

KORE[®]

DEFINITIVE GUIDE
TO **NETWORK
SHUTDOWNS**



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Definitive Guide to Network Shutdowns

From the beginning of the age of IoT, technology has evolved to support increasingly complex capabilities and functionalities. These shifting tech trends have necessitated even more robust, powerful network solutions.

According to a recent report, more than 230 million consumers in the United States alone own smartphones with an additional 100 million owning tablets, which has created exponentially increased demand for the high-speed, high-bandwidth connectivity technologies these devices need to support the streaming, mapping, and other “real-time” applications that users expect. As a result, every carrier has invested in more efficient LTE technologies that can facilitate these needs, but in order to free up spectrum for LTE and now 5G, they’ve been forced to sunset their legacy 2G and 3G networks.

For IoT solution providers, who have traditionally relied on 2G and 3G networks, the impact is great. As legacy technologies disappear, providers must begin the daunting process of migrating their solutions to an appropriate LTE option. But migration doesn’t have to be painful. In fact, with proper planning and a comprehensive LTE migration strategy, IoT providers can not only sustain the success of their deployments but also reap the benefits that LTE has to offer. In this guide, we’ll answer your most pressing questions about network shutdowns and walk you through creating a network migration strategy to set your organization up for success – now and in the future.

More than 330 million consumers in the United States own smart devices.



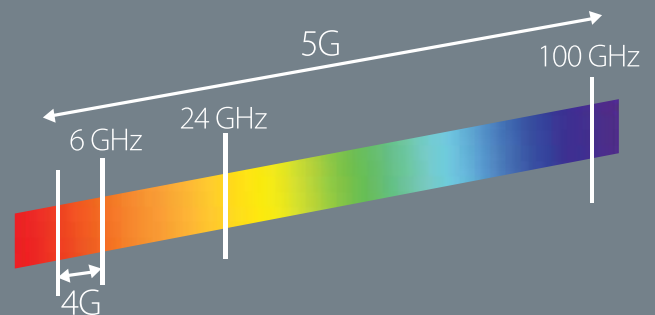
Why do networks shutdown?

Mobile Network Operators (MNOs) cater to consumer demands. As consumers increase their streaming, gaming, and data consumption on a daily basis and as cellular-enabled devices become more prevalent, network capabilities also need to increase. But even in cellular technology, resources are finite. To make way for LTE and beyond, carriers must either purchase new spectrum or re-farm spectrum currently dedicated to 2G and 3G networks.

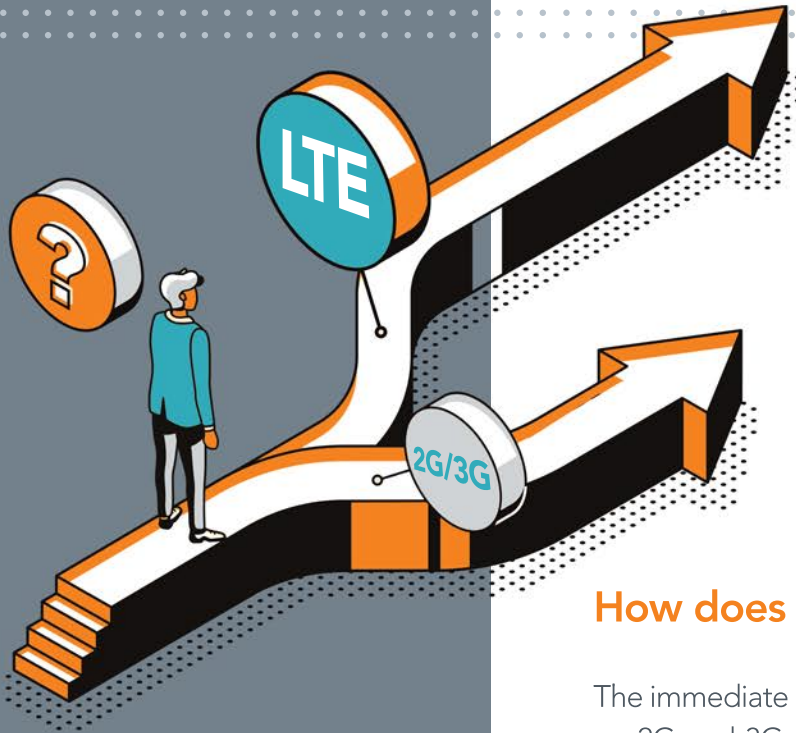
The carrier network shutdown trend began at the end of 2016 when AT&T eliminated its 2G network, impacting an estimated 10-12 million active 2G connections. Since then, many other major carriers have followed suit and announced their plans to sunset their 2G and even 3G networks.

What is spectrum?

Spectrum refers to the invisible radio frequencies that wireless signals travel over, although the frequencies used for wireless represent only a portion of the broader electromagnetic spectrum encompassing frequencies that support things like broadcast radio or TV. Portions of electromagnetic spectrum are grouped in "bands" that are defined by their wavelengths, and because there are a range of frequencies that can be used to facilitate cellular communication, there are different bands included in this range with mildly different characteristics.



The FCC oversees commercial spectrum allocation, and has dedicated spectrum for both licensed (bought for exclusive use by a specific provider such as AT&T, Verizon, etc.) or unlicensed (can be used by anyone – think Bluetooth and WiFi) use cases. Because spectrum is finite resource, we can't create more of it and can only re-purpose what already exists. As such, for cellular carriers seeking to obtain the spectrum needed to support new technologies such as LTE and 5G, their only option is to re-allocate (often referred to as "re-farm") the government-regulated spectrum they already own. This results in shutting down network services with lower value to the carrier such as 2G and 3G.



How does this affect IoT?

The immediate impact on IoT solutions that have been reliant on 2G and 3G technology is a forced obsolescence of their existing connections – and often their devices themselves. To further complicate matters, most IoT devices don't have a need for the high bandwidth capabilities that come along with LTE and 5G. This leaves many organizations questioning if they need to switch at all. In fact, some organizations are dealing with the 2G and 3G phase-outs by switching to carriers with later sunset dates to delay the migration. But what must be realized is that migration is a "when," not "if," scenario. Once these 2G and 3G networks are gone, low power LTE categories – such as Cat-M and NB IoT – will be the only comparable licensed cellular options in terms of functionality and price point.

While switching to LTE or another technology might seem cost-prohibitive now, there are other significant challenges to face if you delay the inevitable. Switching carriers will result in additional costs, training requirements, potential glitches and other issues that can impact the bottom line and disrupt business. Then, a few years later, you'll have to start all over as you will not have any choice but to move to LTE since 2G and 3G will literally be switched off. In essence, avoiding the transition to LTE is not delaying a headache – it's doubling the headaches in a relatively short period of time.

If you're worried that LTE and 5G seem too robust for your current needs, rest assured that there are options that have been specifically designed with IoT in mind. Many carriers have launched new low-power LTE (LPWA-LTE) technologies to maximize battery life and data usage while tapping into the greater

penetration for indoor and outdoor locations that LTE provides. As an added bonus, LPWA LTE is much more future-proofed than its 2G and 3G counterparts, with no fear of network shutdowns in the next 10 years – and the modules needed to support it come at a significantly lower cost.



No matter what technology you select for your IoT solution, the bottom line is that if you're using 2G or 3G, you're going to have to think about migrating – now or later. And while this sounds slightly daunting, there are benefits. Once you move past the panic phase of identifying your new technology options, pulling your existing devices out of the field, and deploying your newly procured and certified devices on your new network technologies, you'll realize that you've unlocked a great amount of potential growth with your solution. Because of their enhanced speed, bandwidth, and security, you can start thinking of ways to evolve your solution into something even greater. And, with even more advanced capabilities like remote network provisioning, you can start thinking of new markets and verticals you can serve. Forced change, while initially resource-consuming, can open doors to new revenue streams for your business.

When will this affect me?

Specific decommission dates will vary not only from one carrier to another but also from one technology to another. Some carriers have already shut down their 2G service while others have a much longer lead-time. Ultimately, the decision of when to shut down their networks is based largely on which segment a specific carrier is catering to more. For consumer-focused carriers like AT&T, the sunsets started much earlier. Carriers with a large market share of the IoT and M2M segment have delayed their sunsets significantly, giving their IoT customers a little more breathing room. While there are dozens of carriers, each with unique sunset dates, let's take a look at four of the biggest players in the North American IoT space:

A note on shutdown dates:

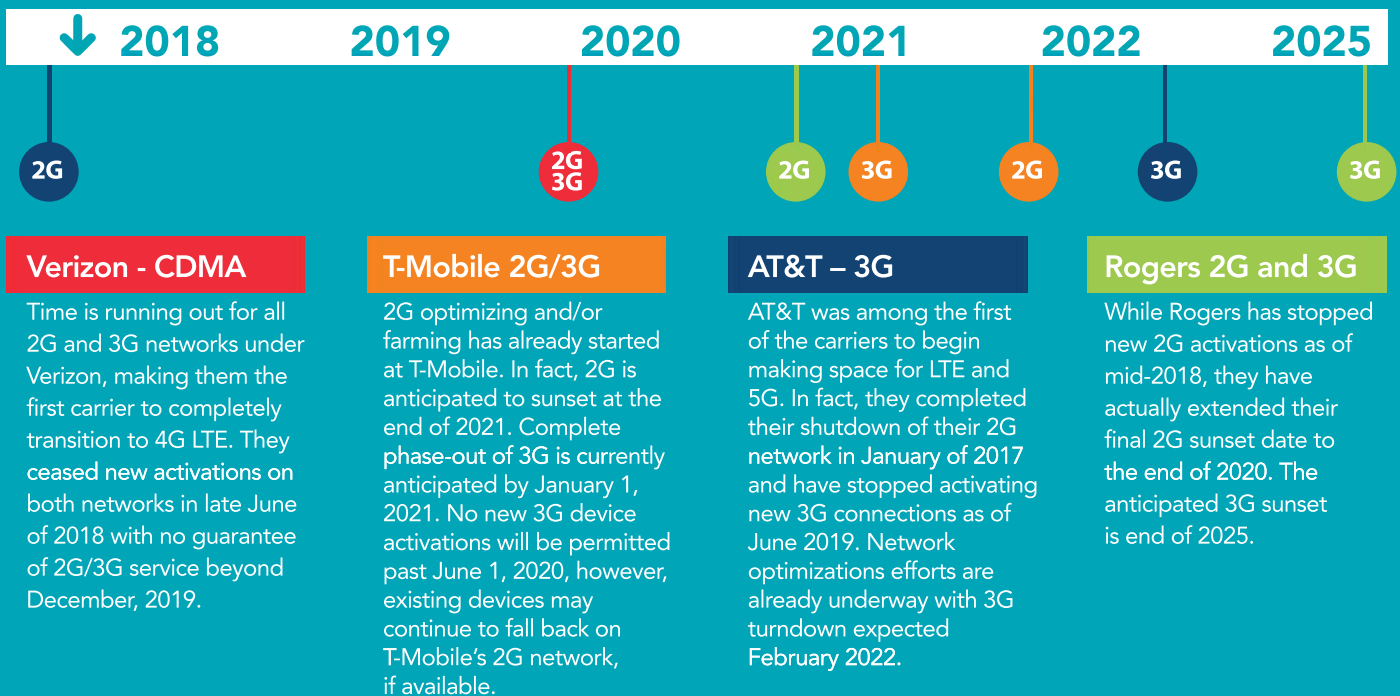
A shutdown date is not really a date. It is a timeframe in which a carrier will do one of two things:

1. **Shut down a technology all at once – like turning off the lights**
2. **Begin a rolling shutdown of select cell towers.**

In some instances, cell towers, including those of roaming partners, can be decommissioned before the actual shutdown date – affecting your coverage earlier than anticipated. Customers should expect natural network degradation across all carriers in the months leading up to final sunset dates. With so much still unknown, acting early and planning gives your organization as much time as possible to make the switch.



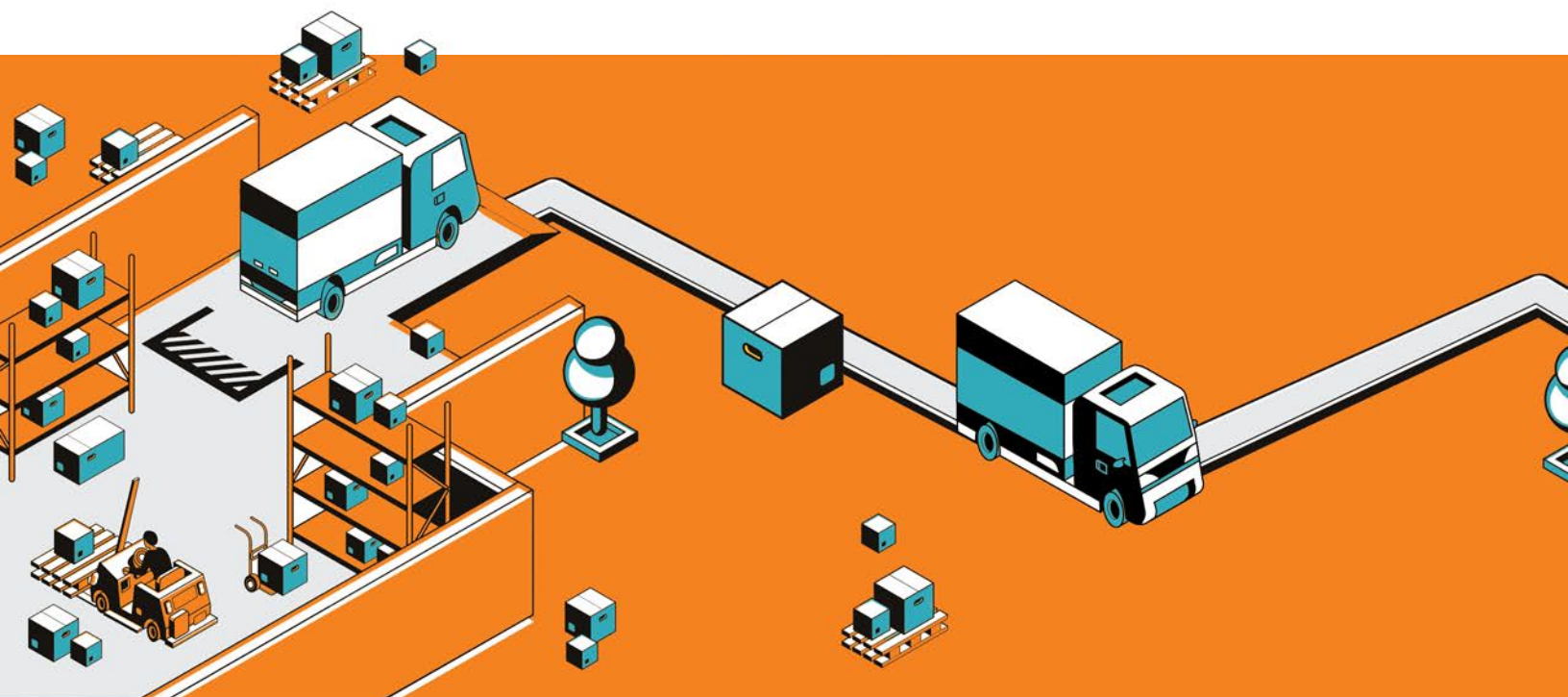
ANTICIPATED CARRIER SUNSET TIMELINE



Specific decommission dates for other carriers are only available as the carriers share them. Some sources, like 1oT, have compiled as many of the publicly available dates as possible and are a great starting point if you're not sure of your specific timeline. Ultimately, though, your best option for receiving the most current, up-to-date network sunset information is to reach out directly to your connectivity provider.

But, regardless of the dates, it's important to start planning your migration strategy at the very least. Failure to properly plan and take action will result in major disruptions for your business and your clients.

Tip: If you're not sure of your specific timeline, reach out to your connectivity provider directly.



How can I minimize the impact?

On average, to migrate 50,000 devices from a 2G or 3G legacy network, it will take anywhere from 18-24 months. This includes the time needed to do everything from evaluating your existing environment and identifying the right network technology to procuring, certifying, and deploying your new solutions. Even for smaller outfits, migrating more than 5,000 devices per month is ambitious. But before you set anything in motion, outlining your migration strategy will help minimize surprises along the way.

Here are the six essential steps:

- 1 **Assess Your Status**
- 2 **Know Your Timeline**
- 3 **Identify a Replacement**
- 4 **Determine a Device Strategy**
- 5 **Understand the Logistical Requirements**
- 6 **Partner for Success**



1 Assess Your Current Status

Before considering your LTE migration strategy, organizations must have a thorough understanding of their current base of connected devices. Here are the key questions you need to answer:

- How many connected devices are you managing?
- Which network technologies (2G, 3G, LTE) are the devices leveraging currently? If more than one, group your devices into the different technologies and carriers they're using.
- Are there any segments of your existing base that are scheduled for end-of-life? If so, what is the last date to activate devices on the carrier in this segment?
- What are your inventory levels for 2G or 3G-capable devices?
- Where are your current 2G or 3G devices located? Are they easily accessible via truck-roll, maintenance visit, etc?

Conducting a comprehensive analysis of your current status provides the baseline information needed to understand the impact of any impending 2G or 3G network shutdowns, and will also equip you with the foundational data needed to begin formulating an LTE migration plan.





2 Know Your Timeline

As outlined above, almost all cellular carriers will be shutting down their 2G and 3G networks over the next three to five years. Of course, the expediency of your migration to LTE will be dependent upon the specific timeline your mobile network operator (MNO) has for shutting down its 2G and 3G networks.

And remember that, many times – as you’ve already seen – carriers will enforce deadlines on the activation of new devices on 2G or 3G networks long before they sunset the network all together. Organizations looking to expand their IoT deployments may be forced to take action earlier than those simply migrating over existing devices.

Once you know the deadline of your existing connections, you can work backwards through the migration milestones to really understand your timeline. You may find that you don’t have enough time to do things on your own – this is when it’s a good time to leverage a partner who can help identify, procure, certify, and deploy new devices as well as help you find the right technology for you.

3 Identify a 2G/3G Replacement

There are many different categories of LTE that vary greatly in functionality. The LTE umbrella spans more “traditional” LTE options such as LTE Cat 4 and LTE Cat 6 that cater mostly to consumer use cases and high bandwidth streaming applications, down to new LPWAN LTE options such as LTE Cat-M1 and NB-IoT that were specifically designed to replace 2G/3G and support the growth of IoT:

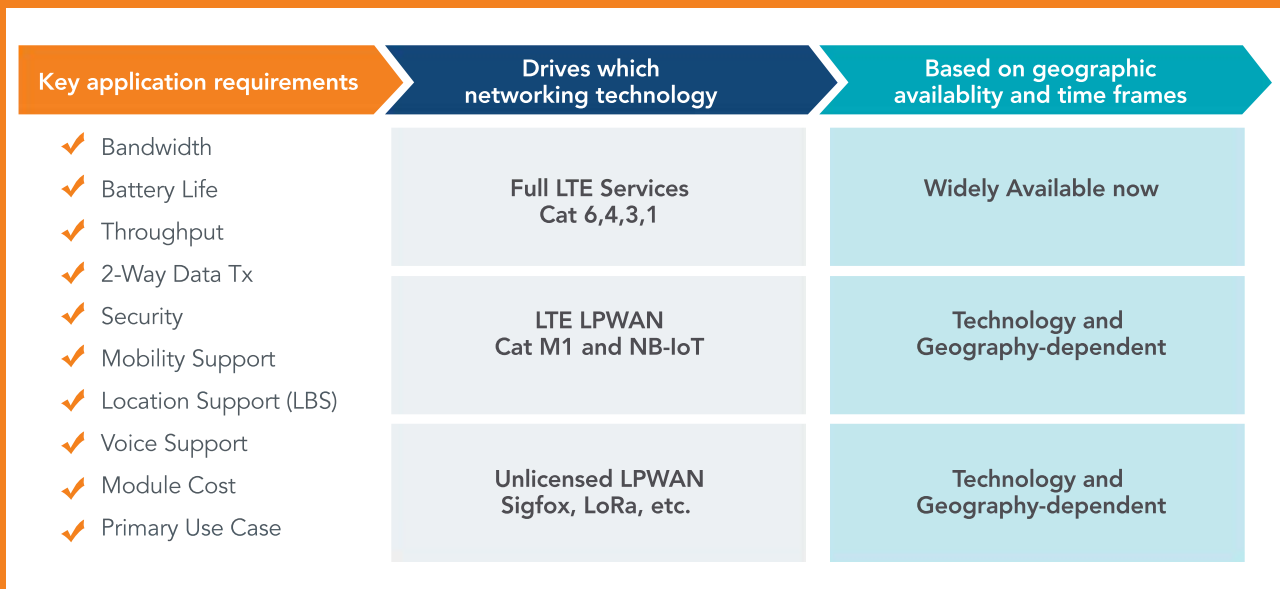
	LTE Cat 6	LTE Cat 4	LTE Cat 1	LTE Cat-M1	NB-IoT
Bandwidth	40 MHz	20 MHz	20 MHz	1.4 MHz	200 kHz
Battery life	Days	Days	5 years	5-10 years	10+ years
Throughput	DL: 300 Mbps UL: 50 Mbps	DL: 150 Mbps UL: 50 Mbps	DL: 10 Mbps UL: 5 Mbps	1 Mbps	250 kbps
2-Way Data Tx	Full Duplex	Ful Duplex	Ful Duplex	Full or Half Duplex	Half Duplex
Security	3GPP (128-256bit)	3GPP (128-256bit)	3GPP (128-256bit)	3GPP (128-256bit)	3GPP (128-256bit)
Scalability	High	High	High	High	High
Mobility Support	Full	Full	Full	Connected & Idle mode	Idle mode
Voice Support	Yes	Yes	Yes	Yes	No
Module Cost	\$50+	\$40	\$20-25	\$10-20	\$5-10
Primary Use Case	Digital Signage, Video, HS Data, Full featured Mobile	WAN Primary, WAN Backup, Full featured mobile	Fleet, Industrials, Logistics, Wearables	Fleet, Industrials, Logistics, Wearables, Security	Smart Grid, Smart City, Smart Metering

It should also be noted that in addition to the aforementioned licensed LTE technologies, there are also a number of proprietary, low-power, wide area network options that operate in unlicensed spectrum such as Sigfox and LoRa.

Contrary to licensed LTE networks, unlicensed spectrum does not require any special permit or license to operate and may be subject to interference from other providers. Due to lack of standardization, unlicensed options also do not come with the same carrier-grade security benefits that licensed technologies inherently include.

	Licensed LPWAN Options			Unlicensed LPWAN Options	
	LTE Cat 1	LTE Cat-M1	NB-IoT	Sigfox	LoRa
Bandwidth	20 MHz	1.4 MHz	200 kHz	100 Hz	125 kHz
Battery life	5 years	5-10 years	10+ years	10+ years	10+ years
Throughput	DL: 10 Mbps UL: 5 Mbps	1 Mbps	250 kbps	100 bps	290 bps - 50 kbps
2-Way Data Tx	Ful Duplex	Full or Half Duplex	Half Duplex	No	Class Dependent
Security	3GPP (128-256bit)	3GPP (128-256bit)	3GPP (128-256bit)	16 bit	32 bit
Scalability	High	High	High	Low	Medium
Mobility Support	Full	Connected & Idle mode	Idle mode	No	Yes
Voice Support	Yes	Yes	No	No	No
Module Cost	\$20-25	\$10-20	\$5-10	#2	\$12
Primary Use Case	Fleet, Industrials, Logistics, Wearables	Fleet, Industrials, Logistics, Wearables, Security	Smart Grid, Smart City, Smart Metering	Smart Grid, Rural, Smart City	Smart Building Smart City

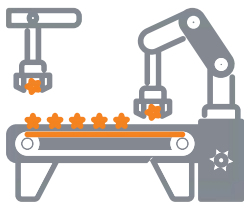
With a thorough understanding of the available options, the next step in identifying the optimal network technology for your IoT solution is to map key application requirements to the appropriate connectivity option, and then validate geographic availability and timeframe:



Today there are 31 commercial LTE Cat-M1 networks launched in 23 countries, and 72 commercial NB-IoT networks launched in 46 countries, however those numbers are continuously growing. For the most up-to-date deployment information, the GSMA commercial deployment map is a useful resource.

4 Determine a Device Strategy

Once a substitute LTE technology has been selected, organizations must generate a strategy for replacing legacy 2G or 3G devices in the field with models that are compatible with the selected network option. There are two primary choices that businesses have when developing a device strategy:



Develop a new, LTE-capable custom device

This option is typically suitable for organizations that have deployed their legacy IoT solutions leveraging proprietary devices, and involves upgrading the device with an upgraded cellular module that supports the desired network technology. While this option will allow organizations to maintain brand fortification and intellectual property, it must be understood that the device may need to be re-certified depending on its unique specifications and the carrier network on which it will be deployed.

Purchase an off-the-shelf, LTE-capable device

For organizations that may not need custom device functionalities, purchasing a new off-the-shelf device can be an attractive option. This will allow businesses to reserve the time and resources that would be necessary to engineer a new device, and will also allow them to surpass any new device certification requirements.

There is no right or wrong answer as to whether you should build or buy the devices you plan to use. Weigh out the cost, time, and resources needed to know what your strategy should be.

5 Understand Logistical Requirements

With a clear understanding of your current installed base, expected timelines, and new technology selections, the next step is for organizations to carefully assess the

logistical processes required to successfully manage the deployment, or the forward logistics, of their new LTE-supported solution.

Key areas to consider in this area include:



Procurement and Order Management – this involves understanding the migration requirements and business forecast to procure sufficient volumes of each product component necessary to replace legacy solutions in the field while also supporting net new deployments



Staging and Kitting – this refers to the work involved in assembling solution components and configuring, pairing, and assembling them into a ready-to-use kit that can be shipped to field technicians or end user locations



Inventory Management – these processes include receiving, documenting, storing, and managing inventory for all solution components for use in staging and kitting, and ultimately deployment



Site Assessment – this requires a physical visit to the solution's final destination to assess signal strength, power availability, and requirements for conduit, cabling, mounting accessories, etc. to be relayed to field technicians for efficient installation



Site Installation – this involves installing the assembled solution kit at the desired location per site assessment or other instructions, as well as activating the solution and confirming it is functioning per its specifications



Asset Management – this refers to the documentation of all components, serial numbers, firmware versions, SIM information, and other assets shipped to each location to create site-specific records of solution for future operational and sustainment requirements

It is important to understand that these considerations, and the specific processes included for each, will vary greatly based on your unique IoT application, use case, and end-user segments. These variables will dictate the role your customers will play in the migration process, as well as how and when they will need to be engaged. For example, if you are a Fleet Management solution provider, it may be as simple as working with your

customers to deliver the new solution kits and installation instructions to their desired locations so they can ensure each vehicle is upgraded during its next scheduled routine maintenance appointment. Alternatively, if you are an mPERS solution provider, you will likely need to engage your customers much earlier and more closely to ensure they receive their upgraded solutions and understand how to activate and use them.

6 Partner for Success

Successfully completing a network migration is no small undertaking, and it is critical that organizations looking to upgrade their IoT solutions to an alternative network technology engage a trusted IoT partner to help them through the process. This IoT partner should not only provide the products and services needed to execute the transition, but also deliver the expert guidance needed to guide this highly complex process. Some of the key attributes and capabilities that organizations should seek in an IoT partner include:

- Extensive IoT expertise, with proven, real-life experience guiding organizations through previous network shutdowns and the network migration process
- Global, scalable, secure network connectivity offerings that span a broad range of cellular carriers, network technologies, and regional requirements
- Strategic IoT partnerships with equipment manufacturers to deliver the devices and/or device components needed to support new network technologies
- Comprehensive professional service offerings to facilitate the device certification as well as forward and reverse logistics' processes needed for a successful device upgrade
- Independent, technology-agnostic offerings to ensure the optimal technology mix is selected to achieve maximized returns on IoT investments

The right partner can help guide your strategy and improve your speed-to-market. Look for a partner that is neutral and unbiased.



What's the bottom line?

No matter how many devices you have or which technology you're currently leveraging, network shutdowns will most definitely impact you. And switching from a legacy technology like 2G or 3G isn't going to be a simple process, for even the most technologically-savvy IoT solution provider. But leveraging new options – 4G, LPWA LTE, 5G, or anything that the future holds – shouldn't be thought of as an inconvenience or a major disruption. If anything, moving to a more robust emerging technology allows your business the chance to expand your reach, innovate new solutions, and serve your customers better.

The key to making your migration as seamless and simple as possible is two-fold:

1. **Map out a comprehensive network migration strategy**
2. **Work with industry experts to identify the right future-proofed technologies for your needs and help you implement them in the least disruptive manner**



Find out how KORE can simplify and accelerate network migrations for your organization – request your complimentary LTE Migration Readiness Assessment today.

Your complimentary, 90-minute LTE Migration Readiness Assessment will provide:

- Benefits of 4G LTE technology, including security and performance enhancements
- Specific decommissioning dates for legacy cellular networks, per carrier
- Best practices and timelines for managing LTE migrations within your organization
- Identification of new IoT devices and carrier SIM deployments, optimized for your business goals

[Request your assessment today!](#)