



Kale Logistics

Technology that Transforms



*Enhancing Safety and Efficiency in Dangerous Goods
Cargo Management through*

Port Community System (PCS)

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Executive Summary

In the modern logistics landscape, managing the export of Dangerous Goods (DG) demands rigorous planning, meticulous documentation, and strict adherence to international regulations to ensure safety and compliance. The global movement of DG cargo necessitates harmonised regulations and advanced digital solutions to streamline processes, mitigate risks, and enhance operational efficiency.

Shipping dangerous goods through ports is a high-stakes operation that requires unwavering adherence to safety protocols and regulations. Despite ongoing concerns about accidents, continuous safety measures, training, and emergency response improvements can significantly mitigate the risks associated with transporting hazardous materials. Effective management of dangerous goods not only ensures the safety of port personnel and surrounding communities but also sustains the integrity of global supply chains.

By prioritising safety and regulation, ports can handle dangerous goods more securely, minimising the risk of accidents and their potentially devastating consequences.

Global compliance for the movement of dangerous cargo in the maritime industry relies heavily on the IMDG Code and IMO's recommendations. These frameworks provide comprehensive guidelines to ensure the safe and secure transport of hazardous materials by sea and within port areas. Adherence to these regulations is essential for mitigating risks, protecting lives, and preserving the environment, thereby ensuring global maritime trade's smooth and safe operation.

Kale Logistics Solutions has developed a comprehensive DG Cargo module within its Port Community System (PCS) to digitalise the entire DG cargo export process to adhere to the IMDG code and IMO's recommendation. This white paper outlines the proposed solution, its functional architecture, and the benefits it offers to various stakeholders involved in the DG cargo supply chain.

Kale Logistics Solutions' DG Cargo module represents a pivotal advancement in digitalising Dangerous Goods management. By integrating key stakeholders and automating compliance checks, the solution enhances safety, efficiency, and regulatory adherence throughout the DG cargo export process. This digital transformation mitigates risks and fosters growth and operational excellence in the logistics industry.

Global Compliance for Maritime Dangerous Goods

Ensuring the safety of personnel, the environment, and property, the movement of dangerous cargo in the maritime industry is governed by stringent regulations established by international bodies and enforced by national authorities. These regulations manage the risks associated with transporting hazardous materials, requiring adherence to both international and national standards, such as:



International Maritime Dangerous Goods (IMDG) Code:
Provides guidelines for the safe transport of dangerous goods by sea.



International Ship and Port Facility Security (ISPS) Code:
Enhances the security of ships and port facilities.



Occupational Safety and Health Administration (OSHA):
Regulates safety standards in handling hazardous materials.



International Maritime Organization (IMO) Recommendations:
Focus on the safe transport of dangerous cargoes and related activities in port areas.

International Maritime Dangerous Goods (IMDG) Code:

The IMDG Code, developed by the IMO, is a critical regulatory framework designed to ensure the safe and secure transport of dangerous goods by sea. It includes guidelines on classification, packing, marking, labelling, and documentation of dangerous goods, aiming to protect crew members, vessels, and the marine environment.

Key Components of the IMDG Code:



Classification: Dangerous goods are categorized into nine classes based on properties and hazards (e.g., explosives, gases, flammable liquids).



Packaging and Labelling: Guidelines for proper packaging, labelling, and marking to ensure safe containment and identification.



Documentation: Requirements for documentation, including the Dangerous Goods Declaration.



Stowage and Segregation: Rules for the stowage and segregation of dangerous goods on vessels.



Emergency Response: Instructions for handling emergencies, such as fire, spillage, and exposure.

IMO's Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas

Complementing the IMDG Code, the IMO's recommendations address the unique challenges of handling dangerous goods in port environments, covering activities such as loading, unloading, storage, and emergency response procedures.

Key Components:



Risk Assessment: Conducting risk assessments to identify potential hazards and implement control measures.



Safety Management Systems: Developing and implementing safety management systems for handling dangerous cargo.



Infrastructure and Equipment: Designing and maintaining port infrastructure and equipment.



Training and Competency: Ensuring adequate training and competency of port personnel.



Emergency Preparedness and Response: Establishing emergency plans and response procedures.



Security Measures: Implementing security measures to prevent unauthorized access.

Together, the IMDG Code and IMO's recommendations form a robust framework for global compliance, ensuring that dangerous goods are transported safely and efficiently. Adherence to these regulations minimizes risks, protects lives and property, and maintains the integrity of the global supply chain.

Role of Port Community System (PCS)

A PCS significantly enhances the management of compliance with global regulations for the transport of dangerous goods by:



Centralising Data

Providing a unified platform for all relevant information.



Automating Compliance Checks

Ensuring continuous adherence to regulations.



Facilitating Communication

Enabling efficient communication among stakeholders.



Coordinating Emergency Responses

Streamlining emergency procedures and responses.

Integrating digital solutions through a PCS streamlines operations, mitigates risks, and ensures adherence to the stringent requirements of the IMDG Code and IMO's recommendations, enhancing the safety and efficiency of dangerous goods transport at ports.



Need for efficiency improvement in Dangerous Goods (DG) Cargo Management at maritime port level

Shipping dangerous goods presents significant risks to health, safety, and the environment. These hazardous materials, ranging from flammable liquids and gases to corrosive and toxic chemicals, are transported through the global supply chain. Ports serve as critical transfer points for these substances, operating under strict regulations and safety protocols.

The global economy's growth has led to a substantial increase in maritime transport, including a significant rise in dangerous goods (DG) shipments. Significantly more than 90% of DG cargo worldwide is transported by ship. In addition, dangerous goods make up around 10% of all containers worldwide. Currently, about 3,000 types of substances or products are classified by the International Maritime Dangerous Goods (IMDG) Code as dangerous goods transported by sea, and about 6,500 types of dangerous and hazardous materials transported by sea.

As the range of DG expands and port activities intensify, the risk of accidents, including explosions and fires, has grown significantly, particularly at dedicated DG berths. Robust safety management is paramount to mitigate these risks.

Statistics on Accidents Due to Dangerous Goods at Ports

Despite stringent regulations and safety measures, accidents involving dangerous goods still occur at ports, often with severe consequences. The following statistics highlight the incidence and impact of such accidents:



Global Incident Statistics:

- According to the International Association of Ports and Harbors (IAPH), there are an average of 85 major incidents involving dangerous goods at ports worldwide each year.
- The International Maritime Organization (IMO) reports that around 10-15% of all marine incidents involve dangerous goods, reflecting the high risk associated with their transport.



Economic Impact:

- The financial losses due to accidents involving dangerous goods at ports are substantial. The Beirut explosion alone caused damages estimated at USD 15 billion.
- Insurance claims related to dangerous goods incidents at ports amount to millions of dollars annually, with significant implications for global trade and port operations.

The proposed solution

The transportation of DG is governed by stringent international regulations, such as the International Maritime Dangerous Goods (IMDG) Code. Exporters and freight forwarders (FFs) must ensure proper classification, documentation, and packaging of DG cargo to prevent accidents and ensure compliance. Inadequate handling and documentation can lead to severe legal repercussions, financial losses, and safety hazards.

DG Cargo Proposed Solution

The DG Cargo module by Kale Logistics Solutions addresses these challenges by offering a digital platform Port Community System (PCS) that integrates various stakeholders and automates compliance checks. The key features of the proposed solution include:



Digital DG Declaration Submission:

Exporters and FFs can submit DG Declarations digitally, ensuring that all necessary information is accurately recorded and transmitted.



Automated Compliance Checks:

The system automatically verifies the compliance of DG cargo with international regulations, reducing the risk of errors and omissions.



Integrated Document Management:

The module provides real-time status tracking and centralised management of all relevant documents, facilitating efficient information flow.



Port/Terminal Evaluation and Emergency Preparedness:

The solution ensures that ports and terminals can handle DG cargo safely and are prepared for emergencies.



Shipping Agent Verification:

The system enables shipping agents to verify and approve DG cargo for transport, ensuring compliance with safety standards.

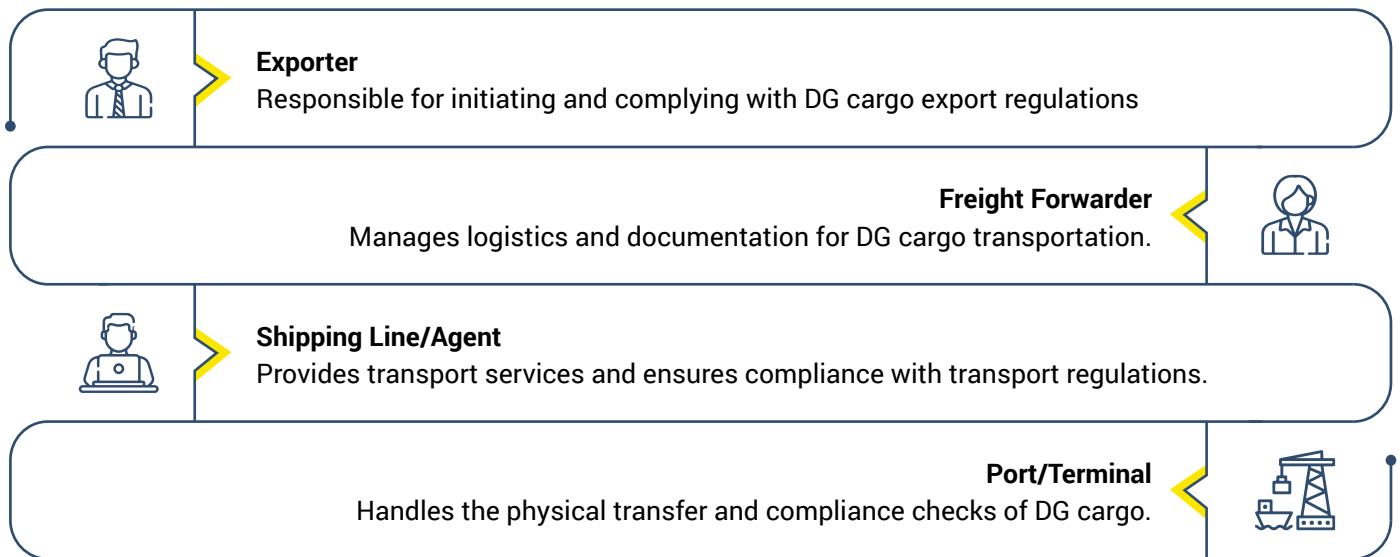


Voyage Creation & EDI Messages:

Shipping lines can create voyage plans and transmit Electronic Data Interchange (EDI) messages, ensuring seamless communication and coordination.

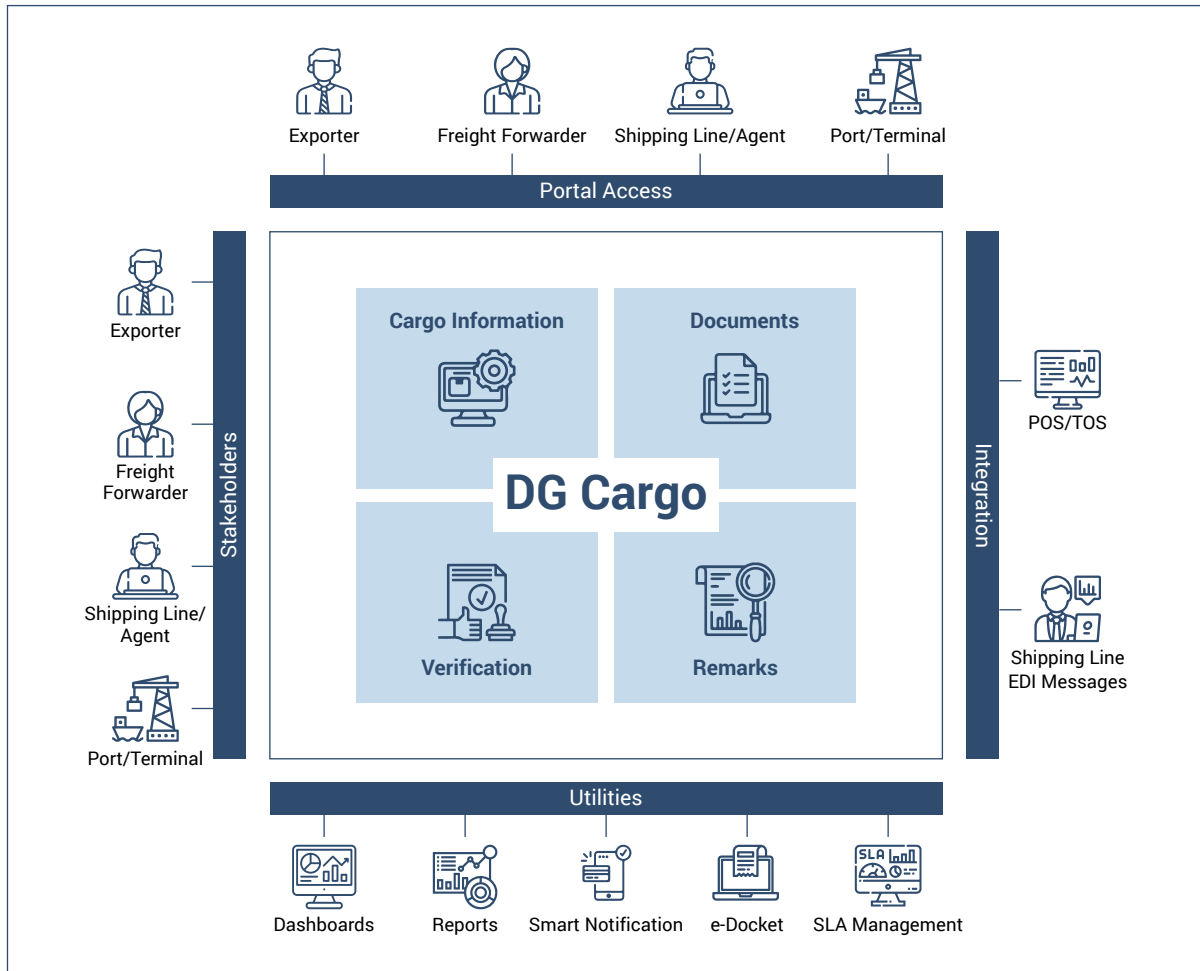
Key Stakeholders Involved

The DG Cargo module integrates several key stakeholders to ensure a smooth and compliant DG cargo export process. These stakeholders include:



Functional Overview

The transportation of DG is governed by stringent international regulations, such as the International Maritime Dangerous Goods (IMDG) Code.



Block Diagram for DG Cargo

The diagram illustrates a streamlined digital ecosystem for managing DG cargo, integrating key stakeholders and essential utilities. The system enhances safety, compliance, and efficiency throughout the supply chain, enabling stakeholders to collaborate effectively while leveraging data-driven insights and proactive notifications for optimised operations.



Business benefits to stakeholders

The implementation of the DG Cargo module offers significant benefits, including:



Compliance assurance:

Ensures adherence to international regulations, avoiding penalties and delays.



Efficiency and accuracy:

Automates processes, reduces errors, and optimises time management.



Enhanced safety and risk management:

Provides tools for proactive risk mitigation and real-time tracking.



Transparency and collaboration:

Centralises management, fosters communication, and promotes collaboration.



Operational optimisation:

Integrates logistics for efficient route planning and real-time analytics.



Scalability and adaptability:

Easily scales to meet growing demands and technological advancements.



Emergency preparedness:

Enables swift response to incidents, minimising damages and ensuring compliance.

Kale's Port Community System - CODEX

Port Community System (PCS) from Kale Logistics Solutions is a UNESCAP award winning innovative platform developed to not only bring together the stakeholders both from land and port-side onto a single platform but also facilitate government-to-business, business-to-government and business-to-business transactions in a highly secured environment.

CODEX connects the entire community of Ports, Maritime Authorities, Customs, Shipping Lines, Terminals, Container Depots, Transporters, and Freight Forwarders on a common highway. The cornerstone of CODEX is automation, which - when implemented and configured –can transform ports into highly reliable, efficient and flexible logistics hubs. In fact, upto 65% of efficiency in the maritime cargo sector depends on the connected stakeholders.

It is engaging in more than 50 ports and 250 terminals across the globe.

How a PCS manages specific compliance requirements



IMDG Code Compliance

Classification and documentation: The PCS ensures that dangerous goods are properly classified and that all required documentation, such as the Dangerous Goods Declaration, is complete and accessible.

Packaging, labelling, and marking: Automated checks verify that packaging, labelling, and marking meet IMDG Code standards.

Stowage and segregation: The system can integrate with TOS and assists in planning and verifying stowage and segregation of dangerous goods on vessels, ensuring that incompatible materials are kept apart.

Integration with regulatory authorities: The PCS integrates with regulatory bodies and authorities to facilitate seamless information exchange. This helps in meeting regulatory requirements and ensures that all dangerous goods are handled according to legal standards.



IMO's Recommendations on Safe Transport of Dangerous Cargos

Risk assessments: The PCS can facilitate risk assessments by providing access to historical data and enabling simulation of various scenarios.

Safety management systems: Integration of safety management systems within the PCS ensures continuous monitoring and management of safety protocols.

Emergency response plans: Detailed emergency response plans can be integrated into the PCS, ensuring quick access and coordination in case of an incident.

Security measures: The PCS can incorporate security protocols to control access to dangerous goods and monitor for any suspicious activities.



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Terminologies

Please find below a list of commonly used terms in the maritime industry:

- | | | |
|----|-------|--|
| 01 | DG | Dangerous Goods |
| 02 | IMO | International Maritime Organization |
| 03 | IMDG | International Maritime Dangerous Goods Code |
| 04 | PCS | Port Community System |
| 05 | ISPS | International Ship and Port Facility Security |
| 06 | OSHA | Occupational Safety and Health Administration |
| 07 | IAPH | International Association of Ports and Harbours |
| 08 | EMSA | European Maritime Safety Agency |
| 09 | USD | United States Dollar |
| 10 | FF | Freight Forwarder |
| 11 | EDI | Electronic Data Interchange |
| 12 | POS | Port Operating System |
| 13 | TOS | Terminal Operating System |
| 14 | MSW | Maritime Single Window |
| 15 | ICT | Information and Communications Technology |
| 16 | IPSCA | International Port Community Systems Association |

About the Author



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Umesh Kurlekar brings with him more than 20 years of experience from Port operations and shipping lines. He spearheads the CODEX Port Community System (PCS) development for global markets. Executed under his leadership, CODEX has been recognized by esteemed institutions like the United Nations, Asian Development Bank and CII for its innovation in Trade Facilitation.

About Kale Logistics Solutions

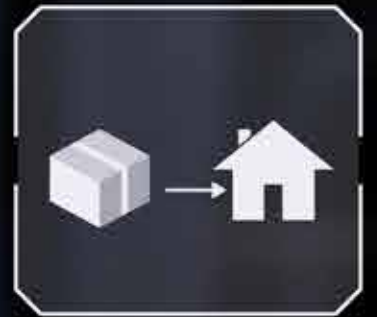
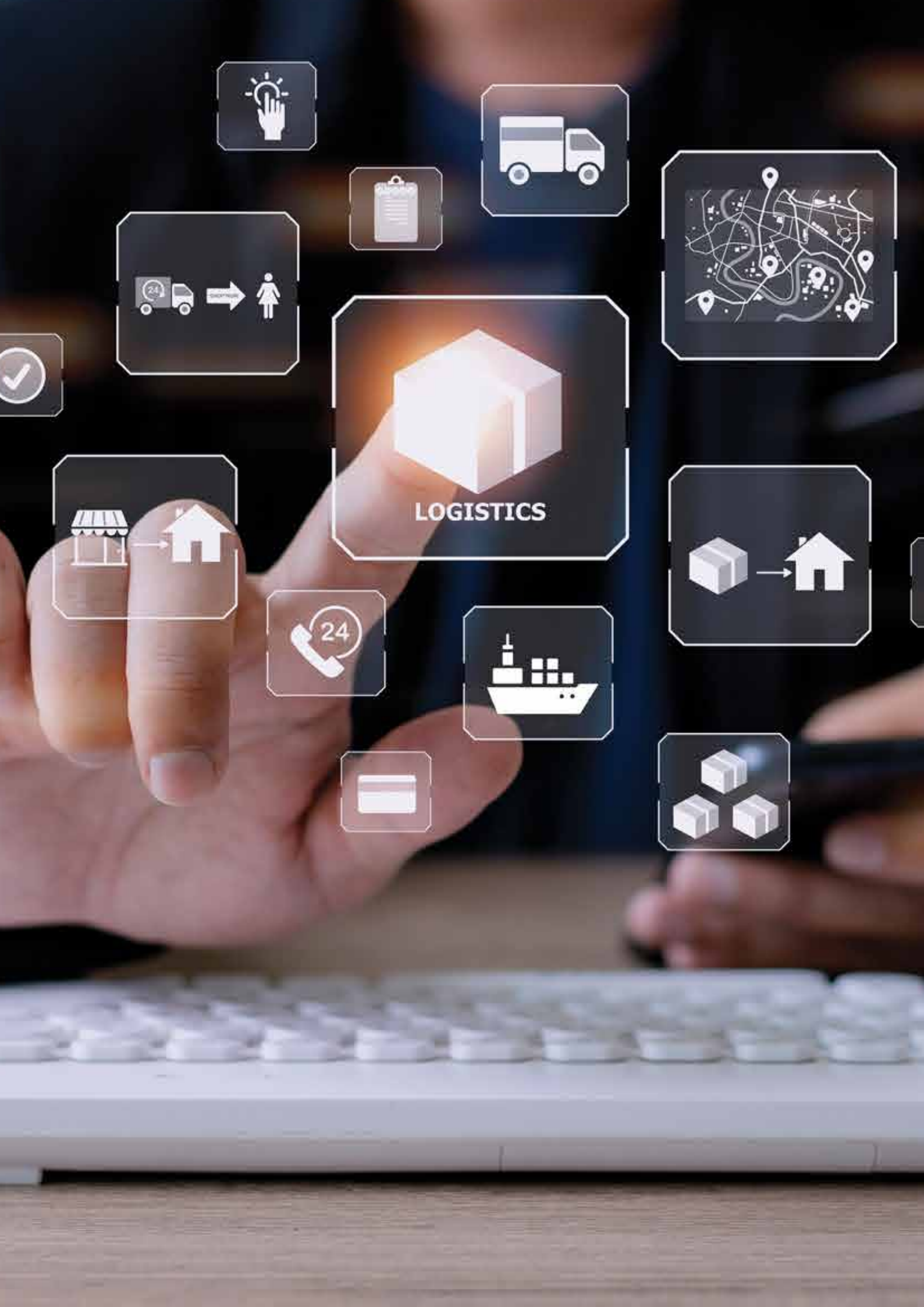
Incorporated in 2009, Kale Logistics Solutions is trusted global tech solutions partner for several Fortune 500 companies worldwide, offering a comprehensive suite of cloud-based tech products for the logistics industry.

With in-depth domain knowledge and technical expertise, Kale has created a suite of comprehensive digital Enterprise Systems and Cargo Community Platforms, which offer a single electronic window capable of supporting operational flows, percolating data to various stakeholders.

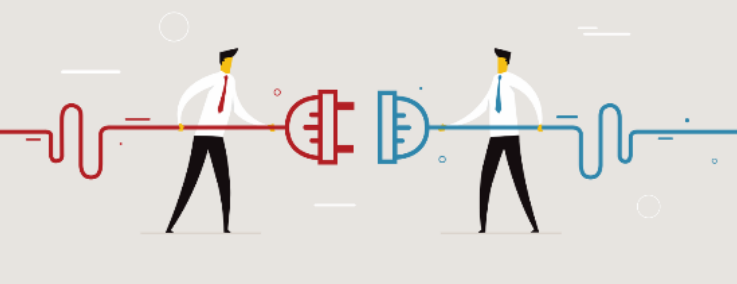
Developed to promote sustainability in the logistics industry, Kale's systems help airports and ports save 1500-1800 trees annually by facilitating the paperless exchange of trade-related information between stakeholders.

Kale's community and enterprise solutions cater to a wide network of Logistics Service Providers (LSPs) and help strengthen and improve their operational and business capabilities.

With offices in India, UAE Kenya, Netherlands, USA, Canada, Colombia, Malaysia and 5000+ clients worldwide across 40+ countries, Kale Logistics Solutions is a major player in the industry who is recognised by global bodies like United Nations, Asian Development Bank, KPMG, Kellogg Business School, Global Ports Forum, etc.




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