Imagine that things around you begin to talk to you and start providing information in a smarter way.

How would you feel if your alarm clock, knows your office location and path, knows traffic conditions and is learned enough to create an estimate of your arrival time and wake you up accordingly. No traffic on road, you can enjoy some more sleep.

Wouldn't it be great if your umbrella updates you about the weather by beeping and tell you to carry it ?

You can connect everything and everything is indeed a lot. The question is not what you can connect but why you would do so: the purpose, the outcomes. And here is well there are a lot of potential goals which determine what things you want to connect so you can capture data from them (and have sent from, between and/or to them). That’s why often you’ll see distinctions being made between [Industrial IoT](https://www.i-scoop.eu/internet-of-things-guide/industrial-internet-things-iiot-saving-costs-innovation/), Consumer IoT and far more terms which are mentioned in this overview.

The Internet of Things is the interconnection of endpoints (devices and things) which can be uniquely addressed and identified with an IP (Internet Protocol) address. With the Internet of Things, devices can be connected to the Internet, sense, gather, receive and send data and communicate with each other and applications via IP technologies, platforms and connectivity solutions.

There are over 7 billion people. Over 90% of the Earth’s surface has connectivity. There are over 1 billion devices on the internet. The amount of books/information if stacked on top of each other could take you to pluto and back 7 times ! IoT is just going to increase this exponentially.

To put everything in simpler words “Internet of Things will enable things around you to update their status on the internet”

It is a blend of Sensors(input), Processors(brain), Actuators(output) with the sweetness of internet. Electronics has become smaller and faster. Internet has become more simpler to use. And the degree of possessiveness of humans is ever increasing. That is why I feel that internet of things is on the cusp of explosion.

IoT is an umbrella term with many use cases, technologies, standards and applications. Moreover, it’s part of a bigger reality with even more technologies. The things and data are the starting point and essence of what IoT enables and means. IoT devices and assets are equipped with electronics, such as [sensors and actuators](https://www.i-scoop.eu/internet-of-things-guide/iot-technology-stack-devices-gateways-platforms/), connectivity/communication electronics and software to capture, filter and exchange data about themselves, their state and their environment.

## **The origins of the Internet of Things: how it all started**

**The idea of the Internet of Things goes back quite some time. We can even go back a very long time but will begin at the end of the previous Millenium where RFID has been a key development towards the Internet of Things and the term Internet of Things has been coined in an RFID context (and NFC), whereby we used RFID to track items in various operations such as supply chain management and logistics.**

The roots and origin of the Internet of Things go beyond just RFID. Think about machine-to-machine (M2M) networks. Or think about ATMs (automated teller machine or cash machines), which are connected to interbank networks, just as the point of sales terminals where you pay with your ATM cards. M2M solutions for ATMs have existed for a long time, just as RFID. These earlier forms of networks, connected devices and data are where the Internet of Things comes from. Yet, it’s not the Internet of Things.

It was obvious that the connection of the types of “things” and applications – as we saw them in RFID (and in M2M and more) – with the Internet would change a lot. It might surprise you but the concepts of connected refrigerators, telling you that you need to buy milk, the concept of what is now known as smart cities and the vision of an immersive shopping experience (without bar code scanning and leveraging smart real-time information obtained via connected devices and goods) go back since before the term Internet of Things even existed.

Again, it took a long time. Furthermore, we shouldn’t reduce the Internet of Things to just these popular and widely known concepts, even if consumer-related attention for IoT without a doubt has led to the grown attention for it as you’ll read further.

The term has recently been added to the Oxford dictionary and is defined as [1]:

The interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

More IOT Definitions

Here is a quick overview of some of the most common.

What is the Internet of Things?

The internet of things (IoT) is the network of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data

Internet Society Overview

The term Internet of Things generally refers to scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate, exchange and consume data with minimal human intervention. There is, however, no single, universal definition

Internet Engineering Task Force (IETF)

The term "Internet of Things" (IoT) denotes a trend where a large number of embedded devices employ communication services offered by Internet protocols. Many of these devices, often called "smart objects", are not directly operated by humans but exist as components in buildings or vehicles, or are spread out in the environment. Following the theme "Everything that can be connected will be connected", engineers and researchers designing smart object networks need to decide how to achieve this in practice.

### Common IOT Terms

* **M2M** – Machine to machine
* **P2P** – Person to Person
* **P2M** – Person to Machine
* **IIOT**– Industrial Internet of Things
* **HIOT**– Home Internet of Things
* **CIOT**– Consumer Internet of Things
* **Big Data** – Very large data sets that can be analyzed to reveal insights and trends
* [**RFID**](https://en.wikipedia.org/wiki/Radio-frequency_identification)– Radio Frequency Identification
* [**NFC**](https://en.wikipedia.org/wiki/Near-field_communication)– Near field communication

It is important to be aware of the main characteristics when we think in IoT implementations:

Scalability and efficiency: Building any network requires careful consideration and design flexibility to achieve scale.

Management and connectivity: hardware and software must be considered and implemented up front because the long-term resiliency and usefulness of an IoT solution must be constantly managed and optimized

Security and social responsibility: while the advantages of what a connected world can do for people and businesses still vastly outweigh the threat, businesses must ensure that they can maintain trust in the system. To do this, business must act collectively and accept that all technology companies share the responsibility to deliver collectively on the promise of secure devices and systems.

### IOT Components

An IOT system comprises three basic Components.

1. The Things -sensors actuators etc
2. The Network and protocols
3. The Platforms, Apps and services

### 1. The Things – Sensors and Devices

In contrast to computers and tablets which are the main devices currently connected to the Internet. Internet of things devices will mainly be:

* Low Power- Power usage and computational Power.
* Low cost
* Wireless

To turn an everyday object like a house or a car into a smart house or car or a **“thing”** will require that the object has:

* A unique address – IPv6 address
* A way to connect to a network – Wireless

### 2. IOT Networks And Protocols

The Internet of things will utilize the existing networking infrastructure, technologies and protocols currently used in homes/offices and on the Internet, and will introduce many more.

Protocols are designed to operate at a particular level in the networking stack. At the **application level** there are a host of new protocols. Some have been available for a long time like ,**HTTP** and **MQTT**, whereas others have been developed especially for the IOT e.g. **COAP**.

### 3. IOT Platforms, Apps and Services

An IOT platform combines several IOT functions in one. It can collect and distribute data, convert data between protocols, store and analyse data.

They are available as **cloud based** and standalone platforms and are available from many companies both large and small.

* Amazon Web services (AWS)
* IBM Watson Bluemix
* Microsoft Azure
* ThingWrox

The Internet of Things converges industries and business areas, uniting Information Technology and Operational Technology ([*IT and OT*](https://www.i-scoop.eu/internet-of-things-guide/industrial-internet-things-it-ot/)) and contributing to industrial transformation (Industry 4.0) and a wave of use cases in the Industrial IoT or [IIoT](https://www.i-scoop.eu/internet-of-things-guide/industrial-internet-things-iiot-saving-costs-innovation/industrial-internet-things-iiot/) , the largest segment of IoT applications and investments. The main areas of Internet of Things investments (industries and use cases) include manufacturing operations, transportation, [smart grid](https://www.i-scoop.eu/smart-grids-electrical-grid/) technologies, [smart buildings](https://www.i-scoop.eu/internet-of-things-guide/facility-management-iot-smart-buildings/) and, increasingly, consumer Internet of Things and smart home automation.

## **The exponential growth of the Internet of Things**

**As we saw earlier the Internet of Things still has a long way to go and the growth of connected devices or “intelligent things” will continue to rise exponentially over the coming years, as multiple challenges get solved.**

In that sense it is safe to say that, despite the fact that we’ve been talking about the Internet of Things for a long time and the fact that IoT in many industries is a reality, we are still in the early years. Although it is expected that, as a term and concept, the Internet of Things will dissapear and just become part of a new normal, we are far from there. Note, however, that in a business context it’s best to focus on goals and use cases when trying to get projects accepted and done than to speak about the IoT.

**The exact predictions regarding the size and evolution of the Internet of Things landscape tend to focus on the number of devices, appliances and other ‘things’ that are connected and the staggering growth of this volume of IP-enabled IoT devices, as well as the data they generate, with mind-blowing numbers for many years to come.**

<https://www.i-scoop.eu/internet-of-things-guide/>

<https://www.quora.com/What-exactly-is-Internet-of-Things-IoT>

<http://www.steves-internet-guide.com/internet-of-things/>

<https://tools.ietf.org/html/rfc7452>

<https://pages.arm.com/rs/312-SAX-488/images/iot-solutions-for-dummies-arm.pdf>