

IoT – A Pathway to Smart India – Part 2 (Pros & Cons in System)

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Abstract:In 2nd Part of this exploratory paper, the database handling, Cloud based Architecture, Embedded System etc are revealed. It also describes the Advantage & Dis-advantage of IoT. Here the reader can easily understand the risk issue like Security threats on Web etc.

1. Database and IoT

There's no denying the rise of the Internet of Things will challenge existing database systems to adapt to accommodate huge volumes of unstructured data from diverse sources. Some analysts question whether RDBMSs have the scalability, flexibility, and connectivity required to collect, store, and categorize the disparate data types organizations will be dealing with in the future. Others warn against counting out RDBMSs prematurely, pointing out that there's plenty of life left in the old data structures.

Imagine billions of devices of every type flooding data centres with information: a secured entryway reporting on people's comings and goings; a smart shelf indicating a shortage of key production supplies; a pallet sensor reporting an oversupply of stocked items.

The Internet of Things poses unprecedented challenges for database administrators in terms of scalability, flexibility, and connectivity. How do you collect, categorize, and extract business intelligence from such disparate data sources? Can RDBMSs be extended to accommodate the coming deluge of device-collected data? Or are new, unstructured data models required?

As we can imagine, there's little consensus among experts on how organizations should prepare their information systems for these new types and sources of data. Some claim that RDBMSs such as MySQL can be extended to handle data from unconventional sources, many of which lack the schema, or preconditioning, required to establish the relations that are the foundation of standard databases. Other analysts insist that only unstructured, "schema-less" DBMSs such as NoSQL are appropriate for data collection from intelligent devices and sensors.

In a November 28, 2014 article [], ReadWrite's Matt Asay reports on a recent survey conducted by Machine Research [] that found NoSQL [] is the key to "Managing more heterogeneous data generated by millions and millions of sensors, devices, and gateways." Not surprisingly, the two primary reasons for the assessment are NoSQL's flexibility

in handling unstructured data, and its scalability, which the researchers claim RDBMSs simply can't match.

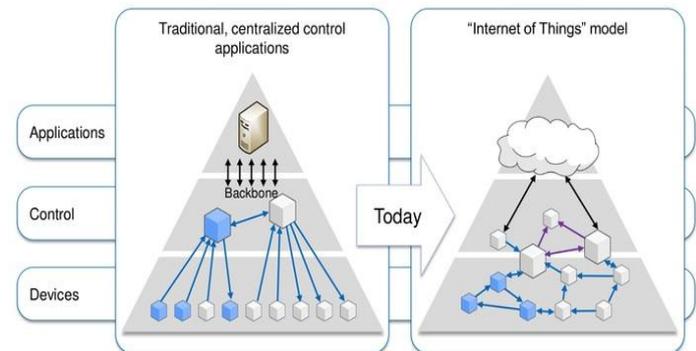


Figure 2: The standard application model is transformed to encompass the cloud by the need to accommodate tomorrow's diverse data sources and types.

Embedded Systems and IoT

As **IoT solutions** present all industries with business opportunities, it gives tremendous opportunities for embedded system developers too. For an embedded developer, it is all about connecting multiple devices to the internet. However, there is a lot more than just being connected to the internet. IoT for embedded systems is more about collecting and analysing large amount of data from different perspectives and summarizing it into useful information to improve the way services and devices are used today.

Major players in embedded hardware and software development are aiming to bring these transformations into their products to take advantage of growing IT market. Smart embedded systems need architecture and design elements to suit real time operations. With billions of devices expected to join in the coming years, analysts expect that IoT will have significant impact on device design. Working with these devices is a different domain for most of the application developers. The key difference between a general OS and RTOS lies within the high degree of reliability and consistency on timing between the task acceptance and completion.

With growth and advancements in the field of electronics and wireless communications, devices around us are able to communicate in a better way than one can imagine. The future of embedded systems and IoT lies in the advancement of technologies that enable faster communication with high interwoven connections between different devices. IoT is gradually sneaking into our lives and is expected to become more persuasive in future. It is going to become a lot more than just a concept, and the interaction between embedded devices will revolutionize the way data and devices are interconnected.

No doubt, the future of **IoT embedded devices** is going to be bright with the easy access of internet in every corner of the world. Internet of things will play a significant role in manufacturing of devices, as a result of which people will have complete access to products at home — even if they are away from home. **The Internet of Things (IoT)** holds a promising future, especially in North American embedded industry where companies come up with innovative products.

Big Data and IoT

Big Data and IoT are two different sides of the same coin. *Big Data is analyzing large amounts of mostly human-generated data to support longer-duration use cases such as predictive maintenance, capacity planning, customer 360 and revenue protection while IoT is aggregating and compressing massive amounts of low latency / low duration / high volume machine-generated data coming from a wide variety of sensors to support real-time use cases such as operational optimization, real-time ad bidding, fraud detection, and security breach detection*

2. ADVANTAGES AND DISADVANTAGES OF IoT

IoT ADVANTAGES

The advantages of IoT span across every area of lifestyle and business. Here is a list of some of the advantages that IoT has to offer:

- **User convenience** - The basic advantage is user convenience. It becomes very easy to perform all activities on our fingertips. Even if we are not present at home we can access all our home system remotely. One can keep track of all the activities taking place in his/her home in event of absence.
- **Maintaining and Saving Energy** - Our smart product helps us to manage our home's energy consumption. For example, automate our thermostat to adjust settings throughout the day based around the times someone is

home or the house is empty. Some "smart" devices can be synced up to your appliances with real-time energy information. This helps your home appliances know the most cost-effective voltage operate.

- **Enhanced Security** - Security during one's absence is quite important. With the help of security cameras we can easily eliminate unwanted people from our home. We can keep track of all the activities which take place in our home in absence. Home alert/automation systems have many security benefits. This allows us to track the activities at our home from any location. Some complete home automation systems will alert us by phone, text or email if there is any unusual movements within our home. For example, automated systems include automatic door locks. Through an automated system, the doors can be locked. This is also a great benefit for us if we have to leave to work before our children leave for school. Often, children run out the door to catch the bus and forgot to lock the door. The fact that we can be alerted each time someone enters our home also allows us to monitor who is entering our home at all times, even when we are not there.
- **Environment and Economical Contribution** - Simply put, we are contributing to the economy when we purchase and utilize a home automation system. We ensure that we are only using the energy and resources that are necessary while we are home, and we are sustaining resources. Home Alert/Automation Systems provide convenience and saves our time and effort performing home activities. When we properly manage our energy, we can reduce our energy consumption, which may help us to save money.
- **Parental Control** - Parents can have complete control over their kid's rooms. For example, it's 10 and parents want their kids to sleep, so just turn off the TV set and lights using their handset. Even user tries to switch it on again, parents will be notified about the same.
- **Improved Customer Engagement** – Current analytics suffer from blind-spots and significant flaws in accuracy; and as noted, engagement remains passive. IoT completely transforms this to achieve richer and more effective engagement with audiences.
- **Technology Optimization** – The same technologies and data which improve the customer experience also improve device use, and aid in more potent improvements to technology. IoT unlocks a world of critical functional and field data.

- **Reduced Waste** – IoT makes areas of improvement clear. Current analytics give us superficial insight, but IoT provides real-world information leading to more effective management of resources.
- **Enhanced Data Collection** – Modern data collection suffers from its limitations and its design for passive use. IoT breaks it out of those spaces, and places it exactly where humans really want to go to analyze our world. It allows an accurate picture of everything.

4.2 IOT DISADVANTAGES

Though IoT delivers an impressive set of benefits, it also presents a significant set of challenges. Here is a list of some its major issues:

- **Security** – IoT creates an ecosystem of constantly connected devices communicating over networks. The system offers little control despite any security measures. This leaves users exposed to various kinds of attackers.
- **Privacy** – The sophistication of IoT provides substantial personal data in extreme detail without the user's active participation.
- **Complexity** – Some find IoT systems complicated in terms of design, deployment, and maintenance given their use of multiple technologies and a large set of new enabling technologies.
- **Flexibility** – Many are concerned about the flexibility of an IoT system to integrate easily with another. They worry about finding themselves with several conflicting or locked systems.
- **Compliance** – IoT, like any other technology in the realm of business, must comply with regulations. Its complexity makes the issue of compliance seem incredibly challenging when many consider standard software compliance a battle.

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