**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

**UNIT-IVF**

**CONTAINERIZATION**

**Containerization** involves bundling an application together with all of its related configuration files, libraries and dependencies required for it to run in an efficient and bug-free way across different computing environments. The most popular **containerization** ecosystems are Docker and Kubernete.

**What is a container?**

A **container** is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another. ... Secure: Applications are safer in **containers** and Docker provides the strongest default isolation capabilities in the industry.

**Containerization concepts:**

The **concepts** behind microservices and **containerization** are similar as both are software development practices that essentially transform applications into collections of smaller services or components which are portable, scalable, efficient and easier to manage.

**GF**

**16 TYPES OF CONTAINER UNITS AND DESIGNS FOR SHIPPING CARGO:**

Container units form the most integral part of the entire shipping industry, trade, and transport. These shipping containers are the structures that store various kinds of products that need to be shipped from one part of the world to another using different [types of container ships](https://www.marineinsight.com/types-of-ships/what-are-container-ships/). Moving containers protect contents on the long journeys they make and ensure they make it back to you in one piece.

As such, depending on the type of products to be shipped or the special services needed from them, container units may vary in dimension, structure, materials, construction etc. various types of [shipping containers](https://www.marineinsight.com/maritime-law/guide-shipping-container-dimensions/) are being used today to meet requirements of all kinds of cargo shipping. Some of the most common types of [shipping containers](https://www.marineinsight.com/recreation/top-26-innovative-uses-of-shipping-containers/) in use today are mentioned below.

## 1.Dry storage container

The most commonly used shipping containers; they come in various dimensions standardized by ISO. They are used for shipping of dry materials and come in size of 20ft, 40 ft and 10ft.

## 2.Flat rack container

With collapsible sides, these are like simple storage shipping containers where the sides can be folded so as to make a flat rack for shipping of wide variety of goods.

## 3.Open top container

With a convertible top that can be completely removed to make an open top so that materials of any height can be shipped easily.

## 4.Tunnel container

Container storage units provided with doors on both ends of the container, they are extremely helpful in quick loading and unloading of materials.

## 5.Open side storage container

providing a much wider room for loading of materials These storage units are provided with doors that can change into completely open sides.

## 6.Double doors container

They are kind of storage units that are provided with double doors, making a wider room for loading and unloading of materials. Construction materials include steel, iron etc in standardized sizes of 20ft and 40ft.

## 7. Refrigerated ISO containers

These are temperature regulated shipping containers that always have a carefully controlled low temperature. They are exclusively used for shipment of perishable substances like fruits and vegetables over long distances.

## 8. Insulated or thermal containers

These are the shipping storage containers that come with a regulated temperature control allowing them to maintain a higher temperature.
The choice of material is so done to allow them long life without being damaged by constant exposure to high temperature. They are most suitable for long distance transportation of products.

## 9. Tanks

Container storage units used mostly for transportation of liquid materials, they are used by a huge proportion of entire shipping industry. They are mostly made of strong steel or other anti corrosive materials providing them with long life and protection to the materials.

## 10.  Cargo storage roll container

A foldable container, this is one of the specialized container units made for purpose of transporting sets or stacks of materials. They are made of thick and strong wire mesh along with rollers that allows their easy movement. Availability in a range of colored wire meshes make these shipping container units a little more cheerful.

## 11. Half height containers

Another kind of shipping containers includes half height containers. Made mostly of steel, these containers are half the height of full sized containers. Used especially for good like coal, stones etc which need easy loading and unloading.

## 12.  Car carriers

Car carriers are container storage units made especially for shipment of cars over long distances. They come with collapsible sides that help a car fit snugly inside the containers without the risk of being damaged or moving from the spot.

## 13. Intermediate bulk shift containers

These are specialized storage shipping containers made solely for the purpose of intermediate shipping of goods. They are designed to handle large amounts of materials and made for the purpose of shipping materials to a destination where they can be further packed and sent off to final spot.

## 14. Drums

As the name suggests, circular shipping containers, made from a choice of materials like steel, light weight metals, fiber, hard plastic etc. they are most suitable for bulk transport of liquid materials. They are smaller in size but due to their shape, may need extra space.

## 15.Special purpose containers

Not the ordinary containers, these are the container units, custom made for specialized purposes. Mostly, they are used for high profile services like shipment of weapons and arson. As such, their construction and material composition depends on the special purpose they need to cater to. But in most cases, security remains the top priority.

## 16.  Swap bodies

They are a special kind of containers used mostly in Europe. Not made according to the ISO standards, they are not standardized shipping container units but extremely useful all the same. They are provided with a strong bottom and a convertible top making them suitable for shipping of many types of products.

**CONTAINERIZATION BENEFITS:**

**1. Increased Portability**

**One of the greatest benefits of containerization is that containers are highly portable. When developers move containerized applications across one or many servers, they don’t have to worry about integration issues with the operating system or other inconsistencies that might slow down activity in a traditional computing environment.**

**2. Improved Scalability**

With containerization and a service-oriented application design, you can scale just the functions you want to without affecting the entire application. For instance, this makes it possible to scale the database component of a web application without scaling the front end servers. With containerization, scaling is also nearly instant as you are able to add and remove resources rapidly. With more containers, you can scale quickly without the need to setup and configure additional servers.

**3. Simple and Fast Deployment**

**Another main benefit of containerization is its ability to simplify and speed up the deployment and configuration processes. With containers like Docker, you can create a single “master” version of your image to quickly deploy on-demand. These containers provide you with the flexibility to quickly create new containerized instances of applications to address growing traffic or rapidly destroy multiple containers to reduce cloud costs.**

**4. Enhanced Productivity**

**Containerization also provides developers with a new level of efficiency as it promotes a rapid development environment. Containers offer a fast feedback loop that allows developers to change a platform’s source code and instantly track these changes as the applications are running using the same source code. Containerization also helps simplify the installation process and decrease dependency errors, allowing you to save time when installing applications.**

**5. Improved Security**

Application isolation allows you to improve security by setting each application’s major process apart from one another in separate containers. This allows you to share specific resources without risking any internal or external security. For instance, if you were working with an outside development team to build an application, you can provide them with just the resources they will need without compromising any information on your own network.

WHAT IS A CARRIER?

A carrier is a company or a person legally entitled to transport goods by land, water, and air. Usually, the carrier works with shippers to ship goods from one place to the other.

There are two main types of carriers or methods by which goods are delivered:

**Common carrier**

refers to the transport provider that offers his services to any person or company, as he is entitled to do so under the license provided by a regulatory body. The common carrier is able to work with more shippers within the same day because he is not bound by any contract.

**Contract carrier**

**R**efers to the company or person who provides transport services for a specified shipper on a long-term basis. This means the contract carrier reaches a common agreement with the shipper and agrees to work under certain conditions over the length of the contract.

**What is an indirect air carrier?**

An indirect air carrier refers to any person or entity within the United States, not in possession of a Federal Aviation Administration air carrier operating certificate, which undertakes to engage indirectly in air transportation of property and uses for all or any part of such transportation the services of an air

**Why is it important to use special carriers?**

Using the carriers will ensure the safety of the goods, the driver, other road users and various road infrastructures. You will also comply with road regulations that limit the weight and size of goods to be transported by specific trucks.

## Meaning of Intermediaries:

Intermediaries are an individual or a company who behave as a middleman between parties for an investment deal, business deal, negotiation, insurance, etc. These are commonly known as a consultant or a broker and are specialised in one specific area having all the necessary information. They give all the required information about a product to the customers and also streamlines a company’s processes. In other words, intermediaries are third party agents or individuals between parties for a specific deal.

## Types of Intermediaries:

The 4 types of traditional intermediaries are as follows:

* **Brokers and Agents-**
* Both the intermediaries sell products and services on a commission or percentage basis. They are legally appointed to impart information about a product to the customers on behalf of the manufacturer or producer, but never take ownership of the product sold. The key function of these intermediaries is to bring buyers and sellers together to make a deal. For example, an insurance or real estate agent gets a commission for their service or a sale, but do not take ownership.
* **Wholesalers and Reseller-**
* They typically buy goods from the manufacturer in bulk and resell them to the retailer or other businesses. They are an independent businessman and take ownership of the products purchased from the manufacturers or producers. Some wholesalers also provide services such as order processing, storage, delivery, and participate in promotion as well.
* **Distributors-**
* The distributors are selected by the manufacturer to distribute their products to the wholesaler or resellers in different locations. The distributors are involved in many businesses and cover many geographical areas. Few services distributors offer to the wholesalers are delivery, maintain inventory, extend credit, etc.
* **Retailers-**
* The retailers are the mediator between wholesaler and customers. They purchase different goods from the wholesaler and sell them to the ultimate customers in small quantities from one place.

# Shipping Agent

# A shipping agent is a person who deals with the transactions of a ship in every port that the ship visits or docks. In simple terms, it is a shipping agent who with a local expert acts as a representative of the owner of the ship and carries out all essential duties and obligations required by the crew of the ship.

It is the ship agent who is entrusted with taking care of every need and requirement of the crew like getting local currency, getting the mail, any repairmen in case the ship requires major [repairing](https://www.marineinsight.com/main-engine/how-is-marine-engine-repair-done-on-board-a-ship/), refilling the food and water containers and many other such duties.

**Brokers**

**Brokers** facilitate a variety of business transactions, such as real estate deals, by acting as an intermediary between the parties involved. **Brokers** build and maintain customer relationships, execute sales and complete administrative duties, such as document preparation, and follow-up with customers.

## What is a Broker?

A broker is an individual or firm that acts as an intermediary between an investor and a securities exchange. Because securities exchanges only accept orders from individuals or firms who are members of that exchange, individual traders and investors need the services of exchange members. Brokers provide that service and are compensated in various ways, either through commissions, fees or through being paid by the exchange itself.﻿

**Freight management**

 Frieght **Management** is the process of overseeing and **managing** a cost-efficient operation and delivery of goods. **Freight management** combines logistics experience, human resources and knowledge to ensure a smooth coordination between carriers and shippers.

**Route planning**

systems shows the method in which the selected transport vehicles should supply the demand points by requested quantities of goods. To find the most cost-effective trips travelling salesman models can be used. ... Both types of transportation i.e both distribution and supply have to be planned.

**Role of ports**

**Ports** constitute an important economic activity in coastal areas. ... **Ports** are also important for the support of economic activities in the hinterland since they act as a crucial connection between sea and land transport. As a supplier of jobs, **ports** do not only serve an economic but also a social **function**.

**What is ICD**

**ICD** means **Inland Container Depot** situated at inland points away from sea ports. **ICD**. is a term used in India in the field of Imports and Export of sea shipments. **ICD** is formed to help importers and exporters to handle their shipments near their place of location.

**CONTAINER CORPORATION OF INDIA** **LTD.** (**CONCOR**)

Is a [Navratna](https://en.wikipedia.org/wiki/Navratna) [Public Sector Undertaking](https://en.wikipedia.org/wiki/Public_Sector_Undertaking) under the [Indian Ministry of Railways](https://en.wikipedia.org/wiki/Ministry_of_Railways_%28India%29). Incorporated in March 1988 under the Companies Act, CONCOR commenced operations in November 1989 taking over an existing network of seven inland container depots (ICDs) from [Indian Railways](https://en.wikipedia.org/wiki/Indian_Railways).

**What is global shipping?**

If you are a new eBay seller in the US or UK, you have probably already noticed something called the **Global Shipping** Program (GSP). To put it simply, the GSP is eBay's international **delivery** program and it claims to simplify the process of selling items to international buyers.

**UNIT –V**

**REVERSE LOGISTICS**

 **Reverse logistics**  is the set of activities that is conducted after the sale of a product to recapture value and end the product's lifecycle. It typically involves returning a product to the manufacturer or distributor or forwarding it on for servicing, refurbishment or recycling.

**Reverse Logistics & SCM - Scope**

Supply Chain Management is concerned not only with the flow of raw materials and finished goods, but scope extends beyond this to include reverse flow of unsold finished goods, parts and packaging materials from the point of consumption at customer’s end back to the organization or to rework/refurbishing vendors.

Today reverse logistics has been adopted in a big way by automotive aftermarket spare parts field as well as electronics and computer hardware markets. Retail and book publishing too have implemented reverse logistics schemes, but the volumes that are returned are relatively lesser than the other fields.

**E**-**logistics**

**E**-**logistics**  is defined to be the mechanism of automating **logistics** processes and providing an integrated, end-to-end fulfillment and supply chain management services to the players of **logistics** processes.

**Logistic information system(LSM)** and it’s objectives

Logistic information system is nothing but a part of [Management Information System](https://www.mbaknol.com/management-information-systems/introduction-to-managment-information-systems-mis/) to manage, control and measure the logistical activities. These activities occur within the organization or as well as overall across the supply chain.

Logistics information systems are important for achieving logistics efficiency and effectiveness. In an enterprise, logistics information system.

**LOGISTIC INFORMATION SYSTEM(LSM) AND IT’S OBJECTIVES**

* It ensures of logistics functional operations into a process pursuing customer satisfaction at the lowest total cost.
* Information system facilitates planning and control of the logistical activities related to order fulfillment.
* It makes the firm more competitive, by making better tactical and strategic decision for the benefits of the firm and its customer.
* Helps provide customers information regarding product availability, order status, and delivery schedules promoting customers service.
* It reduces the requirements of inventory and human resources by enabling requirements planning.
* It interfaces with marketing, financial, and manufacturing information systems and provides information to top management to help formulate strategic decisions for the whole firm.
* The use information technology in information systems has enabled quick response to demand making forecasting redundant. This has also helped in implementing “pull” systems like just-in-time making the firm more competitive.
* It promotes systems that link the operations of the firm, such as manufacturing and distributing, with the suppliers operations on the one hand the customer on the other.
* In the other cases, organizations are finding that through information they can manage dispersed inventories as if they were single inventory. The benefits of this can be considerable. If inventory management is centralized and decisions on replenishment and other quantities are taken or the basis that is a single stock, then only one safety stock instead of many required. The stock itself can be carried anywhere in the system, either near the point of production or the consumption. This is the concept of ‘virtual’ inventory management or electronic inventory management.

# TECHNOLOGY APPLICATION TO AID IN LOGISTICS VISIBILITY AND COMMUNICATION

## ****1.Consider Differing Fulfillment Models****

Modern trade often crosses international boundaries, and trade across borders may require upwards of 20 handoffs to get the destination successfully. However, some products as part of a single shipment may also be coming from domestic locations. To successfully monitor these processes, visibility tools should take international versus domestic time requirements into consideration. Furthermore, this will help reduce delays from issues in one type of fulfillment model.

For example, trade from a single port may become congested. If the logistics visibility tools identify this congestion, incoming shipments can be diverted to a less-congested port. As a result, disruptions and distressed shipments are lessened.

# ****2.Assess Data Quality****

# Although [data can be collected automatically across all shipment processes](http://cerasis.com/transportation-technology/transportation-reports/), the quality of data greatly affects its ability to enact change across supply chain practices. Unfortunately, part of the problem with using incorrect data lies with the [assumption of all data being of high quality](http://cerasis.com/2015/01/30/data-in-transportation/). Warehouse managers should thoroughly screen and assess the quality of data.

# An automated [transportation management system](http://cerasis.com/transportation-technology/cerasis-rater-tms/) (TMS) can effectively screen and manage incoming data. Data which points to inefficiencies and potential disruptions can be quickly located, flagged for input from a manager, and used to change the supply chain practices. For example, data about weather delays could trigger the shipment of the same item from an alternate location where the delay in shipping the order would be less than the time required to get the original order from the area with unfortunate weather to the destination.

## ****3.Point of Origin to Delivery Tracking****

For international shipments, the point of origin of shipment comes under the scrutiny of the [US Customs and Border Protection](http://flashglobal.com/customs-trade-partnership-against-terrorism/) (CBP). Failure to provide accurate point of origin information about a shipment will result in delays, penalties, and possible denial of entry to the US for international shipments. This represents a major disruption in the flow of shipments across the supply chain. However, automated tracking and logistics visibility from the point of origin eliminates this concern.

Many different forms of automated tracking exist, such as [RFIDs and bar codes](http://cerasis.com/2015/03/19/integration-standard-iot/). Furthermore, [robotic picking and shipping machines](http://cerasis.com/2015/07/06/robotics-in-logistics/) eliminate the human element in processing an order. These automated processes can also be used to print and apply shipping labels, which further reduces costs and possible delays in the shipment and delivery of an item.

# ****4.Gather Information in a Central Location****

Although various methods and technologies exist for the tracking of shipments, the information lacks value if not kept in a central location. The central location of data or information hub provides companies with the opportunity to use correlations between existing problems or delays to reduce future delays.

For example, an information hub may contain [data from ERPs, the TMS, and the WMS](http://cerasis.com/transportation-technology/connect-services/). Ultimately, the information hub provides insight into all of the possible factors, which may be affecting a given shipment. If shipment A has suffered a setback due to a warehouse emergency, nearby personnel and drivers can be diverted to assist with returning the warehouse to maximum efficiency.

## ****5.Online Shipment Tracking and Customer Service Relationships****

## Many modern retailers offer shipping status tracking services within their websites, which helps drive traffic to the retailer’s site and improve customer service relationships. However, online shipment tracking relies on information from the respective shipper to ensure all information is up-to-date and reflects the accurate location and status of the shipment.

To take advantage of this trend towards retailer-website tracking capabilities, the supply chain must be willing to share data about a given shipment. Essentially, the entire premise of logistics visibility rests on the concept of sharing information about a given shipment. However, the sharing of data in this respect helps to build strong customer service relationships, which enhance a business’s reputation and drive the supply chain forward.

**Automatic identification** (**auto ID**)

Automatic identification  is a process of automatic data identification via a set of methods, technologies and devices, such as bar code readers, radio frequency identification (RFID), magnetic stripe cards/readers and optical memory cards.

**AIDC TECHNOLOGIES CONSIST OF THREE PRINCIPLE COMPONENTS.**

**AIDC Components**

* **Data encoding** – In this the alphanumeric characters will be translated into the form that can be read by machine.
* **Machine scanning** – The machine scanner reads the encoded data and converts the data into electric signals.
* **Data decoding** – The electrical signals will be transformed into digital data which later converted into alphanumeric characters.

## DIFFERENT TYPES OF AIDC TECHNOLOGIES FOR DATA CAPTURING:

* Barcodes
* Radio Frequency Identification (RFID)
* Biometrics
* Magnetic Stripes
* Optical Character Recognition (OCR)
* Smart Cards
* Voice Recognition
* Electronic Article Surveillance (EAS)
* Real Time Locating Systems (RTLS)

### 1.Barcodes:

Barcodes will be scanned originally by special optical scanners called barcode readers. A Barcode is an optical machine which is a readable representation of data or information and the information which the Barcode contains is about the object which is attached to the barcode. We will see bar-coded items in Supermarkets. Barcode reader uses a laser beam and the reader translates information from the image to digital data and sends it to the computer.

### 2.Radio Frequency Identification (RFID):

[Radio Frequency identification (RFID)](https://www.elprocus.com/rfid-basic-introduction-simple-application/) is a technology that uses radio waves to transfer data between a reader and an electronic tag which is attached to a particular object. This technology used in data collection and identification. A Radio Frequency identification (RFID) is mainly used for object identification and tracking. Without making direct contact with the item, the RFID obtains information on an item.

### 3.Biometrics:

Biometrics is typically involved in the identification of a person and it compares captured biological data with the stored data of that individual. [Biometrics system](https://www.elprocus.com/fingerprint-identification/) consists of a scanning device or a reader with software which converts the scanned biological data like finger prints into digital format. If an individual uses a biometric system for the first time they have to enroll the biometric information. This biometric information is detected and compared with the information stored at the time they enrolled into the system. Fingerprint recognition, face recognition, Palm print recognition and iris recognition are the typical types of Biometric systems used within the world of AIDC.

### 4.Magnetic Stripes:

The magnetic stripe is also known as swipe card and it is read by swiping magnetic reading head. Magnetic stripe technology will be used for security purposes. Magnetic Strips were found on a Magnetic Stripe Card and it is capable of storing data by modifying the magnetism of small iron-based magnetic particles on a strip of magnetic material. They provide standards for bank cards, credit cards, IDs, [ATM cards](https://www.elprocus.com/automatic-teller-machine-types-working-advantages/)etc including the allocation of card numbers. These magnetic stripes contain information about the owner of the respective card. The information in magnetic stripes is read by magnetic stripe reader. The first magnetic stripe cards were used in the early 1960s on transit tickets and in the year 1970s for bank cards.

**5.Optical Character Recognition (OCR):**

Optical character recognition uses technology similar to the one used for CD ROMs. Optical Card Panel is gold colored laser sensitive material that is laminated in the card and the material react when a laser light is directed at them. Optical Card is the electronic or mechanical translation of scanned images of text which were typewritten or handwritten or printed into machine encoded text and it is used to convert books or documents into electronic files. The standards for optical cards can be obtained from ISO.

### 6.Smart Cards:

[A smart card is an integrated circuit card (ICC](https://www.elprocus.com/working-of-smart-card/)) and it is a pocket-sized plastic card which has a small chip attached and contains an integrated circuit. It is an electronic recording device. Smart cards provide strong security authentication in large organizations, they stores data and when necessary those records can be transmitted to a central computer. Most smart cards looks like a credit or debit card, but smart cards can function on at least three levels (credit-debit-personal information). These smart cards are capable of data storing, for providing identification and application processing.

### 7.Voice Recognition:

[Voice Recognition or Speech Recognition](https://www.elprocus.com/understanding-voice-recognition/) is simply a task of translating the spoken words of that particular person and it converts the spoken words to text. It is a technology that can recognize speech. Voice recognition include voice user interfaces such as voice dialing, call routing, search, simple data entry, preparation of structured documents, domestic appliance control, speech-to-text processing, etc.

### 8.Electronic Article Surveillance (EAS):

[Electronic Article Surveillance (EAS)](https://www.elprocus.com/electronic-security-system/) is a technology used to identify items as they pass through a gated area when you enter into any showroom in malls or library. This technology is used to alert the unauthorized persons from taking the items from a store, library or museum and other important places. Theft can be encountered with this technology. RFID and some other types of Electronic Article Surveillance (EAS) systems are used inside the technology of Electronic Article Surveillance.

### 9.Real Time Locating Systems (RTLS):

Real Time Locating Systems (RTLS) are fully automated systems with wireless radio frequency solution that continuously monitors the positions and reports real time locations of tracked resources. It always transmits information at frequent intervals via low power radio signal to a central processor. The locating system is deployed as a matrix of locating devices installed at a spacing of anywhere from 50 to 1000 feet and these locating devices determine the locations of the RFID tags. RTLS system uses battery operated [RFID tags](https://www.elprocus.com/rfid-tags-applications/) and mobile networks based locating system to detect the location of RTLS tags.

### 10.Sensors:

Sensor is a device which measures a physical quantity and converts it into a signal and they can be easily read by the instrument. The various [applications of sensors](https://www.elprocus.com/sensors-types-applications/) included in aerospace, medicine, manufacturing, robotics, machine and cars. Sensors play an important role in automation and control systems. Newly designed sensors are wireless which collects more information than the capability of traditional sensors and they utilize advanced technique where as the traditional sensors were wired.

### Benefits of AIDC:

* One can save valuable time and resources by reducing dependency on manual labor.
* With the use of AIDC technologies, identification of objects or people has become much more efficient and accurate.
* Used in industries, banking and insurance. With the automation of the documents, accurate processing of paperwork is achieved.
* Utilizing the biometric data in AIDC system will ensure access to restricted facilities and provide access to right persons.

**3PL** (**THIRD-PARTY LOGISTICS**)

 A **3PL** (**third-party logistics**) provider offers outsourced logistics services, which encompass anything that involves management of one or more facets of procurement and fulfillment activities. In business, **3PL** has a broad meaning that applies to any service contract that involves storing or shipping items.

**4PL IS A FOURTH-PARTY LOGISTICS**

 A **4PL** is a fourth-party logistics provider and it essentially takes third-party logistics a step further by managing resources, technology, infrastructure, and even manage external 3PLs to design, build and provide supply chain solutions for businesses.

**What is global logistics? ...**

**Global logistics** is the process—largely a science but also an art—of managing the flow of goods through the supply chain, from the place where they are made to the place where they are consumed.

**Operational Strategies**

* Continual Development of New Product/Service Offerings. ...
* Optimize the Supply Chain. ...
* [Get news like this delivered to your inbox every week. ...
* Increased Labor Cost, Decreased Availability. ...
* Bridging the Manager Talent Gap. ...
* Managing Inventory. ...
* Cloud and Subscription Software Models. ...
* Finally, Adopt Continuous Process Improvement**. --- END-----------**