



RESEARCH ARTICLE

INNOVATIVE CONCEPT OF IOT IN CLOUD COMPUTING

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ABSTRACT

IoT permits totally different objects to be perceived or controlled remotely across the present network infrastructure. It conjointly helps to integrate objects from the physical world with computer-based systems and, hence, ends up in improved accuracy, efficiency, and economic edges, additionally as reduced human intervention in their operation. Hurrying for a celebration, we have a tendency to might forget to modify off the fans and lights at home. And bear in mind that lapse solely half approach through the party. Returning home to modify off the fans and lights is just not an possibility. Wouldn't it's helpful if we have a tendency to may throw the gadgets and lights at home even once away? What if we have a tendency to may turn on our air conditioners even before getting into our homes in order that we have a tendency to don't have to be compelled to watch for the room to become cooler? Around twenty years past, this is able to have simply been a phantasy however, today, this is often a reality owing to IoT or the web of Things, that amalgamates package with totally different physical hardware devices. It defines IoT because the internetworking of physical devices (also referred to as sensible devices and connected devices), vehicles, buildings and anything embedded with physical science, sensors, actuators, package and network property, that any permits these objects to gather and exchange knowledge.

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INTRODUCTION

In simple words, the Internet of Things refers to the vast world of different interconnected devices that have embedded sensors, which are capable of providing data and also be controlled through the Internet. So now, even when not at home, we can switch off the fans and lights of our rooms using the Internet. Other common examples include different homes automation devices, like remotely controllable lighting fixtures and thermostats. Then there are traffic sensors, water quality meters, smart electric grids and components that track manufactured goods, all of which work with the help of IoT.

Concepts and Resources

The core idea of the Internet of Things became well-liked in 1999, through the Auto-ID Centre at MIT within the United States of America. Since then, there has been ascent within the IoT area, with the emergence of the variety of competitors standards, projects, tools, frameworks, policies and

organizations, that work towards process however completely different connected devices communicate within the current era. Completely different open source tools and open standards are necessary and can still be thus within the future, so as to confirm that each one these devices are ready to interconnect properly. These open source tools can be liable for the back-end tasks of the process the massive volumes of massive information that each one of those devices will generate within the future. IoT permits completely different objects to be perceived or controlled remotely across the prevailing network infrastructure. It conjointly helps in making completely different opportunities for objects within the physical world to directly integrate with computer-based systems, leading to improved accuracy, potency and economic edges additionally as the reduced human intervention. in line with the estimates of many specialists, IoT can carry with it around thirty billion objects by 2020. it's expected to supply extremely advanced property to completely different devices, systems, and services which will really transcend machine-to-machine (M2M) communication, covering a spread of domains, protocols and applications. The interconnection of such embedded devices is predicted to begin automation ubiquitously, and conjointly

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modify numerous advanced applications like sensible grids to expand to areas like sensible cities.

The challenges of IoT

Though IoT usage is growing in numerous fields, there are a couple of challenges that need our attention and action so it is expeditiously leveraged in areas wherever it's not nevertheless getting used. Let's have a glance at a number of these challenges.

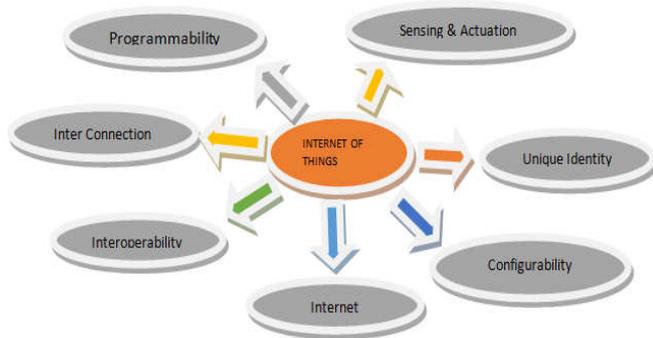


Figure 1. Features of IoT

Data storage and analytics: one amongst the challenges for developers of IoT applications is to clean, method and so interpret the big amounts of data gathered by completely different sensors. The planned resolution for this can be to use wireless sensing element networks. These networks share all the data that's gathered by sensing element nodes, that is then sent to a distributed system for analytics. Another challenge is that the storage of such giant volumes of data.

Platform fragmentation: IoT additionally suffers from platform fragmentation (the inability to support an oversized variety of platforms) and lack of common technical standards. Currently, a good sort of IoT devices (in terms of each hardware and therefore the variations within the computer code running on them) makes the task of developing completely different applications that job systematically across different inconsistent technical systems, difficult. Customers could also be a trifle hesitant to bet their IoT future on proprietary computer code or completely different hardware devices that use proprietary protocols within the concern that these could become obsolete or be troublesome to customize.

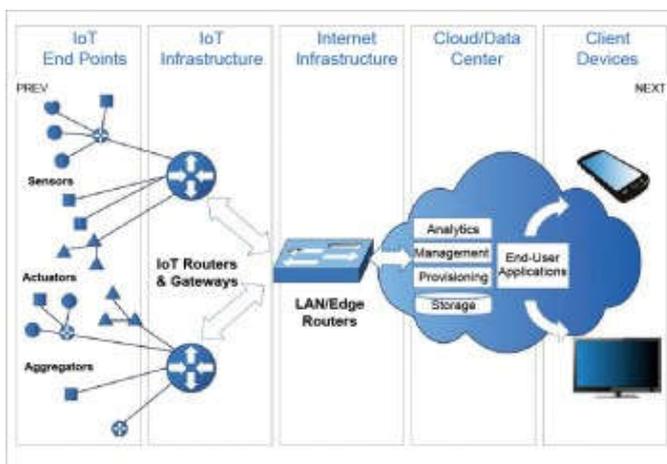


Figure 2. IoT Architectures

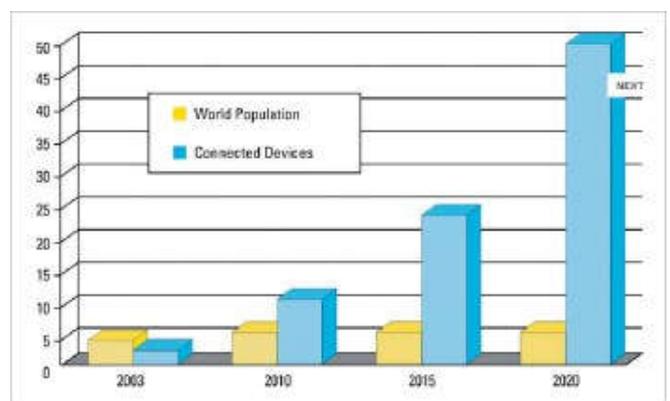
Privacy, autonomy, and control: though IoT has huge potential to empower voters by creating governments clear and by broadening data access, there are serious threats to a citizen's privacy and therefore the scope for political manipulation by the state. Such issues have LED several to conclude that completely different massive information infrastructures just like the kind needed for the net of Things and for data processing area unit incompatible with privacy.

Security: There are several issues raised that IoT is being developed speedily while not a lot of thought being given to the profound security challenges related to it and therefore the completely different restrictive changes that may be necessary. after we talk security issues associated with IoT, we tend to seek advice from securing servers and workstations. The common measures like firewalling or security updates area unit unsuitable for a lot of smaller IoT devices.

Design: the planning and management of IoT should be property and secure. The planning of IoT devices should consider unsure futures with reference to their management, while not risking physical failure. We tend to cannot contemplate IoT devices to achieve success while not giving due thought to the interface's usability yet because of the technology. The interfaces got to be not simply user-friendly however conjointly higher integrated.

Complexity and unclear worth propositions: in keeping with the feedback of many users, IoT solutions area unit either too advanced or lack a transparent use case for various finish users. Consultants conjointly say that the IoT trade is presently heavily targeted on gadgets, and isn't creating those gadgets relevant to specific business verticals. There are unit much that area unit simply not capable to pinpoint what worth IoT offers them.

Traditional governance structures: there's a clash between IoT and therefore the companies' ancient governance structures, as IoT still presents each uncertainty and therefore the lack of historical precedence. Definite processes area unit required to capture the IoT chance. This may facilitate to boost the organizational style processes and to check the new innovation management practices.



Role of open supply in handling the challenges and different aspects of IoT:

The impact of IoT is going to be felt across a good vary of industries and applications, as well as agriculture, medical, producing, physics, consumer, transportation, and energy. a bit like the web, the rising IoT also will depend upon and promote

the adoption of various open supply technologies and standards, as while not the adoption of open standards and protocols, our devices might not be able to communicate with each other. whereas several of the IoT devices ultimately connect back to the web, the various ways they use to speak with each other and with the native management hubs area unit usually proprietary and even poorly documented. There are a unit potentialities that while not a standard foundation for communication, we tend to is also secured into simply one trafficker for all of our devices, and worse, we tend to is also left stranded with a pile of various non-functional hardware if the corporation that makes our devices goes defunct or decides to now not support our devices. There is little question that open supply dominates massive swaths of the intelligent networking and cloud platform code. And for that to translate into IoT dominance, developers can need to fill all potential gaps and implement technologies that area unit essential for IoT. Let's have a glance at the role of open supply in IoT and the way it will facilitate in handling the various challenges.

- We tend to area unit all aware that after we use completely different open supply IoT frameworks, we tend to pay no cash since they're free to be used. With prices, not a barrier, everybody can implement IoT with none hesitation.
- If we tend to attempt to adopt AN open supply IoT framework, we tend to aren't solely drawing on the talents of the developers engaged on this, however, the entire open supply community. to boot, this wider support base usually results in developers obtaining impressed to make newer applications, that they may not have dreamt of once operating in an exceedingly closed, proprietary surroundings.
- The success of the IoT market greatly lies within the property of devices, that a lot of usually than not, share completely different hardware and in operating systems. This can be a significant obstacle to the terrible property we tend to area unit aiming for. If open supply genus API's is used for IoT, then we are able to get obviate this obstacle. This can be as a result of open supply genus API's supply a consistent gate for various codes, hardware and therefore the systems to speak with each other. If one chooses an open supply IoT framework, then developers are going to be ready to build the totally different product, which is able to be practical across totally different OSs like Golem, Windows, iOS, and UNIX.
- AN open supply IoT framework injects the computer code development life cycle with innovation and lightness, that totally different proprietary models fail to match since it offers a large variety of libraries, SDKs and open supply hardware like Raspberry Pi and Arduino. With the assistance of an open supply IoT framework, developers make sure that firms stay on the list of technology by exploitation totally different open sourced tools to customize IoT platforms to suit their wants.
- If we glance at the privacy challenge given by IoT, open supply computer code will defend individuals' knowledge by implementing extremely robust secret writing for the employment of the overall public (SSH, SSL, PGP, etc), and thus offer the building blocks for mobile security and also the protection of information.
- The history of open supply computer code and security has been a roller coaster ride. when long years of dialogue, IT professionals finally began to understand the 'many eyes' approach of open supply computer code communities, once it involves police investigation and addressing the protection risks. The low defect rate of open supply computer code has been proved by freelance studies like Celerity Scans.
- Vast amounts of information ar created by totally different hardware sensors integrated with IoT, and it becomes quite a challenge to handle this knowledge and method it. This knowledge doesn't simply need a special scale of storage and process; however, it additionally needs new techniques like machine learning, computing and data processing. These permit U.S.A. to search out patterns within the knowledge that might not be obvious to totally different ancient analytics strategies. Totally different open supply massive data tools build such analysis potential.

Security of IoT

According to a recent IOActive IoT security survey, less than 10 per cent of all IoT devices has adequate security. the foremost intimidating threat to IoT is that the ability of various hackers to infiltrate and so management a network of devices. try and recall what happened last year once totally different hackers broken the Uconnect system of Landrover Cherokee, and controlled everything, right from the car's air-con system to its accelerator. If we have an ideal match between IoT and open supply, such threats may be restricted to an excellent extent.

- In order to confirm adequate levels of security before we tend to commence our IoT journey, we tend to should outline our security pointers to hide cross-authentication-methods between devices and servers human activity with these devices in addition to proactive malignant code detection. However, such security risks area unit sadly created worse by the customarily opaque security vulnerabilities at intervals the open supply software system. it's essential that we tend to offer our developers simply accessible open supply usage and vulnerability data unceasingly throughout our software system development life cycles in order that they will unceasingly keep a vulnerability check.
- Almost each device that's capable of connecting to a network runs a minimum of a primitive package (along with the code) that makes it perform. If we have AN open ASCII text file base for this, then it permits the safety of the device to be inspected, tested and once needed, simply patched to assist keep the intruders out. totally different secure operative systems, like the UNIX kernel, may be optimised for the embedded devices to assist keep information in addition as devices safe.

Applications of IoT

- IoT helps in energy management by integration the sensing and exploit systems connected to the net.
- The IoT intelligent systems facilitate within the fast manufacture of latest product, dynamically responding to totally different product demands. They allow the

time period improvement of the producing and provide chain networks, by networking sensors, machinery and also the management systems.

- IoT usually makes use of sensors to help in environmental protection by observance air or water quality, soil or region conditions, and might even embrace totally different areas like observance the movement of life in addition as their home ground.
- IoT devices also can be wont to monitor and management the electrical, mechanical and electronic systems employed in numerous styles of buildings.
- IoT is capable of observance and dominant infrastructure like railway tracks, bridges, on- and offshore wind farms, etc.
- IoT also can be wont to alter emergency notification systems and remote health observance. Health observance devices will vary from pulse and pressure monitors to alternative advanced devices capable of observance specialized implants.

Conclusion

The devices with communicating–capabilities is bring closer to the vision of IoT, where the sensing and actuation functions seamlessly blend into the background and new capabilities are made possible through access of rich new information sources. The evolution of the next generation mobile system will depend on the creativity of the users in designing new applications. The IoT is an ideal emerging technology to influence the domain by providing new evolving data and the required computational resources for creating revolutionary applications we present here a user-centric model for approaching this goal through the interaction of private and public clouds. Allowing for the necessary flexibility to meet the diverse and sometimes competing needs of different sectors. It provides us a framework allows networking, computation, storage and visualization themes separate.

Thereby of independent growth in every sector but complementing each other in a shared environment. The consolidation of international initiatives is quite clearly accelerating progress towards IoT, providing an overarching view for the integration and functional elements that can deliver an operational IoT.

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