

# Application and Architecture Survey on Internet of Things

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**Abstract:** Due to many advance technology Internet of things is now used in many application including low-cost sensors, low-power processors, commerce, industry, and education applications. Interconnection can be done with other object around us with the other world through Internet of thing (IoT) which are virtual connection, even wireless connectivity are available. In this paper, we take you to the introduction of Internet of things (IOT), different applications and architectures of Internet of things.

**Keywords:** Internet of Things, Application, Architecture.

## 1. Introduction

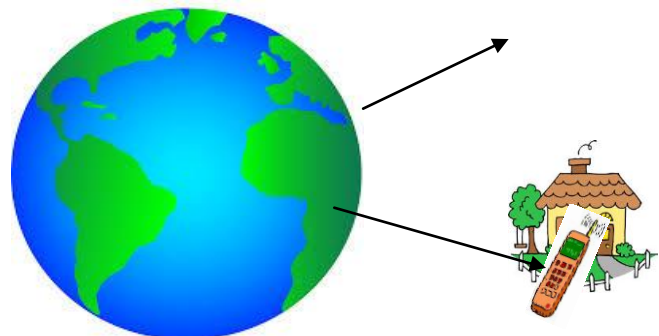
Interconnection of two or more computer form a Internet this concept is changed to interconnection of things around the human or the vision of connected world of objects, virtually everything, objects include wireless connectivity, sensors, communications devices etc. It also refers to uniquely identifiable objects and their virtual representation in an Internet. The phrase "Internet of Things" (IoT) was coined at the beginning of the 21st century by the MIT Auto-ID Center with special mention to Kevin Ashton (Ashton 2009) and David L. Brock (Brock 2001). Data can now flow from our pot plants, our heating system and perhaps even our shoes or clothes. Currently making a difference with this data requires hardware and software knowledge beyond the reach of most with the help of Internet of Things we can achieve it. This also consist of wireless communication technologies such as mobile and wireless sensor networks etc. This paper covers with some of the applications which deal with the Internet of Things (IoT).

## 2. Overview

The Internet of Things (IoT) is a scenario in which objects, animals or people are provided with unique identifiers and the ability to automatically transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT has evolved from the wireless technologies, micro-electromechanical systems (MEMS) and the Internet. In Internet of Thing (IoT), a thing may be a person with heart monitor implant, objects manufactured by human that can be assigned IP address, vehicles that consist of sensors to alert the

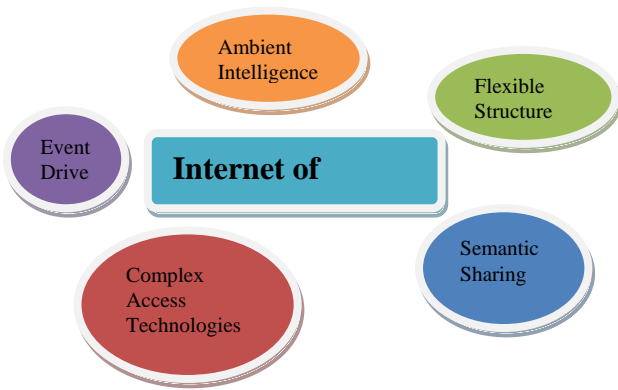
driver when air pressure is less in the tire, or may be the animals with biochip.

IPv6's huge increase in address space is an important factor in the development of the Internet of Things. Imagine a world in which every device in the home, workplace and car are connected. A world where the lights automatically turn on when the car approaches the driveway, the coffee starts brewing when the morning alarm goes off and the front door automatically unlocks when approached by a member of the household, but stays locked when a stranger arrives on the front step. That is the type of world the Internet of Things can create.



Currently, the "Internet of Things" is not a second Internet – rather it's a network of devices that are connected to the Internet that is used every day to search Google, upload images and connect with friends. It's a network of products that are connected to the Internet, thus they have their own IP address and can connect to each other to automate simple tasks.

### 3. Characteristics of IoT



**Ambient Intelligence:** they are autonomous and intelligent entities which act like full interoperability & will be able to auto-organize themselves depending on the context, circumstances or environment.

**Event Driver:** they help us to design the scheme depending on the need.

**Flexible Structure:** where many nodes in terms of thousand will be placed in the disable mode and later will be set to run.

**Complex Access Technologies:** means that there's several kinds of media such as vehicle stone that they need different access technologies.

**Semantic Sharing:** is the machine can read and send by themselves. No need to tell human beings.

### 4. Services

Energy conservation is a needed for the Internet of Things. Concept of energy harvesting will enable larger and larger portions of the consumed energy to be generated by ambient renewable sources available locally thus reducing the losses in long distance energy distribution.

Similar effects will be experienced by road transport and cars. Already today there are hybrid cars available harvesting the kinetic energy of the drive.

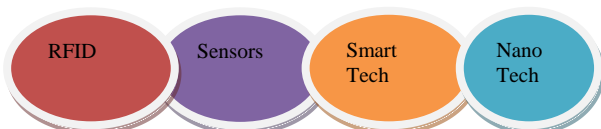
This, in combination with better and more environmentally friendly energy storage in the future will make electrical vehicles achieve longer range and become more attractive alternatives.

Abundant sensory information will enable unprecedented energy optimized control. Climate control is the most energy consuming activity in modern buildings.

The house could adjust the room temperatures according to the personal preferences of those in the room, and avoid heating or cooling rooms excessively without benefits to the inhabitants.

### 5. Some of the Enabling Technologies

RFID: RFID are used to identify and track the data of things. Sensor: To collect and process the data to detect the changes in the physical status of things. Smart Tech: To enhance the power of the network by devolving processing capabilities to different part of the network. Nano Tech: To make the smaller and smaller things have the ability to connect and interact.



### 6. The Applications of IoT

The internet of things can cover many fields of application in our daily life. As the evolution of technology is changing with the new advance technology that can improve our needs and better intelligent services can be produced. some of application that internet of thing cover[8] [9]are:

#### Scenario Food Nutrition

Europe is known with excellent food and wine where the question is t for the perfect taste has been ongoing for centuries. French law pioneered the idea of protecting produce of a limited geographical origin, and similar laws have since been established in many European countries. Traceable identities will help the consumers to verify the origins of the products and help Europe to preserve agricultural diversity and rural lifestyles.

#### Scenario Health Care

Health monitoring helps individual to know their body condition and monitor. Several new tools are being developed and it is used today and it helps doctors to monitor the patience condition and give treatment .Some of examples include:

CardioMEMS Heart Sensor, Nuubo Smart Shirt, GeckoCap.

It is an established fact that several serious common illnesses like breast cancer, cardio-vascular diseases and Alzheimer's disease have genetic components. It is also known that successful treatment depends on early detection.

#### Scenario Biodegradable materials

Will offer the possibility to place temporary sensors and lab-on-a-chip equipment on the patient, or in the patient. Temperature and humidity can be measured inside a cast to prevent skin problems. Antigens may be detected on transplanted organs to help prevent rejection. Intelligent micro-robots may be guided to bring drugs to the infected areas by ex-vivo remote guidance, and assist in the diagnosis providing located measurements of vital parameters. Furthermore, this new sort of personal medical equipment will enable the patient to stay longer and safer at home since the equipment itself can alarm the hospital in case of critical situations, or the patient can be relieved from the hassle of routine checks when there is nothing wrong. Medical research will advance on data from patients living normal lives and not like guinea pigs in hospitals. Telemedicine may replace costly travel and reduce patient stress.

#### Scenario: Intelligent Home

Maintaining particular temperature to boil water is a difficult task that require a huge energy consumptions of the house with huge potentials for energy conservation, and as a consequence a significant positive impact on the environment

.There will be robots taking care of the house, performing all the house works such as cleaning or maintenance. These will collaborate autonomously with the house sensors, and the house control. The intelligent appliances will collaborate to conserve energy, and to signal need for new supplies of food, detergents, maintenance, etc. Some of which may be satisfied automatically by the maintenance robot. This will take away some of today's problems in housekeeping activities.

#### Scenario: Transportation

When there is queue in the traffic,the first car can inform the car just behind that there is an accident or the traffic is too much.with this navigation we can tell that it is an intelligent system which are programmed to go to the saturated path. It

help the driver to be safe by taking the right route and by refusing those action which are dangerous like weather conditions . The cars can go by autopilot on highways which reduces the risk of fatigue related accidents. Cars will also be able to maintain its balance and by maintaining an appropriate service based on the self diagnosis of the problem and ensuring that the right replacement parts are to be taken. The car will plan the time of service to be used for a particular journey and preferences of the usual driver is to safe their life from accidents, and make sure that there is a enough car available if there is need for any of it.

**Scenario Waste Management:** Waste management can be used for the sanitation crews to get alerts if the trash is full. one of the most common example is the Bigbelly . Bigbelly system are found in all the places like college campus ,beach, parking etc .

**Scenario Smart Meters:** Smart meters can provide real-time, and it's a two-way communication between customers and the utility. smart meters helps the customer to received and approximate detail about their electricity usage and to reduce their usage according to price signals.

**Scenario Agriculture:** Smart farm can help the farmer to monitor the wastages and by improving its production . It uses the method data analysis to customize operation and increase production. Some of the examples include-WaterBee, SmartBob , Z-Trap etc .

## 7. Architecture

IOT provides two architecture layer. they are (i) 3-layer architecture and (ii) 5-layer architecture. *The 3-Layer architecture:* consists of perception layer, network layer, and application layer as shown in the figure. Perception layer identify each thing in the IoT system(RFID tags, Sensors ,Camera etc).Network layer is the core of the IoT, which is used to transmits the information which are collected. *Application* layer acts as a bridge between IoT social needs and industrial technology.

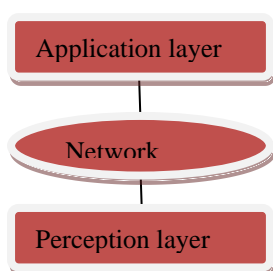


Fig : 3-Layer architecture

*5-Layer Architecture:* It overcome some of the 3 layer architecture disadvantages due to this 5-Layer Architecture came into existence .Business layer: This layer describes IoT applications and management and also responsible for user's privacy. Application layer: This layer specify the types of applications to be used in IoT. Processing layer: handle the information gathered by perception layer. Transport layer : It transmits and receives the information from the perception layer to the processing layer and via versa. It also contains many technologies such as infrared, Wi-Fi, and Bluetooth services. Also, the target of this layer is to used IPV6 to

address each thing in the system . Perception layer: It define the physical meaning of each thing in the IoT system by giving locations and temperatures. It also contain the information about each object in the system and transforms the collected data to signals. In addition, it also contains the technologies such as the RFID and the GPRS.

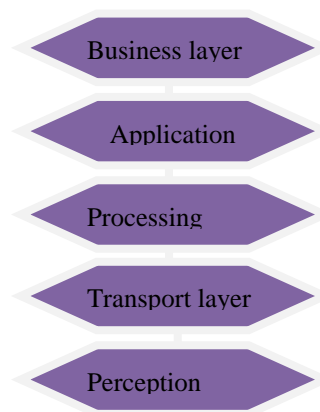


Fig : 5-Layer Architecture

In the paper[2],they have discussed on purpose of a mobile and wide area deployable on WSN communication architecture, the so-called WAN-SAN Coherent Architecture, and they are successfully applying in both the Food and Health-IoT solutions. They also discussed a new WSN stack architecture for reliable, secure communication and demonstrate its functional implementation of the Wireless HART stack. critical requirements consist of reliability, security, and platform-independency of the target industrial systems by natively supporting the RTOS (real time operation system) and multiple processors.

## CONCLEUSION

In this paper, we discuss the definition of IOT ,IOT history. Also, the IoT architectures and some of the applications available are discussed. Some people will choose to monitor their world from their connected devices instead of emerging from their beds hence This IoT is very useful for such people and many research are going through now to improve this technology.

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