

## IoT Data Management and Applied Research in Qatar

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Internet of Things (IoT) is a network of interconnected devices which carry potentially data to serve multiple users. Internet of Things (IoT) has changed the perception of life in every sector of human operation. The number of connected devices is being increased every day making the traditional objects into smart, intelligent and coordinating in decision making. In 2010, the number of IoT connected devices has surpassed the human population and have a significant home and market applications which make these devices highly important. The term Internet of things (IoT) was first introduced by Kevin Ashton in 1999 [1] and it is predicted that by 2020 there will be more than 50 billion smart objects and each person would be owning approximately 7 physical smart devices [2]. Due to the use of modern technologies like Smart Home & Agriculture automation and Education, Energy & Building management, IoTs are rapidly being adopted worldwide. At the same time, the risks and challenges in data management are worth concerning that create obstacles to the services it provides. Due to the associated risks with IoT devices and networks, some of the users are resistant to use these smart devices. Figure 1 below gives an overview of risks with data management are shown. This article provides an overview on current risks and challenges in IoT data management and latest research works in IoTs in Qatar.

The major challenges for IoT data management are Data Storage, Integrity, Privacy and Confidentiality [3].



Figure 1 IoT Data Management Challenges

➤ **Data Integrity, Privacy and Confidentiality:** IoT devices exchanges enormous data every day. The number of attacks against these devices has made it difficult to maintain the integrity, privacy and confidentiality of data in motion and data at rest [4]. Robust authentication, access control and other defense mechanisms can ensure overcoming the following challenges of IoT data management.

➤ **Data Storage:** Due to increase in the number of IoT devices, the huge amount of data is being generated. The concern for data storage and management is rising every year. It requires efficient mechanisms to collect, store and manage data. In addition, better data analysis tools are needed to extract and save useful data [5].

Other areas of concern are Data Heterogeneity & Mobility Management, Interoperability, Data Access Management, Knowledge Management, Data Aggregation tools and Data Analysis tools.