

OPERATOR ADVANTAGES THROUGH IoT & 5G ROAMING ANALYTICS

A White Paper by Kaleido Intelligence & iBASIS

Executive Summary

This new white paper from iBASIS and Kaleido Intelligence highlights the growing importance of analytics and big data intelligence in roaming. It discusses the tangible benefits roaming analytics can deliver for operators' roaming business units and provides recommendations to consider while deploying analytics platforms.

With revenue margins for operators decreasing, they will need to look into fraud protection and intelligence platforms for growth. Further, the predicted growth in VoLTE, 5G and IoT roaming emphasises the need for operators to implement efficient steering policies, secure interconnect, maintain QoS and strict SLAs, and finally understand the risks and opportunities in real-time or near real-time. With 5G roaming expected to continue to evolve over the coming years, unlocking many new opportunities, services and usage, mobile operators must evaluate their analytics strategies and IPX partnerships in place to offer demand-driven different levels of service guarantees.

Key Takeaways



Given the turbulent environment due to COVID-19, it is more important now than ever for mobile operators of all sizes to integrate roaming analytics and campaign management tools to identify, understand and predict usage and traffic growth for IoT and consumer devices.



Implementation of analytics will enable operators to understand inbound and outbound roaming recovery: especially to identify current usage levels, wholesale revenue impact, scenario forecasts for traffic recovery, and make informed decisions based on these data.



Real-time analytics in roaming for mobile operators will enable a better quality of experience, reduce roaming fraud and maximise revenues. By combining machine learning and signalling insights, operators are able to use the power of analytics to facilitate enhanced roaming services including steering and other roaming VAS, roaming hub services as well as roaming fraud, signalling firewalls and network security systems.



A key requirement from operators at this very moment is to integrate analytics and real-time management capabilities into their existing platform. According to Kaleido's operator survey, big data analytics and real-time intelligence were amongst the top 3 5G roaming innovations and services expected by operators.



Analytics will play an important role in monitoring the slice integrity and QoS commitments while expanding services to the international market. Network slicing, a much-touted feature of 5G revenue opportunity, will require advanced automation capabilities within networks. Around 52% of respondents felt that this was extremely or very important, with a further 39% noting it as moderately important while launching 5G SA roaming.



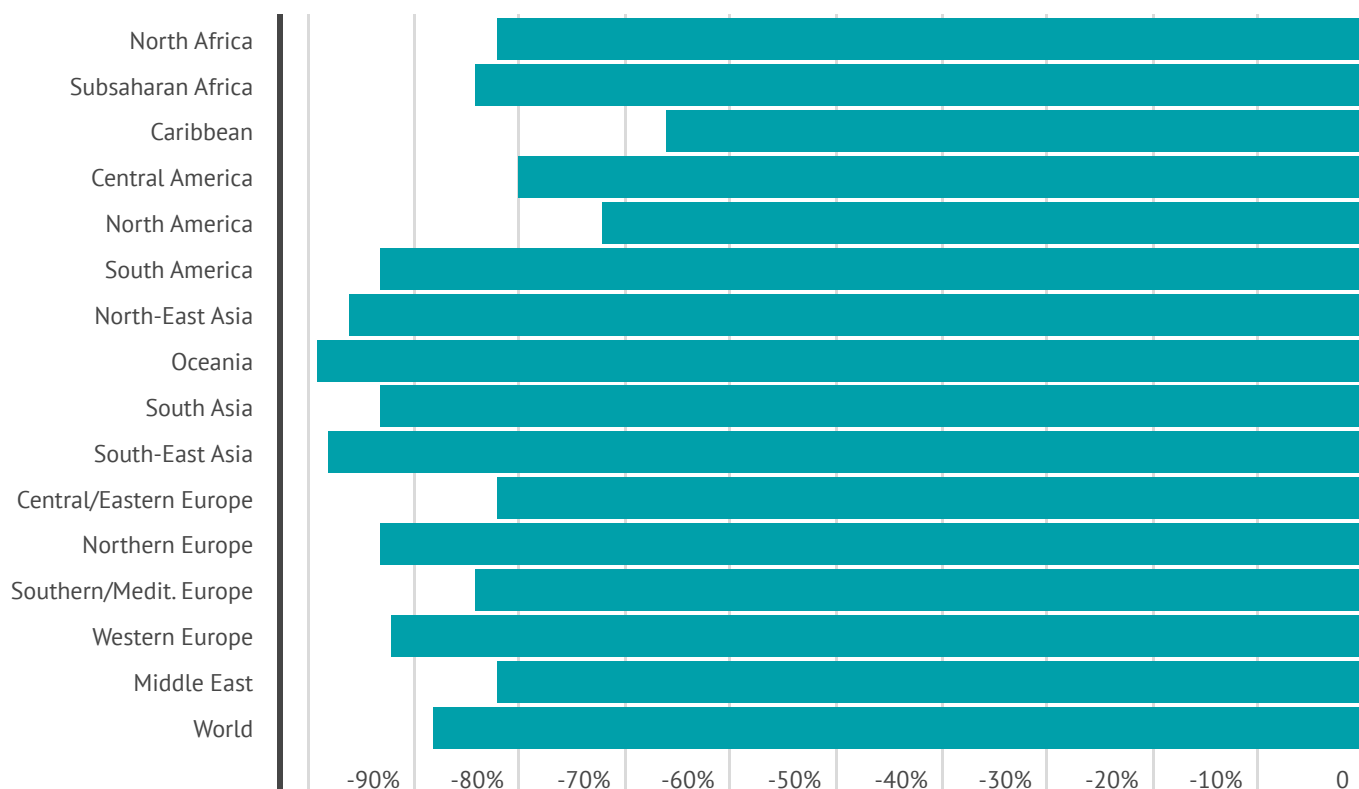
However, around 33% of operator survey respondents believe that innovation is still required the most in roaming analytics and intelligence products offering insights into roaming behaviour, traffic forecasts, device identification and fraud management. This means that operators need the right vendor partner to give them a better understanding and control over the existing and new consumer and IoT roaming applications and services.

International Travel & IoT Market Status

The novel Coronavirus has had a significant impact on the global travel sector since Q2 2020. International tourism fell by 73% in 2020, compared to the previous year, highlighting the severity of the impact COVID-19 has had on the travel sector. In comparison, during the global economic crisis in 2009, travel fell by just 4%.

- In Q2 2020, nearly 100% of global travel destinations had travel restrictions in place.
- In Q3 2020, 53% of all destinations worldwide had eased travel restrictions. By November 2020, 70% of global destinations had eased travel restrictions, equivalent to 152 countries. In comparison, 59 countries kept their borders closed.
- As of March 2021, one in three destinations worldwide was completely closed to international tourism.
- As of Q2 2021, the volume of international travel is down 83% on Q2 2019. Asia-Pacific continues to witness the biggest decline amongst all global regions, currently witnessing 95% lower volume than during the same period in 2019.

Fall in International Arrivals Travel Volume, Q2 2021 vs Q2 2019 YTD



Source: Kaleido Intelligence

Meanwhile, the impact of COVID-19 on the cellular M2M market has been significant. The virus has exposed frailties in business processes that has for many countries led to an economic crisis. This has meant that a core strategy for businesses moving forward will be an acceleration in digitisation strategies, with connectivity being the foundation for future risk mitigation efforts. While mobility continues to be impacted worldwide, the ongoing restrictions only serve to increase the business case for IoT initiatives. As such, there is an increasing confidence in high growth in the market for cellular IoT during the coming years.

Post-COVID Outlook: 5G & IoT Roaming

Driving MNO Strategies

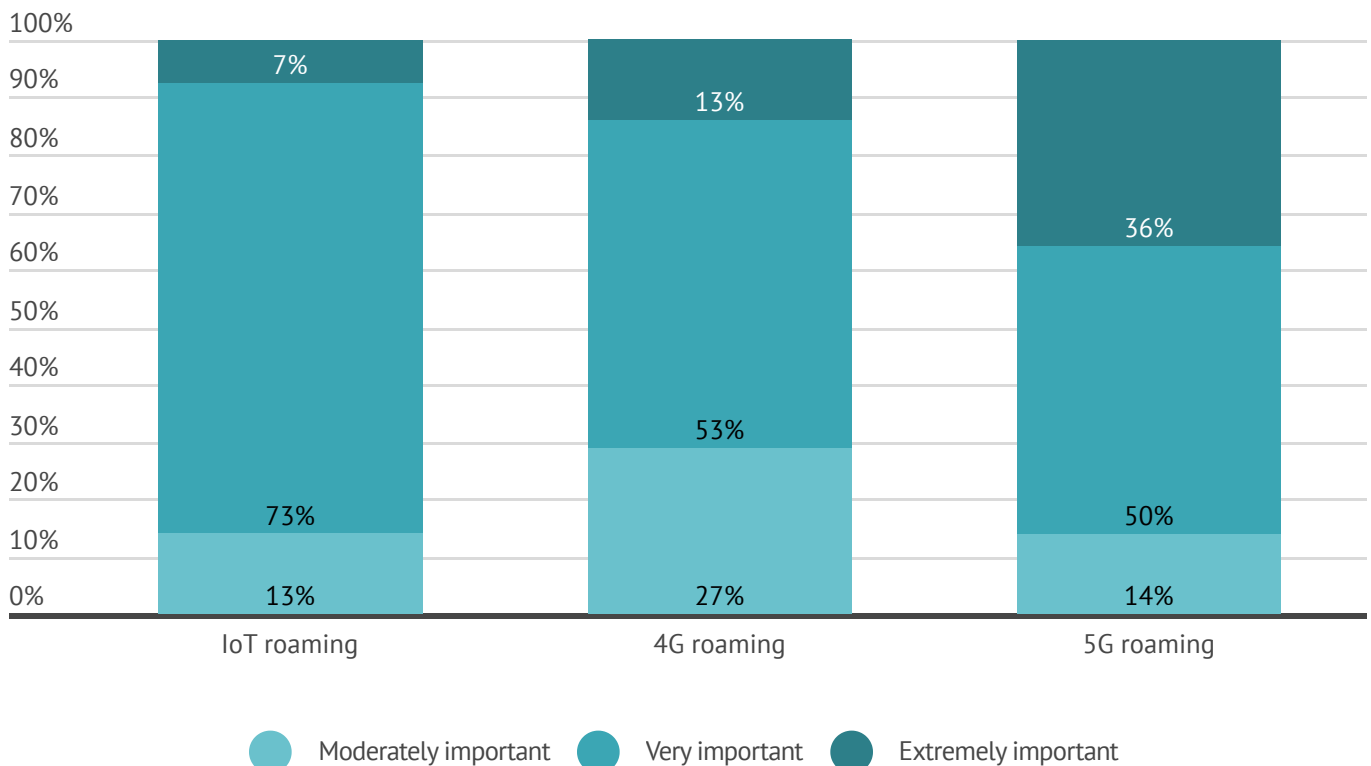
According to an operator survey conducted by Kaleido Intelligence in April 2021, 5G roaming was found to be the number 1 driver for increasing roaming revenues, with around 86% of respondents finding this very or extremely important. This also highlights the strategic and more immediate focus for mobile operators; Kaleido believes that 2021 and 2022 will see more 5G domestic and roaming rollouts. The 5G initiatives underway by operators globally are expected to unlock new roaming revenue streams.

In 2020, mobile operators around the world accelerated their 5G strategies in terms of strategic planning, testing and expanding rollouts. In addition, the pandemic has made clear the vital role that 5G will play in enabling ubiquitous access to digital services across all key industrial and consumer sectors. 5G consumer adoption is predicted to be significantly faster than for 4G. Global 5G connections will reach 1.4 billion in 2022, before reaching 3.9 billion in 2026.

Kaleido believes that 2021 will not witness any slowdown in the adoption of 5G services by customers and that the number of total 5G connections will reach 712 million, up from 237 million in 2020.



What Will Drive Roaming Revenue Over The Next 3 Years? Operator Survey Response



Source: Kaleido Intelligence

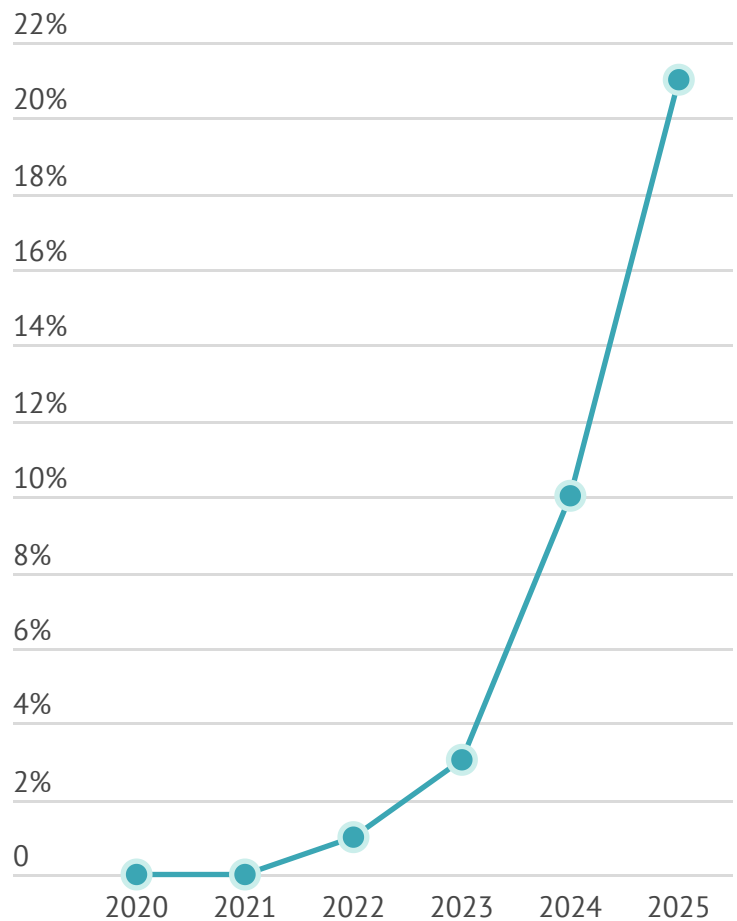
5G will inevitably bring many new opportunities, service levels and usage levels and is predicted to grow faster as operators around the world launch lower tariffs to target the next level of consumer base. However, additional roaming revenue generation via 5G services will depend on introducing more advanced services such as gaming, sports, VR/AR and other entertainment offerings for the consumers.

In comparison, 5G roaming is also about extending connections to IoT devices overseas and other mMTC and uRLLC roaming applications. As noted earlier, in terms of international uRLLC services, there is a demand for vehicle applications, industrial services and healthcare applications. Meanwhile, mobile consumer low latency services, such as VR/AR applications are still at a very early phase of adoption.

Around 67% of the survey respondents believed that 4G roaming will continue to be an extremely important or very important revenue driver over the next 3 years. Kaleido predicts that 4G roaming revenues will continue to account for a significant proportion of the roaming revenues in 2024, with 5G roaming revenues representing around 10%.

IoT roaming services were also found to be second most important revenue driver over the next 3 years, with around 80% of the respondents noting this as very or extremely important. With regards to IoT roaming, Kaleido has already observed a higher emphasis on IoT strategies from operator feedback gathered through its surveys. These efforts are likely to be compounded by the development and acceleration of the e/iSIM ecosystem.

5G Roaming Revenues As A Proportion Of Total Roaming Revenues 2020-2025



Source: Kaleido Intelligence



This predicted growth in 5G and IoT roaming emphasises the need for operators to implement efficient steering policies, secure interconnect, maintain QoS and strict SLAs, and finally understand the risks and opportunities in real-time or near real-time.

The Growing Importance Of Analytics In Roaming

Introduction: The Need

Roaming analytics has become highly important over the years. More operators are expected to implement analytics suites with a significant focus on predicting, forecasting, and impact analysis to optimise their roaming revenues.

A key requirement from operators at this very moment is to integrate analytics and real-time management capabilities into their existing platform. According to Kaleido's Q1 2021 operator survey, big data analytics and real-time intelligence were amongst the top 3 5G roaming innovations and services expected by operators.

The adoption of services enabling actionable insights based on real-time analysis, margin management, traffic detection, RLAH, and managed by advanced machine learning algorithms will provide detailed information on roamer behaviour and consumption. This will further enable predictive analytics to support targeted campaigns and better-quality services.

Around 16% of respondents expected value-added services such as big data analytics and real-time intelligence platforms to be deployed in the cloud.



Key Factors Driving the Demand for Roaming Analytics



The demand from operators will be based on the following key criteria:

- A customisable platform that can be integrated into existing platforms or systems.
- Flexibility and ease of deployment and management.
- An analytics platform that has enhanced next-generation fraud protection that goes beyond the traditional rules-based system.
- Investment-worthy, which offers better returns, enabling incremental revenue and help retain customers.

With revenue margins for operators decreasing, they will need to look into fraud protection and intelligence platforms for growth. Although there is an increase in the awareness of threats and fraud, networks continue to face a constant evolution of risks, hence the need to embrace such solutions, especially as future fraud and security needs will be different from a 5G and IoT perspective. 5G roaming will inevitably mean additional security challenges for operators and was reported as one of the top three future threats against networks in Kaleido's security and fraud survey conducted during November 2020 in order to assess operators' perceptions surrounding mobile signalling security.

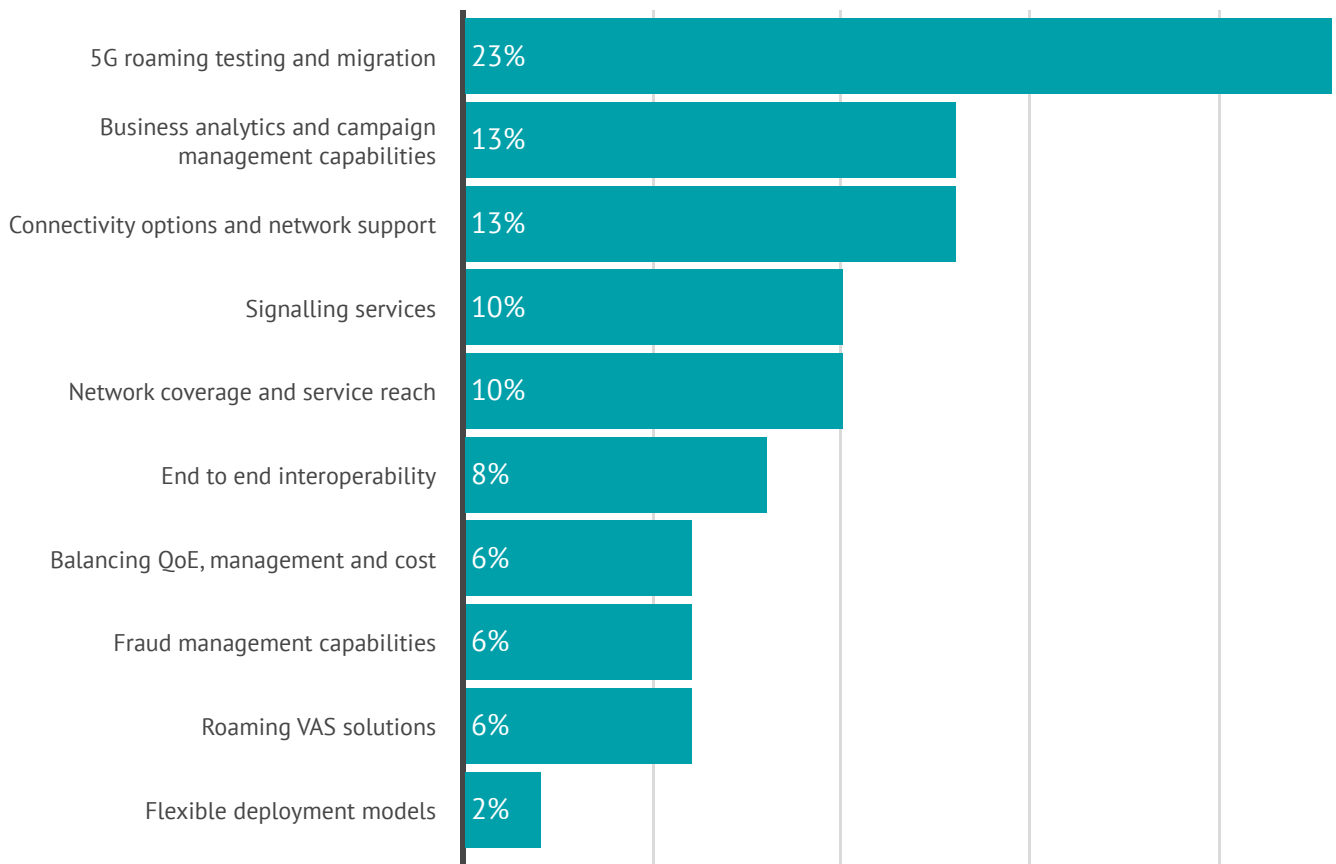
With 5G networks already identified as vulnerable to spoofing, there seems little doubt that the attacks that offer criminals the greatest returns will continue into the near future. It is also inevitable that roaming fraud, which was reduced in 2020 as a result of the pandemic, will return due to the higher number of security weaknesses that exist between two interconnected operators. Indeed, actionable analytics models based on real-time action, margin management, traffic detection, roam like home, enabled by advanced machine learning algorithms are already available. Adoption of such services will provide detailed information on roamer behaviour and consumption, enabling predictive analytics to support targeted campaigns and better-quality services.

Why is Analytics Important?

A significant number of operators are still focused on increasing usage and spend amongst active roamers, without investing in monetising silent roamers; this is expected to change over the coming years, powered by innovative pricing models and investing in analytics suites. With markets such as the EEA implementing RLAH as a result of the EU regulation, and other regions including the GCC, Latin America and Africa extending RLAH for intra-regional travel, operators are focused on other retail innovations and business models via analytics and fraud management solutions.

According to Kaleido's Q1 2021 operator survey, around 13% of the respondents found business analytics as the most important technical requirement. It is more important now than ever for mobile operators of all sizes to integrate roaming analytics and campaign management tools to identify, understand and predict usage and traffic growth for IoT and consumer devices.

What Are Your Key Roaming Requirements From A Technical Solution Perspective? Operator Survey Response



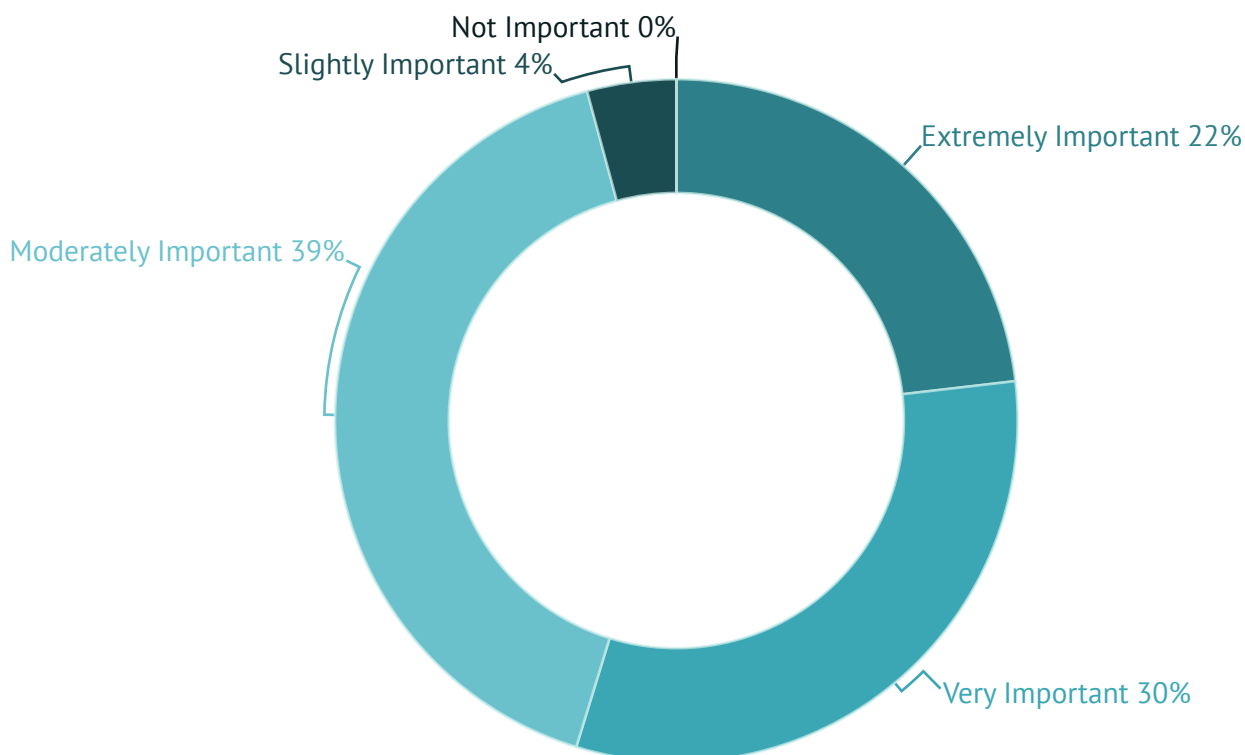
Implementation of analytics will enable operators to understand inbound and outbound roaming recovery: especially to identify current usage levels, wholesale revenue impact, scenario forecasts for traffic recovery, and make informed decisions based on these data.

In addition, analytics will play an important role in monitoring the slice integrity and QoS commitments while expanding services to the international market. This is particularly important for the IoT/M2M market vertical. Network slicing, a much-touted feature of 5G revenue opportunity, will require advanced automation capabilities within networks. Network slicing, where a portion of the available network is sold and run as a separate entity from the rest of the network, will enable the mobile operator to provide a truly global network service.

Around 52% of respondents felt that this was extremely or very important, with a further 39% noting it as moderately important while launching 5G SA roaming. The advantage of being able to optimise the slices, maintain end-to-end integrity and management, and to generate contextualised data will bring multiple possibilities for the operators to offer differentiated services across industry verticals.

Mobile operators must evaluate their analytics strategies and IPX partnerships in place to offer demand-driven different levels of service guarantees across network slices. This becomes extremely important once taken into consideration the fact that 5G roaming is expected to continue to evolve over the coming years, unlocking many new opportunities, service levels and usage levels.

Importance of Analytics: Network Slice Integrity & QoS Commitments, Operator Survey Response



Analytics In Roaming: MNO Opportunities & Strategies

Analytics Matter: The MNO Opportunity

Real-time analytics in roaming for mobile operators will enable a better quality of experience, reduce roaming fraud and maximise revenues. By combining machine learning and signalling insights, operators are able to use the power of analytics to facilitate enhanced roaming services including steering and other roaming VAS, roaming hub services as well as roaming fraud, signalling firewalls and network security systems.

- By combining consumer location data, signalling information from SS7 for 2G/3G, Diameter for 4G and GTP services, operators are able to target new revenue streams by introducing new bundles, personalised roaming upgrades, convert silent roamers and detect all M2M and IoT roaming traffic.
- In addition, analytics will enable networks to intercept any fraudulent calls or hacking sessions by providing the necessary visibility on these scenarios. Also, predictive analytics will aid to mitigate potential impact of large group of IoT/M2M devices updating software at the same time (potentially creating a Denial of Service behaviour) or becoming a botnet with the potential to cause major telecommunication networks disruptions.
- Finally, analytics will also enable operators to meet any legal or regulatory obligations.

Enhance the Roaming Experience

By analysing roaming traffic, performance KPIs collected from subscribers and the network, including network coverage and signalling performance, operators are able to have an in-depth view of the network performance and customer experience. This means that operators are able to steer customers not just based on a traditional set of rules, but control the quality of experience for customers in real-time. This will enable operators to monitor 'high-value' customers to make sure they are satisfied with the roaming experience and connectivity, at the same time automating any QoE management. This not only protects existing business but enables real-time remedial actions.

Maximise Revenue

Roaming analytics will enable operators to boost their revenues and promise rich dividends by:

- Analysing customer behaviour patterns (high-value, business, silent roamers etc) and tailoring products and services to meet customer expectations and needs.
- Analysing app and data usage by country and network technology (3G/4G/5G) and offering personalised plans.
- Identifying silent roamers and offering discounted roaming services to increase usage.
- Understand key factors impacting consumer usage, inbound and outbound traffic.
- Monitor network performances amongst preferred roaming partners and negotiate better wholesale agreements.
- Identify M2M-specific roaming connections, usage and maximise IoT roaming profitability.

Optimise Quality & Manage Roaming KPIs

In addition to monitoring network quality and partner performance in real-time, analytics help operators to ensure SLAs are met by operator partners. This will then assist operators in automating steering and management of subscriber connections. Indeed, this underlines the importance of reliable information and KPIs provided by business intelligence platforms. Analytics and business intelligence platforms will provide critical information such as permanent roaming status, outbound and inbound roaming statistics, as well as M2M vs consumer mobile-specific KPIs and metrics.

Predictive Analytics & Forecasts

With the predicted growth in 5G roaming and IoT roaming, it is critical that operators have deeper insights into roaming services and customers. By recording and analysing historical data including travel patterns and roaming usage, alongside gathering real-time information and combining machine learning algorithms, analytics platforms can predict and forecast:

- Travel patterns
- Consumer behaviour and roaming usage
- Roaming revenues

The MNO Challenge: Innovation Requirements

Kaleido asked the operator respondents about the key roaming product sectors, where they believe the most innovation is required.

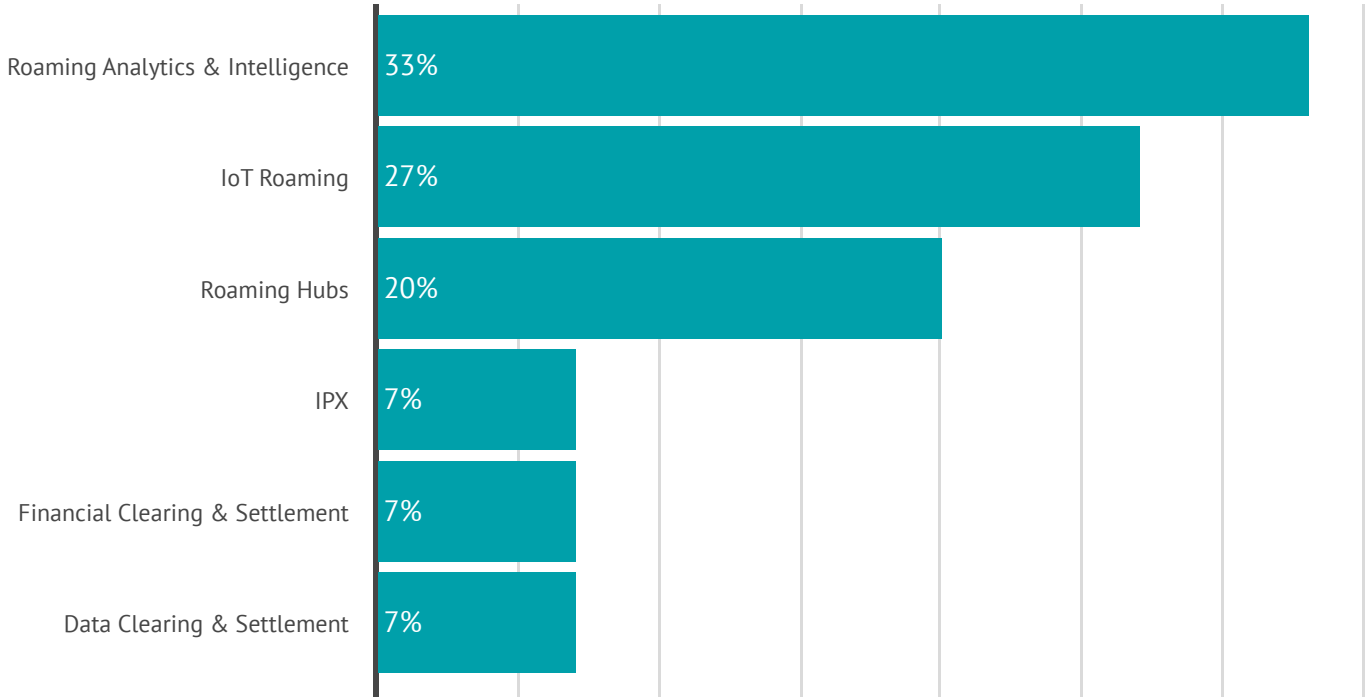
Around 33% of the respondents believe that innovation is required the most in roaming analytics and intelligence products; at the same time, demands for insights into roaming behaviour, traffic forecasts, device identification and fraud management is increasing.

Kaleido concurs with this finding: despite analytics platform now capable of delivering a much greater and enhanced roaming experience to customers and businesses alike, the growing ecosystem of connected devices and services means that vendors must focus on constantly delivering new standards of roaming services and connectivity. For example, steering, fraud protection and end-to-end service optimisation based on real-time data analytics for IoT and consumer roaming devices have become a must-have for mobile operators today. During the COVID-19 lockdown months, countries and regional markets witnessed fluctuations in traffic and users on a constant basis and this has significantly impacted operators planning and forecast models. The need to remodel and forecast traffic based on changing travel volume and demand means real-time insights and analytics are critical to understand both short-term and long-term opportunities and commitments.

Operators need the right vendor partner to give them a better understanding and control over the existing and new consumer and IoT roaming applications and services.



Where Do You Believe The Most Roaming Innovation Is Required? Operator Survey Response



Source: Kaleido Intelligence

According to the survey respondents, the critical innovation that they expect within analytics and intelligence product offerings were as follow:

Roaming Innovation Required in Analytics & Roaming Intelligence Operator Survey Response

- ✓ "E2E view"
- ✓ "Creating flexible analysis to drive business decisions"
- ✓ "Generate value through analytics and implement NPS scoring for roaming"
- ✓ "Better analytics in decision making"
- ✓ "IMSI level analytics"

Source: Kaleido Intelligence

Analytics in Roaming: Defining the Role of IPX

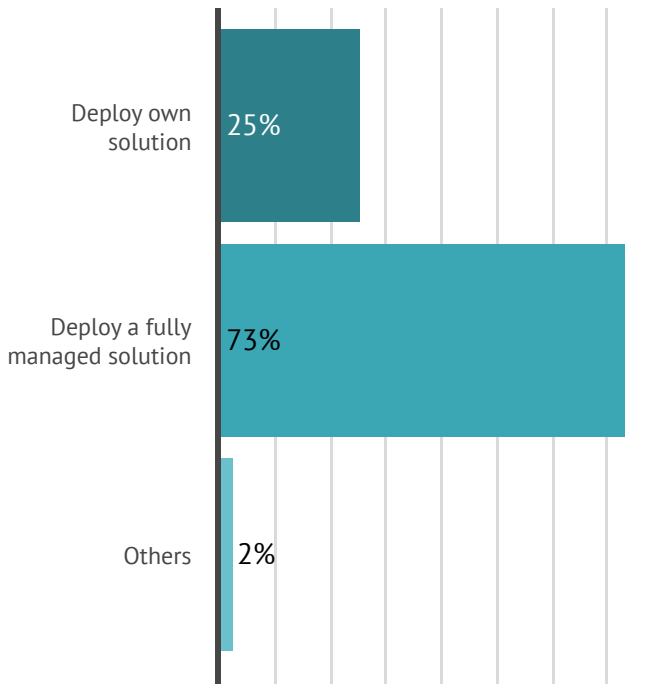
Vendor

The Deployment Model

The primary objective of operators must be to understand the deployment model, align costs and revenues based on a beneficial ROI, and opt for quickly available analytics services capable of faster integration and rollout.

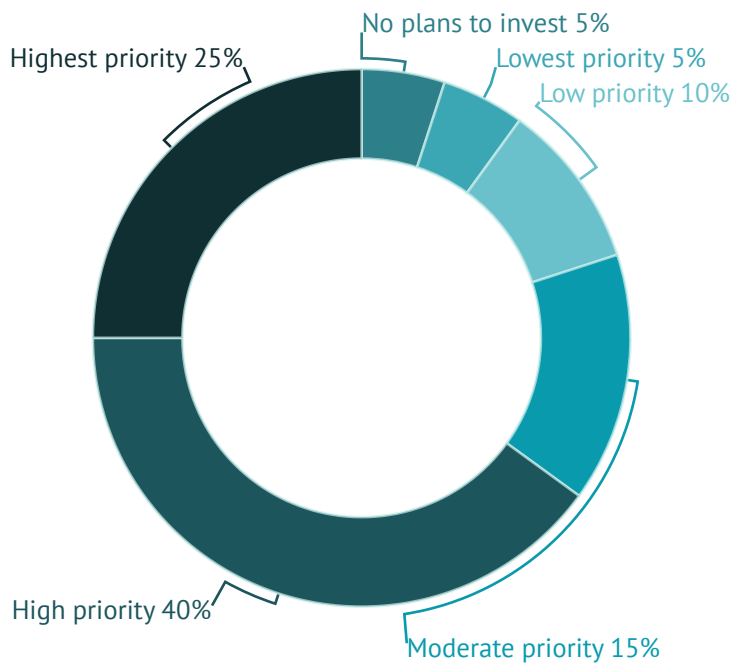
According to the operator survey, respondents prefer a managed service rollout by a roaming vendor or service provider; around 73% preferred this to be the case. Indeed, a managed rollout will enable operators to avoid any complexity in terms of product features and high costs in developing and maintaining the required solution. Combined with the right data and the right expertise, managed solutions can enable high performance results and growth for the operators.

Which Analytics & Intelligence Platform Deployment Model ?
Operator Survey Response



Source: Kaleido Intelligence

What are Your Priorities for Advanced Analytics Investment Plans in 2021? Operator Survey Response



Source: Kaleido Intelligence

In addition, around 75% of the respondents noted that company priorities for investment plans for advanced analytics platforms in 2021 will be of high or highest priority. With advanced analytics and intelligence high on operator requirements while they transition towards 5G roaming and beyond, the need to choose the right partner becomes increasingly important. IPX vendors are well positioned to provide comprehensive statistics to its customers via real-time CDRs, pro-active monitoring and alarming, IMSI level troubleshooting, and service quality reports.

The Role of the IPX Vendor

5G will not just enable faster mobile broadband for roaming consumers but will enable new mMTC (massive machine type communication) and uRLLC (ultra-reliable low-latency communication) services. The critical challenges that operators now face are multiple-fold:

- Ensuring capacity to meet the substantial surge in roaming traffic generated by consumer mobile and IoT connections.
- Ensuring QoS and CoS levels to meet the expected premium experience for both consumer and IoT segments.
- Need to be able to cope with unexpected traffic increases caused by large fleets of IoT devices or mitigate such traffic spikes.
- Finally, requirements to meet network interconnection and steering security policies.

These challenges, alongside other key issues and benefits, can be duly addressed by partnering with an IPX provider enabling a direct migration path from existing roaming services to 5G roaming solution, including signalling and interconnect, security and traffic spike protection, clearing and settlement, alongside other value-added services such as analytics and fraud management.

Operators need to prioritise and define a 5G roaming strategy and work with their IPX vendors to overcome all technical challenges with an emphasis on capacity, analytics, security and introducing new signalling and interworking protocols and functions. Over the past 2 years, we witnessed 5G roaming becoming a reality and stakeholders building on the momentum to launch early commercial services and 5G roaming agreements. In addition, following the launch of 5G NSA and commercial roaming agreements, eMBB applications will continue to drive roaming traffic over the next 4-5 years. Operators must ensure that their IPX partners are ready for the next generation of data services and not just be capable of handling the capacity, but also meet the quality of service requirements, support new use cases and provide slice management. Alongside this, security has been observed as the most important requirement and it is recommended that operators choose the right solution for their security needs.

The emphasis on QoS, efficient steering for 5G and IoT traffic, slice management and integrity as well as security requirements means that operators must have clear visibility across their networks, with partners delivering a comprehensive set of roaming solutions and enabling a deep understanding of risks, trends and opportunities.

Conclusion

Roaming analytics have become highly important over the years with more operators investing in analytics; a significant focus is on predicting, forecasting, and impact analysis to optimise their roaming revenues. According to Kaleido's operator survey, big data analytics and real-time intelligence were amongst the top 3 5G roaming innovations and services expected by operators.

Operators will need analytics platforms to be customisable and easily integrated into existing systems, with enhanced fraud protection and better return of investments enabling incremental revenues and improving churn.

With revenue margins for operators decreasing, they will need to look into fraud protection and intelligence platforms for growth. Although there is an increase in the awareness of threats and fraud, networks continue to face a constant evolution of risks, hence the need to embrace such solutions, especially as future fraud and security needs will be different from a 5G and IoT perspective. They also need to enhance their network protection against signalling vulnerabilities and Denial of Service events.

Analytics in roaming will enable real-time visibility to understand revenue opportunities, enhance customer experience, and detect early threats. Considering the increasing number of roaming devices and connections, operators will need analytics to support this growth in connections and data traffic and optimise their roaming business.

Despite the global impact of the COVID-19 pandemic on roaming traffic and wholesale and retail revenues, the perspective for 5G and IoT roaming remains strong and positive. This means that operators will need a holistic view of the roaming network and services. It also means that the need for implementing powerful and insightful analytics has never been so important ever. Together with a strong interconnection and signalling service, analytics will enable operators to meet all new roaming needs and demands enabled by 5G and IoT roaming in the future.



Real-time analytics in roaming for mobile operators will enable a better quality of experience, reduce roaming fraud and maximise revenues. By combining machine learning and signalling insights, operators are able to use the power of analytics to facilitate enhanced roaming services including steering and other roaming VAS, roaming hub services as well as roaming fraud, signalling firewalls and network security systems.

ABOUT iBASIS

iBASIS is the leading communications solutions provider enabling operators and digital players worldwide to perform and transform. Powered by Tofane Global, the new iBASIS is the first independent communications specialist, ranking third largest global wholesale voice operator and Top 3 LTE IPX vendor with 700+ LTE destinations. With the integration of Tofane's acquisition of the Altice Europe N.V. international voice carrier business in France, Portugal, and the Dominican Republic, iBASIS today serves 1,000+ customers across 18 offices worldwide. iBASIS is taking major steps to help mobile operators experience a fast, secure and easy migration to 5G roaming with a flexible step by step approach. iBASIS is now introducing its 5G signaling exchange testing platform for 5G Stand Alone (SA), a comprehensive trial environment in preparation for launching commercial 5G roaming services with new service based architecture including new signaling protocol -http/2-.

To know more about the multiple scenario and use case testing please contact:

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ABOUT KALEIDO INTELLIGENCE

Kaleido Intelligence is a specialist consulting and market research firm with a proven track record delivering telecom research at the highest level. Kaleido Intelligence is the only research company addressing mobile roaming in its entirety. Our Mobile Roaming & Connectivity research service covers industry leading market intelligence and publications on Wholesale & Retail Roaming, 5G Roaming, IPX, Private Networks, IoT MVNOs, IoT Roaming and Analytics & Fraud in Roaming. Research is led by expert analysts, each with significant experience delivering roaming insights that matter.

For more information on this market study or if you have further requirements, please contact:

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