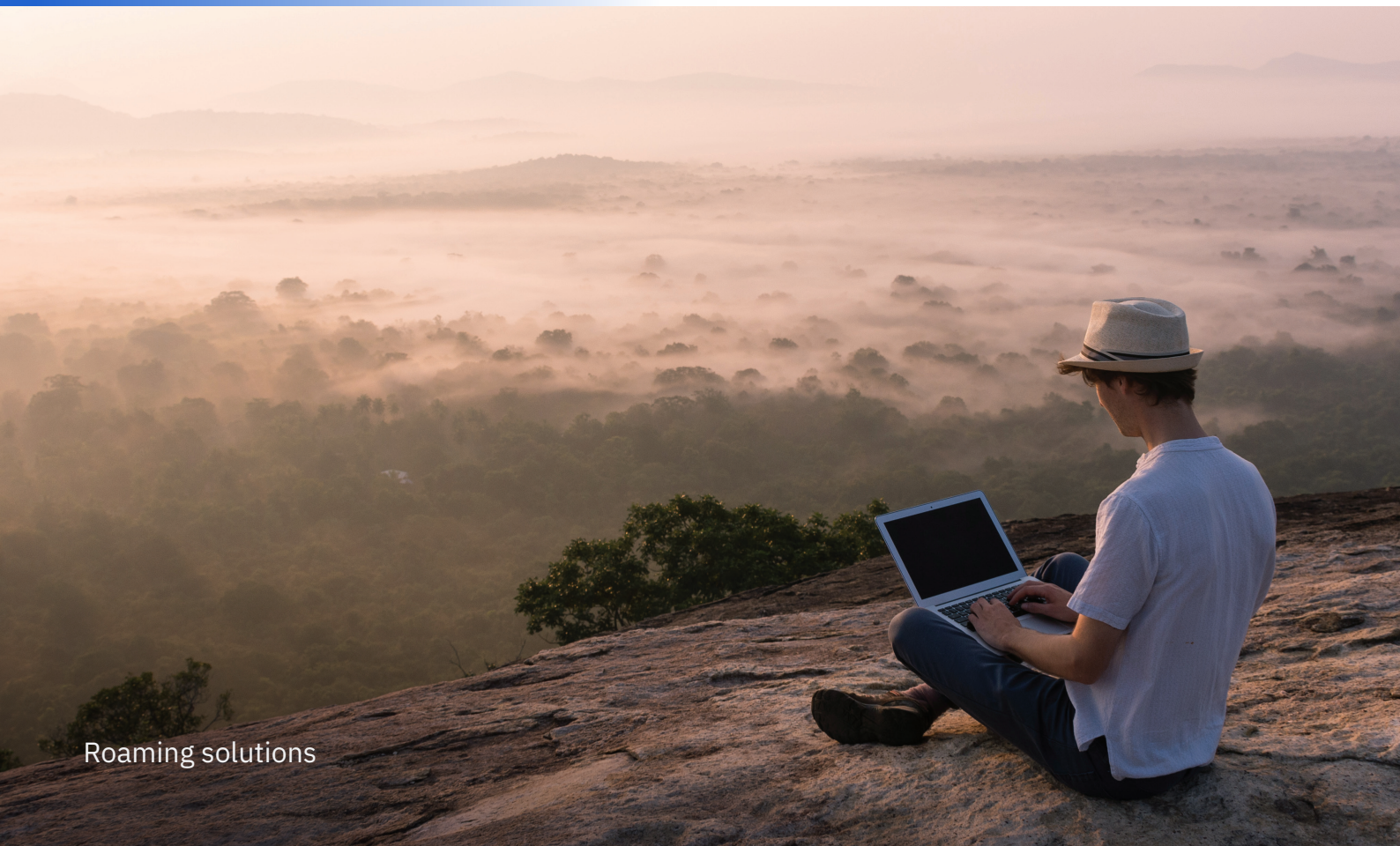




Deliver and augment your international roaming offer with BICS

Roaming solutions



The world is ready to roam. Are you ready?

BICS headquarters:
Boulevard du Roi Albert II, 27
1030 Brussels, Belgium
bics-com@bics.com

Brussels | Bern | Beijing | Dubai | New York | San Francisco | Singapore

A seamless experience

As we move into the new era of a borderless communication market, operators need tools to enable seamless mobility of people and devices. This challenge is further complicated by current industry trends like regulations, a global explosion of data usage, and bill shock concerns.

International roaming for voice, SMS, and data is built upon a network of agreements between international operators ranging from signaling to data connectivity.

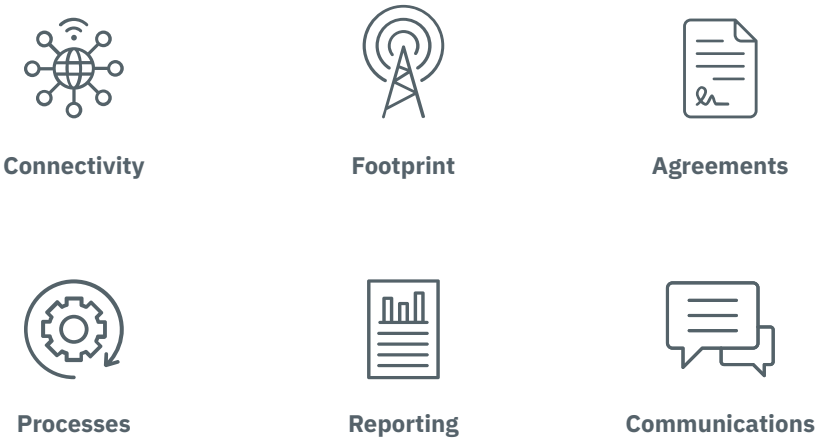
If telecommunications isn't your core business, establishing an international footprint can be technologically and logistically challenging, often taking months, if not years.

Your priority is managing customer services and growing the business — not managing the overheads and expenses associated with agreements, teams, and equipment to manage and maintain these connections.

The world's 'fearless roamers' expect a seamless experience 24x7 at any location, over any network technology (2G, 3G, 4G, LTE, 5G, NB-IoT, LTE-M or CAMEL) and across any service (voice, SMS, or data).



What does it take to establish a global roaming footprint?



The BICS one-stop solution for international roaming

The BICS one-stop solution for international roaming offers you one single interface to manage every component of your roaming business. Without the hassle of global network rollout and management.

Choose the modules you need and deploy in a scalable, phased manner to suit your business needs.

Our one-stop solution gives you the benefit of our decades of international roaming expertise. Access all the advantages of an international roaming footprint - without the capital investment.

The BICS one-stop solution for international roaming is hosted and managed on a fully-owned IPX network.

BICS is the world’s largest signaling provider and an international wholesale carrier with the experience, focus, and financial viability to support your business over the long term. We offer high-quality services through comprehensive SLAs.

An end-to-end solution

For reliable and secure mobile experiences anytime, anywhere.



24x7 customer support with a dedicated account team



Solutions to secure revenue, increase inbound roaming usage, and enforce roaming protocols



Enabling seamless communications



Business process management



Global 2G, 3G, 4G and 5G footprint

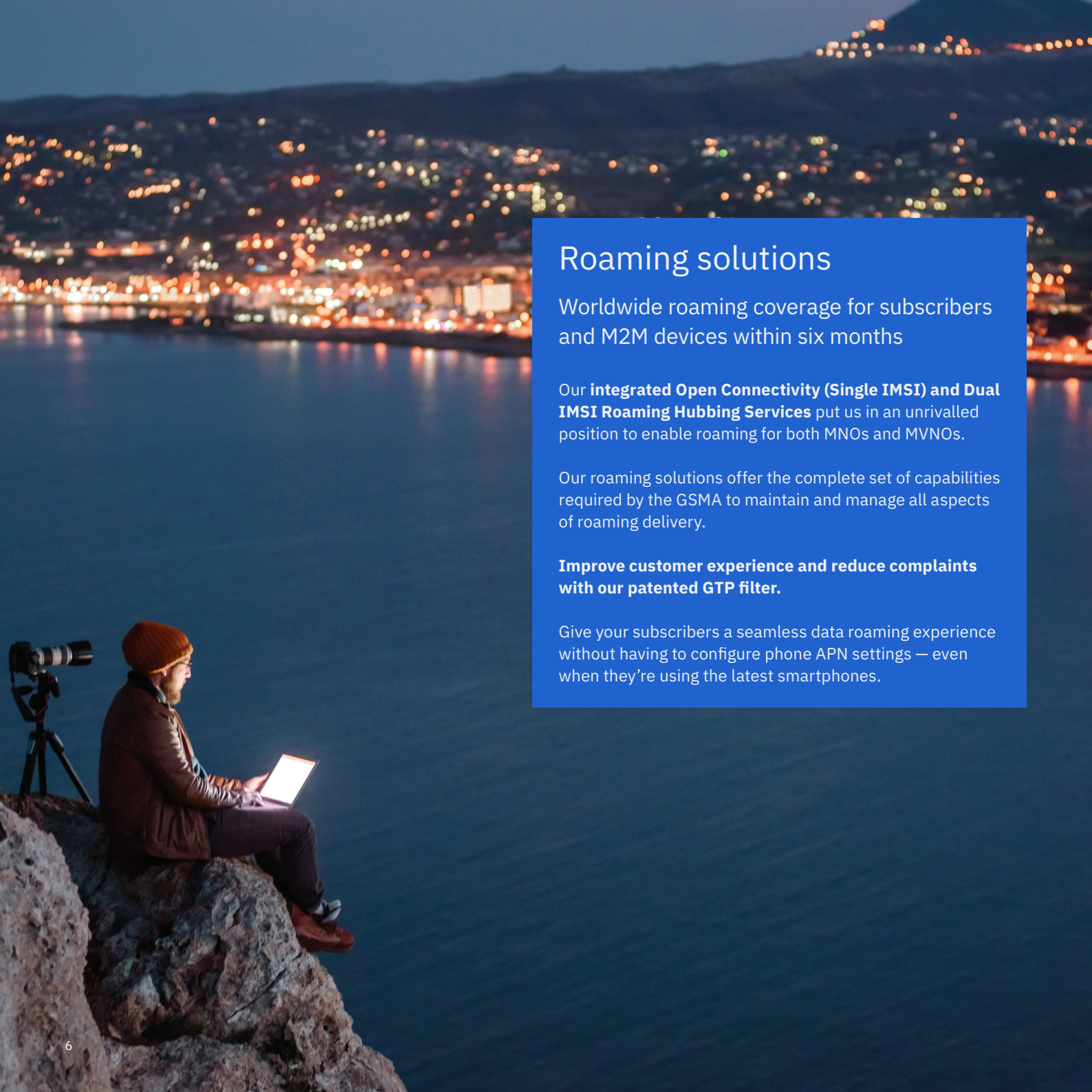


Tools for reporting and visibility



Proactive fraud prevention





Roaming solutions

Worldwide roaming coverage for subscribers and M2M devices within six months

Our **integrated Open Connectivity (Single IMSI) and Dual IMSI Roaming Hubbing Services** put us in an unrivalled position to enable roaming for both MNOs and MVNOs.

Our roaming solutions offer the complete set of capabilities required by the GSMA to maintain and manage all aspects of roaming delivery.

Improve customer experience and reduce complaints with our patented GTP filter.

Give your subscribers a seamless data roaming experience without having to configure phone APN settings — even when they're using the latest smartphones.



Open Connectivity Roaming

Our carrier-grade single IMSI solution provides MNOs with an efficient and streamlined environment to multilaterally extend their roaming footprints — with just one technical and one commercial agreement.

We offer you access to networks in more than 90 countries either through the BICS OC Roaming Hub or through peering with other hubs.

With 110 participating global customers, the BICS OC Roaming Hub provides MNOs with a complete set of world-class hubbing services through a single connection. The Hub supports voice, signaling, SMS, MMS, GRX, and roaming traffic.



90+ countries,
160+ destinations



Instant Roaming

BICS Instant Roaming provides you with a 2G, 3G, 4G and 5G roaming footprint through the network of a high-quality BICS sponsor in key regions: Europe, Asia, and the Americas. We are constantly working to expand the number of sponsors on the platform, so that we can continue to offer the most competitive rates.

BICS Instant Roaming is used by more than 70 MNOs and MVNOs around the world, with more than 20 million subscribers for voice, SMS, and data roaming services.



Instant access to 500
networks worldwide



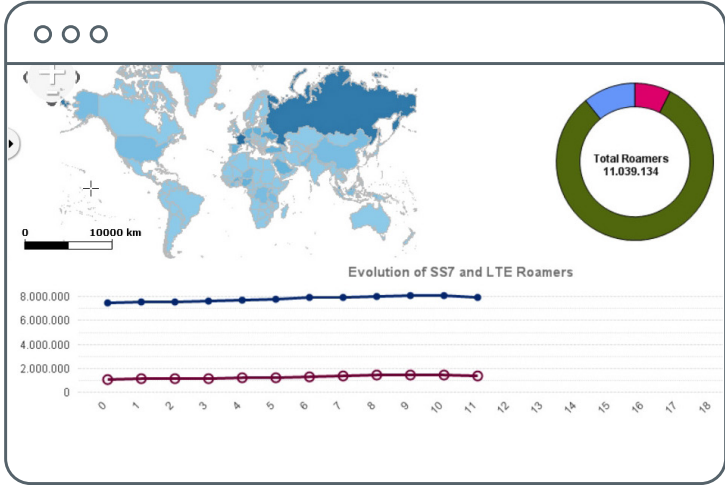
China Unicom Global harnesses the BICS Instant Roaming Hub for superior connectivity

“At the beginning of 2017, we launched an overseas mobile virtual network operator service named CUniq in HK, UK, and USA, allowing customers to enjoy exclusive, excellent, and unique mobile communication experiences. Customers can use on-card-multiple-numbers with worldwide data sharing at a local price. It was therefore important for us to select a roaming partner who can truly offer a global solution with minimal time invested. BICS’ carrier-grade solution upgrades our customers’ connectivity around the clock, anywhere in the world.”

China Unicom

Take control of your roaming business through big data

Achieve 360° visibility across your network and roaming traffic performance



SMART Webvision – subscriber and network insights

By analysing over 3.4 billion records in near-real time every day, our roaming business intelligence and analytics solution gives you granular insights into the roaming traffic, network performance, subscriber usage patterns, quality of experience, traffic deviations, and more. Enabling optimal management of subscriber quality of experience.



Over 3.4 billion records analysed daily



Over 116.1 TB of raw traffic data everyday



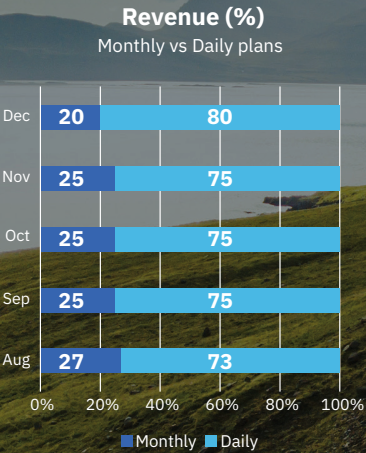
DRC – Data Roaming Control

Grow your outbound data roaming revenue and traffic by presenting silent data roamers with the ideal offer as soon as they land in a foreign country. DRC allows you to manage personalised data roaming bundles, control quality of experience, prevent bill shock, establish trust in roaming, curb ‘prepaid leakage’ and optimise network data speeds.

Sophisticated data analytics incorporating subscriber attributes and data usage history ensure that the right message reaches the right customer at the right place and time.

Marketing campaigns for silent roamers

Detect ‘silent roamers’ in real time and motivate them to switch on by offering customised data bundles. Launch prepaid bundles allowing any subscriber to data roam in any country even without a global network of CAMEL agreements.





Complete voice data roaming connectivity for Swazi Mobile

“Swazi mobile selected BICS for its excellency in delivering complex roaming projects in a very short time, as well as providing premium roaming services thanks to its worldwide footprint.”

Swazi Mobile



SMS

We offer two-way SMS exchange with more than 1,000 MNOs and MVNOs worldwide. Mobile number portability support and inter-technology support allow us to achieve extremely high success rates.



1000+ destinations



500+ on-net connections



20.5 billion messages delivered across the globe every year



Voice

We are one of the world’s leading voice providers, offering market-leading international voice routing services running on MPLS-based infrastructure.

Our direct, low latency, stable routing; full-service transparency; and a futureproof business model enable you to successfully deliver international voice traffic anywhere in the world.



26 billion+ minutes carried annually



550 direct connections



IPX Voice: 100% direct and IP routes



100+ on-net connections with HD voice, international VoLTE, and interworking support



Business Process Management

We provide a range of industry-standard data and financial clearing services that enable reliable and secure processing of the data exchanged between MNOs.

Data Clearing enables the exchange of billing and settlement information on which the whole business of international roaming is based.

Financial Clearing guarantees transparency and traceability for all transactions, providing a clear view of each stage of the clearing and settlement process, including easy approval or rejection of invoices, credits/debits notes, and payments.



How big is fraud in roaming?



A single fraudulent calling line identification (CLI) can generate 18 hours of fraudulent traffic



A single fraudulent CLI can cause a retail loss of US\$4,800, with an average of US\$3 per min retail charge



Operators can lose up to US\$50k per hour to roaming fraud



55% of all international revenue share fraud (IRSF), premium rate service (PRS), and arbitrage fraud incidents are enabled by roaming

A large European MVNO has saved more than €600,000 in “roaming exposure” and proactively blocked more than 123k call attempts within just four months of installing the BICS roaming fraud protection package. The service complemented the MVNO’s existing fraud management system and other efforts to reduce exposure to further fraud.

Comprehensive protection against fraud

We offer comprehensive protection and consultancy to protect operator networks and subscribers from voice and SMS roaming fraud.

Our services include FraudGuard for voice fraud, NRTDRE tracking and reporting, hosted and managed SMS firewall services, and bypass fraud detection and monitoring.

The BICS Roaming Fraud Prevention solution is a completely managed service that offers complete, proactive, real-time fraud prevention at the signaling level. Delivering near-real time alerts based on detection through NRTDRE analysis.

Roaming traffic



Voice Roaming Firewall
Signaling-based Proactive Voice Fraud Protection for CAMEL-enabled VPMNs



FraudGuard NRTDRE
Rule-based Detection for the Non-CAMEL-enabled VPMNs through NRTDRE feed – covers both SMS & data



Crowdsourcing
Centerpiece of BICS global view



Fraud Intelligence Repository
400,000+ incidents
50 million+ numbers



BICS Global Fraud View
1200+ partners
30 billion mins/year



Industry Forums
GSMA, CFCA, etc.



Number Plans & Pricing Analysis
High price, etc.



Periodic IPRS
Market analysis



Roaming value-added services

Combining our signaling leadership and expertise as a market-leading roaming solution vendor, we offer a wide range of roaming value-added services to signaling customers.

Enforce roaming strategy

- **Steering of roaming** – control over outbound traffic registration with advanced steering technologies
- **Campaign management** – welcome SMS service for outbound and inbound roamers
- **Intelligent border roaming** – tethering of subscribers to home network when travelling near international borders

Secure revenue

- **Voice roaming firewall** – proactive protection for outbound roamer voice traffic fraud
- **SMS firewall** – SMS anti-fraud services on international SMS transit traffic
- **Anti-steering detection** – detection and blocking of illegal anti-steering activities
- **Call correction** – analysis of roamers' dialling activity and correction of misdialled calls for pre-paid and post-paid subscribers
- **Short codes** – enablement of familiar short codes to access home services for roamers

Increase roaming usage

- **Gateway location register** – standard 3GPP GLR optimisation system to increase inbound roaming revenues
- **Leakage identifier** – reports leakage of inbound roamers to competing networks and provides alerts to identify GSM radio coverage gaps
- **Data roaming control** – solution to grow outbound data roaming revenue and traffic

Get value from underutilised assets

Access a unique new revenue stream

We create profitable relationships between operators and digital service companies through the following process:

Step 1: We buy underutilised assets from operators around the world:

- Mobile Identity data
- DID number ranges and termination
- SMS (A2P) termination
- M2M traffic termination

Step 2: We proactively spot opportunities identifying:

- Global enterprise needs in authentication
- Mobile numbers for two-way communications
- Fraud prevention and M2M communications

Step 3: We aggregate and convert assets and traffic from operators to match these needs.

The BICS platform is compliant with data privacy regulations and requirements. Liability for final customer consent lies with the merchant.



Seamless Roaming Solutions

“The international reach of our train operations meant providing seamless and reliable mobile connectivity for staff was problematic. In order to support the new range of service-enhancing enterprise apps we needed to find a robust roaming solution which would enable us to improve connectivity between on-board staff abroad and control centres, ultimately improving our punctuality and customer services standards.”

SBB CFF FFS



For more information, please visit:
www.bics.com

bics