THE SUNSET OF 2G

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The dawn of 4G LTE connectivity brings with it new possibilities for connectivity and mobile devices. But as the introduction of any disruptive technology inherently displaces previous technologies, the widespread demand for 4G is ushering in the decline of 2G connectivity – otherwise referred to as the '2G Sunset'. As a solution provider in the M2M or mobile industry, the 2G sunset could have a significant impact on your business. This paper will discuss the top 10 things you need to know about the sunset of 2G.

1. What is it?

The 2G Sunset, as stated previously, refers to the imminent decommissioning of some 2G networks and replacement with 3G and 4G networks over the next few years. Some mobile operators in the US are shutting down their 2G networks in order to use that spectrum to increase data capacity and speed for 4G customers. Some carriers, like AT&T and Verizon, have already begun taking down their 2G capability and "re-farming" their towers for other technologies like 4G LTE.

(2) Why is it happening?

In short, the 2G sunset is the result of simple supply and demand. The proliferation of the smartphone has caused huge increases in packet-data usage – global mobile data traffic grew 81 percent in 2013 – and it is expected to increase 11-fold by 2018 (Cisco Report 2014). This is forcing mobile carriers to acquire more spectrum (the radio waves used to transmit data packets), and deploy more spectrum-efficient protocols like 4G LTE in their existing spectrum in order to meet demand. 4G coverage has been expanding

rapidly and is expected to constitute more than half of the total mobile traffic by 2018. The spectrum, in some cases, in use by older 2G technologies, is needed to make newer technologies like 4G LTE stronger and faster.

(3) A Little More Background: GSM vs CDMA

To really understand why we are in this situation requires some (*very simplified*) backtracking. There are two major wireless network technologies in the United States: CDMA and GSM. Of the big four carriers, Sprint and Verizon use CDMA, while AT&T and T-Mobile (along with most other carriers worldwide) use GSM. CDMA has higher spectrum efficiency, while the simpler GSM technology is typically less expensive, making it easier to scale over a large network.

When 2G was introduced, CDMA networks used 1xRTT data transmission systems, and GSM networks went with GPRS systems – neither of which is significant by itself – however, when it came time to upgrade to 3G technology, the differences began to emerge. CDMA carriers could deploy 3G EV-DO, which is compatible with 1xRTT, meaning they could share spectrum. The GSM carriers had to upgrade to a new technology, 3G UMTS, which is not compatible with their previous GPRS systems. The result is that CDMA carriers were able to deploy 3G more rapidly than GSM. It also became much easier for CDMA carriers to migrate users from 2G to 3G

> “There is no backwards compatibility from LTE to CDMA”

within the same spectrum, while GSM carriers were forced to use more spectrum to support the same number of users between 2G and 3G.

Because of its advantages in efficiency, CDMA carriers have more available spectrum to dedicate to 4G, and have a head start in its deployment. GSM providers are feeling more pressure now to create spectrum efficiency, and as a result are being forced to discontinue or “sunset” some or all of their 2G networks in order to compete in the 4G race.

(4) Backwards Compatibility

It should be clearly noted that there is no backwards compatibility from LTE to CDMA networks, so there is little advantage on those networks of keeping both 2G and 3G active – which is a big reason that Verizon is swiftly moving to LTE exclusively. Sprint’s CDMA network has significantly more flexibility with their available spectrum to continue the support of 2G and 3G in the coming years.

GSM networks on the other hand offer backwards compatibility from LTE (which incorporates Multiple In Multiple Out technologies) to HSPA, UMTS and GPRS – enabling mobile operators deploying LTE to continue to provide a seamless service across LTE and existing deployed networks.

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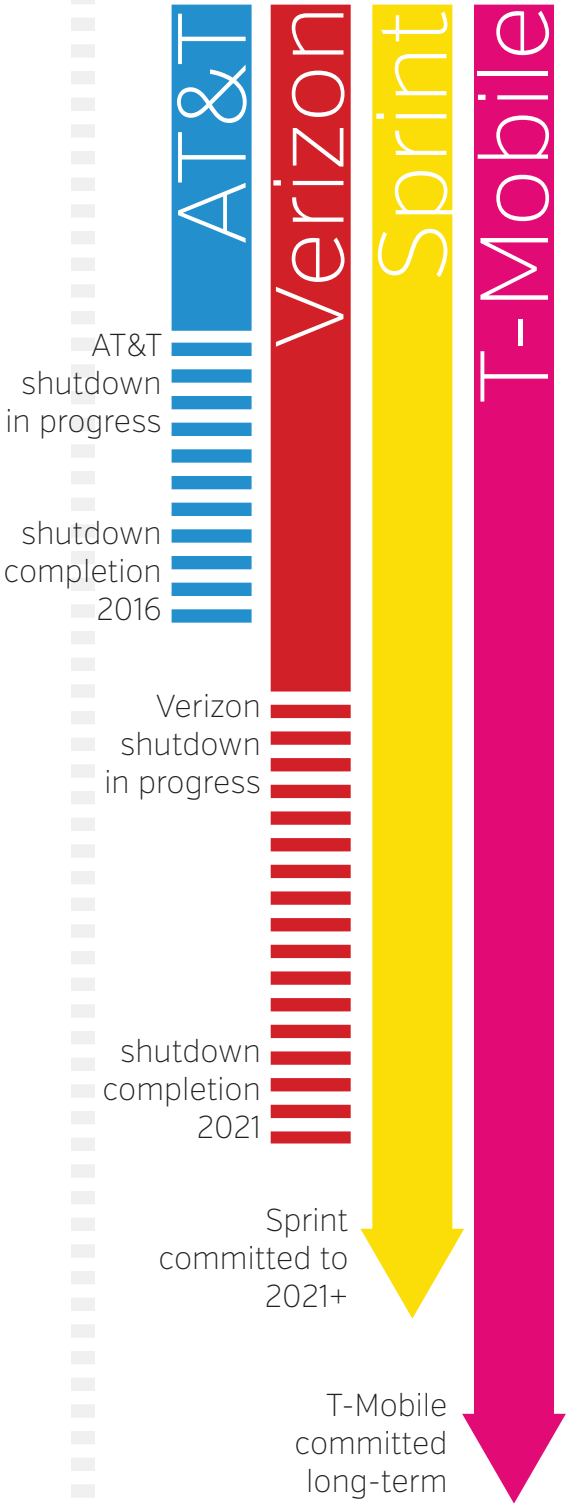

(5) Will 2G disappear completely?

No. Several carriers have made commitments to support 2G spectrum, largely to support the millions of M2M connected devices. Because of the low bandwidth requirements of most M2M applications, even a small sliver of spectrum can support hundreds of millions of M2M devices. Sprint is pursuing the opportunity seemingly vacated by AT&T, and has indicated they intend to maintain a 2G network for the long term – at least through 2020. T-Mobile, while it is dedicating a large portion of its spectrum to 4G, has also committed to keeping a significant portion of spectrum devoted to 2G to serve its M2M customers long term. Verizon has said it will turn down their 2G and 3G networks by 2021.

(6) Who Will Be Most Affected?

The transition to 4G is great for companies requiring high speed and quality connections like video or advertising, but it has enormous cost implications in the M2M industry. M2M applications with low data transfer rates don't require a lot of bandwidth; they may never need the speed of 4G. Furthermore, the cost structure of many M2M applications and devices cannot support the cost of upgrading. Companies with devices utilizing one of the 2G networks that are scheduled to be decommissioned will be stranded when those networks are shut down unless they find cost-effective replacement solutions or upgrade their devices.

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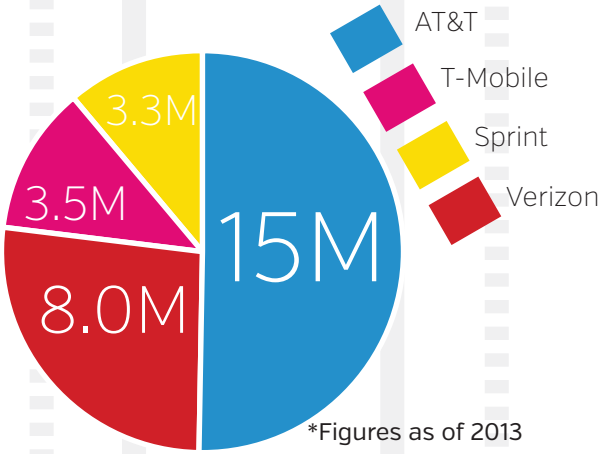

*Figures as of 2013

(7) Why is it a big deal?

Analysys Mason recently forecast that the number of M2M device connections will grow from 200 million in 2013, to 2.2 billion devices in 2023. Of this massive number of connected M2M devices, more than 90 percent are on older 2G networks.

AT&T currently has the largest 2G GSM network in the nation with over 15 million connected devices. Their decision to decommission 2G, along with the shuttered networks of other carriers could require companies to replace an estimated 10 to 12 million 2G GPRS devices in just the next couple of years at a cost of several billion dollars to the M2M industry.

(8) What Are My Options?

M2M companies attempting to navigate the changes of the 2G sunset will be glad to know there are options to transition in a cost effective way. In the long run, most companies will eventually be forced to deploy new devices, but 2G will remain a viable option in M2M for the foreseeable future. Here are some options:

- Stay on 2G GSM using another carrier for new activations – Companies like T-Mobile have continued commitment to 2G GSM. As a global option, Telefonica, EE and Rogers will have 2G up and running for the distant future. This option would require a SIM swap, which is likely the most inexpensive option.

- Migrate to Sprint 2G CDMA (1xRTT) – Sprint is providing modules to facilitate the migration from GSM to CDMA.
- Upgrade devices to 3G GSM or LTE – while module costs are still significantly more, they are declining. A jump to 3G may just delay an eventual jump to an LTE product.

(9) What Should I Know For Business Planning?

In order to prepare effectively for the 2G sunset, M2M companies need to understand how they are vulnerable. Start by understanding what carrier your 2G devices are using and how long that carrier is planning to support them. Contact that provider to understand their roadmap for the 2G sunset and to ensure you are purchasing airtime for an appropriate timeframe on that 2G network. When deciding whether to upgrade to 3G or LTE, make sure you are conscious of what effect potentially more expensive hardware can have on your ROI and if that transition makes sense.

Develop a plan to understand the most cost effective response to transition from 2G, and what costs will be incurred with acquiring and installing new devices, as well as developing new products. M2M providers need to develop a strategy to notify customers, issue recall plans if necessary, train installers and support staff.

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Companies can prepare for the 2G sunset, as well as future transitions in connectivity by working with a partner with multiple carrier relationships. As the shutdown begins to take effect, this partner will ensure the connectivity piece is manageable through one simple portal, and assist you in navigating your carrier and device options.

(10) Where Can I Get More Information?

- AT&T's Migration Plan for M2M: http://cd2migration.att.com/
- Sprint's 2G M2M Resources: http://m2m.sprint.com/m2m-solutions/2g-network/2g-information
- FCC Approved Device Search Form: http://transition.fcc.gov/oet/ea/fccid/

This transition and all of the information floating around about it can be quite overwhelming. We understand that it can be a challenge just to digest all of the information, let alone make a sound business decision. If you could use a little advice on some steps to consider, please reach out to us at **contactus@racowireless.com**.