

Cellular and LPWA IoT Device Ecosystems

Cellular and LPWA IoT Device Ecosystems gives a comprehensive overview of the main wide area networking technologies for the Internet of Things – 2G/3G/4G/5G cellular, LoRa, Sigfox and 802.15.4 WAN.

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Highlights from the report:

- **360-degree** overview of the main IoT wide area networking ecosystems.
- **Comparison** of technologies and standards.
- **Updated profiles** of the main suppliers of IoT chipsets and modules.
- **Cellular** IoT module market data for 2016.
- **Early adoption** trends for emerging LPWA technologies.
- **Cellular** and non-cellular LPWA IoT device market forecast until 2022.

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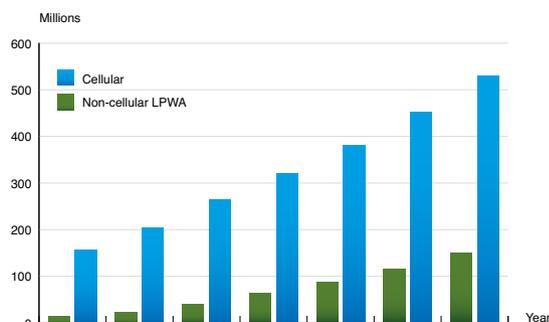
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Which wide area networking technologies will enable the future Internet of Things?

The Internet of Things is weaving a new worldwide web of interconnected objects. As of Q1-2017, more than half a billion devices were connected to wide area networks based on cellular or LPWA technologies. The market is highly diverse and divided into multiple ecosystems. This report will focus on the four most prominent technology ecosystems for wide area IoT networking – the 3GPP ecosystem of cellular technologies, the emerging LPWA technologies LoRa and Sigfox and the 802.15.4 ecosystem.

The potential market for IoT is popularly described as enormous as virtually every object could become networked. Over the past decades, adoption has spread from high value assets to medium value assets as the cost of communication has decreased. Today, the rise of LPWA technologies opens up new opportunities to address greenfield opportunities among low value assets that cost less than US\$ 10. Measured by the potential number of nodes, the three largest opportunities in wide area IoT networking in high to medium value assets is energy meters, motor vehicles and buildings. Billions of energy meters enable consumption-based billing as the revenue base for the electricity and gas industry. Approximately 1.3 billion motor vehicles provide transportation of people and goods worldwide. Hundreds of millions of buildings provide housing and workspace for 7.5 billion humans. Next to these mega markets, there is a multitude of existing and potential device categories ranging in size from 1–100 million. These secondary market segments in high value assets can be divided into enterprise & government where adoption is driven by hard economic value and the consumer segment where soft individual values have a greater influence.

Global demand for IoT wide area networking technology is in a rapid growth phase. Berg Insight forecasts that annual shipments of cellular and non-cellular LPWA IoT devices will grow at a compound annual growth rate (CAGR) of 26.1 percent from 169.1 million units in 2016 to 679.5 million units in 2022. Asia-Pacific is projected to increase its relative volume market share from 40 percent to nearly 50 percent over the period. China is expected to see a continued acceleration in demand and in addition, significant growth is anticipated in India and South East Asia towards the end of the forecast period. Western Europe and North America will also make significant contributions to volume growth, while Latin America and the Middle East & Africa will remain relatively smaller in absolute terms. ►



Annual shipments of cellular/non-cellular LPWA IoT devices (World 2016-2022)

► The 3GPP family of standards is the leading global platform for wide area IoT networking. Berg Insight estimates that annual shipments of cellular IoT devices reached 155.6 million units in 2016, up 35 percent compared to the previous year. Automotive & fleet is the largest application segment, accounting for around 50 percent of the demand. Other major application categories include utilities, payment terminals, industrial & enterprise and buildings & security. The cellular IoT technology landscape is in a phase of transformation. GSM/GPRS is gradually losing its grip on the market, making way for 3G and 4G technologies. The trend will accelerate when NB-IoT devices start to appear in volumes by 2018. 2G will however remain as the main option in emerging markets where NB-IoT is unlikely to become widely available before the mid-2020s. By 2022, Berg Insight believes that 4G will account for 80 percent of global shipments of cellular IoT devices, with a relatively even distribution between high-speed CAT3+, mid-range LTE-M and low-end NB-IoT.

Annual shipments of non-cellular LPWA devices for IoT reached approximately 13.5 million units in 2016. 802.15.4 WAN accounted for 8.0 million units, while shipments of LoRa and Sigfox were around 4.0 million and 1.5 million units respectively. The vast majority of 802.15.4 devices are smart energy meters deployed in North America and other regions. Looking ahead, Berg Insight believes that LoRa and Sigfox will outgrow 802.15.4 WAN and achieve annual shipments in the range of 50–100 million units by 2022. Based on initial feedback from the market, volume segments for non-cellular LPWA in the near to medium term will be asset tracking, buildings & security and smart cities. Sigfox says it is gaining strong traction in supply chain management where it claims that leading players consider adding its connectivity solution to millions of pallets. Rapid success in this segment will be crucial if the company should achieve its target of 100 million devices under contract by 2018. Semtech, the company behind the LoRa technology, says that it is gaining strong traction in smart gas and water metering and building automation. In addition it has identified smart agriculture, logistics, smart manufacturing and smart cities/infrastructure as key future growth markets.

This report answers the following questions:

- How will the IoT wide area networking technology market evolve over the next five years?
- What are the base requirements for adding wide area networking connectivity to a device?
- Will chipset vendors displace module suppliers in the IoT value-chain?
- Which new mass-volume segments can be addressed by low-cost LPWA technologies?
- Why are the new standards LTE-M and NB-IoT so significant for the cellular IoT ecosystem?
- What are the prospects for emerging LPWA technology standards?
- Will the IoT networking market always remain in a state of fragmentation?



Executive Summary

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Glossary

About the Author



Tobias Ryberg is co-founder and principal analyst responsible for the M2M research series. He is an experienced analyst and author of numerous articles and reports about IT and telecom for leading Swedish and international publishers. All major vertical market segments for Wireless IoT have been his major research area for the past 13 years.

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Cellular and LPWA IoT Device Ecosystems is the foremost source of information about all the major wide area networking technologies for the Internet of Things. Whether you are a chipset or module vendor, software vendor, utility, vehicle manufacturer, telecom operator, investor, consultant, or government agency, you will gain valuable insights from our in-depth research.

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