

Wireless IoT Connectivity Technologies and Markets



Wireless IoT Connectivity Technologies and Markets summarizes the main trends in the Internet of Things covering embedded technology, networking and applications.

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Highlights from the report:

- **360-degree** overview of the IoT ecosystem.
- **Comparison** of wireless IoT connectivity technologies.
- **IoT** strategies of key players in the semiconductor and IT industries.
- **Updated** profiles of the main suppliers of IoT chipsets and modules.
- **Summary** of adoption trends and vendor strategies in key vertical market segments.
- **Cellular** IoT device market forecast until 2020.



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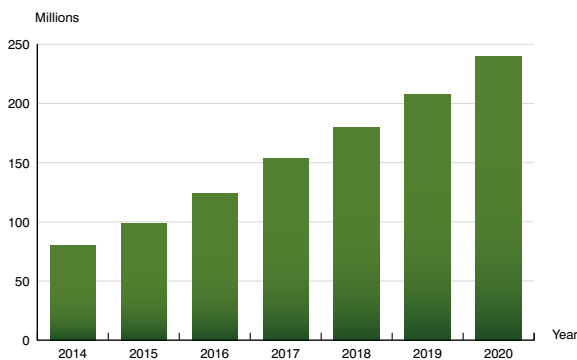


Beyond the hype – what is the reality of IoT?

Berg Insight estimates that 5.9 billion products with embedded microprocessors were sold worldwide in 2014. IoT is about networking these products as well as new device categories that can benefit from connectivity. Consumer products account for the vast majority of devices with embedded connectivity. Small appliances account for a third of the volume or roughly 2.0 billion units. Other top five categories are toys 1.0 billion, home entertainment 0.8 billion, HVAC equipment and controls 0.4 billion and home appliances 0.3 billion. Utility meters and motor vehicles are other significant categories with 0.2 billion and 0.1 billion units respectively.

Berg Insight firmly believes that the main growth segments in the IoT market until 2020 will be established products which sell in significant volumes and incorporate some form of microprocessor technology. Devices and things that do not have any form of digital intelligence today may only represent significant opportunities in the longer term, as greenfield applications normally need considerable time to reach maturity. Consumer oriented products will dominate in terms of volume as few industrial or enterprise products are produced in very large quantities. Potential exceptions are smart infrastructure (e.g. smart cities and intelligent traffic systems) and smart agriculture. Governments and local authorities may propose the deployment of massive sensor networks for resource management, security, safety, environment, traffic and other needs. Such projects will however inevitably become highly complex, expensive, controversial and difficult to implement. The likelihood for any project announced in 2016 to become fully implemented by 2020 is therefore close to zero. Smart agriculture falls into the same category. Some best practices for improved efficiency in the farming and forestry industries using connected sensors will be developed until the end of this decade. Implementing them at full scale will however take several decades and requires massive financial support from governments.

Berg Insight has identified six primary segments that are mainly consumer related and meet the mentioned criteria: energy meters, automotive, home appliances, HVAC equipment & controls, home entertainment and lighting. Moreover, connected wearables are by definition included among the major application categories. The diversity of the market is reflected in the fragmentation among IoT networking technologies due to the broad variety of application environments, communication needs and cost constraints. ►



Annual shipments of cellular IoT devices
(World 2014-2020)

► IoT comprises everything from premium cars with the computing power of hundreds of microprocessors powered by an engine to low-cost sensors based on basic microcontrollers running on coin-cell batteries. One size does not fit all and therefore fragmentation will remain.

Cellular technologies have a prominent role in the IoT market, enabling high value applications with significant data requirements. 2G technologies have dominated cellular IoT for many years, but recently there has been a rapid transition to 3G/4G, starting in North America and parts of Asia-Pacific. LTE Rel-13, due for publication in January 2016, will include several new enhancements that will facilitate the migration of IoT applications to 4G networks. The first set of enhancements are referred to as LTE-M, which defines a new low complexity device category type that supports reduced bandwidth, reduced transmit power, reduced support for downlink transmission modes, ultra-long battery life via power consumption reduction techniques and extended coverage operation. As a complement to LTE-M, a new narrowband radio technology called NB-IOT will be defined to provide improved indoor coverage, support of massive number of low-throughput, low-delay sensitivity, ultra-low device cost, lower device power consumption, and optimized network architecture. NB-IOT has good prospects to bridge the gap between cellular and emerging LPWA technologies such as Sigfox and LoRa.

Another major group of wireless technologies relevant for IoT is wireless local area and personal area networks (WLAN/PAN). Established and emerging standards such as Wi-Fi, Bluetooth, ZigBee and Thread play a key role for networking in homes, buildings and other facilities. International standard organisations and their standards are important for the ecosystem by establishing common foundations for technologies and device interoperability. The adoption of various technologies and standards also depends on which type of network architecture they are designed for as different end-users and applications have very diverse requirements. Radio frequency availability is yet another important factor.

This report answers the following questions:

- How will the wireless IoT technology market evolve over the next five years?
- What are the base requirements for adding connectivity to a device?
- Which vertical markets will become successful and which will fail?
- What drives the development of IoT value propositions from global OEMs and consumer brands?
- 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?
- What is the positioning of short-range technologies like Wi-Fi, Bluetooth, ZigBee and Thread in IoT?

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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 M2M have been his major research area for the past 12 years.

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