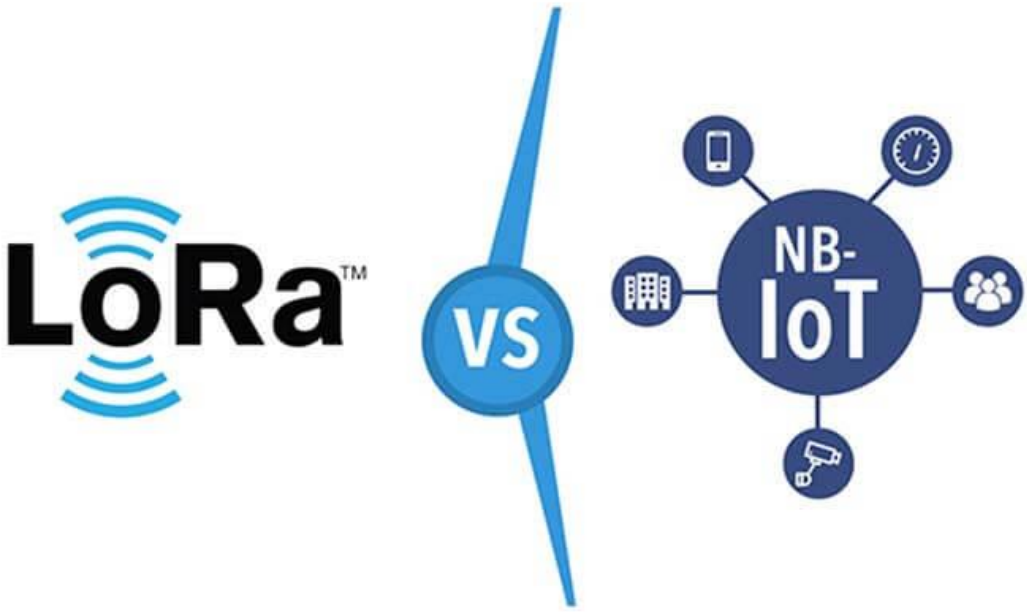
12 Perspectives on Narrowband IoT vs Lora Technology



From 12 perspectives on Narrowband IoT vs Lora technology to learn which IoT standard is more advantageous.

The recent rapid growth of the global LPWAN (Low Power Wide Area Network) market can be attributed to several factors. Rapid developments in machine learning and M2M communication standards are playing a key role, coupled with rising global demand for IoT services, low-cost LPWAN tools, and increasing opportunities for energy efficiency.

The global LPWAN market is expected to grow from over USD 500 million in 2015 to over USD 46 billion by 2022. Semtech's LoRa technology is a bit ahead of the curve in this area, but NB-IoT (narrowband IoT) is also rapidly gaining traction as a powerful LPWAN standard.

This article compares narrowband IoT vs Lora technology by 12 points and explores which LPWAN protocol is more advantageous.

1. The nature of narrowband IoT vs Lora

Lora and LoRaWAN are often used as synonyms, but they do not refer to the same thing.

LoRaWAN is an LPWAN protocol standard that operates in a LoRa technology environment. Lora itself is a modulation scheme for IoT communications.

NB-IoT, on the other hand, was defined by the Third Generation Partnership Project (3GPP) standard in mid-2016 and offers little benefit to devices with low data rates.

NB-IoT can be implemented on its own or using in-band spectrum, and there are two main variants: one announced by Nokia, Ericsson, and Intel, and the other by Vodafone and Huawei. In

other words, NB-IoT is a cell phone standard, LoRa is not.

2. Broadband support for Narrowband IoT vs LoRa respectively

NB-IoT typically operates at a slightly higher bandwidth than LoRaWAN; 3GPP technology requires 180 kHz signal bandwidth, which is slightly higher than the 125 kHz required by Semtech's LoRa technology.

Interestingly, NB-IoT and LoRa have significantly higher signal bandwidth than Sigfox (another mainstream standard for LPWAN), which operates at 0.1 kHz.

3. The need for respective gateways for narrowband IoT vs LoRa

Lora requires a dedicated gateway, while NB-IoT does not. According to a Huawei executive, NB-IoT's infrastructure is set up to connect base stations and sensors directly (LoRa's architecture needs to go through a gateway).

The LoRa gateways currently available are robust and often affordable, but they can be cumbersome because they have some additional hardware to manage. NB-IoT, on the other hand, does not require this at all.

4. Frequency requirements for narrowband IoT vs LoRa respectively

LoRa IoT technology, like Sigfox, uses unlicensed radio waves. Therefore, applications supported by LoRaWAN will be cheaper and have better battery life (and will be even better in the future).

NB-IoT services are synchronous and use licensed bands, unlike LoRa's asynchronous protocol (both LoRa and NB-IoT use bands below 1 GHz).

Now, the cost of band licensing is not low. The cost per MHz is more than $500. Carriers can deploy NB-IoT in guard bands, in 4G LTE spectrum, or in standalone networks.

5. The respective ecosystems of narrowband IoT vs LoRa

The LoRa ecosystem is more powerful than NB-IoT and other cellular IoT communication standards and has been adopted as an IoT network standard in many countries and regions, including the US, Australia, New Zealand, Taiwan, and the Netherlands (LoRa is also hot in India).

In comparison, NB-IoT is a new player, having just made its commercial debut in Spain in early 2017 (Ireland will also be using NB-IoT networks).

The low cost, wide range, and versatility of LoRa technology offer advantages in terms of a stable ecosystem and community support. However, there will be many opportunities for NB-IoT to catch up in the coming years.

6. Narrowband IoT vs LoRa's suitability for different types of applications

While the debate between LoRa and NB-IoT has generated a lot of misinformation, it is worth noting that the two technologies are optimized for different types of end-use applications.

For example, LoRaWAN is suitable for applications and devices that require low cost, high battery life, and do not need to communicate very often (e.g., several times a day).

NB-IoT, on the other hand, is best suited for applications that require short downlink latency and high communication frequency. Both IoT protocols have their own values and cannot be substituted for each other.

7. Narrowband IoT vs Lora' respective customer profiles

The main customers for IoT/M2M communication standards such as LoRa, NB-IoT, and Sigfox are telecom leaders around the world (SK Telecom deployed LoRaWAN last year to build an IoT

network in Korea).

Lora can also be used by non-telecom operators, which is not possible with NB-IoT. Crowd-sourced networks can easily access and implement LoRa-based IoT solutions (The Things Network has already done so).

8. Narrowband IoT vs Lora network coverage

Remote coverage is a unique selling point for both NB-IoT and LoRa, but NB-IoT is clearly more powerful in this regard, with coverage extending to 18-21 km, higher than LoRa's 12-15 km.

NB-IoT works well in urban areas but has only mediocre performance in suburban and rural areas (where 4G signal is not available).

LoRaWAN does not rely on cellular data or Wi-Fi, so it can maintain relatively stable coverage in any region.

Note: Compared to the cost of constructing base stations for 4G-LTE, which is necessary for the introduction of NB-IoT, the cost of constructing base stations for LoRa is a fraction of that for 4G-LTE, and the low investment required gives LoRa a significant advantage.

9. The respective battery performance of narrowband IoT vs Lora

This is also the point at which LoRaWAN performance will improve. Since NB-IoT uses cellular licensed radio waves, devices need to synchronize their networks at regular intervals (relatively frequently), which consumes power.

In the ALOHA-based LoRa architecture, such network synchronization is not required. Linear transmitters in NB-IoT require several orders of magnitude more peak current than LoRa with non-linear modulation, which puts a greater strain on the battery.

10. Narrowband IoT vs Lora respective data rates

In this regard, NB-IoT can more or less throw LoRa under the bus. Since NB-IoT has higher data rates, it is better suited for applications that require faster data throughput. While Lora technology also does a good job, NB-IoT is still the more efficient IoT for faster applications. There is no doubt that NB-IoT is a more efficient IoT protocol for faster applications.

Note: Sigfox, another LPWAN technology, has a data rate of 100 bps, which is well below NB-IoT and LoRa.

11. Narrowband IoT vs LoRa Availability of major self-owned networks

The market for LoRaWAN technology is maturing and gaining acceptance in public networks. loRaWAN is already being deployed around the world to enable smart cities.

NB-IoT is gaining traction in the public sector, but it is not as available as LoRa in private companies' own networks. Large enterprises can easily build hybrid IoT models using LoRa to build smart facilities and at the same time use public networks to handle off-device information and activities. NB-IoT, on the other hand, can only be used in the public network model.

12. Cost factors for narrowband IoT vs LoRa respectively

The overall cost of LoRaWAN modules is about $8 to $10, which is about half the price of cellular LTE modules such as NB-IoT.

The more complex the NB-IoT network, the higher the costs associated with IP (in terms of licensed bands), and the higher the total cost of NB-IoT. Upgrading from NB-IoT to advanced 4G / LTE base stations is more expensive than deploying LoRa via industrial gateways or tower-top

gateways. Will be more expensive than LoRa deployment as the market matures, the cost of LoRa technology is expected to decline further.

Narrowband IoT vs LoRa conclusion

Based on the above 12 Perspectives on Narrowband IoT vs Lora Technology analysis, it is difficult to pick a clear winner between LoRa and NB-IoT. Both have their own advantages and disadvantages.

Due to technical and functional differences, they can perfectly coexist and serve different parts of the global IoT market. Scalability is an issue for both technologies, and it remains to be seen whether either will take the lead in the LPWAN market in the long term.

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