



IRSF in 2021

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Same old fraud but new destinations

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Do we need to rethink our Prevention
and Detection Strategies?

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In September 2018, I prepared a White Paper highlighting the changes in IPRN Provider behaviour, particularly around the destinations being advertised for IRSF and Wangiri calling activity. This paper was primarily prompted by the introduction of the EU Roam Like Home (RLAH) directive, which resulted in a gradual change in destinations being offered, suspected of being offered to enable the exploitation of calling bundles being offered by CSP's where calling to multiple destinations under one calling tariff were being offered. This resulted in a change of the typical high risk destinations which, following the EU Directive, started to include many destinations which were previously considered low risk.

1. Introduction:

Historically, certainly in the years leading up to 2018, the same countries would usually appear in the top 10 terminating IPRN destinations month after month, these being the most prized destinations by fraudsters owing to the high pay-outs associated with their call termination rates. These countries were destinations such as Cuba, Latvia, Lithuania, Somalia, and others.

Since 2018, there is evidence that the focus of these destinations has been extended to include a much wider range of country codes, with many of these being previously considered of low risk, and of little interest to fraudsters because of their low termination rates.

These changes are believed to have been driven by more efficiencies in most telco's fraud detection capabilities which has resulted in common fraud destinations (and numbers) being known, and either blocked or hot-listed by originated carriers. Another contributor, particularly relevant to the lower termination rate destination numbers, is the revenue opportunities that are being created for fraudsters, and those engaging in arbitrage, through the various tariff offerings now commonly offered which allow multiple destinations to be called using one bundled tariff service.

2. Same old fraud

As already stated in this paper, the top 10 IRSF destinations changed very little month on month for many years, so it was quite an easy task for Fraud Analysts to channel much of their detection activity towards these high-risk destinations. If an IRSF attack was detected, it was unusual if one of the top 10 risk destinations was not included in the dialled destinations during that incident. We identified these top 10 destinations by the quantity of numbers for each destination being advertised by IPRN Providers, and the number of IPRN Providers who were advertising them. This methodology was generally confirmed through the fraud reports and surveys submitted through the various industry Fraud and Risk Forums.

The writer has maintained a database of International Premium Rate Numbers advertised by IPRN Aggregators for the past 8 years, and from an initial database of 17,000 IPR numbers in 2013, we now have a database which contains over 10 million numbers (as at 20 August 2021). In 2014 we were finding around 4,000 numbers advertised each month, 1,700 of them being new numbers. We are now finding around 3 million numbers advertised each fortnight with between 300,000 and 600,000 of these being new numbers each month. The new number total reached a high during August 2021, when we identified 2.7 million new IPRN's for the month (these are numbers not previously advertised by any IPRN Provider).

Each fortnight before this updated database is distributed to the many CSP's who subscribe to our service, we perform an analysis over the new content to identify the top 10 destinations in the database, and the top 15 currently advertised. The top 10 destinations from the total database numbers normally only have 1 or 2 changes per month, however the top 15 currently advertised will now generally have between 8 and 12 changes which reflects the destination changes IPRN Providers are making every fortnight or month.

3. ...but new destinations

However, it has been noted that the percentage of the database which makes up these top 10 destinations is changing. 3 years ago, the top 10 destinations advertised by IPRN Aggregators accounted for 42% of the total database, which consisted of 220 destinations. The list of destinations as of August 2021 now includes 239 countries, and the percentage of the top 10 destinations has been decreasing over the past 3 years, and as of 20 August 2021, this top 10 only accounts for 23.7% of the total database. (This percentage is 2 points higher than it was in July, influenced by two destinations with huge increases in advertised numbers, Nigeria making up 6.11% of the total and Dominican Republic 3.3%).

It is not uncommon now to find 1 or 2 destinations making the top 15 advertised IPRN destinations for that period entering this list for the first time, many of these being destinations that a few years ago were never considered a serious enough threat that they would make this top 15 high risk list.

Unfortunately, fraud incident reporting within the industry has declined over the past year or two, so we no longer have the benefit of reviewing fraud incident reports to maintain awareness of what destinations are being targeted for IRSF, however from the few incidents I become aware of each month, there are always destinations listed which I would not have expected to see in previous years.

4. So, what has changed?

There is no doubt that many of the IPRN Providers are moving their focus away from the traditional high risk/high termination rate destinations and adding many of the lower risk/lower profit destinations. They will accept that the trade-off of lower settlement rates against the potential longer detection times make this strategy more profitable for them. The fraudsters understand these lower risk destinations are not subject to such intense scrutiny, so it is likely that the IRSF terminating number will remain active for a longer period.

In my 2018 paper, I looked at the 7 highest risk destinations along with a comparison of the growth in those destination numbers over the previous 2 years. The table from this analysis was,

Fig 1 - Highest risk destinations by number of IPRNS advertised

Country	Sept2016 numbers	Sept 2018 numbers	% increase
Cuba	7683	19985	160%
Latvia	5662	11509	103%
Lithuania	4548	10294	126%
Somalia	3191	7776	143%
Guinea	3239	6718	107%
Seychelles	3338	6352	90%
United Kingdom	1788	5927	231%

Fig 2 – Lower risk destinations by number of IPRNS advertised

Country	Sept2016 numbers	Sept 2018 numbers	% increase
Belgium	20	447	2135%
Portugal	3	286	9433%
Poland	355	1833	416%
France	119	511	329%
Greece	20	369	1745%
Italy	80	341	326%
Philippines	125	1620	1196%

To demonstrate the changes in destinations in 2021, and the change in these destinations even in one year, it is interesting to look at the top 10 currently advertised risk destinations and compare these with the top 10 destinations from the same period of 2020. The table below (Fig 3) represents all numbers advertised by the IPRN Providers that we monitor for the month of August of those 2 years. The total numbers advertised in August 2020 was 2,670,265 while in the same month of 2021, the total advertised figure was 6,417,374 million, an increase of 140%. Six of these top 10 destinations were significantly above this 140% figure. It is noted that only two destinations from 2018 top 7 make the top 10 in 2021, and these are United Kingdom and Somalia.

Fig 3 – Highest risk destinations by number of IPRNS advertised during August 2020 and August 2021

Country	Number Count Aug 2020	Number Count Aug 2021	% increase
Nigeria	12544	658284	5147%
Iraq	16775	133993	699%
Belgium	14974	112104	648%
Russia	16847	106610	533%
Latvia	35024	103336	195%
United Kingdom	51678	96520	86%
United Arab Emirates	13630	84532	520%
Somalia	30529	79702	161%
Afghanistan	39271	78490	100%
Papua New Guinea	6736	70870	952%

It is a similar situation when looking at the new numbers advertised during these same two periods – these are numbers that have never, prior to August of each year, been advertised by any IPRN Provider that we monitor.

Fig 4 – Highest increase in new IPRN's advertised during August 2020 and August 2021

Country	Number Count Aug 2020	Number Count Aug 2021	% increase
Nigeria	5761	607575	10446%
Iraq	5491	109853	1900%
Belgium	5064	87659	1631%
Russia	5292	64382	1116%
Somalia	4563	61565	1248%
United Arab Emirates	1428	57516	3927%
Gabon	3513	55114	1468%
Papua New Guinea	2980	53944	1710%
United Kingdom	17109	50601	195%
Myanmar	2091	42797	1946%

Taking the top 7 destinations from 2018 and looking at the percentage increase in all numbers for those 7 destinations in 2020/2021, 5 of these 7 destinations show an increase of considerably less than the 140% average increase in all numbers advertised over this period.

Fig 5 – 2020/2021 total advertised numbers for highest 7 destinations from 2018.

Country	Number Count Aug 2020	Number Count Aug 2021	% increase
Cuba	46685	55946	20%
Latvia	35024	103336	195%
Lithuania	32136	57381	78%
Somalia	30529	79702	161%
Guinea	33137	36969	11%
Seychelles	15237	16893	11%
United Kingdom	51678	96520	86%

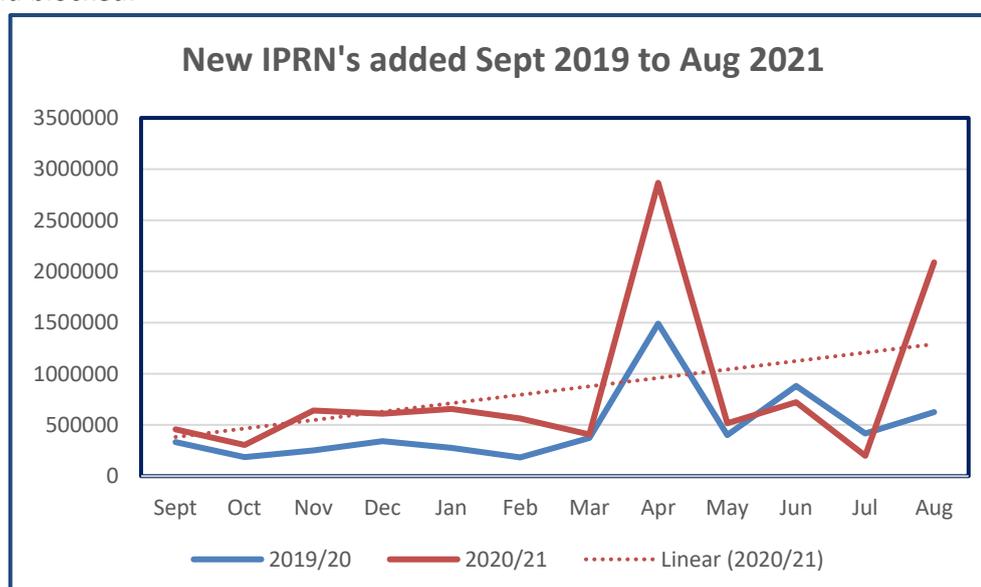
There are a total of 30 destinations which show a reduction in advertised numbers between August 2020 and August 2021. A sample of these destinations, and the percentage decrease relating to their numbers is demonstrated in the following table.

Fig 6 – Sample of 2020/2021 total advertised numbers showing a decrease in numbers advertised.

Country	Number Count Aug 2020	Number Count Aug 2021	% decrease
American Samoa	365	95	-73%
Ascension Island	8178	6780	-17%
Brazil	1615	958	-40%
Colombia	1557	789	-49%
Congo (Republic)	34672	24064	-30%
Guinea Bissau	13032	11691	-10%
Mozambique	22219	17507	-21%
Peru	1845	1039	-43%
Tunisia	61464	49356	-19%
Zimbabwe	31159	17138	-44%

The changes in advertised IPRN's is certainly a clear indication that IPRN Providers are changing their advertised number stocks more than once per month, and our analysis shows that not only are numbers being changed, but also destinations are being changed regularly.

The quantity of new numbers added has increased year on year since we started the IPRN Database back in 2013/14. In the year September 2019 to August 2020, we added 5.76 million new numbers and the year Sept 2020 to Aug 2021, we added 10.033 million numbers. The graph below shows that there is now a tendency to add multiple numbers every few months, which we assume coincides with more numbers being detected by telco's and blocked.

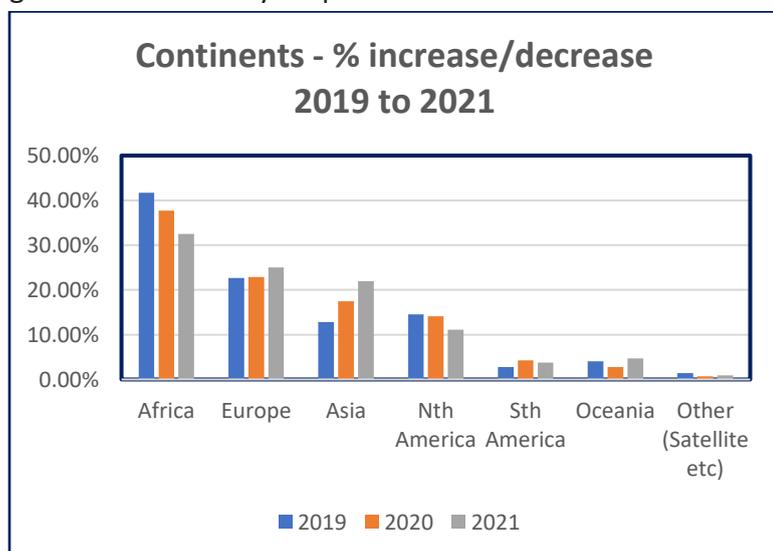


5. A closer look at the data

In the past, we have filtered these advertised numbers by the continents in which the countries are located, and this is a good method to show how the 'target' countries are changing from year to year. The following table shows the total numbers advertised for April 2018, August 2020 and August 2021, along with the percentage of the total numbers for each period as allocated to the Continent where those countries are located.

Continent	April 2019 total	% of 2019 total	August 2020 total	% of 2020 total	August 2021 total	% of 2021 total
All Continents	464,303		2697167		6554015	
Africa	193,599	41.69%	1017830	37.70%	2130998	32.51%
Europe	105,190	22.65%	617868	22.90%	1639460	25.01%
Asia	59,401	12.79%	470976	17.46%	1437651	21.93%
Nth America	67,497	14.53%	380672	14.11%	728345	11.11%
Sth America	13,024	2.80%	114444	4.24%	249799	3.80%
Oceania	18,842	4.05%	75523	2.80%	307730	4.69%
Other (Satellite etc)	6,750	1.43%	19854	0.73%	60032	0.91%

The graph below shows the increase/decrease in the percentage of IPRN's advertised by each continent over this 3-year period. Africa has traditionally increased year on year as a high risk region, however has decreased in risk over this period. This decrease would have been greater was it not for the high quantity of Nigeria numbers advertised in August 2021, 607,575 (or 22.5%) of the 2.697 million new numbers advertised in August 2021 were allocated to Nigeria, so this has impacted the decline in numbers for Africa somewhat. Europe and Asia have both continued to increase their percentage growth over this 3-year period.



6. Conclusions:

The conclusions from the analysis of these 2020-2021 IPRN's has not changed a lot from the 2018 analysis. It is clear that IPRN Providers are both increasing their number stock considerably and changing the destinations they are advertising.

One measure we review is the risk rating of each of the 237 calling destinations in PRISM, and we assess this by taking the quantity of numbers advertised for each destination, and assuming that the destination with the highest quantity of numbers advertised is the highest risk (number 1) and the destination with the lowest numbers advertised, is the lowest risk (number 237).

These high and low risk destinations can change each month, for example for August 2021, the top 5 risk destinations in order were Nigeria, Iraq, Belgium, Russia and Somalia where those for August 2020 were (in order) Tunisia, Algeria, United Kingdom, Cuba and Afghanistan. These constant changes reinforce our view that monitoring high risk destinations in order to manage the IRSF and Wangiri Fraud Risk is ineffective, when these high-risk destinations are changing each month. Also, monitoring, or blocking numbers that have been used during IRSF attacks previously is ineffective, when we consider that over the past 12 months, over 10 million new numbers have been added to IPRN Providers number stocks.

We are also concerned at the increase in Mobile Station Roaming Numbers (MSRN's) that are being advertised as MSRN's. At of the 20 August 2021, we had 142,476 MSRN's advertised and this has increased from 121,295 in August 2020. As a direct dial call cannot terminate to an MSRN (used for transiting roaming calls only) it is assumed these MSRN's are being 'hijacked' and short-stopped at a foreign destination. If these MSRN's are blocked, that could impact a roaming customer from receiving calls, and result in complaints. It must be assumed that one of more IPRN Providers have access to the IR21 documents to source these numbers.

Attached is an Excel file which identifies the continents and countries represented in my IPRN Database, the quantity of IPRN's advertised over August 2020 and 2021, and each countries risk rating (1 being the highest risk). You will note that there is quite a lot of movement up and down the risk index between 2020 and 2021 for some destinations.



Continent_Country
IPRN's advertised with



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About the author

Colin is a telecommunications professional with over thirty years' experience, specifically in the areas of Fraud, Investigations, Revenue Assurance and Threat Management. Colin specialises in the areas of Telecoms Fraud (Internal and External) and Investigations. He also has considerable experience with Personnel and Physical Security, Law Enforcement Agency Liaison, Intelligence Management, Regulatory Compliance, Revenue Assurance and Policy development.

Colin joined the telecommunications industry after a 19-year career with the New Zealand Police. He started first with Telecom New Zealand, where he established the country's first Fraud Management Centre in Auckland. After 12 years there, he moved to Vodafone New Zealand where he has been Fraud Manager for Vodafone New Zealand and Australia. In 2005 he was transferred to Vodafone Group Services (Germany) to manage the Fraud and Agency Liaison functions, and 12 months later, moved to Vodafone Group Headquarters in the UK where he was appointed as Vodafone Group Fraud Manager, and 2 years later, to a role of Head of Vodafone Group Fraud and Investigations. After 7 years in the UK, Colin took early retirement from Vodafone, returned to New Zealand, and started his own consultancy company.

In 2012/13 Colin researched the use of Test Numbers being used prior to an International Revenue Share Fraud incident and created a database of known or available IPR Test numbers in use. That database has grown from 17,000 numbers in 2013 to over 10 million today and has proven itself as an effective defence against IRSF by the many Telecom operators who now use it through an annual subscription.

Through his career, Colin has been involved in a number of Telecom industry forums at a leadership level, was appointed in 2013 as Fraud Advisor to the Pacific Islands Telecom Association (PITA) and in 2020, was inducted into the Risk Assurance Group (RAG) Hall of Fame for services to the Telecom industry. He is also appointed as an industry expert on International Revenue Share Fraud and Numbering Misuse to the International Telecommunications Union (ITU) and to Europol.

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