Ericsson slashes cellular IoT device forecast by 20 billion

Back in 2010, Ericsson set the bar for much of the subsequent hype around the Internet of Things by making a very pubic prediction that by 2020 there would be 50 billion internet connected devices. Others have been more or less aggressive, suggesting "conservative" numbers of 20 billion, while some have stretched credulity with projections up to 1.5 trillion. The 50 billion isn't just IoT, it covers everything from phones to smart TVs to tractors, but the biggest single element is what we now call the Internet of Things, with the original 50 billion prediction including around 20 billion cellular IoT connections.

Most analysts have supported the Ericsson line with an estimate somewhere between 30 and 50 billion. But just before Christmas, in their latest Mobility Report, Ericsson quietly changed their minds. They still kept the headline number of around 50 billion connected devices, but dropped the number of cellular connected IoT devices in 2020 from their previous estimate of 20 billion to just over 1 billion.

The important word here is cellular. This week, as the mobile community gathered in Barcelona for their annual jamboree, which is the Mobile World Congress, the industry was still full of expectation that they would own the Internet of Things, and more importantly, the revenue associated with it. Ericsson doesn't want to spoil that hope with any blatant contradictions, but if you look more closely at the implication of their new numbers, the IoT aspirations of the networks look less than rosy, as their revenue projections begin to disappear into thin air.

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Ericsson had provided some warning about their change of heart, but it's received little public attention, and almost no analysis. The first indications came last year when they released a paper on Capillary Networks. In this they suggested that a large proportion of IoT devices would connect first to a capillary network and thence to a cellular network and the cloud, as shown below.
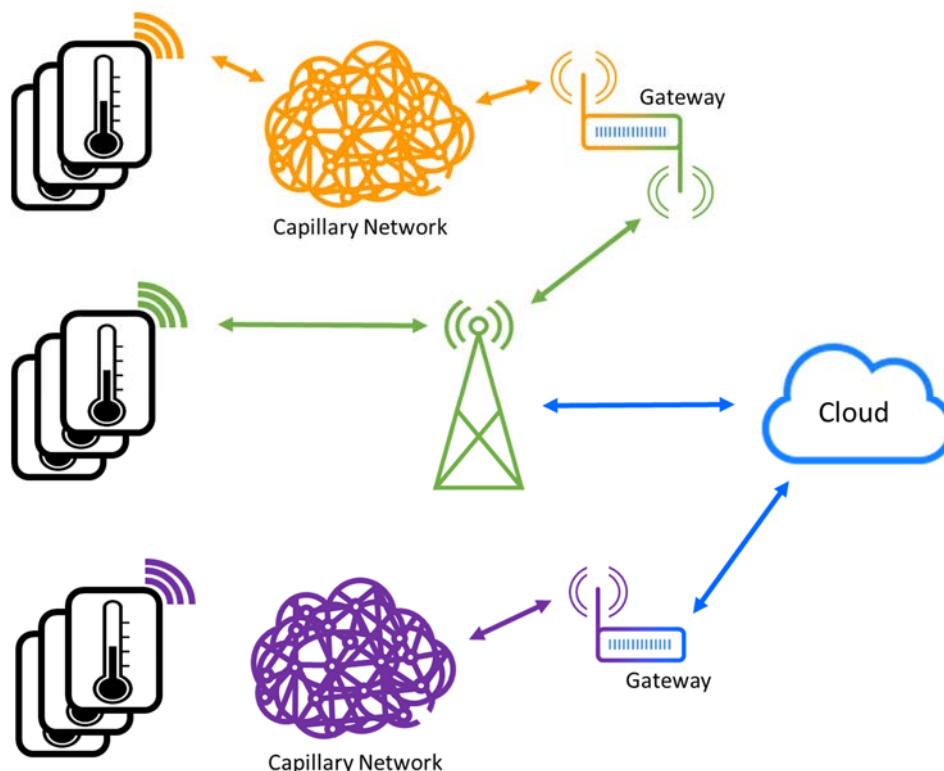
As the diagram shows, a capillary network is just a long-winded name for what the rest of the world has always considered the local connectivity behind a gateway. Essentially, Ericsson are admitting that the bulk of IoT devices will probably use Wi-Fi, Bluetooth, ZigBee or even cables to provide an internet connection to the cloud. Others have coined the term "fog computing" to cover this local connectivity, effectively seeing it as a local cloud, often with the addition of local processing and control.

Whilst Ericsson's Damascene moment may not have affected the number of sensors which will be producing data, it has some important ramifications. They still think there might be around 20 billion IoT devices, but the way they will connect will be very different from what most in the cellular industry expect. Their concept of capillary networks mean that many will be connected to gateways, in much the same way that the M2M industry has always thought it would happen.   Once they allow for gateways providing the majority of connections to the "things", Ericsson's new figure for cellular IoT connections slims down to about 1.3 billion. That's still a very big number. But the reduction tells us that the sands on which the Internet of Hype has been built may be a lot less stable than many had thought or hoped. Let's look at what makes up that 1.3 billion.

Around half a billion of the connections in 2020 will probably be dedicated sensors with a cellular connection. That's simply more of what is already being delivered by M2M applications, covering everything from connected alarms to telematics and telemetry. It's a good, regular growth which will happen regardless of whether the IoT takes off or not. Where the networks are available, a lot of these will remain legacy GPRS or 3G. I'd also expect the global march of smart metering to add a further 200 million direct cellular connections in that period, which gives us a total of 700 million connections using existing cellular technology.

That leaves around 600 million potential new gateways which will have a cellular connection. Doing the maths suggests each of these gateways will have an average of 30 – 50 sensors. We're already seeing the growth of one application where that number of sensors is connected to a cellular gateway. It's called a car and according to the GSMA will account for around 200 million new, embedded cellular connections over the period from now to the end of 2020. That's just a result of the growing level of mobile connectivity in vehicles. Most of these will be LTE, as the vision for connected cars includes streaming content.

That leaves 400 million new cellular gateways deployed over the next five years, which does at least have the advantage of sounding feasible, as it's only doubling the current rate of M2M deployment. But for the network operators these new numbers are a major issue. The 900 million vehicle, metering and M2M connections would happen anyway – they're just incremental growth. Take them out and you have less than half a million new cellular connections resulting from the growth of the IoT, instead of the 20 billion the industry had been led to believe were just around the corner.

It's not surprising that no-one has wanted to talk about this. Mobile operators have been enthusiastic advocates of the 20 billion new connections, not least because they're blinded by the additional money they think they'll make from them. Ericsson's recalibration pulls the rug from under their IoT expectations. What it says is that that the IoT market in 2020 won't look very different from today's M2M market, still being dominated by higher value applications in vertical markets.

What does this mean to cellular operator's revenue predictions? Most realise that IoT contracts won't be as high a value per connection as mobile phones, but that doesn't stop most of them still hoping to get around a dollar per month from each device. At $12 per year, those missing 20 billion

devices means a loss of anticipated revenue of around a quarter of a trillion dollars each year. When you look at the projected global operator revenue of $1.445 trillion in 2020, that a significant chunk of it, so this is a big hole in their profitability. Of course, we don't know how much IoT revenue had been factored in, but losing even part of $250 billion dollars isn't a pleasant experience.

There are bigger ramifications, the most serious of which is the battle for "who owns the IoT?" Network operators have always considered themselves the prime contender, arguing that if they have the relationship as connectivity provider, it's a natural step to own the cloud and the analytics within it. Here Ericsson tries to provide a few crumbs of comfort. Their capillary network paper implies that network operators who own the capillary gateway will be the natural owner of the devices behind them. So looking at the picture above, Ericsson is claiming that they will own anything connected to the orange capillary cloud, deriving revenue from managing them. Someone certainly needs to own them – one of the least discussed and poorly understood pieces of the Internet of Things puzzle is the need for device management. This needs addressing however we connect the 20 billion sensors.

Ericsson goes further, suggesting that once network operators put their capillary networks in place they could also own the devices without a cellular link – the purple capillary cloud. But why either of these should naturally be the role of the network operator strikes me as a very ill-founded conclusion. Network operators don't have the relevant device management or cloud analytics skills. So the more these 20 billion connections look like today's M2M business, the more likely it is to be a vertical play, with cellular networks just providing the pipe.

There is another important knock-on effect. Outside mobile applications, like cars, where there's enough power and revenue to justify using LTE modems, the potential market for low power wireless has suddenly shrunk to just a few percent of what the industry had expected.

Most of the 20 billion new IoT devices that had been expected were predicated on the availability of a low cost, low power, wide area connectivity, which is something where the cellular industry has rather spectacularly dropped the ball, failing to develop one in time. Within the cellular world of 3GPP, that's now perceived to be an LTE Cat-1, LTE-M, or NB-IOT module. Outside the cellular world a number of other options have appeared to fill the void, with a variety of LPWAN solutions, of which Sigfox, LoRa and Ingenu are the current front runners.

All of these need chips and standards to be developed, networks set up and volumes to rise to bring the prices down. If there was only one standard chasing this market, everything should be fine. But with half a dozen major contenders and as many second rank options, the stakes get higher for each, as several will crash and burn. That brings confusion to those wanting to implement products, which will further delay deployments, putting more pressure on each variant to convince the world it is the winner.

At MWC, the hype behind NB-IOT was high. The mobile industry has been badly rattled by the success of LoRa and is responding in the manner it knows best, which is attempting to market its way out of the problem. But that takes the focus off the other issues of the IoT, concentrating just on the radio and forgetting the real task, which is provisioning, device management, data plans, cloud and analytics. And until someone picks up that challenge, the IoT is just going to remain a fancy name for M2M, with no hockey stick growth.

If the network operators continue to concentrate on radios, they will probably lose control of the IoT and end up as pipes. It will also delay the time until we start to connect everything, which is the preliminary step needed to establish the Internet of Things. There is still hope - it could be different.

It's possible for someone to grasp the nettle and bring us back to the original numbers that Ericsson predicted by putting together a proper end-to-end play. But from what I saw in Barcelona this week, it won't be any of the current players. I'll explore that in the next article on the arrival of NB-IOT.

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