

# **Blockchain in IoT: Examples, Challenges & Real World Applications**

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- both **Blockchain** and IoT are revolutionary technologies that are changing the world around us
- Blockchain refers to an encrypted, distributed, decentralized computer filing system designed to facilitate the creation of tamper-proof, real-time records.
- IoT is a term used to describe the interconnection of computing devices embedded in everyday objects via the Internet that allows them to send and receive data.

- While Blockchain empowers IoT devices by enhancing their security and bringing transparency within the IoT ecosystems, IoT allows smart devices to send data to private blockchain ledgers to be included in shared transactions along with other tamper-resistant records.
- The combination of Blockchain and IoT can enable businesses to both access and share IoT data within their private network safely, without needing any central control and management system whatsoever.

# IoT Challenges – How can Blockchain help?

- According to [Statista](#), the total installed base of IoT connected devices globally is estimated to stand at 75.44 billion by 2025, indicating a fivefold increase within ten years. As the number of smart devices and connected devices increases around the world, the amount of data generated every second will continue to scale higher and higher.

- Handling such vast amounts of data inevitably raises security concerns what with the incidence of cybercrimes increasing significantly over the last decade. With millions of devices connected to the Internet, each becomes vulnerable to possible security breaches (hacking, phishing, etc.) if proper security measures aren't put in place. Although the existing security technologies are playing a major role in mitigating IoT security risks, they won't suffice in the long run.

- Furthermore, the current IoT ecosystems rely on centralized, brokered communication models, better known as the server/client paradigm. In this infrastructure, all devices are identified, authenticated, and connected through cloud servers that have massive processing and storage capacities.
- These IoT solutions are highly expensive, thanks to the high infrastructure and maintenance costs of centralized cloud services. As the number of IoT and connected devices increase, these costs will multiply substantially. Hence, not all businesses will be able to afford cloud IoT solutions.

- However, with a decentralized approach as Blockchain, these challenges can be easily overcome. This is because adopting a standardized peer-to-peer communication model to process the massive volumes of transactions between connected devices will reduce the installation and maintenance costs of large centralized data centers.

# 1) Supply Chain and Logistics

- A supply chain network involves numerous stakeholders, and this is primarily the reason why delivery delay becomes one of the biggest challenges in the supply chain and logistics industry. This is where Blockchain and IoT enter.
- While IoT-enabled devices will allow companies to track shipment movement at every stage, Blockchain will provide transparency to the entire transaction. IoT sensors (for example, motion sensors, GPS, temperature sensors, etc.) can offer details about the shipment status.
- This information is then stored in the Blockchain network for transparency – once the data is recorded on the Blockchain network, all the supply chain stakeholders listed in the Smart Contracts can access to the information in real-time. Together, Blockchain and IoT can help improve the reliability and traceability of the supply chain network.



- **2) Automotive Industry**

- Digitization has swept across all sectors of the industry, and the automotive industry is no exception. Today, automotive companies are leveraging IoT-enabled sensors to develop fully automated vehicles. The automotive industry is further inclined to connecting IoT enabled vehicles with Blockchain tech to allow multiple users to exchange crucial information easily and quickly.
- Also, the industry is readily exploiting Blockchain IoT use cases that can transform autonomous cars, smart parking, and automated traffic control for the better.
- NetObjex presents a compelling case in point by creating a smart parking solution by combining Blockchain and IoT. It has collaborated with PNI, a parking sensor company for real-time vehicle detection and finding possible parking spots in the parking area. The integration also automates payments using crypto-wallets.

- **3) Smart Homes Industry**

- In the traditional centralized approach, exchanging information generated by IoT devices lacks the security standards and ownership of data. However, thanks to Blockchain IoT allows homeowners to manage the home security system remotely from the smartphone. Blockchain could elevate Smart Homes security by eliminating the limitations of centralized infrastructure.
- For instance, Telstra, an Australian telecommunication and media company, provides smart home solutions. The company has implemented Blockchain and biometric security to ensure no one can manipulate the data captured from smart devices. Naturally, when the data is saved on the Blockchain, only the authorized person/persons can access it.

- **4) Pharmacy Industry**
- One of the biggest challenges of the pharmaceutical sector is the increasing incidence of counterfeit medicines. Thanks to Blockchain IoT, the pharmacy industry is now capable of countering this issue. Blockchain IoT allows all the stakeholders involved in the drug manufacturing process to be responsible and update the Blockchain network with relevant information in real-time.
- The transparent nature of Blockchain will further allow all the stakeholders to access and monitor all the stages of drug manufacturing and supply from their connected devices.
- **Mediledger** is one interesting Blockchain IoT applications that can track the legal change of ownership of prescription medicines.

# Conclusion

- **Blockchain** technology is the answer to some of the primary challenges of IoT, including its scalability, privacy, and reliability. Blockchain tech can be an excellent means to track and monitor billions of connected devices, thereby enabling the sharing and processing of transactions between connected devices.