

# Integrated Chain of Custody

Al-enabled cold supply chain empowering condition base visibility



# > Introduction

The pandemic has dominated the world-headlines globally for disrupting normal way of life in the last two years. Globally the need for integrated cold supply chain has emerged as the key focus area, whether it is vaccine, food or chemicals.What lies ahead is a challenging scenario to transport the temperaturecontrolled shipments from manufacturing to distributing it for last mile administration. Topping the logistical puzzle are the stringent temperaturecontrolled storage requirements for maintaining the efficacy of the product during its storage life. The current global cold-chain infrastructure is inadequate to adhere to the distribution and storage norms and needs a safe, reliable, and predictable real-time tracking & condition monitoring of the product life-cycle to outlast its intended storage-life.

The Integrated Chain of Custody Solution byHCL Technologies is an integrated offering that helps enterprises ease the challenges arising out of complex global distribution programs. This solution comprises IoT sensors to track the location and monitor the condition/integrity of product packages or containers and an interactive management portal to maintain real-time visibility of the shipment. Further, by leveraging enterprise systems integrations and optional blockchain synchronization, HCL Technologies' solution ensures truly intelligent cold chain distribution management. It automates workflows that maximize efficiencies for every stakeholder in the value chain.

### Business Drivers



Inadequate shipment traceability for foolproof consignment handling during its journey



Preventing counterfeiting or illegal diversion or theft of shipments from manufacturing to point of sale



Legacy temperature monitoring at points of administration (road transport, warehouse, ground handler etc.) risking shipment integrity leading to revaccination orders

### Prevalent risk factors impacting the cold chain









# lockchain-integrated custody management

Paper-less, shared, decentralized ledger for increased transparency and accountability among stakeholders. Helps pinpoint and minimize compromises to the efficacy and authenticity of the shipments. Smart contracts can also be leveraged to automate payment release to well- performing supply chain partners and initiate audit trails for those needing process improvements.



# Autonomous supply chain management

Integrated Chain of Custody [ICOC] enterprise systems integration with supply chain management systems such as TMSes and WMSes auto-initiate corrective courses of action. This include re-routing of vaccine shipments and replenishment of expired or compromised inventory right at the start of the distribution in manufacturer's premises until the time of consumption at the point of vaccine administration.



### Real-time location tracking & integrity management

Round-the-clock monitoring of shipment in transit and during storage – using configurable location and environment – monitoring sensors. This can be integrated with maps that recommend optimal routes avoiding geo specific hot-spots to ensure safe and timely delivery.



# Data-driven preemptive decisioning

A 24x7 monitoring team predicts and proactively manages issues before they spiral out of control by coordinating with relevant stakeholders throughout the shipment's lifecycle.



### Integrated Chain of Custody (ICOC)

The future of cold chain implementation - converging integrated technologies



TMS/WMS/air-cargo integration for realtime event traceability

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Seamless integration with transport management system ERP enables event and shipment traceability

Pallet and product traceability from one system

### Continuous sensor data for event alerts

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Synchronous data feed from over a dozen device variables like environment, motion, condition, etc.

Facilitates root cause assessments and improvements

### Exception notifications

Real-time monitoring and reporting along with exception-based workflow notingetion

#### Respond only when needed proactively correct problems





#### Utilize location optim



Up to 90% reduction in shipment damages ensuring safer delivery of essentials



Improvements of up to 50% in SLA compliance due to immediate, proactive alarms & resulting rapid response







Utilize real-time insights of a shipment's location through its journey, enabling optimal route with minimal disruptions. This ensures uncompromised delivery of the shipment in the right time and at the right location while realizing cost reduction

#### Safety and training

Utilizing real-time insights on works environment from air quality, impact, and motion detection to ensure workers safety in a critical cold shipment. AR/VR to ensure fast and correct training to certification process and more safe hands on ground to achieve near minimum operational disruption

#### Integrated operations

Seamless synergies between warehouse and ground operations; allowing land/airside collaboration with warehouse ensuring complete visibility and availability of space and staff to handle large temperature controlled ULDs



#### Reimagine cold chain

Utilize accurate tracking and logging to improve supply chain efficiency, reduce manual intervention, automate and digitize the audit trail to boost productivity thereby improving demand planning and optimization



## Enhance end-user satisfaction and experience

Minimize integrity compromise of shipments to ensure timely availability and administration schedule compliance. Prevent stockout situations, and deliver proactive support and peace of mind



#### Ensure increased accountability

Blockchain-enabled chain of custody management ensures transparency by and among stakeholders and reduces the hassles of paper documentation while upholding adherence to

social-distancing norms. Supply chain partners can request manufacturers for audit trails and environment condition logs to carry out best practices in the transition of vaccines temperature controlled shipments





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