh extenders are just hammered onto a piece of wood and stuck on the side of a house. We've tied them on coconut palms and people can carry them around in a backpack."

He adds that the project is looking to boost its presence in Vanuatu by working with local operators. "Our system stands alone from everything else. If we can integrate that in a seamless way with the existing cellular networks, even if you're beyond the range of phone coverage, our devices can repeat a way back from the edge of coverage."

Dr. Paul Gardner-Stephen tests his mobile technology in Vanuatu following a volcanic eruption in the region.

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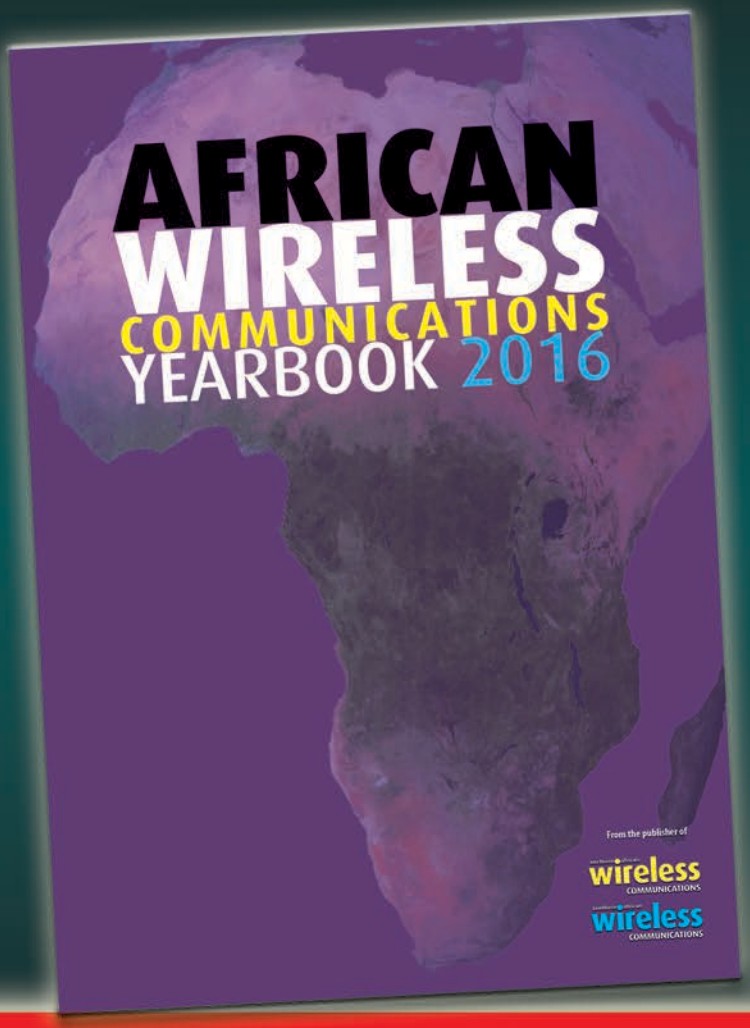

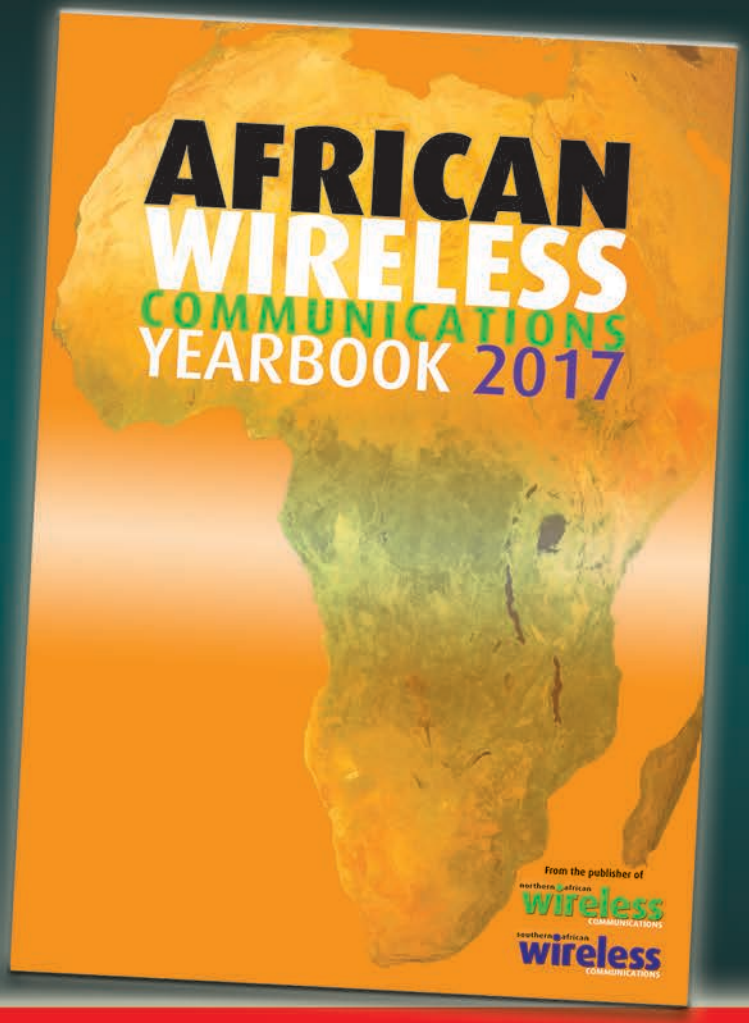

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