

## Growth of IoT: Moving from Fragmentation to Open Possibilities

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In relative terms, the Internet of Things (IoT) is still a young industry, with a lot of growth—and assuredly a lot of revenue—in its future. For several years now, it's been widely recognized that IoT has enormous potential and will likely become a very large global market. And yet the market waits... As with many nascent industries, the sources of revenue aren't always crystal clear in the early stages of development, and there will undoubtedly be twists and turns along the way.



But as we all look forward into the future of the IoT, some of the uncertainties around revenue sources are starting to clarify. A [recent survey](#) that examined the attitudes of several hundred players in the mobile space about their perspectives on the future of the industry highlighted one idea: that the initial ramp-up of IoT will be focused on the biggest things... and the smallest.

Survey respondents were asked to rank several IoT market sectors in terms of their IoT/M2M revenues by 2023. The top two responses focused on two areas. First, the small: the data show that consumer applications, such as smart home IoT solutions, are expected to lead the way. Then, the big: smart cities and local government applications. As cities come under increased pressure to leverage technology to help save precious public funds, IoT solutions for street lighting, video surveillance, and traffic management in particular appear to hold a lot of appeal for local governments around the world.

## Addressing Fragmentation

These three segments—smart home, automotive and smart city—have one thing in common from a revenue perspective: they are all widespread, mass-adoption applications, that will impact the way people live their daily lives. As more people have opportunities to interact with these IoT devices and networks, and as more use cases are studied, it stands to reason that other applications will follow in other less omnipresent, less tactile vertical markets like manufacturing, energy and agriculture.

Despite the optimistic views about widespread adoption of IoT in our homes, garages and cities, the respondents to this survey expressed one significant concern: fragmentation. More than nine out of every 10 respondents characterized technology standardization as partially or highly fragmented.

Addressing fragmentation is complex but straightforward, and much of the standards work has been underway for years already. Many of the mobile operators already see that the 3GPP standards focused on IoT (such as NB-IoT, LTE-M, and 5G) will address the vast majority of the fragmentation issues related to connectivity. But it's not enough to simply connect these massive networks of devices.

As these networks grow into populations of millions and billions of devices—many of them in low-power, wide-area networks—standards are needed on the service and application layers as well.

## Release 3 rewards

As the global standards organization for the IoT, oneM2M develops technical specifications to

address the complexities of the challenge, providing a common M2M Service Layer. This service layer allows the wide plethora of devices to be seamlessly integrated into IoT deployments and addresses fragmentation challenges by allowing operators to manage their networks from end to end using core network functions instead of deploying standalone software. The crucial value provided by oneM2M is that in providing the abstraction layer it allows for cross-silo data. Indeed, the oneM2M organization was [pleased to announce the rollout of Release 3](#) recently, which includes interworking with core 3GPP network functions and added capabilities for low-power wide-area network (LPWAN) devices.



FIGURE 1 (Click to enlarge)

Release 3 enables seamless integration between devices to manage power resources efficiently. 3GPP has been increasing IoT-centric features in order to avoid network congestion, while at the same time enhancing security and, ultimately, enabling IoT devices to use power more effectively. The seamless interworking of devices with these 3GPP network services, including the NB-IoT and LTE-M, will be based on using the 3GPP Service Capability Exposure Function (SCEF). By combining 3GPP's underlying network with oneM2M's service layer in this way, operators will increase their services with added IoT capabilities.

As momentum builds around LPWAN solutions, including NB-IoT and LTE-M, it is expected to encourage high volumes of low price-point connected devices. The commercial success of these new devices will vary according to their efficiency in gathering and sharing IoT data. That said, however, by enabling interworking with LPWAN technologies from 3GPP, Release 3 will support operators in the deploying of cellular IoT services, bringing new revenue generating opportunities higher up the value chain.

As oneM2M works to open up the IoT ecosystem, doing so will inevitably improve the business case for new services to be launched and, with the abstraction layer that Release 3 creates, the exchange of cross-silo data will be simplified. In addition to this, by supporting a set of 3GPP-defined APIs, it will highlight new revenue streams for mobile operators, reducing the cost of deployments at the same time.

## Commercial success

Looking at an example in the smart home area, network operators will be dealing with networks of devices and appliances from a variety of manufacturers. A given home might have a home security system from one manufacturer, a smart thermostat from another, and still another supplying the family's smart refrigerator. To address this challenge, oneM2M creates a standard API that facilitates control of all of these devices. The commercial success will depend on the efficiency of the approach taken for gathering and sharing data at scale. Similar models exist in the oneM2M standard for industrial and other applications.

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The value of technologies lies not only in the technologies themselves, but in the capabilities they empower, the applications they enable, and the business and lifestyle possibilities they unlock. Some of the examples of cellular IoT value-added services enabled by oneM2M's Release 3 include:

- IoT device enrollment to provide cellular IoT devices connected to an operator's network with secure security credentials, authentication and registration;
- IoT device location tracking, which supports current location tracking, stores past device locations and generates notifications to IoT apps;
- the ability to manage data delivery based on schedule and priority of requests;
- network communication pattern configuration for operators to efficiently manage network resources in response to the anticipated communication patterns of IoT devices, according to input from IoT apps;
- the ability to wake a sleeping device, to create almost a sixth sense edge for devices and enable extra benefits such as reduced battery wastage.

The impact of Release 3 cannot be underestimated, as it will undoubtedly reveal significant new revenue streams for mobile operators while lowering the associated cost of deployment. Ways to monetize NB-IoT and LTE-M will be identified and, by taking a standardized approach at the service layer and removing the burden of understanding diverse LPWAN aspects, application proliferation will be simpler.

We will soon get to a place where everything works seamlessly together, where any endpoint of the IoT is at the developer's disposal, and where any data source can be tied in. Then the possibilities will be limited only by the imagination.