

IoT Challenges: Standardization

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I. ABSTRACT

Over the last few years, the Internet of Things (IoT) has grown in popularity and usage by leaps and bounds. The relevance of IoT in the lives of industries, technologists, and home users is well understood. Essentially, the Internet of Things (IoT) has brought in a massive industrial revolution and has aided in the automation of numerous activities in businesses and homes. The rapid rise of IoT, on the other hand, is a significant source of concern. Not only are security, authentication, and privacy issues plaguing IoT. It also doesn't work as effectively as it should with access control issues. Industry 4.0 refers to the fourth industrial revolution. The lack of effective regulation, standards, and governance has resulted in a steady decline in the security of IoT networks and devices, as well as a wide spectrum of privacy concerns. This paper investigates the Internet of Things industry and discusses the critical need for standardisation, the benefits of governance, and the challenges that the IoT sector faces as a result of the lack of regulation. We also introduce an IoT security framework (IoTSFW) for organizations in this study to address the existing absence of rules in the IoT market. Implementing the guidelines outlined in the suggested framework will aid organizations in achieving security, privacy, long-term viability, and scalability in their IoT networks.

II. INTRODUCTION

Microsoft's Windows 3.0 was hailed as a groundbreaking achievement little over three decades ago. It was an operating system for the 8086 CPU that could run on just 384KB of memory. It wowed users with its user-friendly graphical interface and multitasking capabilities. Fast forward to today, and we can see that we are surrounded by Internet of Things (IoT) devices and systems that run on very little memory but can perform far more complicated calculations than Windows 3.0 could back in the 1990s. The Internet of Things has generated a huge network of connected gadgets that are continually communicating with millions of other "Objects" connected to the Internet. The IoT industry's immense expansion has had enormous positive effects on the people, and IoT is playing a major role in bringing man closer to technology. In the commercial sector, one of the advantages of this technology is its capacity to assist Industry 4.0, automation, efficient data collecting, cheaper production and maintenance costs, and so on. Many researchers, academics, and industry experts have

been astonished by the rapid and widespread acceptance and deployment of IoT. Another impressive feature of the Internet of Things is how technology has made our lives easier, more productive, and less stressful. Not only has AI incorporated in little hardware like Amazon Echo and Google Home provided us with direction and support, but it has also taken over arduous elements of our lives, such as automated shopping through smart fridges, self-driving automobiles, and difficult medical procedures conducted by robots. Furthermore, IoT is being utilized to intelligently monitor, identify, analyze the environment, and manage critical infrastructure. However, the absence of regulation in the industry, which is still considered to be in its infancy, has hampered IoT development. The International Organization for Standardization (ISO) has done numerous studies, most recently in the last ten years, to establish the economic benefits of standardization for rising technology enterprises. These case studies convincingly demonstrate that adopting standards to organizations results in practical benefits, such as streamlined internal operations, increased innovation, increased financial returns, and enhanced chances to join new markets. According to some estimates, there are trillions of Internet-connected things. It is becoming increasingly important for IoT devices to operate securely as they gather, transmit, store, and analyse data in an unobtrusive manner. However, the market suffers from unregulated IoT proliferation because to a lack of defend norms, regulation, and universal standards. Many manufacturers, developers, and facilitators of this technology operate without oversight or regard for security, resulting in poor security across the IoT ecosystem as a whole. While certain recent advancements in the area of standardization, like as the UK Government's Secure by Design Initiative, have addressed industry concerns, they do not fully address them. Furthermore, present standards and projects only cover a tiny percentage of IoT components and services.

III. STANDARDISATION IN SCIENCE

When talking about standards, it's crucial to first understand why they're being implemented in the first place. A standard's principal goal is to systematize the application of instructions. Standards that are developed via research and endorsed by industry experts are both authoritative and credible. A standard seeks to formalize a consensus on how to perform an action, develop a product, measure an object, or provide a service. Standards can assist organizations in

applying instructions consistently and equally across the board in this way. Additionally, the same standards can be used to measure conformity with the original instructions at a later time. Hundreds of standards exist now, covering a wide range of topics from toy safety to nuclear power plants . Extensive scientific research, collaboration between industry, academics, and legislative organizations are all used to create effective standards. Organizations accept standards once they have been finalized. Sector experts' involvement, which demonstrates both a knowledge of the subject matter and an understanding of the demands of their industry, is critical in the formulation of effective standards . Standardization not only improves the quality of services and products, but it also aids the growth of scientific knowledge. Perhaps the most famous example of such progress is that of 'Drosophila,' the standardized fruit fly, which has resulted in significant advances in genetics. Drosophila experiments in 1916 were the first to show that genes exist on chromosomes. As a result, Drosophila was the first organism to have its entire genome sequenced in the year 2000 . According to research, many different units of weights and measures existed in France in the late seventeenth century. Anxiety, misunderstanding, and dishonesty in dealing resulted from the huge number of units used to measure common commodities. As a result, during the French revolution, the previous system of measures was replaced with a single unified measuring system throughout the country . This move paved the way for inter-regional trade, the formation of a competent state administration, and the ability for residents to perform their own measurements with the assurance that their calculations would be acknowledged throughout the state. The first generation of standards in the information technology sector were formally launched in the late 1980s, when IBM developed and standardized private networking solutions such as TCP/IP . In the 1980s, when the Internet began to emerge as a platform for cost-effective communication and data sharing, IEEE 802.3 was developed as a standard for 10Mb/s Ethernet. Standards in the communication sector focused on system optimization to enable new services like email, data transfer, and telephony. Whereas, in the information technology industry, the next generation of standards focused on enhancing quality of service (QoS) in order to meet the growing demand for multimedia services among end users.

IV. BENEFITS OF STANDARDISATION

V. ISSUES DRIVING THE STANDARDS DISCUSSION IN THE IOT INDUSTRY

A. *Security*

B. *Interoperability*

VI. OUTLOOK OF STANDARDISATION IN THE IOT INDUSTRY – ANALYSIS

VII. CONCLUSION

VIII. REFERENCE

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