**WE ASKED MNOS TO TELL US ABOUT THEIR CHALLENGES WITH ROAMING IoT…**

# Roaming Internet of Things Strategy Report 2017

**STRATEGIC ANALYSIS VERSION**

rocco

UROS
Uni-fi Roaming Solutions

**ROCCO Roaming Internet of Things Strategy Report 2017**
**was created, designed and sponsored by ROCCO™ in cooperation with UROS**
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"We are all now connected by the Internet, like neutrons in a giant brain."

*Stephen Hawking*


# Roaming Internet of Things Strategy Report 2017

## Contents

# About the Authors

## Jason Bryan

Jason is Senior Consultant, Analyst and C.E.O of ROCCO based between Malaga, Spain and the ROCCO HQ in the UK. He has overseen the last 5 years of in-depth monthly research on Industry Analysis, Vendor Performance, Market Intelligence and Market Pricing in the Roaming and Interconnect space. Jason was the founder of ROCCO in 2012, building on 20 years experience of Roaming and Interconnect roles in Vodafone, Telefonica Groups and a number of Vendors, as well as GSMA Chairmanship roles.

# Introduction

## The Objective of This Report


As the cartoon on the right demonstrates, there are many anecdotes and speculations about how IoT might work in the future, but the reality is that even while IoT seems like a future world, IoT and Roaming Internet of Things (Roaming IoT) has already advanced tremendously with all kinds of devices on the move globally.

At ROCCO we believe that MNOs need support to know how best to handle this new phenomenon and so we decided to work together with UROS to investigate Roaming IoT.

For the last 8-10 years MNOs have been struggling with the challenge of how to quantify Internet of Things. Clearly it represents an opportunity for revenue growth but it also introduces new processes and resources which need to be managed so the true nature of its value has yet to be recognised and may not be for several years more.

Internet of Things comes with a lot of hype and anticipates an industrial revolution for the whole industry, but there are questions about how big an opportunity it will bring and how will this effect MNOs:

- What are the impacts on Roaming processes?
- What revenues are MNOs seeing today?
- What revenues should they expect from the future?

This report concludes a 6 week investigation between February and March 2017 by ROCCO with MNOs into Roaming IoT. It is the first major research project which uses the responses of MNOs about Roaming IOT globally to dig into some of the issues around Roaming IoT. The aim of this research is to offer to MNO's insights into global MNOs opinions on Roaming IoT, or as we used to call it M2M Roaming.

The report captures challenges faced by MNOs in Inbound and Outbound Roaming IoT traffic scenarios, working with Roaming Partners in delivering transparency about Roaming IoT devices and their traffic, their behaviour and usage patterns and reveals some interesting data about Roaming revenues and future expectations of what Roaming IoT devices might mean to Roaming revenues in the next few years.

Our aim at ROCCO is to enlighten MNOs on how to handle some of these challenges by facilitating discussion and informing them what their Roaming Partners are doing and thinking about this new market opportunity. Every MNO globally can learn something from this report.

## Methodology

Our methodology for this research is very simple. ROCCO sent a survey to all the MNOs and MVNOs. We publish social media posts and make communications across our 34,000+ Roaming and Interconnect contacts in the industry (with a focus on MNOs) and we gather the insights and feedback from every MNO we can to make our report.

ROCCO is a neutral research company and does not assist with the sales of products and services of any vendors in the market. ROCCO does not produce sponsored research, our aim is to provide always the truth in a situation, to ask the questions MNOs want us to ask and give the responses we receive with true transparency.

ROCCO has for the last year had an inspiring dialogue with UROS - Uni-Fi Roaming Solutions in thinking about Roaming IoT. UROS are starting to support enterprise customers with their Roaming IoT Platform. They already have many MNO partners whose subscribers use the famous “Goodspeed” devices and Apps which they sell on the market. Their focus as a company is in supporting MNOs in eliminating Roaming Bill Shock by offering solutions which make Roaming usage transparent to the consumer (or IoT Platform user) and derive trust in Roaming. ROCCO has found a great support in UROS in raising the issues related to Roaming IoT in the market.

**What we publish here in this report are the aggregated perceptions of MNOs on Roaming Internet of Things with advice and specific case insights.**

This report is sent to all MNOs who responded to the research and is also available for download on the web from www.uros.com and

www.roamingconsulting.com. For any other question about our methodology, please contact ROCCO at hq@roamingconsulting.com

# Executive Summary

## The Hyper Connected Society

Written by Jason Bryan CEO of ROCCO

**"The Internet will disappear. There will be so many IP addresses, so many devices, sensors, things that you are wearing, things that you are interacting with, that you won't even sense it. It will be part of your presence all the time. Imagine you walk into a room, and the room is dynamic. And with your permission and all of that, you are interacting with the things going on in the room." — Eric Schmidt, Google chairman, on a panel at the World Economic Forum**

ROCCO has been asked a number of times by MNOs to gather data on the Internet of Things Roaming strategy and here is the first result, a short 19-question survey for MNOs into their strategy behind Roaming Internet of Things. Roaming IoT or M2M Roaming has been around for around 20 years in some form or other. Even in the late 1990s MNOs used to receive requests for hundreds or thousands of SIMs to use in diverse ways but there was never a record to verify which specific SIMs were dedicated to IoT.

Cut to January 2009, the situation was the GSMA offices in London and I was chairing the Roaming Innovation group (RING). We had a new agenda item "Roaming machines" and it was the very first time an MNO brought to the group's attention the need to investigate Roaming Internet of Things (then known as M2M or Machine2Machine).

Apparently there were impacts that roaming things of many kinds could have on an MNOs network and RING should investigate.

As I looked around the room at the 30-40 MNOs present from all parts of the world and from all different kinds of MNO, it was clear that no one really knew how to define M2M and how it would differ from Roaming humans. The impacts however became clear, “things” could be much more unpredictable than human traffic with traffic occurring on a large-scale basis without transparency of which sim profiles were actually machines and which were humans. This had apparently already started to cause MNOs many issues. One thing however was clear from the discussion, while everyone knew that this traffic would grow, no one in the room was considering that this new traffic could actually bring new revenues.

Later that year I started working in Vodafone Group and I saw for myself the dynamics of M2M Roaming first-hand working in VRS with my little team of negotiators to bring M2M Roaming to the group.

Cut to 2017 and M2M Roaming has since been known as a number of projects ‘Embedded SIM’, ‘Connected living’, to name only two, but right now we refer to it as Roaming Internet of Things. The reality is that in one form or other Roaming IoT has been around for over 20 years waiting to be defined and refined and there’s still some work to do in refining it.

In a recent IoT study by the European Commission they claim that the IoT market in Europe to expand with yearly growth rates over 20% in value between 2013 and 2020:

**“The number of IoT connections within the EU28 will increase from approximately 1.8 billion in 2013 (the base year) to almost 6 billion in 2020”.**

**“IoT revenues in the EU28 will increase from more than €307 billion in 2013 to more than €1,181 billion in 2020, including hardware, software and services”.** [1]

With the emergence of the Internet of things and our dependence on GSM, Wi-fi etc to support almost everything connected, we are entering into a new phase of civilisation, one that is both incredibly powerful and fragile, as Herzog, describes – “civilization is a thin layer of ice atop a rolling, chaotic ocean”. What we have today will be challenged and if we are not ready to embrace the change we will not be part of it.

[1] European Commission Report: Definition of a Research and Innovation Policy Leveraging Cloud Computing and IoT Combination.

The year in mind for the 'arrival' of IoT as we anticipate its maturity today is 2020. The European Commission sees it like this:

"The hyper-connected society will be an established reality by 2020, as most of the 'things' that can be connected, will be by then. In fact, we assume that the remaining connectivity issues presently affecting some EU regions, will have been overcome by 2020 and millions of people and networked devices will underpin Europe's society and economy, as well as its citizens' lives".

With this in mind we start to look into the MNOs opinions on Roaming IOT, taking into account 2016 and the road to 2020.

## Main Findings from this Report

Roaming IOT is today a challenge for MNOs. Standardisation of processes between Roaming Partners are either not stringent enough or not followed. For Inbound Roaming alone, transparency of what traffic is Roaming IOT is the an important issue and brings with it challenges with understanding both the impact on an MNOs network and how to determine the charging methodology. As traffic continues to grow the sensitivity on these issues will naturally also increase.

Everyone wants to send their Roaming IoT traffic, even if the impact on their Roaming partners network may not be monetised by the revenue enhancement this traffic brings. This is not regular data traffic, nor is it only data but voice and sms too and since most MNOs do not always know what a MB of data costs to their business it is much harder to recognise the value of Roaming IOT devices with light traffic patterns and often permanent registration 365/24/7 on the visited network.

Despite this MNOs have an expectation that for Inbound Roaming, that by 2020 there will be so many devices roaming, that traffic will potentially match that of traditional Roaming revenues.

For Outbound there are more challenges; both in getting the agreement to send your Roaming IoT sims to your Roaming Partners network but also in providing them the specific ranges that you use. Less strong revenues are predicted and potentially even Roaming Bill Shock unless metering and IoT platforms are adopted to assist in providing the right insights into the pricing.

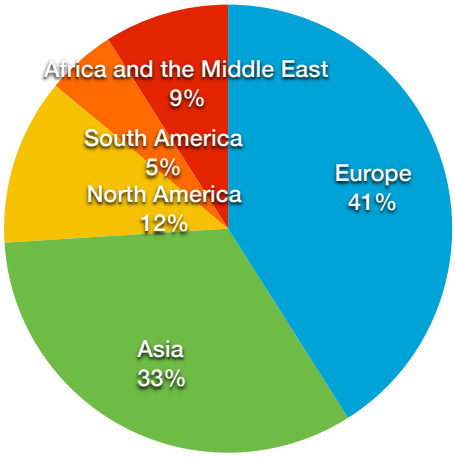
On balance, while there is no single and clear end-to-end working solution for Roaming IoT today. There are however workarounds and many interesting platforms that

will offer for the most part great Roaming solutions and some structure to make MNOs comfortable with this new revenue stream.

The bottom line seems to be that there are potential revenues to be made and some MNOs have worked out solutions to meet their Roaming partners expectations. With 2020 ever nearer its time for MNOs to adopt new principles for managing this important new revenue stream and thats where seeking the good advice of MNOs who are making success of this work is needed.

## About the MNOs

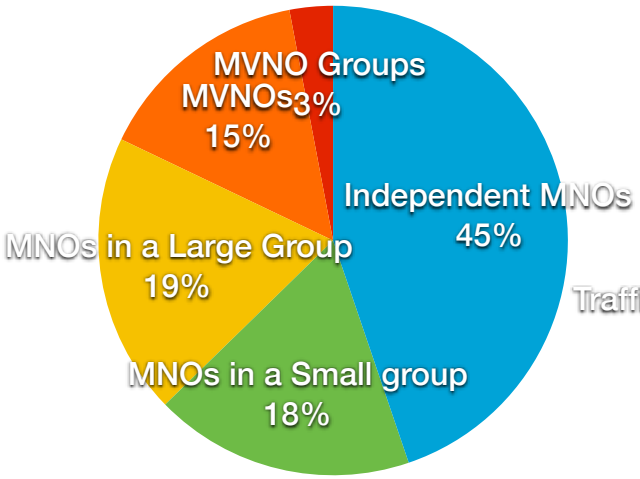
Geographic split of MNO respondees



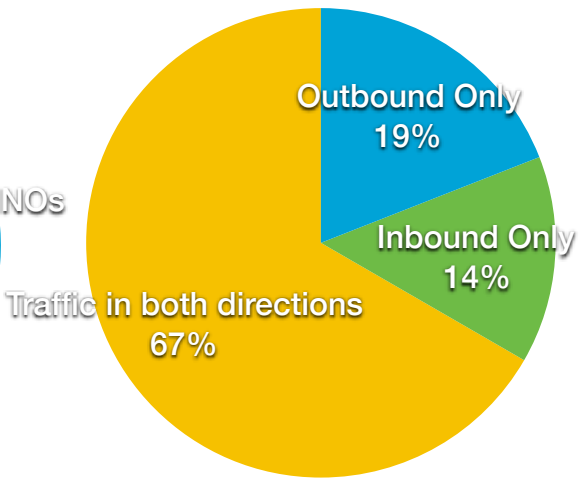

73 MNO respondents, representing 96 MNOs in total in 81 Countries, with the inclusion of 6 MNO Groups responded to our survey. One of the MNOs was a satellite Operator.

While 41% of MNOs responding were from Europe, 33% where from Asia, with Northern America at 12%, Africa and the Middle East 9% and South America at 5%.

MNO Repondees to this Survey

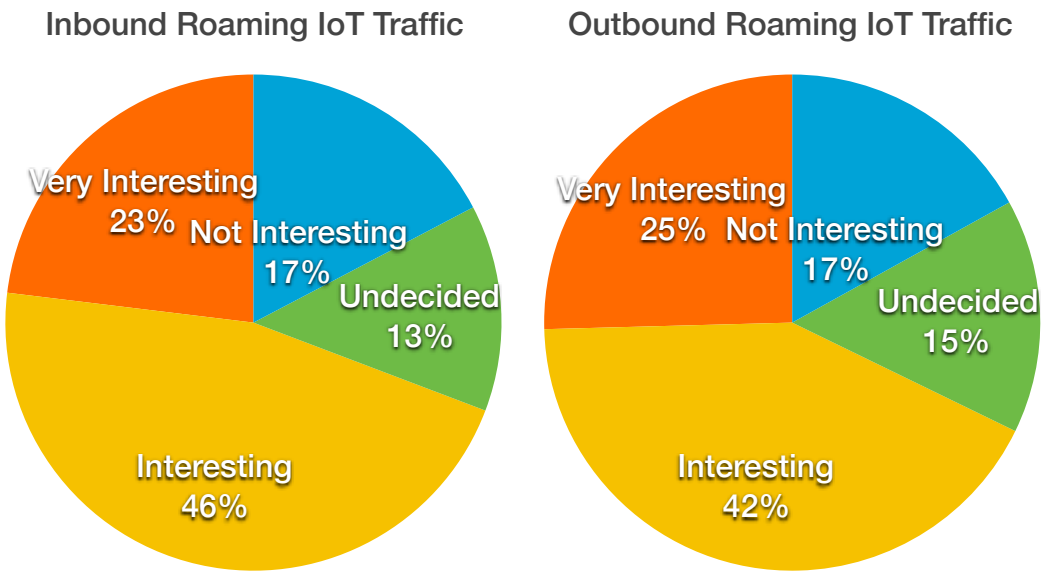



What type of RIoT /M2M Traffic they have



## Are Roaming IoT revenues interesting for MNOs?

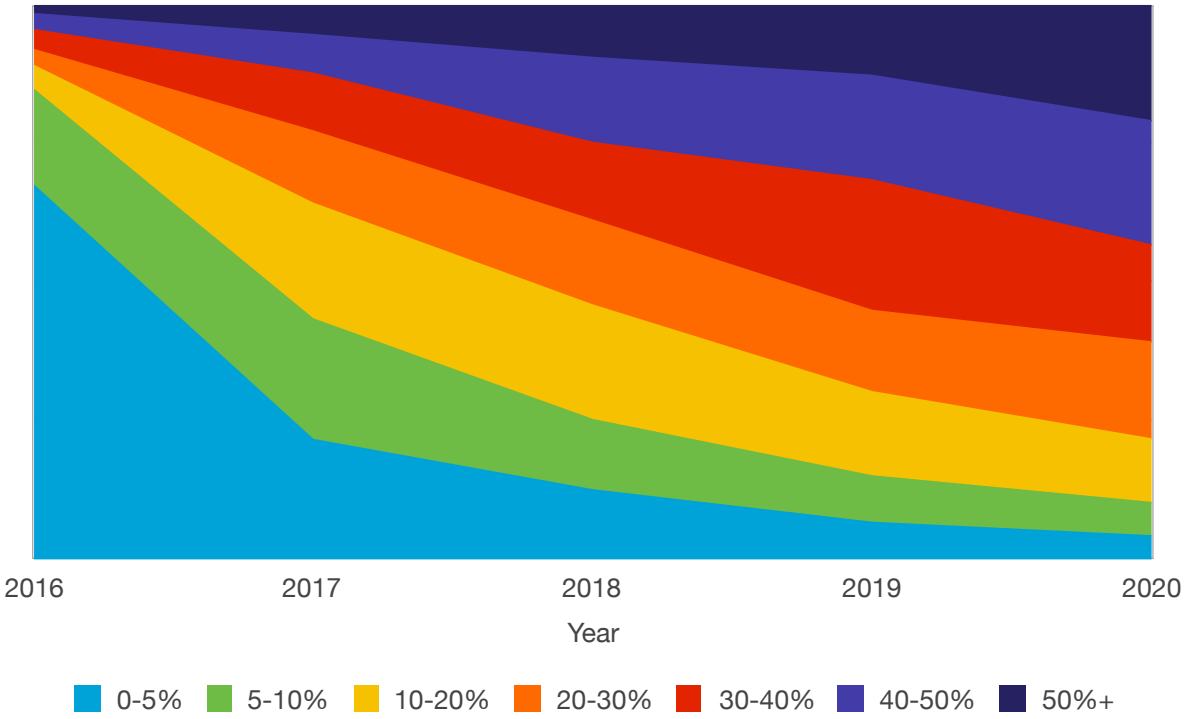
MNOs who responded to our survey believe that Roaming IoT Traffic is Interesting or Very Interesting with only a few doubters. This may suggest that some MNOs are prepared



## Overall Revenue expectations

This Overall revenue chart shows that in 2016 MNOs made between 0-5% Revenues Inbound and Outbound from Roaming IoT. However in future years enhancements in revenue will come apparent especially reaching into 2020 when up to 50% of all Roaming revenues are anticipated by IoT for some MNOs.

Overall Roaming revenues current and anticipated

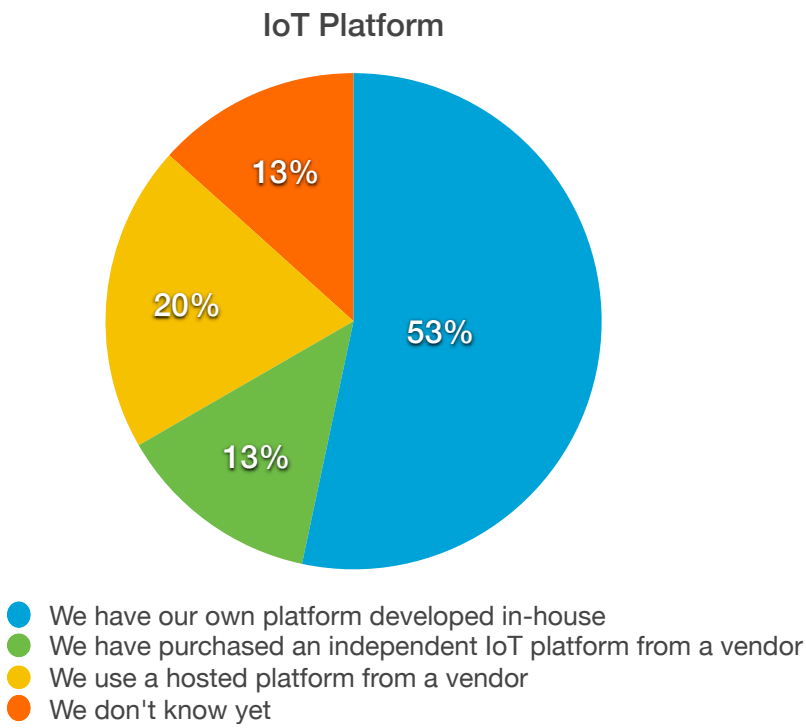



## What types of Solutions or Platforms are MNOs using to support Roaming IOT

Some MNOs find it difficult to manage their Enterprise customers needs for Roaming IoT and the need for some kind of platform or solution is generally needed. The main challenges come from the need to provide:

- Guaranteed Roaming
- Competitive tariffs

- Analytics, in a big data world the Enterprise customer needs analytics both to monitor usage to be able to bill effectively but also to be able to understand how the solution is developing and how it might be optimised
- End to end solution not reliant solely upon the resources of the MNO
- Extensible solutions with which are updated when needed
- Scalable solutions to deal with growth
- Flexible solutions to the wide array of devices to be supported
- Secure solutions where data is managed effectively



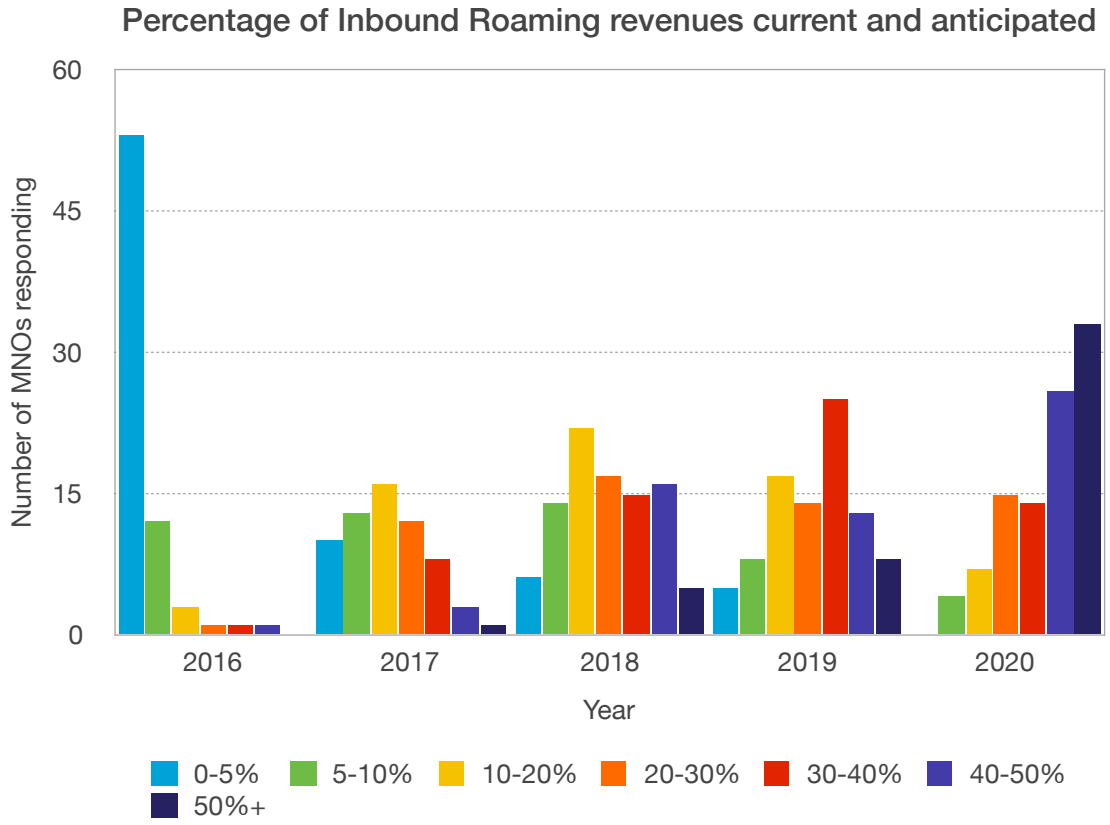

**End of Executive Summary**

# Inbound Roaming

## Percentage of Inbound Roaming revenues

Here we present the percentage of Inbound Roaming revenues coming from Roaming IoT against the total Roaming revenues.

While 2016 results are actual, 2017-2020 are speculative on business expected to be developed and take up of services, traffic patterns disclosed by




Roaming Partners on the evolution of Roaming IoT traffic.

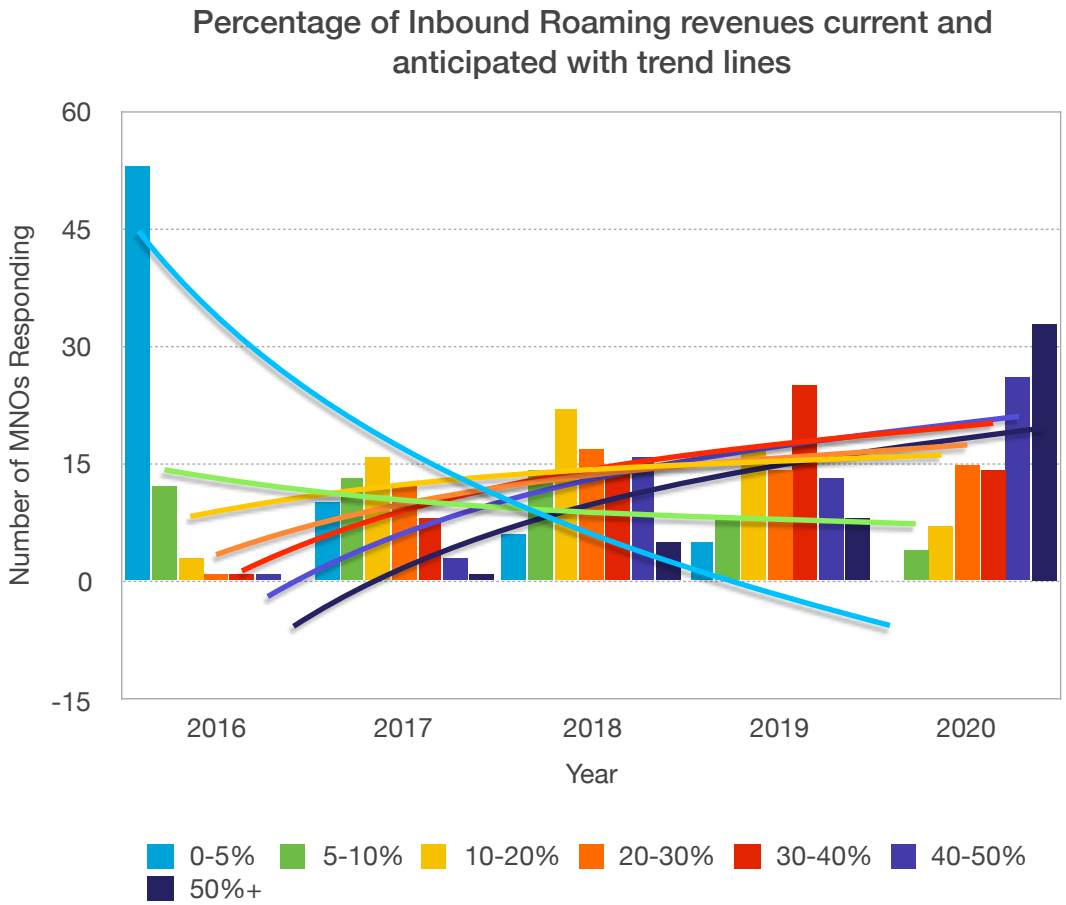
As you can see it is anticipated by just less than half of the MNOs responding to our survey (33 MNOS out of 73) that Revenues coming from Roaming IoT Traffic for Inbound Roaming will match that of traditional roaming by 20/20 and by almost 2/3s of MNOs state that at least 40-50% of Revenues will come from Roaming IoT traffic. What seems certain is that most MNOs expect at least that Roaming IoT traffic will contribute.

What is likely is that with approximately 70% of Traditional Roamers globally becoming silent and switching off Data Roaming, MNOs have the

perception that Traditional Roaming Revenues have declined. At present it is uncertain how MNOs will respond to Silent Roaming and encourage Roamers to return to GSM for data. But what it does suggest is that there are high expectations on Roaming IoT traffic and the evolution of GSM MNOs being used for IoT devices.

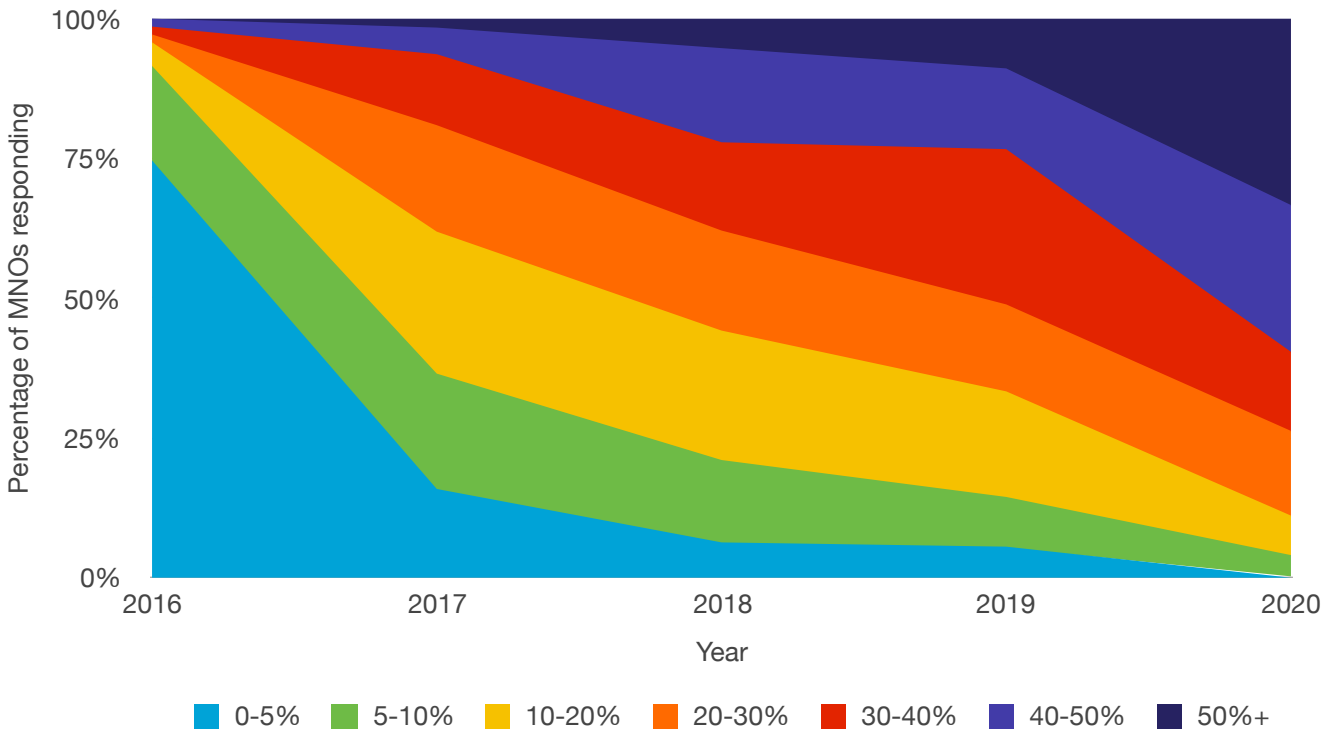
This is also despite MNOs perceptions that the eSIM trend will remove the Roaming scenarios in some devices allowing the device to become a local sim i.e. not considered part of Roaming revenue.

Here with trends highlighted against each percentage.




And here as a stacked chart:

Percentage of Inbound Roaming revenues current and anticipated as a stacked chart



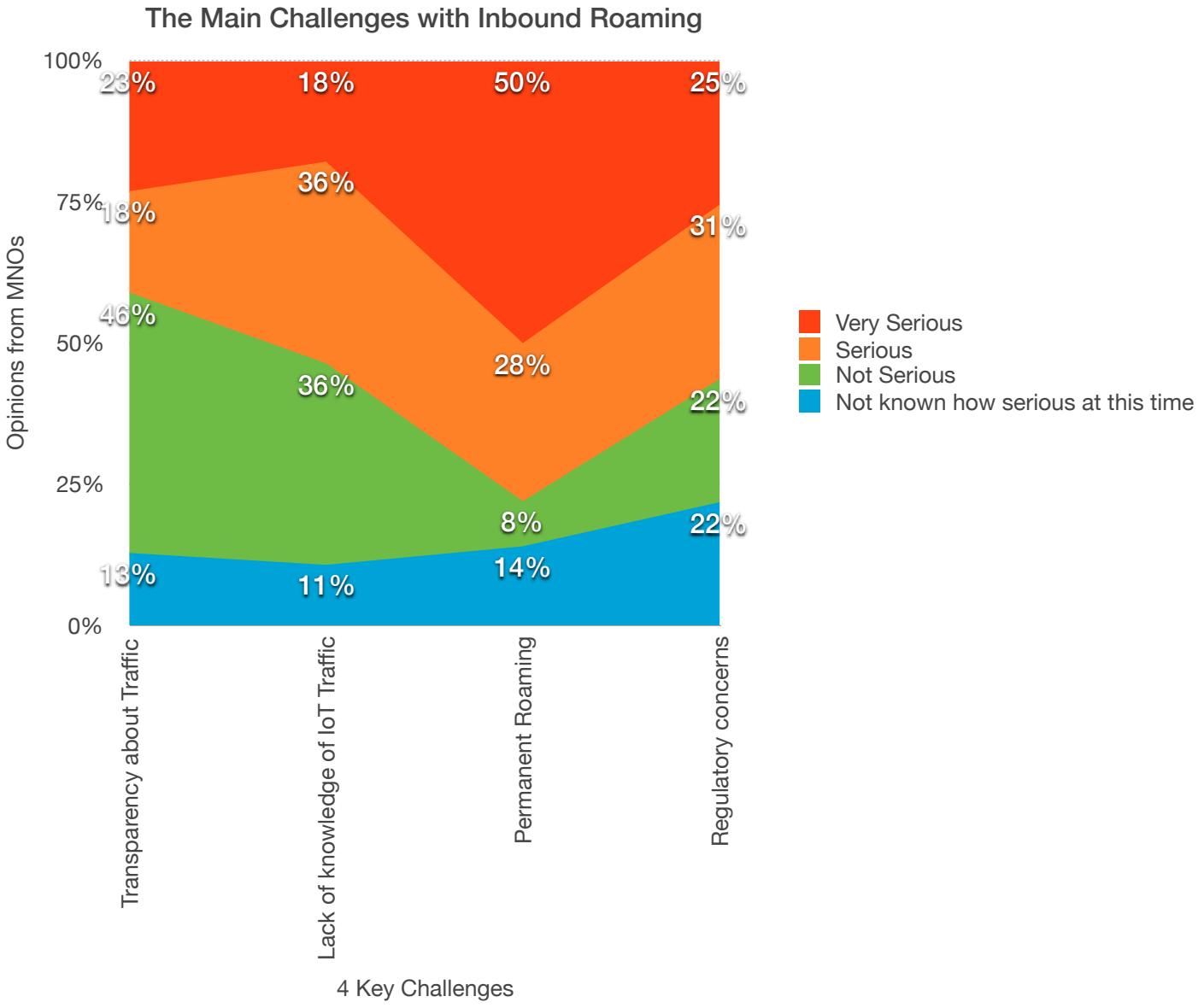

## The Main Challenges with Inbound Roaming

MNOs responded in our survey about these known challenges and how serious they were to them. Note that some MNOs could not identify how serious issues there were at this time. The most serious issue that MNOs have informed us they have with Inbound Roaming IOT is around the Amount of Traffic Permanently Roaming. This is a concern because MNOs would have to support for the life of a device (5-15 years is speculated) potentially low reward traffic in return for high network support. Exactly 50% of MNOs thought this was an issue.

The least concerns seems to be around the transparency of traffic with 46% feeling that they understood well the IoT traffic coming from their Roaming Partners. Although there appear to be also MNOs who doubt this also. One such MNO informed us:

**"We have set-up a dedicated TADIG code to handle M2M traffic and charge it accordingly, splitting is performed based on known IMEI's used (whitelist)"**

Some MNO Groups or Independent MNOs have established Independent Roaming Agreements specifically for Roaming IoT /M2M which has allowed them to be fully transparent about this traffic. This independent TADIG code allows their Roaming Partners receiving the traffic to have full transparency of the traffic for IoT and if needed charge a

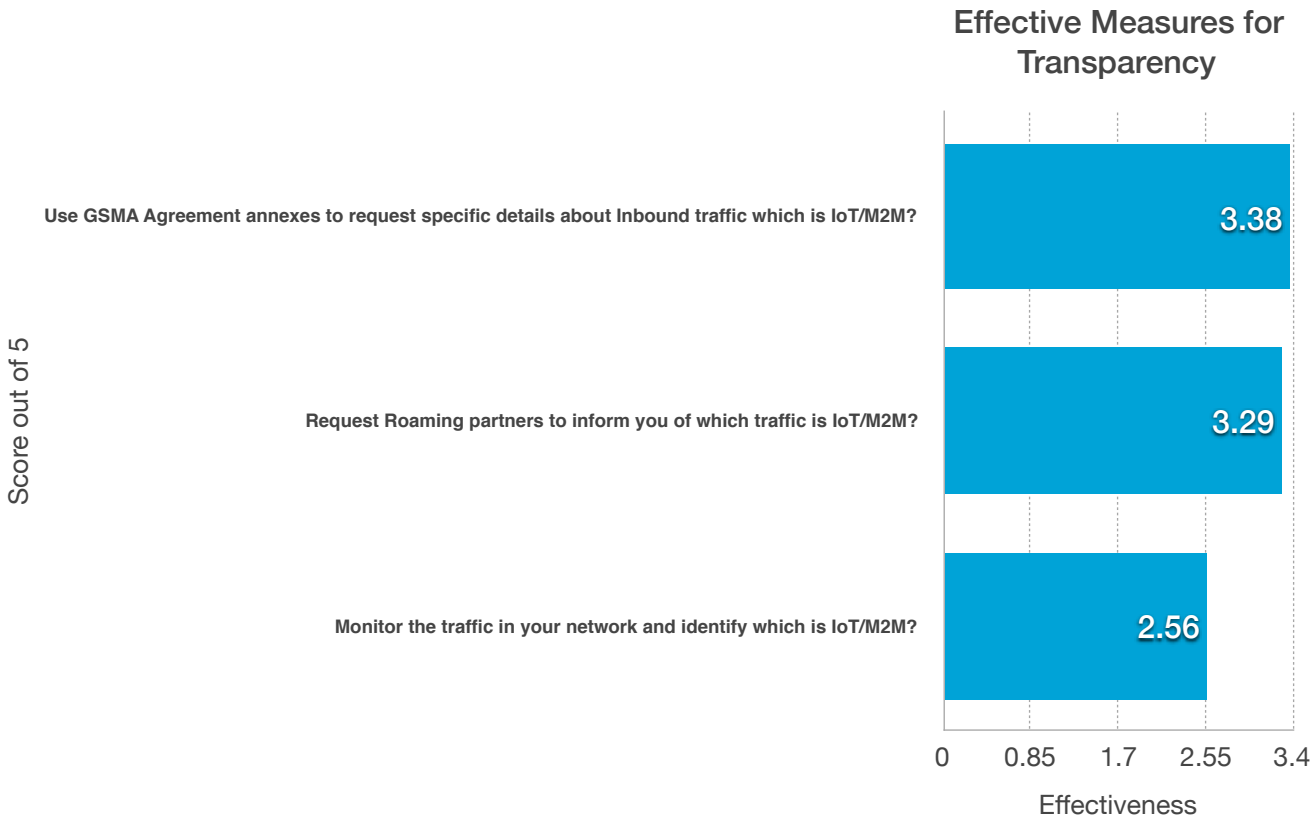



different Inter Operator Tariff for that traffic should the cost of maintaining the devices exceed the devices usage.

## Effectiveness of Transparency Measures

Several influential MNOs who work on standards development and also have large quantities of Roaming traffic have been effective in setting standards with their Roaming Partners for transparency. GSMA Annexes AA.13 to the International Roaming Agreement and/or Inter Operator Tariff discount agreements have been made by MNOs to try to define the status of Roaming IOT Traffic in their networks.

One example of an MNO challenge was this comment from an MNO:

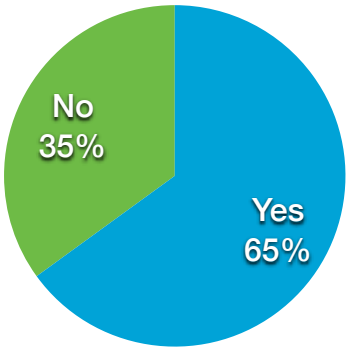



"M2M traffic is often on consumer IMSI ranges and APNs so it is virtually impossible to identify the traffic unless the roaming partner has traffic transparency through separate TADIG, IMSIs or APNs"

And an example of an MNO who resolved the Transparency concerns said:

"They (the Roaming Partner) need to inform us which IMEI's (TAC codes) will be used"

Are you concerned about Inbound Permanent Roaming on your network?




## Inbound Permanent Roaming

When asking MNOs about Permanent Roaming it seems to be clear that almost 2/3rds of all MNO's who responded said they had concerns.

Several MNO's made comments including these:

"Limited traffic, high impact on signalling"

"Inefficient use of network resources"

"Increased entry barriers to local M2M market driven by roaming partners offering global M2M connectivity to local M2M customers by means of heavily discounted IOTs".

"It is important to identify and have a specific charging model for this kind of service".

"The inbound volume will go to eSIM card (using local IMSI), transfer the roaming volume to local volume"

## Useful advice given by MNOs about how to handle Permanent Roaming

"(Permanent Roaming) is not an issue as its just more traffic!"

"Look for ancillary services that could be offered to roaming partners seeking to expand M2M reach"

"Have contractual clauses charging premium for permanent roamers. It isn't about blocking the PR, but monetizing them. If the VPMN is providing all the services, it's fair that it gets the bigger share of the revenue pie."

"Be careful about signalling charges!"

"To make sure they are monitoring the traffic on each roaming parter using as a criteria of identification and for the traffic sum up the IMSI."

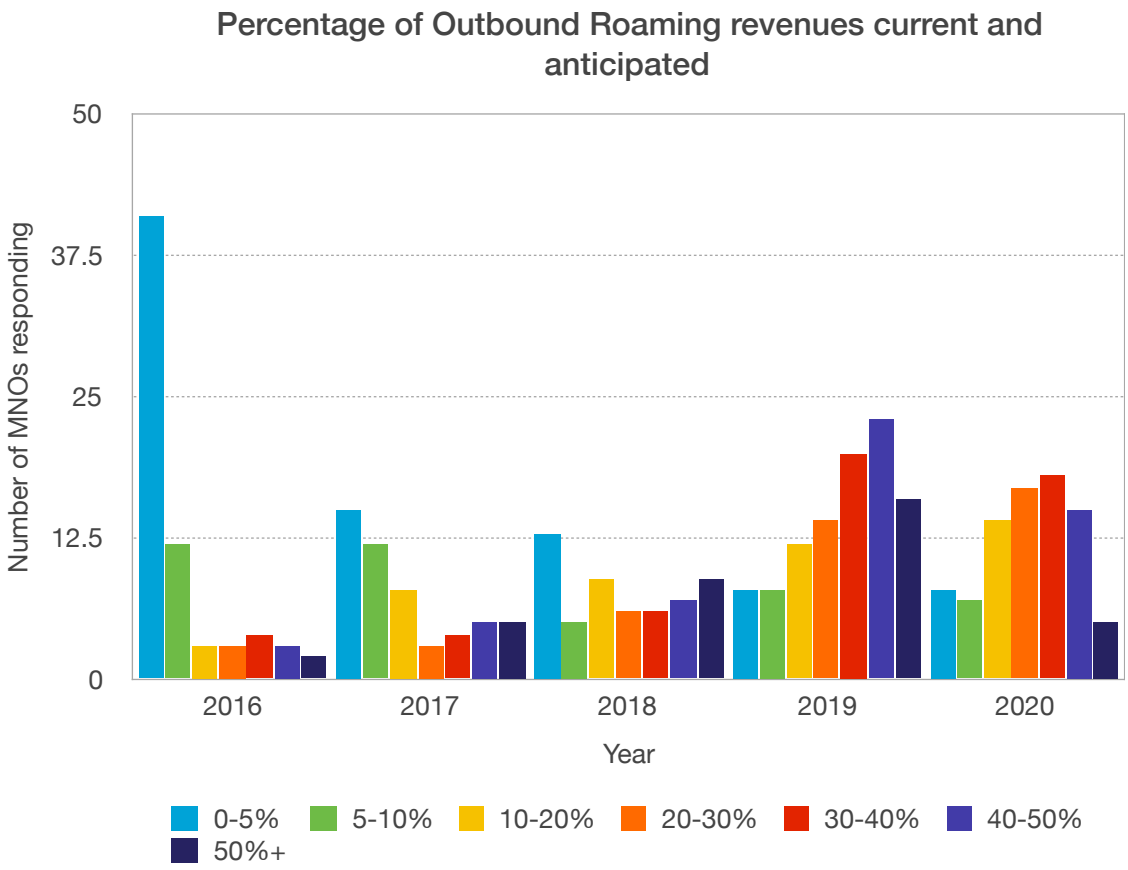
# Outbound Roaming

## Percentage of Outbound Roaming revenues

Here we present the percentage of Outbound Roaming revenues coming from Roaming IoT against the total Roaming revenues.

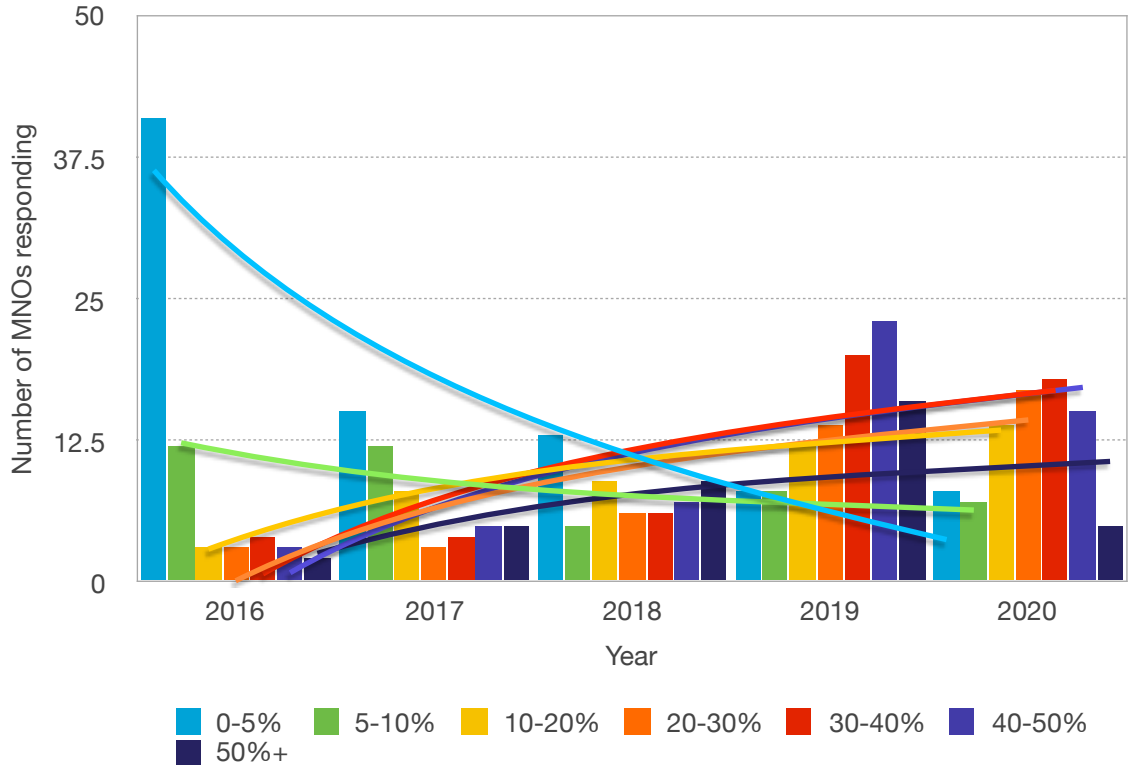
While 2016 results are actual, 2017-2020 are speculative on business expected to be developed and take up of services, traffic patterns disclosed by Roaming Partners on the evolution of Roaming IoT traffic.

As you can see from an Outbound perspective, MNOs are not so positive about Outbound Roaming Revenues for IoT getting as close to Traditional

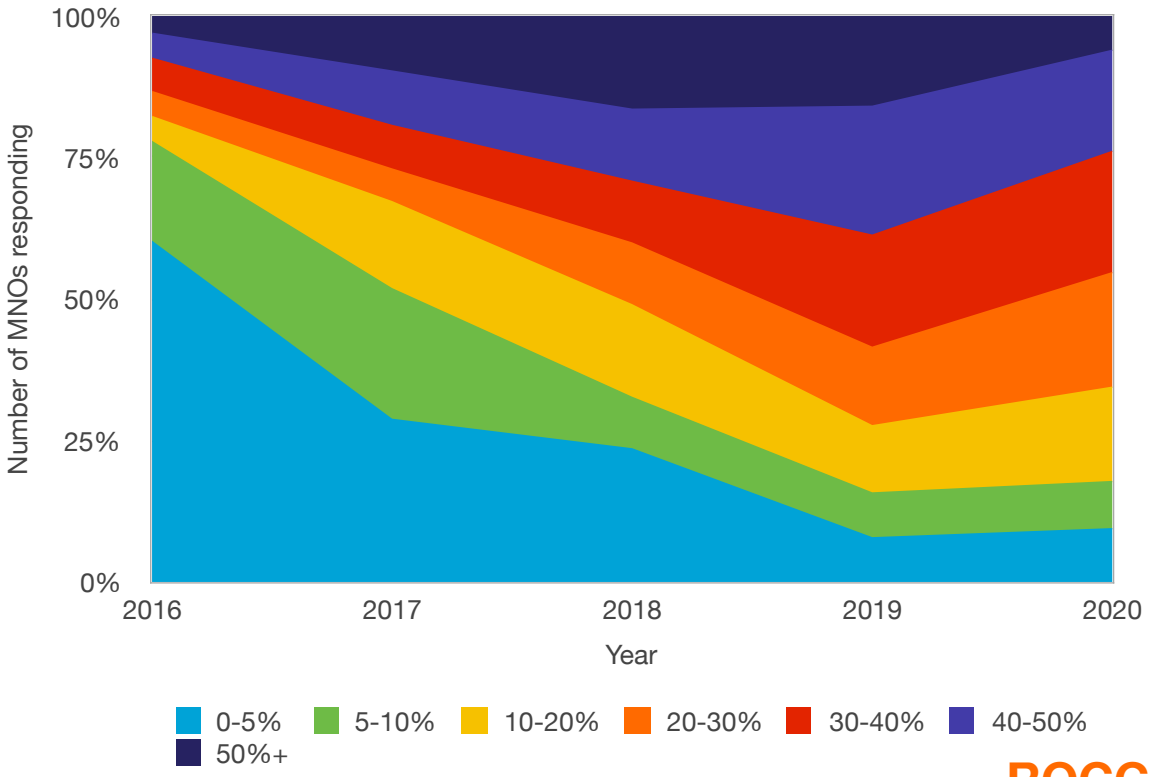



Roaming levels. This might seems strange that MNOs feel that from an Inbound perspective the levels are higher, because wouldn't their Outbound be the Inbound of an other MNO? It would appear that either Outbound poses more challenges then Inbound or that there MNOs responding to this survey are not expecting to be Outbound MNOs for Roaming IoT. This simply means that they

Percentage of Outbound Roaming revenues current and anticipated with trend lines




Percentage of Outbound Roaming revenues current and anticipated stacked



do not consider themselves to have a high degree of Roaming IoT sims Roaming out. We will examine this later when we come to the challenges of Outbound Roaming.

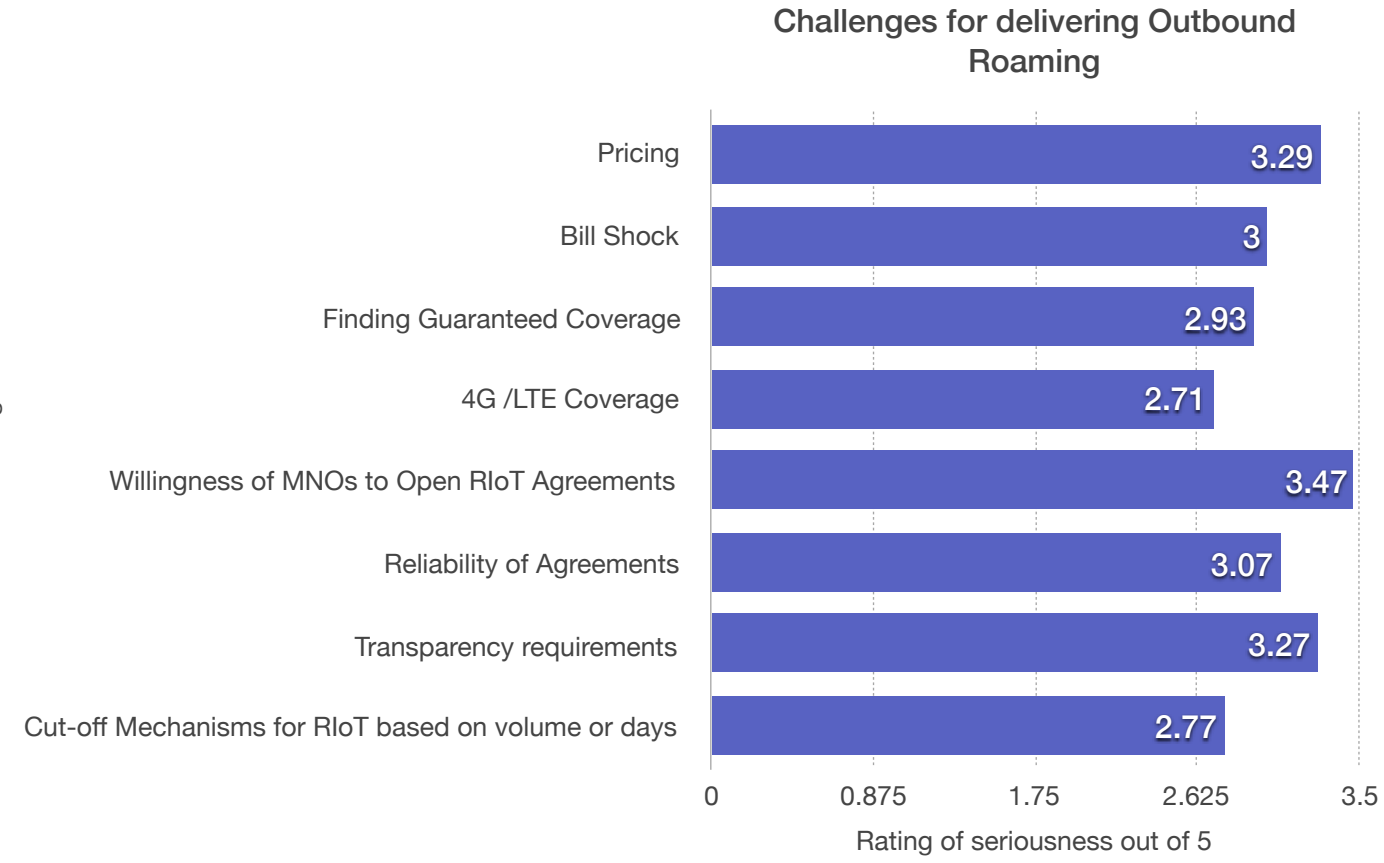
Here we see the trend lines for the Outbound. Clearly more revenue is made as times goes on but the trend does not suggest a great leap in revenue. This could be because the MNOs we surveyed do not feel that the tariffs they are being charged by their Roaming partners allow them to increase revenues for Roaming IoT.

Finally lets look at the stacked chart. It shows a potential revenue anticipated across all percentage ranges. Potentially reaching peak in 2019.

## The Main Challenges with Outbound Roaming

One might assume that the problems faced for outbound are the same as those felt for Inbound simply in reverse but the case can be very different as we can see below.

As we can see the biggest issue is that of the willingness of Roaming Partners to open their network to Roaming IoT and then secondly the price (Inter-operator tariff) they want to charge. In 3rd place the transparency measures they want to send.



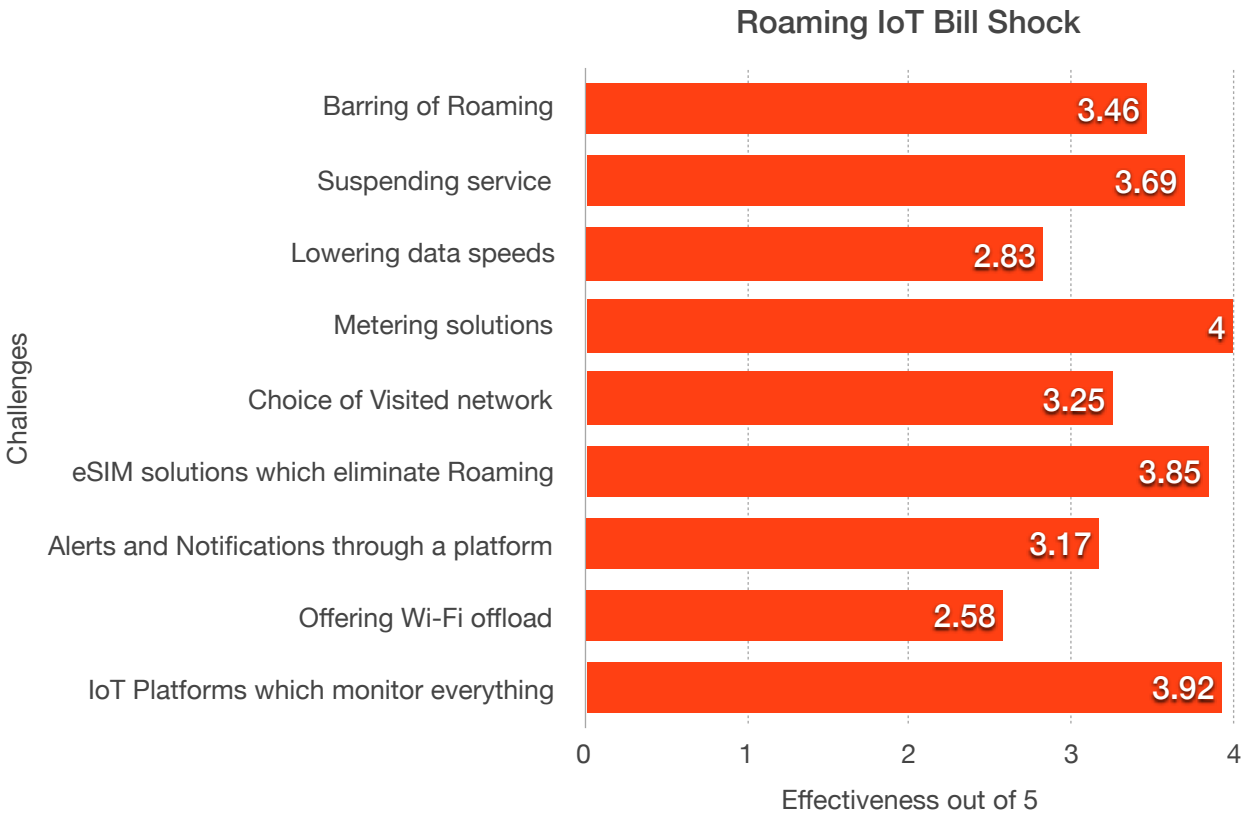

It is well known that in some cases MNOs even make agreements only to open their networks to Roaming IoT traffic based on high IoTs specifically for the transparent traffic they see coming in or limiting the number of days or volumes they allow on their networks. This is often to deter the Outbound MNO offering Roaming coverage to an Enterprise customer the Inbound MNO also wants to service in their country.

## Roaming IoT Bill Shock

In some cases just like traditional roaming, the device owner/Enterprise customer or even the subscriber of the device which is roaming has a surprise in the form of Roaming charges!

While regulation and transparency measures for traditional roaming has lessened this issue it is still a global phenomenon and is growing with LTE and massive uptake of data service.

For Roaming IoT the issue can also be lessened and in the bar chart below we can see how MNOs have tackled this for Roaming IoT.



We can see here that Metering and IoT Platform solutions are popular solutions by MNOs to assist in pricing issues and surprises to the Enterprise customer.

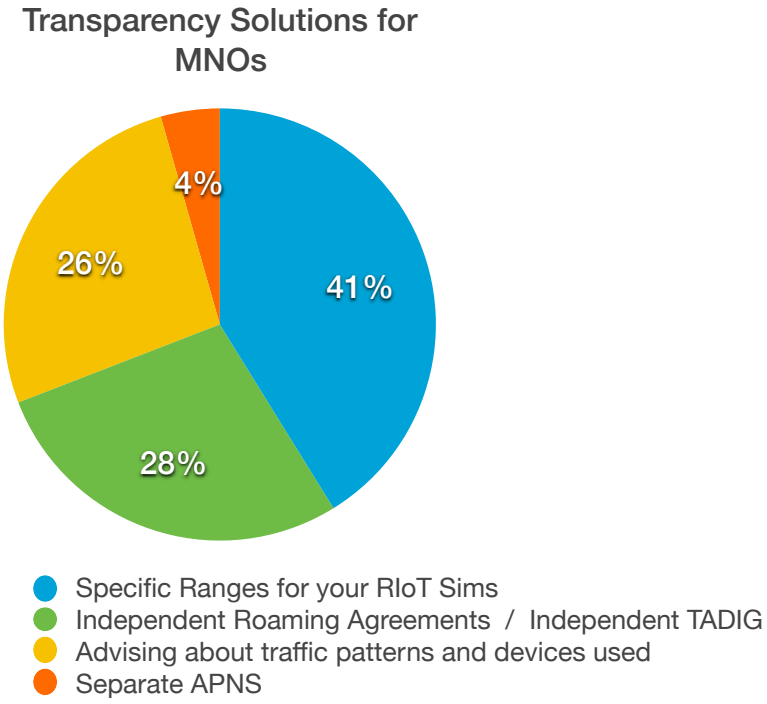
eSIM solutions are also being used extensively, even if sometime the Roaming IoT tariffs and the domestic tariff are not greatly different, the concept of the device using a domestic networks sits well with Enterprise customers which in the traditional roaming scenarios are familiar with taking local sim options.

Pushing the customer to Wi-Fi is clearly the less enticing option for the GSM networks.

## Transparency Solutions for MNOs

Over time MNOs have learned that if they want to send Roaming IoT sims to their Roaming Partners network and guarantee service they have to be upfront about it and the following recommendations have been made by MNOs as to how to deal with that.

It is not always possible to recall which ranges have been allocated to




Roaming IoT devices, however since 2009 GSMA Standards have stated that

MNOs should record and communicate this information to their Roaming Partners. Therefore, many MNOs expect it and if they don't receive this information normally as an annex to AA.13 Roaming Agreement they may take whatever action they deem necessary to limit the impact on their networks and revenues.

As indicated earlier, several large MNO groups have established separate TADIG codes for Roaming IoT traffic. This is a smart practice if they want to be assured that this traffic is guaranteed and agreed between themselves and their roaming partners. This method does however require that all Roaming Partners test an introduce into billing systems new TADIG codes and only MNOs or MNO groups who have influence and high volumes of traffic are likely to be able to make that happen in a timely manner.

# Notes on Our Report

## Eligibility for taking part in this report

Only MNOs (which includes MVNOs) were applicable to take part in this research. Feedback from Vendors, companies who were not MNOs was removed.

## Your Feedback, Our Future Reports

This is our first Roaming Internet of Things Report and while we weren't expecting as many ratings as we received we know as well that more ratings would be helpful. We hope that this first report will create enough interest to stimulate more data for our 2018 research.

We would welcome your feedback on our questions, research, interpretation of the results and our presentation of the results. Please contact us at hq@roamingconsulting.com to give your view.

We have taken a lot of feedback on this survey which we intend to use in the revision of this survey for 2018.

In 2018 we intend to repeat several questions we have created here and then understand how perceptions are changing with regard to Innovation and how the performance has evolved.

## Our Catalogue

In 2017, following a demand from MNOs and Vendors ROCCO created a catalogue of all our Training Events and our reports. This is available to see online or to download at our website www.roamingconsulting.com