

AEROSPACE & DEFENCE

Cost savings and efficacy benefits of blockchain and IoT in airport retail supply chain

executive summary

This white paper explores integrating blockchain technology and Internet of Things (IoT) devices to enhance efficiency and reduce costs in the supply chain of retail products from the land side of an airport through security and into airside retail outlets.

By leveraging blockchain for product authentication and IoT devices for real-time tracking, the supply chain can become more transparent, secure, and streamlined. This approach minimises administrative burdens, enhances security, and supports a trusted trader model that benefits manufacturers, distributors, airport authorities, and retailers.

Key takeaways

- 1. Product authentication and verification:** Blockchain provides immutable records and enhances trust without intermediaries.
- 2. Streamlined security checks:** Automated verification reduces administrative load and speeds up processing.
- 3. Real-time tracking and monitoring:** IoT devices offer continuous monitoring and proactive issue resolution.
- 4. Low-cost implementation:** Scalable and affordable IoT devices integrate easily with existing systems.
- 5. Transparency and traceability:** End-to-end visibility improves inventory management and reduces fraud risk.
- 6. Enhanced Security:** The trusted trader model and continuous tracking reduce counterfeiting.
- 7. Cost Savings:** Lower administrative and security costs, and minimized losses through real-time tracking.

REACHING TERMINAL VELOCITY

introduction

Airports are bustling hubs where retail operations are critical to both passenger satisfaction and revenue generation. However, the movement of products from manufacturers to airside retail outlets involves **complex logistics, stringent security checks, and significant administrative overhead.**

Traditional methods often lead to **delays, increased costs, and security vulnerabilities.** The integration of **blockchain and IoT** presents a solution to these challenges.

The role of blockchain in the supply chain

Product authentication and verification

Blockchain technology provides a decentralised and immutable ledger for recording transactions and verifying product authenticity. Each product can be assigned a unique digital identity recorded on the blockchain from the point of manufacture. This identity includes key information such as origin, manufacturing details, and ownership history.

- **Immutable records:** Blockchain ensures that once a product's data is recorded, it cannot be altered, providing a reliable and tamper-proof trail.



- **Enhanced trust:** Stakeholders along the supply chain can trust the authenticity of products without the need for intermediary verification.

Streamlined Security Checks

By utilising blockchain, airport security can shift from manual checks to a more efficient system where product authentication is verified digitally from the source all the way along the supply chain. The entire history of a product is available on the blockchain, allowing for quick and accurate verification at security checkpoints.

- **Reduced administrative load:** Automated verification reduces the need for manual paperwork and scanning of individual items.
- **Faster processing:** Security personnel can process consignments more quickly by relying on blockchain data.

The role of IoT in the supply chain

Real-time tracking and monitoring

Scalable IoT devices, such as low-cost sensors, RFID tags and LowRA sensors, can be attached to products and consignments to provide real-time tracking and monitoring throughout the supply chain.

These devices collect data on the location, condition, and status of products, which are then recorded on the blockchain.

- **Continuous monitoring:** IoT devices provide continuous updates on product location and condition, ensuring transparency.
- **Proactive issue resolution:** Alerts from IoT devices can help stakeholders address potential issues, such as temperature deviations or unauthorised access, promptly.

Low-cost implementation

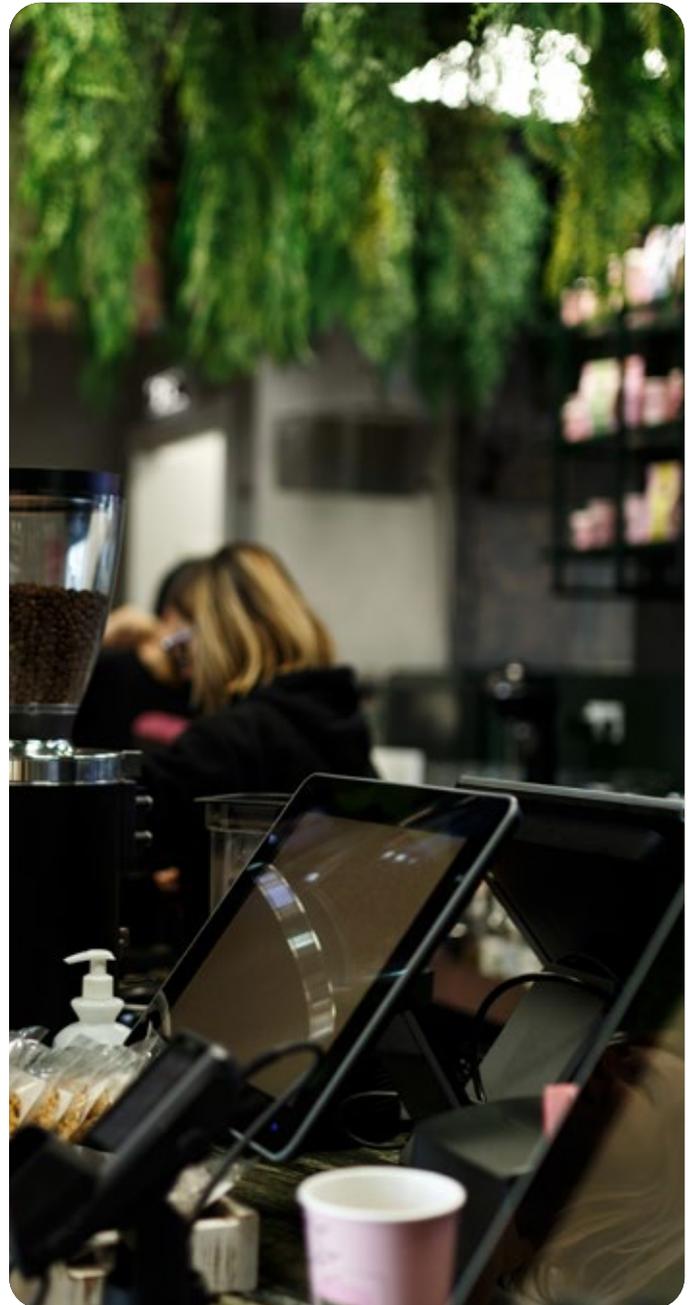
IoT technology has become increasingly affordable, making it feasible for widespread adoption in the supply chain. Simple devices like RFID tags and GPS trackers are cost-effective yet powerful tools for enhancing supply chain visibility.

- **Scalability:** Low-cost IoT devices can be deployed at scale without significant investment.
- **Integration with Existing Systems:** IoT solutions can be integrated with existing supply chain management systems, minimising disruption and additional costs.

Benefits of a connected blockchain-IoT system

Transparency and traceability

Combining blockchain and IoT creates a transparent and traceable supply chain from the manufacturer to the airport retail outlet. Every transaction and movement is recorded and accessible in real time.



- **End-to-end visibility:** Stakeholders can track the entire journey of a product, ensuring accountability and reducing the risk of fraud.
- **Improved inventory management:** Retailers can better manage inventory levels, reducing overstocking and stockouts and supporting just-in-time deliveries. On average, for every one (1) percent (%) saved, it equates to \$100K.

Enhanced security

Security is significantly enhanced by using blockchain for authentication and IoT for monitoring. The immutable nature of blockchain prevents tampering, while IoT devices provide real-time alerts for anomalies.

- **Trusted trader model:** Airports can implement a trusted trader model where verified consignments are fast-tracked through security, reducing congestion and delays.
- **Reduced risk of counterfeiting:** With robust verification at the source and continuous tracking, the risk of counterfeit products entering the supply chain is minimised.

Cost Savings

Integrating blockchain and IoT leads to substantial cost savings across the supply chain. Key areas of savings include:

- **Lower administrative costs:** Automated processes reduce the need for manual checks and paperwork associated with traditional supply chain and security processes.
- **Reduced security costs:** Efficient security checks lower operational costs and improve throughput.
- **Minimised losses:** Real-time tracking with IoT devices (e.g. temperature or drop sensors) reduces the likelihood of lost or damaged goods.



conclusion

The adoption of blockchain and IoT technologies in the airport retail supply chain offers **significant cost savings, efficiency, and security benefits**. By providing a transparent, traceable, and secure system, these technologies **enhance the overall effectiveness of supply chain operations from the manufacturer to the airside retail outlets**.

This integrated approach supports a trusted trader model, reduces administrative burdens, and **ensures a smooth and efficient flow of products through airport security**, ultimately benefiting all stakeholders involved.

INNOVATION THROUGH AUTHENTICATION

about ubloquity

ubloquity leverages cutting-edge blockchain and AI technology to provide secure, transparent, and efficient digital asset identification, authentication, and traceability solutions across various supply chains, including freight, pharma, aerospace, and provenance.

By enabling real-time visibility and compliance through a centralized platform, ubloquity empowers businesses to enhance security, streamline operations, and build trust with their customers. Trusted by industry leaders, ubloquity's innovative solutions ensure the seamless and frictionless movement of goods while maintaining the highest standards of product integrity and customer satisfaction.

