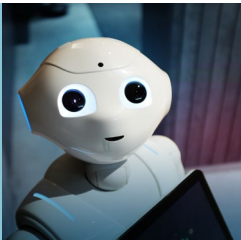




future tech 

# Fourth Industrial Revolution Internet of Things (IoT)



The term "**Internet of Things**" was coined in 1999 <sup>1</sup>to describe a production line optimization system in which **sensors act as the eyes and ears** of a computer, allowing it to see, hear, touch and interpret, **thus converting information from the physical world into digital information**.

Nowadays all kinds of objects or devices contain sensors, from everyday objects such as refrigerators, loudspeakers, televisions and, of course, in industry. Anything you can imagine could be connected to the internet and **interact without the need for human intervention**, the goal is therefore a **M2M (machine to machine) interaction** or M2M devices. The Internet of Things is making the global fabric around us smarter and more responsive, merging the digital and physical universes. Therefore, **the definition of IoT could be the grouping and interconnection of devices and objects through a network (either private or Internet, the network of networks), where all of them could be visible and interact with the aim of offering new services and improved processes**.

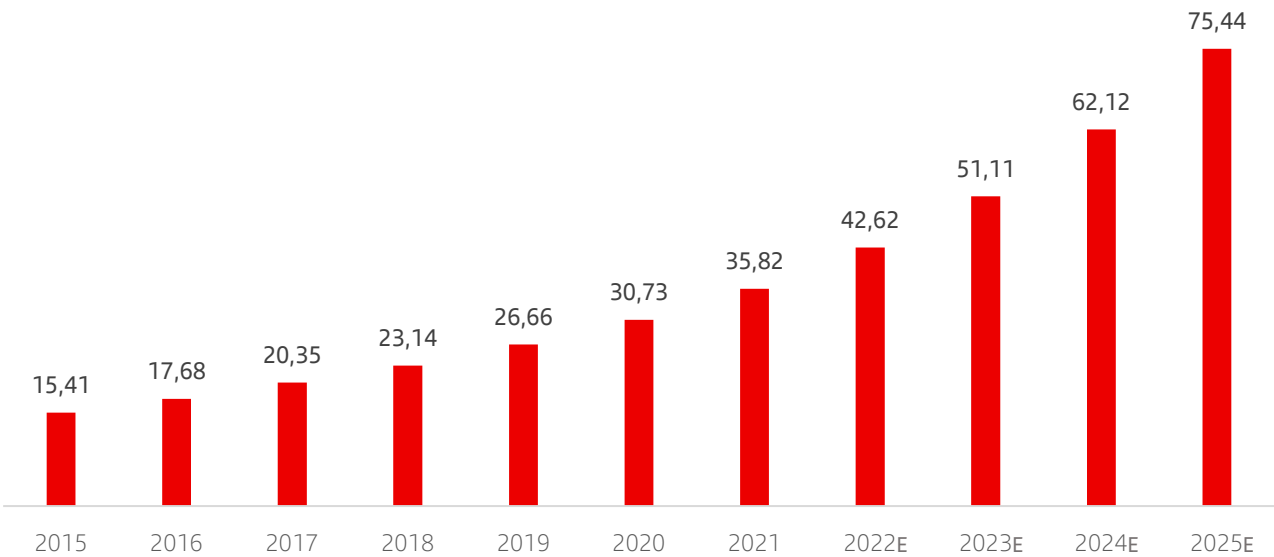
According to *Statista*, **by 2020 each U.S. household had on average 10 devices**. Smartphones, speakers and 5G itself are now significantly determining how

we interact and manage our homes and our businesses. McKinsey Digital magazine states that **127 devices are connected to the Internet for the first time every second**.

One example of what the future holds in terms of mobilization is that, while it is too early to expect fully driverless cars, the technology behind fully autonomous driverless vehicles is still undergoing rigorous testing and development. **Statista predicts that we will see a jump in partially automated vehicles by 2025, when the market will reach \$36 billion**. Finally, by 2035 North America will have 29% of the autonomous driving vehicle fleet, followed by China with 24% and Western Europe with 20%.

In terms of investment, as the IoT ecosystem continues to grow, so does the importance of securing those IoT networks. According to Gartner, **spending on IoT security solutions would have well exceeded \$600 million by 2021**. This is a significant jump from the \$91 million spent in 2016, and this annual global spending statistic shows that IoT solutions are headed for a massive boom over the next decade.

Devices connected through the internet of things between 2015 and 2025.  
Source: Statista



<sup>1</sup>. <https://www.wired.com/story/wired-guide-internet-of-things/>



## Key innovations driving IoT growth



### 5G

The name **5G** refers to the **fifth generation of mobile network technology**. The fundamental difference with its predecessor, 4G LTE is a **significant increase in connection speed** (10 gigabytes per second, 10 times faster than the leading fiber optic offerings on the market) and<sup>2)</sup> a **drastic decrease in latency time**, i.e. web response time.

The main objective of previous generations of networks was to improve human communication. The 1G network made it possible to talk via mobile; 2G incorporated text messaging; the smartphone era came with 3G which introduced internet connectivity and 4G turned it into broadband, which made it possible to play videos in real time (streaming) or augmented reality. **5G has an additional objective, which is to connect a greater number of devices at the same time** (vehicles, robots, urban furniture (traffic lights)). **which will be able to exchange information in real time.**



### Cloud computing

The IoT is poised to produce a **significant volume of data**, and as such, will require **considerable space not only to process but also to store this data**. The cloud computing solution is the only technology that has the potential to quickly and seamlessly process such a significant volume of data. For example, when numerous smart devices transmit crucial health data to doctors around the world, huge volumes of data are produced. It is no wonder that only the cloud can process such masses of data effectively.

Several significant developments in innovation have made cloud computing one of the most powerful drivers of IoT. Identity management platforms are one such solution for providing data security.



### Sensors

IoT sensors are best defined as **devices that wake up, collect real-world data, send data to cloud services, gateways and modems, and then go back to sleep**. IoT sensors can be configured to wake up at intervals or be triggered when important changes are detected.

**Sensors are one of the core components of the IoT.** For example, to unlock the front door, the sensor on the key can open it, which instantly transmits a message for the lights to turn on and the thermostats to regulate the temperature in the house. All these activities occur simultaneously.

The science behind the design of IoT sensors is similar to how microprocessors work. They use the lithography procedure that ensures that multiple copies of the sensor are deployed simultaneously. However, the IoT can only perform one particular task. Subsequently, a microprocessor and a typical IoT sensor can be attached and connected to wireless radios to communicate.

2. [https://www.nationalgeographic.com.es/ciencia/que-es-5g-y-como-nos-cambiara-vida\\_14449](https://www.nationalgeographic.com.es/ciencia/que-es-5g-y-como-nos-cambiara-vida_14449)



## Innovators in the Internet of Things



**Cisco Systems** is one of the largest providers of enterprise networking hardware that enables electronic devices to connect and communicate with each other. **Cisco designs the networking hardware** that other companies rely on to manage and run a variety of connected devices. In addition, Cisco Systems has developed a proprietary software platform called "Cisco Kinetic" that manages the massive amount of data involved in IoT products.



**Dexcom** is a company that is using IoT in healthcare, specifically for diabetes management. Dexcom **makes unique, patented medical devices that monitor people's glucose levels**. The company's flagship product, called the G6, includes a self-applier, sensor, transmitter and touchscreen receiver connected to the Internet that display glucose data in real time. Smartphones and smartwatches can also be connected and used to display glucose information.



**NXP Semiconductors** NV operates as a global semiconductor company. **The company designs semiconductors and software for mobile communications, consumer electronics, security applications, in-car entertainment and networking**. NXP offers its products to automotive, identification, wireless infrastructure, lighting, mobile and computing applications.



**Salesforce Marvell Technology Group** Ltd. engages in the **design, development and sale of integrated circuits**. The company offers System-on-a-Chip devices, which leverages proprietary technology portfolio of intellectual property in the areas of analog, mixed and digital signal processing, and integrated and stand-alone circuits. It also develops integrated hardware platforms along with software that incorporates digital computing.



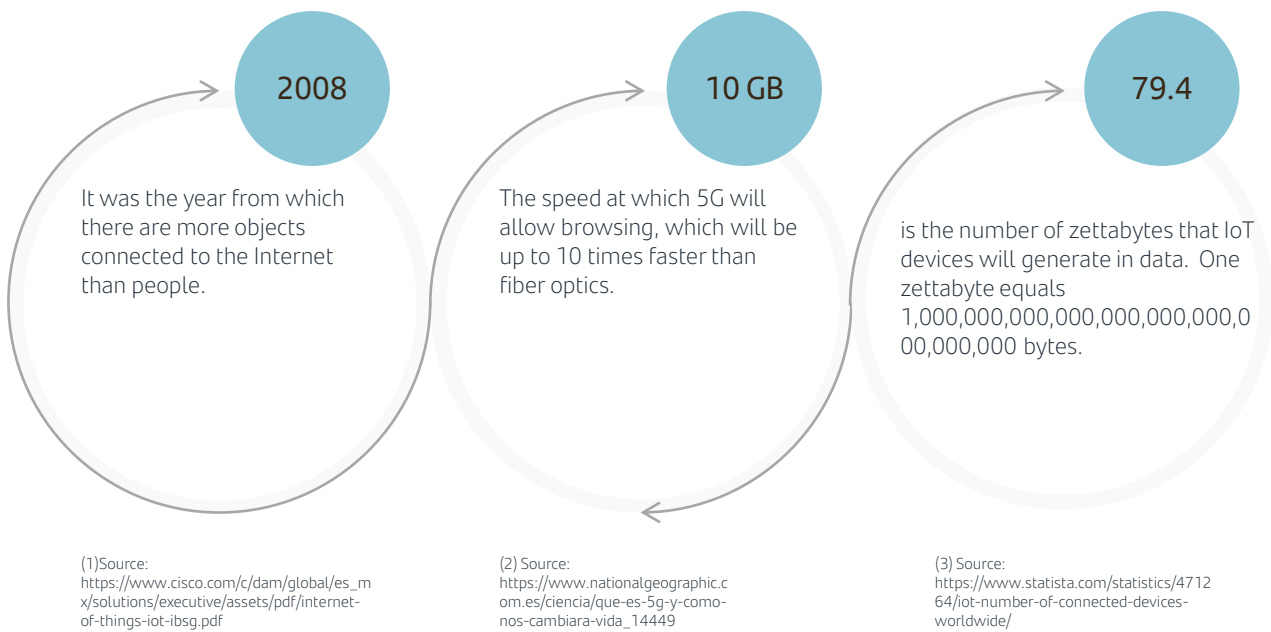
**Advanced Micro Devices, Inc. (AMD)** produces **microprocessors** as stand-alone devices or embedded in an **accelerated processing unit (APU)**, chipsets, discrete and integrated **graphics processing units (GPUs)**, data center and professional GPUs, and development services and embedded servers and processors, **semi-custom System-on-Chip (SoC) products, development services, and game console technology**. In recent years, the company has armed itself with new product families: Radeon for graphics and Ryzen for computing, in order to strengthen its position vis-à-vis long-time rival and market leader Intel. Most of AMD's sales come from international customers.



**Honeywell International** Inc. is a global technology and manufacturing company. The company **offers industrial process control products and services such as aerospace, control, sensing and security technologies for commercial buildings, safety and productivity solutions, specialty chemicals, advanced materials, process technology for refining and petrochemicals, and energy-efficient products and solutions**.



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