The 2G/3G sun set as 5G rises even higher

M2M (Machine to Machine) was created to provide a means of collecting tiny amounts of data from a wide range of devices in order to enable feedback or control of a situation or machine. This has developed over the last decade into what we know as the IOT which can be cellular 2G, 3G or 4G or a combination of cellular with Narrow Band Wireless like SigFox, LoRa or Weightless.

The desire to use technology to connect things firstly through the implementation of M2M over a decade ago and currently the connectivity revolution 'the IoT' means that organisations wanting to benefit from the advantages that this technology brings need to remain aware of the impending changes being undertaken by the cellular network providers as they look to benefit from the expediential growth expected through the deployment of many billions of sensors and multiple IoT use cases.

It is inevitable that 5G will change the IoT landscape with high data rates and low latency yet the roll out has the potential to generate indecision, and confusion for organisations as they look towards their IoT deployment strategies. Many organisations with deployments that currently use 2G or 3G they will need to consider their longer term deployment approach and may well begin to look towards various LPWaN (Low Power Wide Area networks) solutions.

Similar to Vodafone's article "Vodafone to 'Crush' LoRa, Sigfox With NB-IoT" we can say with a degree of certainty that the cost of deploying 5G will cause the inexorable sunset for 2G and 3G. The cellular mobile evolution from analogue 1G through Edge onto 3G and now 5G networks makes it virtually impossible for the networks to support older generation infrastructure and invest in future formats. At some point obsolescence is inevitable.

NB-IoT and LTE-M are commonly linked to 4G yet we should note that they form a pivotal function for 5G LPWaN. The 3GPP standards group has completed the standardisation of NB-IOT, developed to support IoT deployments by cellular operators as such we can assume this will deploy at pace.

LPWaN such as LoRa and SigFox enabled early adopters to deploy low data rate IoT solutions where latency was not a major concern. The cellular network providers however where slower in entering the market as their revenues have always been tied inextricable to higher data rate needs such as voice and video. Having awoken to the opportunity we have seen a fundamental shift in their thinking with an emphasis being applied to competitive solutions to the likes of LoRa, SigFox and Weightless through CAT-M and NB-IoT via 4G LTE and 5G networks. The issue for network operators remains cost, the older analogue and 2G systems are expensive to maintain and operate while the digital based 4G formats and above are slimmer in design and more cost effective.

If you have yet to deploy then you will surely avoid 2G and 3G and your choice as to which LPWaN will depend on your data and speed requirements. So what for those already deployed on these expiring formats? Who are the big players on the user side? The last decade has seen utility meter manufacturers with roll outs in the millions, water, gas and electric companies,

remote monitoring and roadside advertising all add up to a vast European wide customer base using low data rates and where latency is not regarded as a critical parameter.

On the network side you have the main Mobile (MVNO's), Vodafone, O2, etc. all supporting 2G deployments so what next? Globally Europe has seen a wider number of operators and networks supporting 2G deployments and as such there appears a reluctance to talk about the inevitable obsolesce with any degree of certainty, nothing has been set in concrete as yet however due to the size of the 2G user base these operators are indicating that the likelihood is that 3G will be 'sunsetted' first.

The USA has a lower number of Network operators and some of these are currently 3G only the largest 2G operator AT&T turned off 2G in 2016. Sprint have said they will support 2G until 2021, however there is a possibility that they may extend beyond this date as other customers search for a 2G supporting network.

Japan shut down its 2G Networks in 2012 and currently runs only 3G and 4G. This trend is continuing in most of Asia with Singapore announcing switch off, only China is giving support for 2G although support beyond 2020 is questionable. The 2G network in some territories has already been shut down by a number of operators across the globe including AT&T, Telstra, Optus and Vodafone. There are plans to continue running the 2G network in certain regions until a number of specified dates going out to 2019, 2020 and 2025. Looking at each of these operators in turn gives some insight into the process for migration away from 2G and 3G but most have declined to state or adhere to previously nominated plans.

Vodafone : Switched off 2G in Australia last year but the CEO has stated that due to the high volume of 2G based M2M in Europe they plan to help customers migrate to new platforms and will maintain service until 2025.

Telefonica O2 : Made a statement at the Mobile Congress that they had a large customer base across Europe using legacy 2G and would maintain that network service for at least the next 5 years.

T-Mobile : Have already announced a shut down of 2G in the Netherlands in 2020.

EE : Have already started back in 2017 converting many of their bases stations from 2G to 4G, the CEO their customers are demanding wider availability of 4G.

Globally the newer emerging economies like India, China and Singapore are all on rapid developments driven by bandwidth and will therefore likely jump straight to 5G based solutions.

As previously highlighted the cost of operating an older analogue or 2G system is high, in fact estimated to be in the order of 4 times that of a 5G system. M2M and Smart Metering require low data rates typically less than 1Mb/s and the cost of data remains the critical factor. This remains the inverse for voice and video requirements that are hungry for ever more bandwidth and lower latency. However, as more data analytics are required the IoT bandwidth and latency will become more important. For users the cost of data determines the contract and hardware cost and as devices become more capable of higher data rates the cost will be reflected in the enhanced data handling capability e.g. a 1000Mb/s data rate device on a 5G network will have a corresponding higher price. Although migration may appear to be more costly as compared to

current usage deployments, consideration needs to be given to users increasing data requirements and more edge based computing so migrating acts to future proof not only the hardware but also their analytic requirements.

Volume users will continue to negotiate special data rates with the operators. If you are a large utility with for example a 20 million smart meter deployment negotiating a low data rate deal on 5G is likely possible, particularly with deployment amortisation. However if your deployment is a few hundred modules, even grouped together the data rate will be very low but your ability to negotiate will be limited. In that case 4G with CAT-x may be a solution until the cost of bandwidth falls which it inevitable will.

Siretta is your partner of choice when considering your next deployment with extensive knowledge and experience within IoT focused on cellular technologies in support of 2G (GPRS), 3G (UMTS), 4G (LTE), NB-IoT and LTE Category M. Siretta can assist in building a future proofed ecosystem offering bespoke solutions and a design service supported by an experienced team of dedicated development & application engineers as well as software specialists offering complete end to end solutions with a heavy emphasis on high level system design.