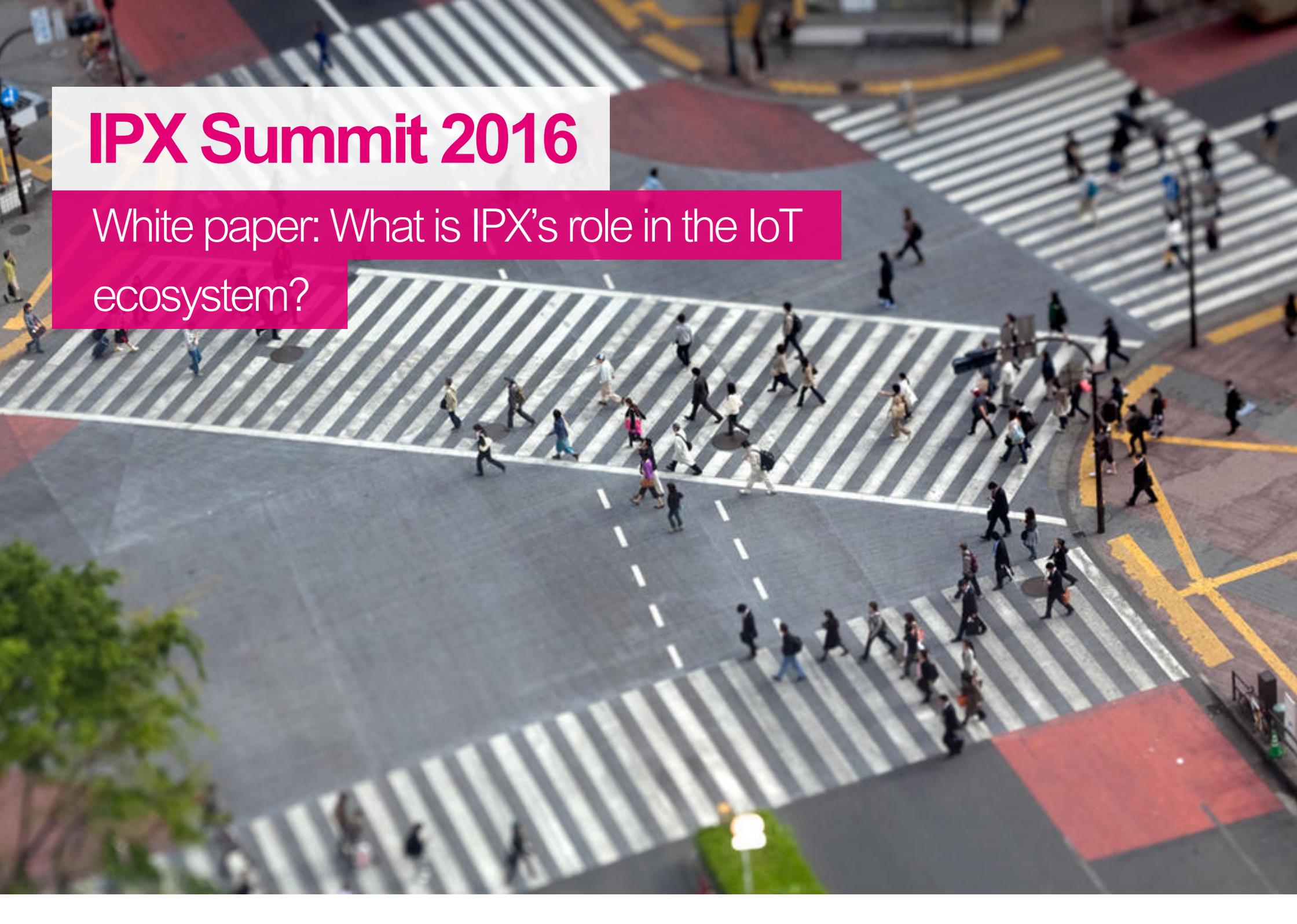


IPX Summit 2016

White paper: What is IPX's role in the IoT ecosystem?



...but it is now going through the roof!

Estimations for the absolute number of connected devices today and tomorrow vary a lot from one analyst to the other. The magic number of reaching 50 billion in 2020 was established by CISCO and has been quoted a lot. Recently most analysts have revised the number downwards however there does not seem to be any doubt about the significant growth rates projected. Gartner forecasts that the number of connected devices will more than quadruple between 2015 and 2020, to some 21 billion connected devices.

**Table 1: Internet of Things Units Installed Base by Category
(Billions of Units)**

Category	2014	2015	2016	2020
Consumer	2,277	3,023	4,024	13,509
Business: Cross-Industry	632	815	1,092	4,408
Business: Vertical-Specific	898	1,065	1,276	2,880
Grand Total	3,807	4,902	6,392	20,797

Source: Gartner (November 2015)

IoT is not built on cellular alone...

What does this mean for Mobile Network Operators (MNO's)? Will they achieve 21 billion subscriptions from IoT by 2020 alone? Obviously not. IoT is not just built on connectivity via cellular networks. There is a wide range of IoT use cases and in most cases the requirements differ from that of the human subscriber use case. In the majority of cases IoT connectivity has to:

1. be cheap
2. come with excellent coverage (e.g. fire detector, car)
3. come with low power consumption (in many cases for example a fire detector that is to last 5-10 years without the battery being exchanged)

In the majority of cases cellular networks are not the best choice. Most connected devices can be found in the home where typically a fixed connection and Wi-Fi as an extension is available at no extra cost. Also a Wi-Fi module can be built into a device at a lower cost than a cellular module. According to Berg Insight some 12% of connected devices use cellular:

- Wi-Fi: **72%**
- Fixed (PSTN, ISDN, Cable, DSL, Fibre): **15%**
- 2G, 3G, 4G: **12%**
- LPWA (SIGFOX, LoRa, NB-IoT): **<1%**
- Satellite: **<1%**

Source : Berg Insight

... but for cellular it is the "2nd wave"

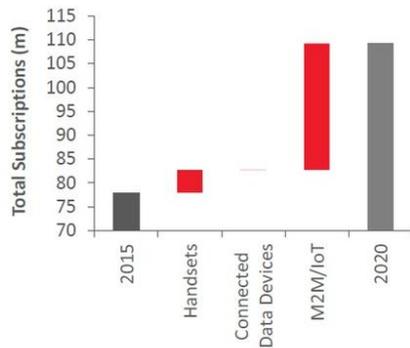
Even if the ARPU for an IoT SIM is way lower than that of a subscriber, this market becomes increasingly relevant for Mobile Network Operators. MNO's have enjoyed significant growth over the last two decades. They equipped subscribers with mobile handsets and subscriptions firstly for telephone, and then Internet services. This "first wave" has now reached its limit. Growth in developed markets can no longer come from equipping more individuals simply because everyone already has one or more mobile subscriptions. A lot remains to be done however when it comes to connecting "things" where we are still at a low level. This can be the "second wave" of cellular allowing tremendous growth.

Pyramid Research demonstrates that net additions in the mobile industry today come almost exclusively from IoT:

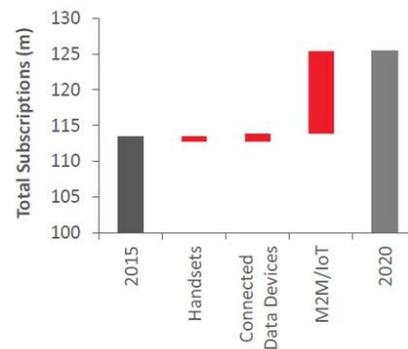
Mobile subscription trends

M2M/IoT devices will account for the bulk of new subscriptions over the 2015-2020 period, particularly in developed markets.

FRANCE NET ADDITIONS BY DEVICE, 2015-2020



GERMANY NET ADDITIONS BY DEVICE, 2015-2020



Source: Pyramid Research

IPX is the natural facilitator for IoT

IPX as a semi-private multi-services network for (mainly) international interconnect, has been increasingly adopted by the mobile community over recent years. It is secure, standardized and it comes with a set of Classes of Service that are applied from end-to-end. As such using IPX for IoT traffic is a natural step for MNO's who are simply extending their existing business flows. Today we already see that a significant proportion of IPX traffic comes from IoT. Machina Research found that 7% of all roaming connections in 2015 were IoT-related, with an annual growth rate of 100%. This traffic is generated in 3 use cases:

1. **Mobility roaming:** When a person travels abroad they can conveniently continue to use mobile services. The same applies to a connected car. When it crosses the border it remains connected. In both cases a roaming agreement between the visited and the home network sets the commercial frame. The technical interconnect is facilitated via IPX and hub services for Signaling and Data Roaming.
2. **Permanent roaming:** In addition to this "permanent roaming" plays a significant role in IoT. Some objects equipped with a SIM never see their home country - they remain in a permanent roaming context. There are two main reasons for this:
 1. *Global production.* It is convenient for manufacturers in their production process to use one SIM globally regardless of the country the product is eventually shipped to. This is comparable to

the user manual that contains many languages so that the product, along with its manual, can address an entire region or continent.

2. *Best coverage*: In the standard non-roaming scenario, only the network of the original MNO is available. In the typical roaming scenario however, more than one visited network is available. The driver of a connected car equipped with permanent roaming has a vital advantage when he has a serious accident. If this happens in the middle of nowhere, the car could lose network coverage when rolling into a ditch. In the roaming scenario, the SIM will switch to the 2nd or even 3rd operator in the list of preferred networks. The car would still be connected and could place an emergency call.

3. **IoT-specific platforms**: Further potential for IPX comes from the traffic going to international IoT-specific platforms. Today many operator groups build up new platforms for IoT. The chances are that they centralize this new infrastructure in one place and that it's used by all of their affiliates. Also alliances like the GMA (Global m2m Alliance) operate central service platforms that their operator members need to reach. If they can reach these platforms via the IPX access that they already have, then they do not hesitate to use IPX once again as a convenient and safe means.



As a consequence, IoT is not only a growth driver for MNO's but also for the carriers. In IPX today we are seeing an exponential growth in usage. It comes partly from the increased use of roaming by subscribers as the fear of high bills is reduced as roaming prices come down (or at least no premium for roaming at all as E.U. regulations intend). LTE roaming is widely available. So why not watch Netflix in your hotel room in Spain just as you would do at home in London?



But the other big driver behind the growth that we see in IPX is IoT. And this trend is here to stay. Car theft prevention was one early pioneer IoT case but the list of items to connect in the world is long.....and it's getting longer by the day

About the author:



Christian Wollner heads up Product Management for Mobile World at Deutsche Telekom International Carrier Sales & Solutions (ICSS). He is responsible for a comprehensive portfolio of mobile products for mobile operators and service providers with a key focus on international roaming (2G/3G, LTE and Wi-Fi) and messaging (SMS, MMS).

Christian has French and German degrees in International Affairs and Law. He also holds a post-graduate degree in Telecommunications and Media from Paris Dauphine University.

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THANK YOU FOR READING

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