Business means: A company transacts business activities through the production of a good, or offering of a service or retailing of already manufactured products.

In contrast, trade refers only to the buying and selling activities, which form a part of business activities. So trading activities involve of buying, selling, or exchanging goods or services between people, firms, or countries.
<table>
<thead>
<tr>
<th>Group</th>
<th>Term</th>
<th>Expansion</th>
<th>Trade contract responsibility</th>
<th>Mode of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1   2   3   4   5   6   7   8   9   10   11</td>
<td>Land  Sea  Air  Multimodal</td>
</tr>
<tr>
<td>E</td>
<td>EXW</td>
<td>Ex Works</td>
<td>B   B   B   B   B   B   B   B   B   B   B   B   B   B   B   B   B   B</td>
<td>@</td>
</tr>
<tr>
<td>F</td>
<td>FCA</td>
<td>Free Carrier</td>
<td>S   S   S   B   B   B   B   B   B   B   B   B   B   B   B   B   B   B</td>
<td>@</td>
</tr>
<tr>
<td>FAS</td>
<td>Free Along Side</td>
<td></td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
</tr>
<tr>
<td>FOB</td>
<td>Free On Board</td>
<td></td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
</tr>
<tr>
<td>C</td>
<td>CFR</td>
<td>Cost and FReight</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
</tr>
<tr>
<td>CIF</td>
<td>Cost Insurance and Freight</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>CPT</td>
<td>Carriage Paid To</td>
<td>S   S   S   S   B   B   B   B   B   B   B   B   B   B   B   B   B   B</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>CIP</td>
<td>Carriage and Insurance Paid To</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>D</td>
<td>DAF</td>
<td>Delivered at Frontier</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
</tr>
<tr>
<td>DES</td>
<td>Delivered Ex Ship</td>
<td>S   S   S   S   B   B   B   B   B   B   B   B   B   B   B   B   B   B</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>DEQ</td>
<td>Delivered Ex Quay</td>
<td>S   S   S   S   B   B   B   B   B   B   B   B   B   B   B   B   B   B</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>DDU</td>
<td>Delivered Duty Unpaid</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
<td>@</td>
</tr>
<tr>
<td>DDP</td>
<td>Delivered Duty Paid</td>
<td>S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S   S</td>
<td>@</td>
<td>@</td>
</tr>
</tbody>
</table>

_B = Buyer's responsibility_  
_S = Seller's responsibility_

1. Inland freight in Seller's country;  
   Delivery to the carrier or frontier  
2. Customs clearance in Seller's country  
3. Payment of customs charges and taxes in Seller's country  
4. Loading to the main carrier or means of conveyance  
5. Main carriage-freight  
6. Cargo (marine) insurance  
7. Unloading from the main carrier or means of conveyance  
8. Customs clearance in Buyer's country  
9. Payment of customs duties and taxes in Buyer's country  
10. Inland freight in Buyer's country  
11. Other costs and risks in Buyer's country
Mode of payment in international business

**PAYMENT TERMS**

- **Consignment**: Payment will be made after goods being sold in import country.
- **Open account**: Delivery first before payment.
- **Collection**: Delivery first before payment (through bank).
- **Letter of Credit**: A guarantee for payment by Bank.
- **Advance payment**: Pay first before delivery.

**Risk**

- **100**: Exporter's risk.
- **0**: importer's risk.
**Letter of Credit operating mechanism**

**Pre shipment activities**

1. Purchase & Sales Agreement (Communication expenses both Seller's/Buyers Account)
2. Request for a Letter of Credit Banking charges Buyers Account
3. Request to Advise and possibly confirm the Letter of Credit
4. Advise on receipt of Letter of Credit to Seller/Exporter

**Post shipment activities**

1. Shipments of goods
2. Documents
3. Payments
4. Payment
5. Documents
6. Payment
7. Documents

1) Signing of Sale Contract between Buyer & Seller
2) Importer or Buyer opening Letter of Credit
3) Issuing Bank informs Advising Bank
4) Advising Bank informs Exporters/Shipper receipt of Letter of Credit
5) On receipt of L/C Advise from his advising Bank exporter make arrangement of shipment and advise shipping instructions to importer
6) Submit shipment documents to his bankers
7) Advising bank forward shipment documents to issuing bank
8) Issuing bank informs importer to remit L/C amount
9) Importer make payment of L/C and receives Document
10) Issuing Bank remits sale proceedings to Advising Bank
11) Advising bank credit Exporters account
Simple domestic contracts

Seller ———> Contract of Sale ———> Buyer

Both the parties are privy to the contract and provide consideration

In International sale where the seller provides transport as part of Sale Agreement

Contract of Sale CIF
Only the seller and carrier are privy to the contract of Carriage and provide consideration

The buyer relies on the carrier to take care and to deliver his goods, but there is no common consideration provided by the carrier.

In International Sale where the buyer arranges his own transport as part of the Sale Agreement

Contract of Sale FOB
Only the buyer and the carrier are privy to the contract of carriage and provide consideration

The seller relies on the carrier to take care of and deliver his goods but there is no common law privity between the seller and carrier and no consideration
DATA EXCHANGE IN INTERNATIONAL TRADE

- 20 actors;
- > 200 data elements;
- Manual procedures;
- Multiple data systems;
- > 30 documents or messages.
A network of actors involved in Import & Export Trade:

- Exporter/Importer
- Banks
- Inspection/Quality agencies
- Agencies authorised to issue Certificate of Origin (Chamber of Commerce)
- Packaging companies
- Marine Insurance / Other Insurance Agents
- Custom Authorities
- Port authorities/Container terminal operators
- Transport & Logistics Firms
- Custom House agents (CHAs)
- Ship Owner/Ship Brokers/Shipping Line/Stevedore/Freight Forwarder
LD-8
(Equivalent to IATA Type 6A)
Internal Capacity
243 cu ft/6.9 cu m
Maximum Gross Weight:
5,400 lb/2,450 kg
External Dimensions:
(L x W x H)
96" x 60" x 64"
228 cm x 152 cm x 162 cm

LD-4
(Equivalent to IATA Type 7A)
Internal Capacity
194 cu ft/5 cu m
Maximum Gross Weight:
5,400 lb/2,450 kg
External Dimensions:
(L x W x H)
96" x 60" x 64"
228 cm x 152 cm x 162 cm
Aircraft chartering

Aircraft are chartered for a number of reasons:

- **Cargo** may be unexpectedly delayed, or stranded in a particular location.
- Scheduled flights may be fully booked

Chartering of an aircraft is an expensive exercise and it is an option which requires careful consideration. The following are major concerns:

- **Finding** an aircraft with adequate capacity and flight range
- **Obtaining** traffic and landing rights to ensure passage to the desired destination.
- Charterer having to pay for both legs of the journey, because of the lack of cargo for the return journey.

In such cases it is recommended that you avail of the services of an experienced air cargo agent or airfreight forwarder to ensure you are using the right equipment, at the lowest available price, for the job.
**Port** is the place where (such as airport or seaport) used for loading and unloading of Cargo and a place to manage all the imports, exports of goods between one country to another.

**Harbours** are just vast spacing places, where ships, cargo container loaders and vessels are anchored for safety purposes from bad climate or weather conditions.

1. Free Ports, ports where international trade can be conducted with less strict Customs regulations, so saving time on paperwork and bottom line costs. Very useful if looking to transship cargo through a regional hub port. For that reason many regional hubs tend to have Free Port Zones.
2. Closed Ports, ports where foreign trade vessels are barred and only national coastal traffic is handled.

<table>
<thead>
<tr>
<th>Port model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public service port</strong></td>
<td>A public port authority owning and operating all equipment (port authority and port operations)</td>
</tr>
<tr>
<td><strong>Tool port</strong></td>
<td>A public port authority owns all equipment which is operated by labor employed by private firms (port authority + ownership of equipment required for port operations)</td>
</tr>
<tr>
<td><strong>Landlord port</strong></td>
<td>Separation between public port authority (not involved in port operations) and private operators (generally concessionaires)</td>
</tr>
<tr>
<td><strong>Private service port</strong></td>
<td>Private port authority owning and operating all equipment (private port authority and port operations) (in some case – not always - port infrastructures are financed / built / owned by the private sector)</td>
</tr>
</tbody>
</table>
Docks are places where ships, vessels are designed and repaired.

Dry Dock means under no water stream conditions, designing and repairing of ships is done. In this particularly, engine repairs of Ship are done in most cases. Where as in a Wet Dock, upper parts of ship (which is as in if a Ship is on Sea, the half that we can see upon water) are repaired or remodelled there.

Jetty may be called temporary asylum for Small Ships, that or those which cannot enter Harbours. It is just for extra spacing parking for such smaller ships.

Quay is the space at the Harbour or Shore, where all the ships can moor nearby.

Wharf is less substitutive than a quay, and may be on the bank of a river or a of a Big Lake.

<table>
<thead>
<tr>
<th></th>
<th>BUILT ON PILES</th>
<th>BUILT ON FILLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARALLEL TO SHORE</td>
<td>WHARF</td>
<td>QUAY</td>
</tr>
<tr>
<td>EXTENDING OUT FROM SHORE</td>
<td>PIER</td>
<td>JETTY</td>
</tr>
<tr>
<td>Service group</td>
<td>Component/type of service</td>
<td>Basis</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Navigation</td>
<td>Port dues</td>
<td>Size of ship</td>
</tr>
<tr>
<td></td>
<td>Pilotage</td>
<td>Size of ship</td>
</tr>
<tr>
<td></td>
<td>Tug services</td>
<td>Tug time involved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size of ship</td>
</tr>
<tr>
<td></td>
<td>Mooring/unmooring</td>
<td>Size of ship</td>
</tr>
<tr>
<td></td>
<td>Ancillary services</td>
<td>Various</td>
</tr>
<tr>
<td>Berth</td>
<td>Berth hire</td>
<td>Time of ship alongside</td>
</tr>
<tr>
<td></td>
<td>Wharfage</td>
<td>Volume/weight/size of cargo</td>
</tr>
<tr>
<td></td>
<td>Ancillary services</td>
<td>Amount consumed</td>
</tr>
<tr>
<td></td>
<td>Stevedorage</td>
<td>Volume/weight/size of cargo</td>
</tr>
</tbody>
</table>
Indian major Ports and minor (private) ports
SAILING & STEAM SHIPS ARE ABBREVIATED AS ‘S.S.’. SHIP IS AN ELONGAGED METAL BOX HENCE IT IS CALLED AS ‘VESSEL’. MOTOR VESSEL ABBREVIATION IS M.V. AND M.T. IS FOR TANKER SHIP.
Ships are built
- to satisfy a large number of different needs of the owners of the world’s merchant and naval fleets
- and those different needs result in some very different hull shapes and sizes, speed requirements, and propulsion types.
- average age of ships are 20 to 25 years
SHIP BUILDING PROCESS

Design work (Naval Architect)

Keel Laying

Stepping up of Mast

Launching

Christening (Naming)

Pre-commissioning Crew

Sea Trial

Delivery — Sailaway

Commissioning
More than 90% of the world's cargo carrying tonnage is covered by the classification design, construction and through-life compliance Rules and standards set by the ten Member Societies and one Associate of IACS. (International Association of Classification Societies. The flow chart is given below:
Hull Panel

Project Team
Areas of competence

All technical items related to the structure of ships, other than those covered by the Survey and the Statutory Panels, such as Loads and strength Materials and welding Hull damages

Machinery Panel

Project Team

All technical items related to the mechanical, electrical and electronic systems of ships (electronic navigational equipment excluded), other than those covered by the Survey and the Statutory Panels, such as: Propulsion system Auxiliary machinery systems Electric power generation and distribution system Machinery damages

Statutory Panel

Project Team

All technical items, including ISM and ISPS certification, other than those covered by the other panels, which are addressed by international instruments, e.g. International Maritime Organization (IMO) and International Labour Organization (ILO) conventions. IMO matters relevant to a specific field of interest of other Panels are dealt with by those Panels (e.g. surveys for the purpose of statutory certificates fall under the Survey Panel remits). The Statutory Panel may, if requested by the parent Panel or GPG, act as "advisory" Panel.

Survey Panel

Project Team

All technical items related to the survey and certification of ships, components and materials including Procedural Requirement
Inter-governmental Organisations

International Maritime Organization (IMO)
International Labour Organization (ILO)
United Nations Conference on Trade and Development (UNCTAD)
World Meteorological Organization (WMO)
World Customs Organization (WCO)
International Hydrographic Organization (IHO)
International Maritime Mobile Satellite Organization (INMARSAT)
Paris MOU on Port State Control
Tokyo MOU on Port State Control
Indian MOU
Mediterranean MOU
Black Sea MOU
Latin American MOU
SHIP BUILDING PROCESS

Keel laying

Fitting of engine

Fixing of Propeller

Fixing superstructure

Bow assembling

Hull work is finished
FOLLOWED BY NAMING CEREMONY AND LAUNCHING
CREW COMPLEMENT BY SHIP CLASS: The required crew size will be dictated by a document called the Minimum Safe Manning Certificate. This document dictates the minimum number of personnel necessary to safely navigate and operate the vessel.

- Captain/Master
  - Deck Department
    - Chief Officer/Chief Mate
    - Second Officer/Second Mate
    - Third Officer/Third Mate
    - Deck Cadet
    - Bosun
    - Able Seaman
    - Ordinary Seaman
  - Engineering Department
    - Chief Engineer
    - Second Engineer/First Assistant Engineer
    - Third Engineer/Second Assistant Engineer
    - Fourth Engineer/Third Assistant Engineer
    - Engineering Cadet
    - Qualified Member of the Engine Department
    - Pumpman
    - Oiler
    - Wiper
  - Stewards’ Department
    - Chief Steward
    - Chief Cook
    - Steward’s Assistant
    - Messman
Some of the more common vessel types are:

**Merchant ships**

- Bulk cargo
  - Bulk-type general cargo
    - Liquid cargo
      - Tankers, e.g. for chemicals, acids, products, crude oil, (ULCC, VLCC), wine, gas (LNG, LPG)
    - Solid cargo
      - Bulk carriers, ore carriers
        - Ore/oil carriers
        - OBO carriers
        - Cement tankers
  - General cargo
    - Heavy-lifts
      - Heavy lift vessels
        - OBC freight carriers
        - LASH carriers
        - BACO carriers
        - Container/ro-ro ships
        - CONDOCK ships
        - SEABEE carriers
        - Car carriers
        - All-container ships
        - Other multipurpose freighters
        - Special forest product carriers
    - Light cargo
  - Living cargoes
    - Passenger vessels
    - Passenger ferries
    - Livestock transporters
    - Combination carriers
    - Passenger/container vessels
    - Semiconainer vessels
    - Conventional cargo ships
Types of dry bulk cargo ships

- **Handysize Type Ship**: Approximately from 10000DWT to 30000DWT
- **Handymax Size Type Ship**: From 30001 to 50000DWT
- **Panamax Type Size Ship**: From 50001DWT to 80000DWT
- **Capesize Type Ship**: From 80000DWT and larger
Types of tanker ships

- **Handysize Type Tanker**
  - From 19001 DWT to 25000 DWT

- **Panamax Size Type Tanker**
  - From 50001 DWT to 80000 DWT

- **Suezmax Size Type Ship**
  - From 120,000 DWT to 200,000 DWT

- **Aframax Type Tanker**
  - From 80000 to 120,000 DWT

- **VLCC - Very Large Crude Carrier Size Type Ship**
  - 200,000 DWT to 350,000 DWT

- **ULCC - Ultra Large Crude Carrier Size Type Ship**
  - 350,000 DWT and Above
### Types of gas carriers

<table>
<thead>
<tr>
<th>Tank capacity</th>
<th>78,000 m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross tonnage</td>
<td>46,500 tons</td>
</tr>
<tr>
<td>Length</td>
<td>230.0 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>35.6 m</td>
</tr>
<tr>
<td>Depth</td>
<td>20.8 m</td>
</tr>
<tr>
<td>Speed</td>
<td>16.7 kts</td>
</tr>
<tr>
<td>Main engine</td>
<td>Mitsubishi UE diesel engine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank capacity</th>
<th>135,000 m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross tonnage</td>
<td>112,200 tons</td>
</tr>
<tr>
<td>Length</td>
<td>297.5 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>45.75 m</td>
</tr>
<tr>
<td>Depth</td>
<td>25.5 m</td>
</tr>
<tr>
<td>Speed</td>
<td>19.5 kts</td>
</tr>
<tr>
<td>Main engine</td>
<td>Mitsubishi steam turbine</td>
</tr>
</tbody>
</table>
Types of ships

PCTC: Pure Car and Truck Carrier

Container Ship

General Cargo Ship

Cattle Carrier
## Container ships size

<table>
<thead>
<tr>
<th>Generation</th>
<th>Length</th>
<th>Draft</th>
<th>TEU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Generation (1956-1970)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Converted Cargo Vessel</td>
<td>135 m</td>
<td>&lt; 9 m</td>
<td>500</td>
</tr>
<tr>
<td>Converted Tanker</td>
<td>200 m</td>
<td>8 m</td>
<td>800</td>
</tr>
<tr>
<td>Cellular Containership</td>
<td>215 m</td>
<td>10 m</td>
<td>1,000 - 2,500</td>
</tr>
<tr>
<td>Panamax Class</td>
<td>250 m</td>
<td>11-12 m</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>290 m</td>
<td></td>
<td>4,000</td>
</tr>
<tr>
<td>Post Panamax</td>
<td>275 - 305 m</td>
<td>11-13 m</td>
<td>4,000 - 5,000</td>
</tr>
<tr>
<td><strong>Fifth Generation (2000-?)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Panamax Plus</td>
<td>335 m</td>
<td>13-14 m</td>
<td>5,000 - 8,000</td>
</tr>
</tbody>
</table>

![Graph showing the growth of container ship sizes over time](image)
Ship’s parts

Bridge: The bridge of a ship is an area at front of the ship where the navigational equipment are housed. The ship is controlled from the bridge by the captain or navigational officer.

Propeller and Rudder: A propeller is a type of fan that transmits power by converting rotational motion into thrust and the Rudder is used for steering the ship.

Cargo Control Room: Cargo Control room where PIC can monitor cargo operation.

Funnel: Funnel is a casing used for the exhaust pipes from the engine and is located near to the bridge.
Ship’s parts ....continuation

Cargo Hold: A ship's hold or cargo hold is a space for carrying cargo. Cargo in holds may be either packaged in crates, bales, etc., or unpackaged (bulk cargo). Access to holds is by a large hatch at the top.

Mast: The mast is used to carry antennas, whistle, navigational lights, flags etc.,

Crane: Crane is a machinery for hoisting and lowering the heavy objects.

Anchor: The anchor is used to secure the ship in a stationary position at sea.
Ship’s part ....continuation

Mooring: Mooring is to secure a ship in position at a quay or berth or jetty for safe cargo operation and to make access to people from shore to ship.

Life Boats: A lifeboat is a small, rigid or inflatable boat carried for emergency evacuation in the event of a disaster aboard a ship.

Accommodation ladders and gangways fitted on ships are used to support the means of embarkation and disembarkation. For many people the gangway or accommodation ladder is the first point of contact with a ship.

Cabin: A cabin is a compartment on board a ship for the private use of the ship's crew, officers, captain and or passengers.
Ship’s port and starboard side

Someone standing aboard facing the Bow of the ship

Some one is standing before a ship looking at the Bow of the ship
WEIGHT TONNAGE TERMS

- **DISPLACEMENT (W)** - The weight of water of the displaced volume of the ship, which equals the weight of the ship and cargo. In other words: it is the weight of the volume of water displaced by the hull.

- **DEADWEIGHT** - total weight of cargo, stores, fuel and water needed to submerge a ship from her light draught to her maximum permitted draught; it is given by the difference between the load displacement and light displacement (also known as lightweight). DWT for short.

- **GROSS TONNAGE** - Gross Tonnage is a measure of volume inside a vessel. This includes all areas from keel to funnel and bow to stern. Gross tonnage is the complete physical volume of space a cargo ship’s hold has. The means to calculate gross tonnage is laid out in the International Convention on Tonnage Measurement of Ships. Gross Tonnage is used to determine the number of crew, safety rules, registration fees, and port dues. It is the standard most often used to define a vessel.

- **NET TONNAGE** - The tonnage most frequently used for the calculation of tonnage taxes and the assessment of charges for wharfage and other port dues. Net tonnage is obtained by deducting from the gross tonnage, crew and navigating spaces and an allowance for the space occupied by the propelling machinery.

  Net tonnage is a method of calculation for how much cargo space a ship has. It is not a measure of weight or mass, or the displacement weight of a ship, but instead a volume measurement. Each ton in a net tonnage figure is equivalent to 100 cubic feet (2.83 cubic meters) of space.

- **CARGO DEADWEIGHT** - Capacity is determined by deducting from total deadweight the weight of fuel, water, stores, dunnage, crew passengers, and other items necessary for use on a voyage.
A ship's **Length Overall (LOA)** is measured in feet and inches from the extreme forward end of the bow to the extreme aft end of the stern. The **beam** of a ship is its width at the widest point as measured at the ship's nominal waterline. The **beam** is a bearing projected at right-angles from the fore and aft line, outwards from the widest part of the ship. **Air draft** (or **air draught**) is the distance from the surface of the water to the highest point on a **vessel**. This is similar to the "deep draft" of a vessel which is measured from the surface of the water to the deepest part of the hull below the surface, but **air draft** is expressed as a height, not a depth.
The draft aft (stern) is measured in the perpendicular of the stern.

The draft forward (bow (ship)) is measured in the perpendicular of the bow.

The mean draft is obtained by calculating from the averaging of the stern and bow drafts, with correction for water level variation and value of the position of F with respect to the average perpendicular.

The draft of a ship can be affected by multiple factors, not considering the rise and fall of the ship by displacement:

- *Draft variation by list.*
- *Draft variation by water level change.*
- *Allowance of fresh water draft variation by passage from fresh to sea water or vice versa.*
- *Heat variation in navigating shallow waters.*
The dead weight scale is made up of several columns:

Column A (dead weight ton-saltwater) gives the lift capacity of the vessel.

Column B (draft [feet or meters] to bottom of keel) shows the mean draft in feet and meters.

Column C (displacement tons, saltwater) gives the displacement tonnage of the ship plus any material placed in the vessel.

Column D (tons per inch or centimeter immersion) denotes the number of tons required to change the mean draft of the vessel 1 inch or centimeter at various drafts.
**Bale Capacity:**

This is the cubic capacity of a space when the breadth is taken from the inside of the cargo battens, the depth from the wooden ceiling to the underside of the deck beams and the length from the inside of the bulkhead stiffeners or sparring where fitted.

**Grain Capacity:**

This is the cubic capacity of a space when the lengths, breadths and the depths are taken right to the ships side plating. An allowance is usually made for the volume occupied by frames and beams.

**Stowage Factor:**

This is the volume occupied by unit weight of cargo. Usually expressed as cubic metres/ tonne. It does not take into account space, which may be lost due to broken stowage. However it obtained by multiplying the greatest length by the greatest breadth with the greatest height.
Broken Stowage:

The space between packages which remains unutilized. This is generally expressed as a percentage and the amount that is to be allowed varies with different cargo and the shape of the hold. It is greatest when large cases have to be loaded in an end hold, where the after end narrows down considerably.

BS is generally not given in any of the booking lists, but is a ship/hold experience factor or a sister ship experience factor for that particular cargo. The most commonly accepted figure is about 10%, thus with a BS of 10% the available cargo space that may be loaded would be 90%.
Terms used for calculating freight

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsibility of Cargo Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Load Port</td>
</tr>
<tr>
<td>Full Liner Term (FLT)</td>
<td>Owner</td>
</tr>
<tr>
<td>Liner In Free Out (LIFO)</td>
<td>Owner</td>
</tr>
<tr>
<td>Free In and Liner Out (FILO)</td>
<td>Charterer</td>
</tr>
<tr>
<td>Free In Out Stow Trim (FIOST)</td>
<td>Owner</td>
</tr>
<tr>
<td>Berth term/Berth term (BT/BT)</td>
<td>Owner</td>
</tr>
<tr>
<td>Hook/Hook (HT/HT)</td>
<td>Owner</td>
</tr>
</tbody>
</table>

Apart from above terms, following terms are also used
WOWO means Walk on Walk off - for cattle
FOFO means Float on Float off - for boats, ships, yachts, off shore oil drilling rigs etc.,
RORO means Roll on Roll off
Sto-Ro means Stowable Roll on Roll off
Terms used for calculating freight rates:

FIOS (Free In, Out, Stowed):
It is most important to remember that the "Free" reference is viewed from the Ship Owners point of view - not the Shipper’s. Freight rates quoted on a FIOS basis specifically exclude all aspects relating to cargo handling operations. The ship is only responsible for expenses arising as a result of the ship calling into the port, i.e. port dues, pilotage, berth hire and light dues etc. Another very important consideration when booking cargo on FIOS terms is that the ship does not bear any responsibility for the speed of loading or discharging. Usually the rate agreed includes a fixed "free" period of time for loading/discharging operations, after which time a daily demurrage is incurred. Obviously this is of paramount importance where port congestion or stevedoring performance is uncertain. There are many overseas ports which fall into this category and particularly where vessel demurrage rates can vary significantly, depending on the size and type of ship nominated to undertake the particular project.

Full Liner Terms:
This is somewhat a vaguer term given different port practices. However, it generally implies that the freight amount provided includes both shore based and on-board stevedoring, lashing/unlashing, dunnage materials, securing/unsecuring and all costs of presenting to/receiving the cargo from the ship’s side; with the shippers/receivers just bearing the cost of discharging from/reloading to the transport, along with the usual port charges/levies/taxes etc.

Frequently the terms are varied at different ends of the voyage i.e. FILO (Free In/Liner Out), LIFO (Liner In Free Out) or FIFO (Free In/Free Out) etc. To be absolutely sure of all liabilities, it is always advisable to request that terms clearly and concisely indicate what is/isn’t included in your particular contract - in layman’s terms.
Liquid Cargo measurement

\[ \text{Sounding} + \text{Ullage} = \text{Total depth} \]

Ullage is measured from the top down.

Sounding is measured from the bottom up.
1) Iron ore extracted from mine  2) Iron ore loading and transported from mine site to Port (Transportation from mine site to railway siding transportation, loading at railwagon involved)  3) At port iron ore offloaded to Stock Pile which will be mechanically transported by reclaimer to conveyor belt and through loading arm chute, loaded onto ship
GLOBAL COMMUNICATION NETWORKS

In 1979 the UN International Maritime Organization sponsored the establishment of the International Maritime Satellite Organization (INMARSAT).

Inmarsat C is one of the most flexible mobile satellite message communication systems in the World, it has the ability to handle commercial, operational and personal messages just as easily as distress and safety communications.

Inmarsat C is recommended for the any of the following applications:

- E-mail and messaging
- Fax and telex
- SMS text
- Remote monitoring
- Tracking
- Chart and weather updates
- Maritime safety information
CHARTERING FLOW CHART

Seller → Buyer

Negotiation of Price: Material Cost price + packing expenses + delivery at seller's warehouse (Ex-works) + Ex-works cost + loading cost (FOB) + FOB + Carrier cost (CFR)

Mode of payment

Agreed by both Seller and Buyer they sign Sale Contract

As per sales contract term if CFR term, Seller become charterer

Charterer → Ship Broking Company

As per sale contract term if FOB term Buyer become charterer

Ship Owener → Cargo Loading and Discharging expenses borne by Ship owner under Liner term

Bank

Vessel arrives load port, loading of cargo completed, freight in full paid by charterers to ship owner then Bill of Lading will be released by ship owner to Charter party signed between Charterer and Shipowner

At discharge Port, upon submission of Original Bill of Lading the Cargo will be released to Receiver/Importer/Charterer
CHARTERING NEGOTIATIONS

CHATERER ← BROKING COMPANY → SHIP OWNER

Main terms

Cargo name & Quantity
Load & Discharge port
Load port loading quantity per day
Discharge Port discharge quantity per day
Freight indication if any
Cargo readiness date

Sub terms

Ship particulars such as name of ship, IMO number, call Sign, Classification Society, P&I Club, Valid certificates, Ship's Gross/Net/Dead weight, number of hatches/holds, crane & capacity, cargo Bale/Grain capacity, year of build. Draft, Beam, Air draft, mainly freight indication

LayCan, Lay Time, Detention & demurrage of ship and despatch
Freight payment term and term for releasing of Bill of Lading
FREIGHT CALCULATION FOR VOYAGE CHARTER

Register, ship owner
Ship building Cost or Purchase of second hand ship cost
Bank, Share holders, Holdings or individual proprietor

Bareboat charter
Who agrees to pay daily charter hire till the life of the ship hence it is called demise charter. Probably the Demise charter can acquire ship during the life of ship

Time Charter
Who agrees to pay daily charter hire for a specific period of time such as six months, one year, five year and so on....

As per Sale Agreement
Buyer CFR term Seller FOB term will become CHARTERER

VOYAGE CHARTERER

Voyage Charter
Who agrees to pay for a particular voyage per metric ton of cargo for a particular days agreed by Voyage charterer and if the days exceeded, he has to pay ship owner demurrage and if the ship is despatched quickly the ship owner pays despatch money to the Charterer

SHIP OWNER

Loading and discharging expenses at load and discharge port
Local Taxes, Custom charges, Port charges to accumulate total cargo at Dock.

Daily charter hire payable to owners + bunker charges i.e. Fuel oil expenses at sea voyage + Diesel Oil expenses at Port stay + Lubricant oil expenses for both sea and at port. Any other ship & crew related expenses

WILL ARRIVE TOTAL COST DIVIDED BY QUANTITY OF CARGO PER METRIC TON, ADD HIS PROFIT DEPENDING UPON BALTIC DRY INDEX / DEMAND & SUPPLY
<table>
<thead>
<tr>
<th>Activity</th>
<th>Bareboat Charterer</th>
<th>Time Charterer</th>
<th>Voyage Charterer</th>
<th>Liner Shipping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital costs</td>
<td>Owner</td>
<td>Owner</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Port charges</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner &amp; owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Time Risk in Port</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Loading and Unloading</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner &amp; owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Bunkers</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Time risk at Sea</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Canvassing/seeking</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Cargo</td>
<td>Charter</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Manning &amp; Crewing</td>
<td>Charter</td>
<td>Owner</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Maintenance and Repair</td>
<td>charter/owner</td>
<td>Owner</td>
<td>Owner</td>
<td>Owner</td>
</tr>
<tr>
<td>Hull, War &amp; P&amp;I Insurance</td>
<td>charter/owner</td>
<td>Owner</td>
<td>Owner</td>
<td>Owner</td>
</tr>
</tbody>
</table>
Charterer → Registered Owner of Ship → Bareboat or Demise Charterer → Owner
Charterer → Time Charterer → Time Charterer → Time charted owner or Disponent Owner
(Sub) Charterer → Voyage Charterer → Voyage Charterer → Time charted owner or Disponent Owner
Steamer agents

Ship owners and charterers cannot be present at every port their ship docks at, or watch over every deal secured for employment; there simply isn’t enough time if they want to build their business. But, as you would expect, they also do not want to wash their hands of the day-to-day operations of these multi-million dollar assets. The middle ground comes in the form of a Ship’s Agent, a person or firm who transacts all business on behalf and under the direction of a ship owner or charterer.
What is it like working as an Agent?
The list of ‘jobs’ that need to be done when a ship calls at a port is exhaustive – arranging for loading and unloading of cargo, purchasing stores, arranging crew changes, organising inspections, booking repairs... and so on.

Add to that the need to have local contacts in every port that the ship calls to successfully, and cost effectively, perform those duties, and the importance of a local agent becomes clear.

Acting for, or on behalf of, another, Agents provide an onsite operations person with knowledge of the ins and outs of conducting business in a particular port, in locations where the ship owner or operator may not have an office or personnel.
FLOW CHART OF AGENCY WORK

Buyer (Importer) charters ship for FOB term shipment

Seller (Exporter) charters ship for CFR term shipment

BROKING COMPANY

Owner

Charterer's Agents

Owners' Agents

Government & Statutory Bodies involved:
- Customs Authorities
- Port Authorities
- Immigration
- Port Health

Service providers involved:
- Shipping Agents
- Stevedores
- Custom House Agents
- Clearing & Forwarding Agents
- Transporters

Cargo Operation by Pipelines to storage tanks

Types of ships:
- Bulk ship
- Breakbulk ship
- Pure Car Carrier
- Container ship
- Passenger ship
- Tanker ship
- LPG tanker ship
- LNG tanker ship
<table>
<thead>
<tr>
<th>TRAMP SHIPPING</th>
<th>LINER SHIPPING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operates indeterminate dates</td>
<td>Operate predetermined dates</td>
</tr>
<tr>
<td>Subject to inducement of cargo</td>
<td>Offers regular scheduled service</td>
</tr>
<tr>
<td>Lower fixed cost</td>
<td>Higher fixed cost</td>
</tr>
<tr>
<td>Placement of vessels depending upon the volume of cargo</td>
<td>Number of vessels to put in Liner service is determined by ports of call, frequency, distance and speed</td>
</tr>
<tr>
<td>Tramp vessel can wait till cargo is filled up.</td>
<td>Vessels arrives &amp; sails port empty or load as per schedule</td>
</tr>
<tr>
<td>Overheads is less</td>
<td>Administrative Overheads are high</td>
</tr>
<tr>
<td>Cargo booking done through Ship or cargo brokers</td>
<td>Cargo Booking will be taken care by Marketing &amp; Sales personnel</td>
</tr>
<tr>
<td>Principal</td>
<td>Agents</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------</td>
</tr>
</tbody>
</table>
| Registered Owner/                             | Owner's Agent                 | If charter party allows the owners or Bareboat or Time charterer to appoint their own agents, at the load and discharge ports to handle port/customs entry & clearance port disbursements by paying port dues, pilotage, berth hire, light house dues and all other matters, those agents are called 'Owners Agents'
| Bareboat charterer/                           |                               |                                                                                                                                        |
| Time Charterer/                                |                               |                                                                                                                                        |
| Registered Owner/ Bareboat charterer/          | Husbandry agent               | Shipowners appoint their own agents to attend non-cargo matters specifically those matters related to vessels repairs, supplies of stores, provision, bunker, survey and any other reasons for the vessel to call. |
| Time Charterer/                                |                               |                                                                                                                                        |
| Owner or Time charterer                        | Protecting or Supervisory agent | In this case, the owners and charterers appoint individually their agent to protect their interest when under the charter party the vessel is consigned to another's agent. For example according to the Charter party owners appoint their agent, to protect charterers interest, charterers may appoint their agent. If the Charter Party permits Charterers to appoint agent, then Owners nominate their agents to protect their interest. |
| Voyage charterer                               | Charterer's nominated agent    | As the charterers have the right to nominate their agents at load and discharge port to handle all their requirements, port disbursements by paying port dues, pilotage, berth hire, light house dues. Some time owners also may also ask them to look after their interests and vessel & Master's requirements as an additional responsibility. They are called as 'Chartered nominated agents' |
AGENTS DUTIES AND RESPONSIBILITIES WITH PORT AUTHORITIES:

BEFORE ARRIVAL OF VESSEL:
VESSEL'S PARTICULARS, CARGO DETAILS, STEVEDORE'S DETAILS, PLANNING OF CARGO OPERATION, ARRANGEMENTS OF DIRECT RECEIPT OF HEAVY LIFT CARGO FROM SHIP, FOR OBTAINING SUITABLE BERTH.

ONCE SUITABLE BERTH IS ALLOTTED BY PORT AUTHORITIES:
PAYMENT OF MARINE DUES SUCH AS PORT DUES, PILOTAGE, BERTH HIRE FOR CALCULATED STAY OF SHIP AT BERTH.

CO-ORDINATION WITH TRAFFIC DEPARTMENT FOR ARRANGEMENT OF RECEIVING CARGO,

AGENTS

CO-ORDINATION WITH SHIPPERS OR RECEIVERS, CUSTOM HOUSE AGENTS OR FREIGHT FORWARDERS, CLEARING AGENTS FOR SUBMISSION OF CUSTOMS & PORT DOCUMENTS.

AFTER VESSEL'S BERTH (COMING ALONG SIDE):
ARRIVAL PARTICULARS, COPY OF SHIP'S REQUIRED CERTIFICATES TO CONFIRM THE TONNAGE.

DURING CARGO OPERATION: THE AGENT OR THEIR REPRESENTATIVE TO BE PHYSICALLY AVAILABLE AT THE SHIPSIDE ALL THE TIME TO SUPERVISE THE CARGO OPERATION.

FOR EXPORT CARGO THE AGENT SHOULD ENSURE IN CONFIRMINITY WITH PORT TRUST TALLY THAT THE CARGO LOADED ON BOARD IN APPARENT GOOD CONDITION, MASTER AGREES TO SIGN CLEAN MATE RECEIPT OR AUTHORISE THE AGENT TO RELEASE THE BILL OF LADING AND FOR IMPORT CARGO ALL THE CARGO LANDED IN GOOD AND SOUND CONDITION.
Ship's Agent

Owner

Advising
- Port restrictions & condition
- Proforma Disbursement
- Export cargo arrival status
- Receivers arrangements for import cargo

Berthing Prospects Report
- Ship arrival
- Ship berthing
- Cargo commencement
- Any delays affecting cargo operation
- Cargo completion delays and ship sailing
- Comply with instructions
- Specific
- Crew Logistics
- Spare Logistics
- Bunker & Stores supply
- Master Cash Advance
- After sailing send final Disbursement account and remit any surplus funds to owners

Charterer

Advising
- Prior vessel arrival
- Tender Notice of Readiness (NOR)
- Pre-planning meeting for cargo-operation with stevedores
- Report cargo related delays which affect cargo operation and detain vessel for a longer period
- Prepare Statement of Fact (SOF) showing NOR tendered & accepted cargo operation commence completion time, rain cargo & ship related delays obtain charterers signature

Surveyor
- Co-ordination for conducting initial interim and final surveys and ascertain B/L quantity of cargo loaded or discharged

Ship

Co-ordination with
- Port, Customs
- Immigration
- Port Health authorities by filing necessary documents and to ensure smooth arrival berthing cargo operation and sailing.
- Attend to Master's requirements such as cash advance, crew medical attendance if any.
- To attend any matter related ship
PROCEDURE TO BE FOLLOWED AND DOCUMENTS TO BE SUBMITTED TO CUSTOMS DEPARTMENTS:

**FILING OF SHIP'S ARRIVAL PARTICULARS**

**FILING OF IMPORT GENERAL MANIFEST**

**PAYMENT OF INDIAN LIGHT HOUSE DUES**

**PAYMENT OF CUSTOMS OVERTIME**

**INFORM SHIP'S PARTICULARS AND ARRIVAL DETAILS TO RUMMAGING DEPARTMENT, CENTRAL INTELLIGENCE UNIT, DOCK INTELLIGENT UNIT, IMPORT, EXPORT MANIFEST DEPARTMENT**

**CUSTOMS BOARDING DOCUMENTS REQUIRED:**
- LAST PORT CLEARANCE
- SHIP'S STORES LIST IN DUPLICATE
- CREW LIST IN DUPLICATE
- DECK CARGO MEMO CERTIFYING THE QUANTITY IN DUPLICATE
- CERTIFYING NO OPIUM ON BOARD THE SHIP
- LIST OF FAVOUR PARCEL IF ANY
- SHIP'S CURRENCY (INDIAN & FOREIGN) DECLARATION
- LIST OF ARMS & AMMUNITION ON BOARD (SHIP'S PROPERTY)
- PRIVATE PROPERTY LIST OF CAPTAIN, OFFICERS AND CREW CONTAINING VALUABLE ARTICLES, CURRENCY (INDIAN & FOREIGN) AND PROPERTY WITH THEM ON SHIP INCLUDING DUTIABLE AND VALUABLES
- INDIAN LIGHT HOUSE DUES
- CUSTOMS OVER TIME PAID CHALLAN

**DOCUMENTS TO BE SUBMITTED TO CUSTOMS OFFICE WITHIN 24 HOURS ARRIVAL OF SHIP:**
- SHIP'S STORE LIST AND SHIP'S, CAPTAIN'S, OFFICERS' & CREWS' PRIVATE PROPERTY LIST
- BOARDING OFFICER'S CERTIFIED DECLARATION OF DECK CARGO, NO OPIUM, ARMS & AMMUNITION, GOLD SILVER CARRIED AS CARGO, COPIES OF SHIP'S CERTIFICATES, LOAD LINE CERTIFICATES, LIGHT HOUSE DUES, SAFETY EQUIPMENT, RADIO & WIRELESS EQUIPMENTS CERTIFICATES.
- FOR OIL TANKERS: LODING CERTIFICATE OBTAINED BY THE MSTER FROM LOD PORT, CARGO FLASH POINT CERTIFICATE, QUANTITY OF CARGO ON BOARD ETC.

BEFORE DEPARTURE OF SHIPS TO BE SUBMITTED:
- APPLICATION FOR PORT CLEARANCE, NO OBJECTION FROM INCOME TAX, CLEARANCE CERTIFICATES FROM PORT, IMMIGRATION & COPY OF LIGHT HOUSE DUES CERTIFICATE, CHANGE OF COMMAND OF SHIP
IMMIGRATION DEPARTMENT

Advise vessel's arrival particulars along with copy of crew list.
Intimate Immigration Officer vessel's berthing time and request in the prescribed format along with crew list.
When the Immigration officer boards the vessel, make the Master of the vessel to present his, officers and crew's and if cruise/passenger ship to produce all passenger's passport for verification and to issue them temporary shore passes. (As per Immigration rules issuance of shore passes to Srilankan, Pakistani & Bangaladeshi crew is restricted

PORT HEALTH DEPARTMENT

Instruct Master of ship to apply for Radio Free Pratique by sending Pratique message by cable or fax/email through agent to grant free pratique

If ship is coming from Yellow fever area request Port Health Officer to board vessel to check and issue clearance to be brought from anchorage to suitable berth

Request Medical officer to board the vessel upon berthing or at outer anchorage to check crew for any contagious & infectious disease and inspect shi's galley (kitchen) for mortality of mice or insects
ISO container types and size

- 20ft High Cube
- 40ft Open top
- Garment on Hanger (GOH container)
- Reefer 20” & 40”
- Tank container
- Flat Racks
Container terminal
Freight Rate Mechanism

- Inland transport costs: 25%
- Ship costs: 23%
- Terminal costs: 21%
- Container costs: 18%
- Others: 13%
Freight components

• **INDICATIVE CALCULATION – OCEAN FREIGHT**
  • 1. Basic Freight (FRT)
  • 2. Transport Additional (Where applicable)
  • 3. CAF on 1 and 2 (where applicable)
  • 4 BAF/FAF d(**)
  • 5. Any Other surcharges and Ancillar charges
Surcharges

**Bunker Fuel** — Compensates for wide fluctuations in marine bunker fuel and diesel oil at key (BAF/FAF) transpacific load ports.

**Congestion** — Addresses costs related to schedule delays, rerouting of cargo and other impacts from sudden or sustained port congestion.

**Currency(CAF)** — Covers increased local currency operating costs in Asian countries relative to U.S. dollar-denominated freight charges and revenues.

**Feeder** — Covers sudden increases in spot market rates for connecting vessel and inland barge feeder service in Asia.

**War Risk** — Addresses higher insurance premiums, shipment rerouting or rescheduling, and other increased costs serving countries at risk of war or armed conflict.

**Container Service** — Covers cleaning, fumigation, maintenance and repair and other services to container equipment after use.

**Documentation Fee** — Fee applied at origin and/or destination to offset rising staffing, training, equipment and information systems costs relating to increased volume and complexity of documentation.

**Hazardous Rail Security** — Covers security-related charges paid to U.S. railroads for intermodal shipments of hazardous cargo.

**Terminal Handling** — Reflects shoreside handling costs at origin port, from receipt of the container at the CY or CFS terminal through its loading onto the vessel. Charges vary by port, carrier and services performed; special charges may apply to refrigerated, hazardous or other cargo requiring additional handling.
Ancillary charges ...contd..

**Detention** — Period of time container and/or chassis is held by receiving party at its premises after delivery

**Demurrage** — Period of time loaded container remains at destination terminal awaiting pickup by shipper or consignee.

**Drayage** — Trucking of container and/or cargo on behalf of the customer within a port area, to and from an off-dock CY or CFS or locally for pickup or delivery
Shipping Sectors
(Example only) Container trade flow volumes of east/west axis in 2004 (unit: 1000 teu)
CONTAINER TRAVELLING FROM A PLACE TO PLACE THROUGH MOTHER VESSEL AND FEEDER VESSEL
Here is the containerized shipment cycle. Many of you may already be familiar with this and should take the time to review it.
Integrated logistics

The logistics in the supply chain must anticipate the customers’ needs – this is integrated logistics.
Layers of Logistics Explained

- **Actors**
  - Cargo owners
  - Carriers
  - Logistics service providers
  - Lead logistics providers & consultants

- **Services**
  - Manufacturing, Retailing
  - Transportation
  - Logistics
  - Supply chain management

**Layers**
- **1PL**
- **2PL**
- **3PL**
- **4PL**

**Integration**
- Service integration
- Supply chain integration
Humanitarian & Medical courier

• Specifically, the activities of “planning, implementing and controlling the efficient, cost-effective flow of and storage of goods and materials as well as related information, from point of origin to point of consumption for purpose of alleviating the suffering of vulnerable people” are known as “humanitarian logistics”.

• Briefly, “for humanitarians, logistics is the processes and systems involved in mobilizing people, resources, skills and knowledge to help vulnerable people affected by disaster”

• Medical Courier Services is saving lives. Discover why the Medical community relies on Quick's Medical Courier Services for their critical blood, tissue, organ and medical device transport
A supply chain consists of three types of entities:
• customers,
• a producer, and the
• producer's suppliers.

The extended supply chain includes customers' customers and suppliers' suppliers.

Supply chain management oversees and optimizes the processes of:
• acquiring inputs from suppliers (purchasing),
• converting those inputs into a finished product (production), and
• delivering those products or outputs - to customers (fulfillment).
What is Cold Chain Logistics?

Major Sectors: Food and Beverages, Bio-Pharmaceutical

The Cold chain logistics infrastructure

- **Supply Procurement**
  - Precooling System
  - Farms (Rural Markets)
  - Manufacturers

- **Transport**
  - Refrigerated Trucks
  - Refrigerated Railway Wagons
  - Refrigerated Cargo Containers

- **Storage**
  - Cold Storage
  - Warehouses

- **Transport**
  - Refrigerated Trucks
  - Refrigerated Railway Wagons
  - Refrigerated Cargo Containers

- **End Customer**
  - Retail, Terminal, Markets, Factory, Ports, Airport