**Iot definition:**

IoT is short for Internet of Things, also called The Internet of Objects. This refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems.

OR

**Definition**

A network of internet-connected objects able to collect and exchange data using embedded sensors.

These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices.

**History of Iot**

The Internet of Things (IoT) has not been around for very long. However, there have been visions of machines communicating with one another since the early 1800s. Machines have been providing direct communications since the telegraph (the first landline) was developed in the 1830s and 1840s. Described as “wireless telegraphy,” The Internet of Things, as a concept, wasn’t officially named until 1999. One of the first examples of an Internet of Things is from the early 1980s, and was a Coca Cola machine, located at the Carnegie Melon University. Kevin Ashton, the Executive Director of Auto-ID Labs at MIT, was the first to describe the Internet of Things, while making a presentation for Procter & Gamble.

**History**

1999, Auto-ID Center founded in MIT – Keven Ashton 2003, EPC Global founded in MIT

2005, Four important technologies of the internet of things was proposed in WSIS (World Summit on the Information Society) conference.

2008, First international conference of internet of things: The IOT 2008 was held at Zurich.

**How IOT works**

IoT A complete IoT system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. Below I will briefly explain each component and what it does.

**1) Sensors/Devices**

Sensors or devices collect data from their environment. This could be as simple as a temperature reading

However, whether it’s a standalone sensor or a full device, in this first step data is being collected from the environment by something.

**2) Connectivity**

Next, that data is sent to the cloud (what’s the cloud?), but it needs a way to get there!

The sensors/devices can be connected to the cloud through a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet.

Each option has tradeoffs between power consumption, range and bandwidth (here’s a simple explanation). Choosing which connectivity option is best comes down to the specific IoT application, but they all accomplish the same task: getting data to the cloud.

**3) Data Processing**

Once the data gets to the cloud, software performs some kind of processing on it.

This could be very simple, such as checking that the temperature reading is within an acceptable range. Or it could also be very complex, such as using computer vision on video to identify objects (such as intruders in your house).

But what happens when the temperature is too high or if there is an intruder in your house? That’s where the user comes in.

**4) User Interface**

Next, the information is made useful to the end-user in some way. This could be via an alert to the user (email, text, notification, etc). For example, a text alert when the temperature is too high in the company’s cold storage.

However, it’s not always a one-way street. Depending on the IoT application, the user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone.

And some actions are performed automatically. Rather than waiting for you to adjust the temperature, the system could do it automatically via predefined rules. And rather than just call you to alert you of an intruder, the IoT system could also automatically notify relevant authorities.

**Applications of iot**

**Health**

The internet of things has numerous applications in healthcare, from remote monitoring to smart sensors and medical device integration. It has the potential to not only keep patients safe and healthy, but to improve how physicians deliver care as well.

**Care**

Perhaps the greatest improvement IoT brings to healthcare is in the actual practice of medicine because it empowers healthcare professionals to better use their training and knowledge to solve problems. They utilize far better data and equipment, which gives them a window into blind spots and supports more swift, precise **actions.**

**Medical Information Distribution**

IoT devices give direct, 24/7 access to the patient in a less intrusive way than other options. This results in fewer accidents from miscommunication, improved patient satisfaction, and better preventive care.

Emergency Care

The advanced automation and analytics of IoT allows more powerful emergency support services, which typically suffer from their limited resources and disconnect with the base facility. It provides a way to analyze an emergency in a more complete way from miles away. It also gives more providers access to the patient prior to their arrival. IoT gives providers critical information for delivering essential care on arrival. It also raises the level of care available to a patient received by emergency professionals. This reduces the associated losses, and improves emergency healthcare.

**Smart home**

The first and most obvious benefit to smart homes is convenience, as more connected devices can handle more operations (lighting, temperature, etc.) and frees up the resident to perform other tasks. IoT devices can help reduce costs and conserve energy.

**Smart House IoT Devices**

First we have the Amazon Echo, arguably the first and most recognizable name in this space. The device functions as a central hub for your other smart home gadgets.

One of the more famous smart home device manufacturers, has created a Learning Thermostat that can automatically adjust temperature based on your location and uses a far-field sensor to determine the time and temperature from a distance. And thanks to a recent update, it now works with Alexa

**Transportation**

The Internet of Things (IoT) is dramatically accelerating the pace of innovation in the transportation industry—especially the cars and trucks we drive every day. Autonomous vehicles will be commonplace by 2025. Autonomous vehicles will free the “driver” and passengers to socialize, have a business meeting, or learn more about the environment around them. This is because they offer many benefits, including lower energy consumption and fewer accidents.

There are already several apps that help drivers find parking spaces. But imagine a car that could identify an empty parking space as it passes by and then upload that information to the cloud. New and existing apps could then use the real-time data to improve alerts to drivers about open spaces nearby.

**Smart cities**

The IoT has the potential to transform entire cities by solving real problems citizens face each day.

Active Safety: City centers are often look eerie and unsafe, especially late at night. IoT systems are being deployed in such situations to enforce safety for all.

**Environmental Detection**: Most of the cities house couple of expensive monitoring stations for observing pollution or weather conditions.

**Smart Parking:** The whole point of introducing the concept of parking was to reduce congestion, however, the business case was unclear with most of the cities.

**Industrial Internet of Things**

Industrial automation is one of the most profound applications of IoT. The IoT infrastructure, combined with advanced sensor networks, wireless connectivity, innovative hardware and machine-to-machine communication, will completely transform the conventional automation process of industries.

In the construction industry, determining concrete quality is very important. The Embedded Data Collector, or EDC, from Smart Structure, works by embedding sensors in the concrete during the pouring and curing process. This way, the sensors become a permanent part of the structure. They provide vital information about concrete strength and quality directly to the Smart Structures Work Station.

Advanced metering promises to make energy management easier for everyone. Smart metering solution, which will help consumers better understand their energy needs and help them with load management as well. They have many multi-energy metering solutions to offer reliable and efficient energy management.

**Evolution of IoT**

The Internet of Things (IoT) is rapidly evolving. There is a need to understand challenges in obtaining horizontal and vertical Application balance and the key fundamentals required to attain the expected

50 billion connected devices in 2020.

Digital content will be ever more accessible with the evolution of Internet readers that make it

Possible to exploit content in all occasions of use for which today we use physical data storage

Devices. For example a viewer connected via Wi-Fi, and the iPad let you quickly get access to

Online content without needing to turn on your PC.The evolution that is partially happening right now is

In the transformation to digital of the information needed to reproduce objects with

3D printers, or ‘making machines’ that make it possible to reproduce physical objects in your

Own home.

For example, PlingPlong, PlingPlong is a cushion that reads books that are brought close to it. Nabaztag5, is a ‘rabbit’ connected to the Internet and it reads newspapers, emails, weather forecasts, messages and even audio books downloaded from the Internet.

What has changed since the 2000s to make this all possible? There are several key factors. They include the expansion of networking capabilities, the introduction of large-scale data analytics tools (which make it easier to manage and interpret data from IoT devices) and the creation of new standards, such as the Allseen Alliance's [AllJoyn](https://allseenalliance.org/framework), which make it simpler for IoT hardware and software from different vendors to interact.

Perhaps more than anything else, however, the growth of the cloud has played a crucial role in making modern IoT possible. That's because the cloud provides a low-cost, always-on place for storing information and crunching numbers. Cheap, highly available cloud infrastructure makes it easy to offload storage and compute tasks from IoT devices to cloud servers. In turn, IoT devices can be cheaper, leaner and meaner.

**Future**

As the size and cost of sensors and communication technologies continue to decline, the “Internet of Things” (IoT) grows by leaps and bounds. In 2020, more than 50 billion devices are connected to the Internet. Businesses and governments struggle to integrate this evolving technology, using analytics to winnow insights from the treasure trove of data that improve delivery models in health care, transportation, security and defense, infrastructure management and many other areas. The exponential growth of the IoT proves to be a regulatory headache, forcing governments to keep pace with the ever-changing technology.

Two of the world’s biggest technology players, Apple and Google are currently locked in a battle for IoT supremacy, with Google buying up manufacturers of internet-enabled technology for the home, and partnering with others.

**Critism and Controversies**

**Vulnerability to Hacking**: Researchers have been able to hack into real, on-the-market devices with enough time and energy, which means hackers would likely be able to replicate their efforts. For example, a team of researchers at Microsoft and the University of Michigan recently found a plethora of holes in the security of Samsung's SmartThings smart home platform, and the methods were far from complex.

**True Security**: Jason Porter, AT&T's VP of security solutions, told BI Intelligence, Business Insider's premium research service, that securing IoT devices means more than simply securing the actual devices themselves. Companies also need to build security into software applications and network connections that link to those devices.

**Consumer Confidence:** Each of these problems could put a dent in consumers' desire to purchase connected products, which would prevent the IoT from fulfilling its true potential.

**Summary.**

The IoT is expected to transform how we live, work and play. From factory automation and automotive connectivity to wearable body sensors and home appliances, the IoT is set to touch every facet of our lives. We will “author” our life with networks around us that constantly change and evolve based on our surroundings and inputs from other systems. It will make our lives safer with cars that sense each other to avoid accidents. It will make our lives more green with lighting systems that adjust based on the amount of daylight from windows. It will make our lives healthier with wearables that can detect heart attacks and strokes before they happen. There is a long road ahead to the IoT of 2020. But one thing is for sure, it is going to be amazing.