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THE CUSTOMER EXPERIENCE USING INTERNET OF THINGS

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Abstract

The internet of things is not some funnel dream; it is a completely new worldview for building connections. Yet deciding when, how, also, to what degree to apply associated items and other sensor-created information to the client experience stays inadequately comprehended by advertisers and advanced strategists. This paper gives the idea for modeling the customer experience using internet of things along with this architecture of IoT. use cases for customer experience in the internet of things different steps for architecting consumer-facing IoT experiences the new risks in IoT and applications of IoT.

1. INTRODUCTION

Over the last decade net has created vital impact in our economies and societies by transfer in exceptional communication and networking infrastructure. The world-wide net has been a serious driver of worldwide data and media sharing. IOT may be a platform for connecting folks, objects, and environments to tell and alter visibility, engagement, and innovation. The Internet of Things (IOT) describes a worldwide network of intercommunicating devices. It integrates the ever-present communications, pervasive computing, and close intelligence. This can give the premise for several new applications, like energy observance, transport safety systems or building security. This vision can for certain modification with time, particularly as synergies between Identification Technologies, Wireless sensing element Networks, Intelligent Devices and technology can alter variety of advanced applications. Innovative use of technologies like RFID, NFC, Zig Bee and Bluetooth, and area unit conducive to form a price proposition for internet of Things stakeholders

The Internet of Things (IOT) is a domain in which protests, creatures or individuals are given one of a kind identifiers and the capacity to exchange information over a system without obliging human-to-human or human-to-PC collaboration. IOT has developed from the union of remote advancements, smaller scale electromechanical frameworks (MEMS) and the Internet. The idea might likewise be alluded to as the Internet of Everything. A thing, in the Internet of Things, can be a man with a heart screen embed, a ranch creature with a biochip, a car that has worked in sensors to alarm the driver when tire weight is low - or whatever other common or man-made article that can be doled out an IP address and gave the capacity to exchange information over a system. In this way, the Internet of Things has been most nearly connected with machine-to-machine (M2M) correspondence in assembling and power, oil and gas utilities. Items worked with M2M correspondence abilities are frequently alluded to as being shrewd.

IPv6's massive boom in deal with space is an important factor within the improvement of the net of things. Humans should effortlessly assign an IP deal with to each "thing" on the earth. An boom in the variety of smart nodes, as well as the amount of upstream records the nodes generate, is predicted to raise new issues approximately information privacy, information sovereignty and protection.

The IoT is large due to the fact an item that could represent itself digitally becomes something more than the object by using itself. not does the item relates just to you, but is now connected to surrounding items and database statistics.

2. ARCHITECTURE OF IOT

The IOT Reference Model gives the most noteworthy reflection level to the meaning of the IOT-An Architectural Reference Model. It advances a typical comprehension of the IOT area. The portrayal of the IoT Reference Model incorporates a general talk on the IOT area, an IOT Domain Model as a top-level depiction, an IOT Information Model clarifying how IOT data will be displayed, and an IOT Communication Model with a specific end goal to comprehend specifics about correspondence between numerous heterogeneous IoT gadgets and the Internet all in all.

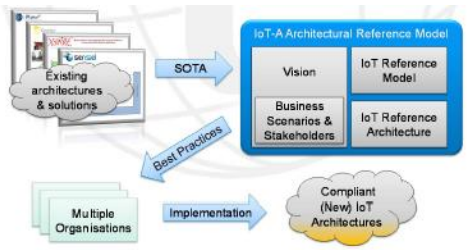

Fig.1: IOT Reference Architecture

The meaning of the IOT Reference Model is adjusting to the OASIS reference model definition. The IOT Reference Architecture is the reference for building agreeable IoT structures. Thusly, it gives perspectives and points of view on various building angles that are of worry to partners of the IOT. The terms perspective and viewpoints are utilized by general writing and norms the making of the IOT Reference Architecture concentrates on unique arrangements of systems instead of solid application.

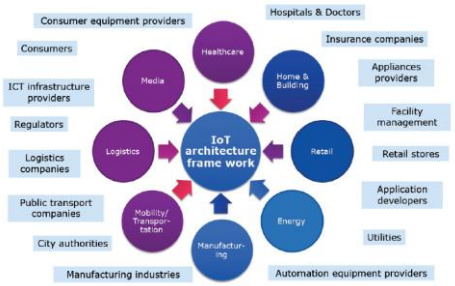

Fig.2: IOT Architecture Framework

IOT Reference Architecture ensures the interoperability of solutions and allows the formation of new synergies across those domains.

3. MODELING THE CUSTOMER EXPERIENCE USING INTERNET OF THINGS

In many ways, utilizing IoT can be a win-win for brands and consumers. From a brand standpoint, product voice helps those in consumer-facing functions (e.g., marketing, support, sales, and product) achieve common goals: brand awareness, insight, contextual relevance, satisfaction, efficiency, loyalty, innovation, and conversion. IoT helps achieve these goals through the following:

A. Context, context, context.

By utilizing sensors and client knowledge, IoT conveys us closer than at any other time to a definitive advertising objective: conveying the right substance or involvement in the right connection. At the end of the day, conveying the right data or administration to the opportune individual, at the perfect place and time by means of the right stage

B. Unprecedented insight into the customer journey.

Making and checking sensor-based touch focuses in the logged off world gives brands experimental, regularly client driven, experiences that scaffold the verifiably baffling crevice between how buyers carry on online and what they do in conjunction disconnected from the net.

C. The world's largest focus group

IoT enables real-time insights on actual consumer behavior, product performance, and consumer-product/service interaction, not just what people say they do and what they say the product and service do. As a result, product and service optimization can happen faster and with greater accuracy. It can also reduce friction in traditional consumer-driven communications with brands.

D. Consumer-driven optimization

Advertisers can influence buyer association for progressing enhancement on account of ongoing knowledge into how shoppers communicate with associated endpoints, the capacity for end clients to modify inclinations, machine learning, and other prescient abilities. This implies more precision and less speculating.

3.1. Use cases for customer experience in the internet of things

How can brands actually enhance customer experience in the Internet of Things? The following primary use cases represent how brands can design customer experiences in the Internet of Things

Use case 1: reward reward consumers for their time, money, effort, and engagement

Use case 2: information and decision making empower consumers with the ability to access and act on intelligence

Use case 3: facilitation foster easier, more accessible and convenient brand experiences

Use case 4: service support and retain customers by proactively identifying opportunities

Use case 5: innovation leverage feedback for rapid r&d, customization, and improvement

3.2. Four steps for architecting consumer-facing IOT experiences

A. Prioritize Use Cases

- Define Future State Customer Experience Vision
- Begin with Empathy
- Replace Behaviors, Don't Reinvent Them
- Consider the Platform
- Start Small, but Prioritize with an Eye for Multiple Use Cases

B. Make The Business Case

- Align IoT Initiatives with Business Objectives
- Educate All Stakeholders on IoT's Potential & New Business Model Creation

C. Build The Infrastructure For Interoperability

- Collaborate & Integrate Across Teams & Workflows
- Focus on Data Integrity First
- Integrate Technology, Standards, & Data for Interoperability
- Infuse Content Strategy into IoT Use Case Prioritization

D. Engage With Transparency

- Prioritize Transparency in Consumer Communications
- Brands Have an Ethical Obligation to Default to Privacy
- Craft Experiences to Reflect (& Respect) Existing Relationship
- Anticipate Messaging Evolution
- Move Strategically—which May Mean Conservatively

3.3. Examples Of IOT Platform

The IoT Platform enables users to connect, create, analyze and experience "things" in new ways.

- **ThingWorx IOT Platform**

The ThingWorx IoT Platform is the secure and scalable foundation for building and deploying enterprise IoT applications for connected products - faster and more cost-effectively than internally built solutions.

ThingWorx is the industry's leading Internet of Things (IoT) technology platform. It enables innovators to rapidly create and deploy game-changing applications, solutions and experiences for today's smart, connected world.

4. WAYS THE INTERNET OF THINGS WILL CHANGE THE WAY WE WORK

The "Internet of Things" (IoT) may sound like the futuristic wave of talking refrigerators and self-starting cars, but Internet-connected devices that communicate with one another will affect our lives outside the "smart home" as well. For workers, IoT will change the way we work by saving time and resources and opening new opportunities for growth and innovation.

i. Even more data

Companies will have access to an enormous flood of data that all these connected devices will generate. But that data needs to be analyzed to understand more about customers and

trends. Companies will need to start using IoT data as part of their planning in order to stay competitive and to offer innovative new services and products."

ii. Know where everything is, all the time

IoT has the potential to make the workplace life and business processes much more productive and efficient.

"Companies can track every aspect of their business, from managing inventory and fulfilling orders as quickly as possible to locating and deploying field service staff. Tools and factories and vehicles will all be connected and reporting their locations.

iii. Get anywhere faster

The interconnectivity of mobile devices, cars and the road you drive on will help reduce travel time, thus enabling you get to work faster or run errands in record time.

iv. Cheaper, greener manufacturing

"The Internet of Things will drastically lower costs in the manufacturing business by reducing wastage, consumption of fuel and the discarding of economically unviable assets."

v. Completely remote mobile device management (MDM)

IoT will also enable remote control of other Internet-connected devices, the cutting-edge technology that has given them full control over smartphones and tablets now allows remote management over other devices, including Android cameras and set-top boxes, among others.

vi. Increased device management complexity

As the number of connected devices grows, so does the complexity of managing them. With IoT, they will have an additional function: controlling IoT-connected devices. "Many of the future IoT-connected devices will not have a screen. The way to take control over the device will be via smart phones,".

vii. Save time and get more out of your day

One of the most convenient aspects of IoT is that you have devices that "know" you and will help save time by allowing you to get in and out of places and conduct transactions faster using a mobile device.

"The iPhone or Android will increasingly interact with a whole range of sensors that you never see and don't own, but which provide your Smartphone with valuable information and act on your behalf through an app".

viii. You may actually have to work harder

It's being driven by data and large-scale efficiencies when you convert something to bits rather than atoms."

"Netflix more or less destroyed Blockbuster by using the Internet to vastly improve the logistics of exchanging DVDs and removing pesky late fees. Then they converted the atoms of a DVD into bits and deliver 80 percent of their movies over broadband now. [You get] more movies on-demand and lower costs. And an entire industry — the DVD rental business — is consigned to the archive of history."

5. THE NEW RISKS in IOT

With the future connection of billions of devices, the number and type of attack vectors will increase, as will the amount of data, creating a daunting challenge for companies and those responsible for defending the infrastructure. It's no longer a matter of if attacks will happen, but when. Incentives for attackers are extremely large, and all organizations must understand how attackers pursue valuable.

i. IoT devices as infection vectors

IoT devices as could be used as infection vectors to spread malware across organizations or become the source of denial-of-service attacks which could in turn cause damage or in some instances, loss of life.

ii. Privacy

When adversaries reach a point where they can begin correlating information from different sources a car, a smart phone, a home automation system they will be able to gain a much bigger picture about a user than if they were looking at information from only one device, system, or application. These details about users, from their shopping habits to their physical location, will allow actors to launch well-crafted, highly targeted campaigns at a level of sophistication never before seen.

iii. Forgotten assets

There is the squeezing worry of the developing populace of deserted and unmanaged Internet-associated gadgets. What's more, one issue that digital security experts predict is that these overlooked resources won't get fixed through any deliberate means abandoning them very defenseless. To battle these dangers over the whole assault continuum — some time recently, amid, and after an assault, associations need pervasive insurance over an expansive scope of assault vectors. Reinforcing frail connections over the security chain rests to a great extent upon the capacity of individual associations and industry to make mindfulness about digital danger at the board level and make digital security a basic for the business.

6. THE NEW OPPORTUNITIES

There are insufficient assets or mastery to address all the information and occasions over the blasting number of associated gadgets. In any case, associations that address these rising difficulties with a comprehensive methodology can be better arranged to catch esteem from new open doors and experiences. What's required is a risk driven and computerized way to deal with Security that traverses both the operational innovation (OT) where large portions of the IoT gadgets frequently live and data innovation (IT) spaces. Generally, associations control and screen these situations independently. As the OT layer turns out to be progressively IP-empowered and web associated, the OT layer can turn into a state of weakness that security foes can assault straightforwardly or turn from to assault the IT layer. Along these lines the requirement for a brought together approach crosswise over both areas that conveys the accompanying capacities.

Visibility-Driven: The more we can see, the more we can correlate information and apply intelligence to understand context, make better decisions, and take action—either manually or automatically. This capability has broad implications for not only IT security, but also across the entire enterprise.

Threat-Centric: As we focus on detecting, understanding, and stopping security threats through continuous analysis, real-time security intelligence can be delivered from the cloud and shared across all security solutions to detect and remediate against threats.

Platform-Based: Security is no longer solely a network issue. It requires an integrated system of agile and open platforms that cover the network devices, and the cloud. While there is no silver bullet to addressing every security risk, intelligent cyber security is what will enable a secure IoT and IoE world.

7. APPLICATION

There are a few utilizations of organized Things in Agriculture, Healthcare, Retail, Transport, Environment, Supply chain administration, Infrastructure checking and so forth. Some of them are recorded beneath:

- Agriculture: Applications in Agriculture incorporate Soil and plant checking, Monitoring of nourishment inventory network, Monitoring of creatures
- Retail Management: Retailing has numerous applications zones of business hobby. It incorporates observing client conduct and inclinations, Shelf stock following, connection based publicizing and item advancements, candy machines, robotized checkout, and burglary control.

- Healthcare: Identification of spurious medications is a noteworthy application in human services region. Other application regions are close to home wellbeing checking, telemedicine, helped living.
- Security: Detection of fake merchandise, Access control, confined materials, Banknotes, Passports
- Government and open part: Disaster administration, Forest observing, Tourism bolster, Homeland security, Pollution checking
- Home: Home security, Smart - home (lighting, amusement, vitality administration, help)
- Sports: Sports gear: client execution observing, Safety.

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