

INTERNET OF THINGS (IOT)

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Abstract: *The Internet of Things (IoT) is field that is comparatively new to us but still has helped us in very big way. IoT has become one of essential things in our life with or without knowing it. We have summerised different different application, methods and processes involved in the working of IoT and have provided a brief explanation of the Introductory part of Internet of Things(IoT). This paper is limited to Application and Frameworks use in IoT.*

Keywords: *Internet of Things, Frameworks, Applications*

1. INTRODUCTION

The Internet of Things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet of things has been considered a misnomer because devices do not need to be connected to the public internet, they only need to be connected to a network and be individually addressable.

The main concept of a network of smart devices was discussed as early as 1982, with a modified Coca-Cola vending machine at Carnegie Mellon University becoming the first ARPANET-connected appliance, able to report its inventory and whether newly loaded drinks were cold or not. Mark Weiser's 1991 paper on ubiquitous computing, "The Computer of the 21st Century", as well as academic venues such as UbiComp and PerCom produced the contemporary vision of the IOT. In 1994, Reza Raji described the concept in IEEE Spectrum as "[moving] small packets of data to a large set of nodes, so as to integrate and automate everything from home appliances to entire factories". Between 1993 and 1997, several companies proposed solutions like Microsoft's at Work or Novell's NEST. The field gained momentum when Bill Joy envisioned device-to-device communication as a part of his "Six Webs" framework, presented at the World Economic Forum at Davos in 1999.

Applications

The following are some of the applications of IoT:

1. Consumer applications: A growing portion of IoT devices are created for consumer use, including connected vehicles, home automation, wearable technology, connected health, and appliances with remote monitoring capabilities.

2. Smart home: IoT devices are a part of the larger concept of home automation, which can include lighting, heating and air conditioning, media and security systems and camera systems. Long-term benefits could include energy savings by automatically ensuring lights and electronics are turned off or by making the residents in the home aware of usage.

3. Medical and healthcare: The Internet of Medical Things (IoMT) is an application of the IoT for medical and health related purposes, data collection and analysis for research, and monitoring. The IoMT has been referenced as "Smart Healthcare", as the technology for creating a digitized healthcare system, connecting available medical resources and healthcare services.

2. IOT STANDARDS AND FRAMEWORKS

There are several emerging IoT standards, including the following:

- IPv6 over Low-Power Wireless Personal Area Networks (6LoWPAN) is an open standard defined by the Internet Engineering Task Force (IETF). The 6LoWPAN standard enables any low-power radio to communicate to the internet, including 804.15.4, Bluetooth Low Energy (BLE) and Z-Wave (for home automation).

- ZigBee is a low-power, low-data rate wireless network used mainly in industrial settings. ZigBee is based on the Institute of Electrical and Electronics Engineers (IEEE) 802.15.4 standard. The ZigBee Alliance created Dotdot, the universal language for IoT that enables smart objects to work securely on any network and understand each other.

- LiteOS is a Unix-like operating system (OS) for wireless sensor networks. LiteOS supports smartphones, wearables, intelligent manufacturing applications, smart homes and the internet of vehicles (IoV). The OS also serves as a smart device development platform.

- OneM2M is a machine-to-machine service layer that can be embedded in software and hardware to connect devices. The global standardization body, OneM2M, was created to develop reusable standards to enable IoT applications across different verticals to communicate.

IoT frameworks include the following:

- Amazon Web Services (AWS) IoT is a cloud computing platform for IoT released by Amazon. This

framework is designed to enable smart devices to easily connect and securely interact with the AWS cloud and other connected devices.

- Arm Mbed IoT is a platform to develop apps for IoT based on Arm microcontrollers. The goal of the Arm Mbed IoT platform is to provide a scalable, connected and secure environment for IoT devices by integrating Mbed tools and services.
- Microsoft's Azure IoT Suite is a platform that consists of a set of services that enables users to interact with and receive data from their IoT devices, as well as perform various operations over data, such as multidimensional analysis, transformation and aggregation, and visualize those operations in a way that's suitable for business.
- Google's Brillo/Weave is a platform for the rapid implementation of IoT applications. The platform consists of two main backbones: Brillo, an Android-based OS for the development of embedded low-power devices, and Weave, an IoT-oriented communication protocol that serves as the communication language between the device and the cloud.
- Calvin is an open source IoT platform released by Ericsson designed for building and managing distributed applications that enable devices to talk to each other. Calvin includes a development framework for application developers, as well as a runtime environment for handling the running application.

3. RESULTS

In a nutshell, there are various types of IoT Standards and Frameworks which can be used by a person to develop their own IoT system and use them in their day to day life.

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REFERENCES

1. https://en.wikipedia.org/wiki/Internet_of_things
2. <https://www.techtarget.com/iotagenda/definition/Internet-of-Things-IoT>