

Initiatives towards the cross-domain interoperability of Smart Devices

Abhishek Kumar Vishwakarma ^a, Dr. Rahul Kumar Ghosh ^b

Ram Krishna Dharmarth Foundation University, Ranchi, Jharkhand, India

^b *Ram Krishna Dharmarth Foundation University, Ranchi, Jharkhand, India*

**Corresponding author email id:*

abhishek.kumar762@gmail.com

ABSTRACT

Smart devices, enabled with internet connectivity and computing capabilities, collect data and interact with their environment. These IoT devices offer increased functionality and convenience, from household appliances to industrial sensors. Technological advancements, cost reductions, and the demand for efficiency and security drive their popularity. The global IoT market is projected to grow significantly, especially with the rise of smart homes, 5G networks, and IoT adoption in sectors like healthcare and manufacturing. Interoperability, crucial for seamless operation of diverse smart devices, faces challenges including fragmented standards, security risks, technical complexity, and conflicting market incentives. Efforts to address these challenges involve industry-wide standards, open-source platforms, and secure communication protocols. However, ensuring interoperability among diverse devices presents significant challenges:

1. **Fragmented standards:** The rapid growth of IoT has led to the proliferation of standards, protocols, and technologies, hindering interoperability efforts.
2. **Security and privacy:** Interoperability increases vulnerability to cyber threats, raising concerns about security and privacy.
3. **Technical complexity:** Achieving interoperability is technically complex and requires substantial time and resources, compounded by compatibility issues and lack of standardization.
4. **Market incentives:** Conflicting interests among manufacturers make it difficult to establish common standards and protocols.

Despite these challenges, ongoing efforts aim to enhance interoperability through industry-wide standards, open-source platforms, and secure communication protocols. By addressing these challenges, the potential benefits of interoperability can be realized, leading to a more connected and seamless IoT ecosystem. This paper reviews recent IoT protocols and standardization developments, focusing on interoperability.

Keywords: IoT, Smart Devices, Interoperability, IoT Protocols