A Freight Forwarding System is a specialized software solution designed to facilitate and optimize the complex processes involved in shipping goods from one location to another. This system serves as a centralized platform for managing various aspects of freight forwarding operations, including logistics coordination, documentation management, shipment tracking, and communication with stakeholders such as carriers and clients.

# Freight Forwarding System

The entities and attributes within a Freight Forwarding System are closely related and interconnected, forming a comprehensive framework for managing the entire shipping process. Here's how these entities and their attributes are related:

# Summary of entities and attributes:

Shipment serves as the central entity in the system, representing the movement of goods from origin to destination.so there is an entity called ‘Shipment’ with the following attributes Shipment\_ID,Orgin,Destination,Shipping\_Date,Arrival\_Date,Status,Weight,Volume,Client\_ID.

After shipment we need to transport goods which are associated with specific shipment with the help of container.so there is an entity called ’Container’ with the following attributes Container\_ID,Type,Size,Weight\_Capacity,Status,Arrival\_Date,Departure\_Date,Shipment\_ID.

Carriers are responsible for transporting shipments from one location to another.so there is an entity called ‘Carrier’ with the following attributes Carrier\_ID,Name,Contact\_Info,Address,Type.

Arrangements made for transporting shipments with specific carriers and containers are represented by booking.so there is an entity called ’Booking’ with the following attributes Booking\_ID,Shipment\_ID,Container\_ID,Carrier\_ID,Booking\_Date,Departure\_Date,Arrival\_Date,Status.

After the booking there is an need of knowing the transportation path between specific origin and destination points is represented by the route.so there is an entity called ‘Route’ with the following attributes Route\_ID,Origin,Destination,Distance,Estimated\_Duration.

The charges associated with shipping services provided for each shipment is represented by invoices document.so there is an entity called ‘Invoice’ with the following attributes Invoice\_ID,Shipment\_ID,Client\_ID,Amount,Due\_Date,Status.

Tracking records provide real-time information on the status and location of shipment.so there is an entity called ’Tracking’ with following attributes Tracking\_ID,Shipment\_ID,Location,Date\_Time,Status.

There is a need of clearance process for shipments crossing international borders is managed by the customs records.so there is an entity called ‘Customs’ with the associated attributes Customs\_ID,Shipment\_ID,Declaration\_Date,Clearance\_Status,Duty\_Amount.

Various paperwork and forms required for shipping and customs clearance is included by documents.so there is an entity called ‘Documents’ with the following attributes Document\_ID,Shipment\_ID,Type,Description,Status.

Finally the goods are shipped to the clients.so there is an entity called’Client’ with the following attributes Client\_ID,Name,Contact\_Info,Address.

## Summary of entity relationship:

1. **Shipment**:
   * A shipment can consist of multiple containers, so it has a one-to-many relationship with the Container entity.
   * Each shipment is associated with a specific carrier responsible for its transportation, indicating a one-to-one relationship with the Carrier entity.
   * Shipment details are used in booking transportation services, establishing a one-to-many relationship with the Booking entity.
   * Shipment progress is tracked, leading to a one-to-many relationship with the Tracking entity.
   * Customs information is associated with shipments, forming a one-to-many relationship with the Customs entity.
   * Shipment-related documents are stored, indicating a one-to-many relationship with the Document entity.
   * Invoices are generated for shipments, establishing a one-to-many relationship with the Invoice entity.
   * Each shipment is associated with a specific client, indicating a one-to-one relationship with the Client entity.
2. **Container**:
   * Each container is part of a shipment, establishing a many-to-one relationship with the Shipment entity.
   * Containers are associated with bookings, forming a one-to-many relationship with the Booking entity.
3. **Carrier**:
   * Carriers are responsible for transporting shipments, leading to a one-to-many relationship with the Shipment entity.
   * Carrier details are used in booking transportation services, indicating a one-to-many relationship with the Booking entity.
4. **Booking**:
   * Bookings are associated with specific shipments, leading to a many-to-one relationship with the Shipment entity.
   * Each booking is made by a specific client, indicating a one-to-many relationship with the Client entity.
   * Bookings are associated with specific containers, forming a one-to-many relationship with the Container entity.
5. **Route**:
   * Routes can be associated with multiple bookings, forming a many-to-many relationship with the Booking entity.
6. **Invoice**:
   * Invoices are generated for specific shipments, establishing a many-to-one relationship with the Shipment entity.
   * Each invoice is associated with a specific client, indicating a one-to-many relationship with the Client entity.
7. **Tracking**:
   * Tracking records are associated with specific shipments, forming a many-to-one relationship with the Shipment entity.
8. **Customs**:
   * Customs information is associated with specific shipments, leading to a many-to-one relationship with the Shipment entity.
9. **Document**:
   * Documents are associated with specific shipments, forming a many-to-one relationship with the Shipment entity.
10. **Client**:
    * Clients are associated with multiple shipments, establishing a one-to-many relationship with the Shipment entity.
    * Clients can have multiple bookings, indicating a one-to-many relationship with the Booking entity.
    * Clients are associated with multiple invoices, forming a one-to-many relationship with the Invoice entity.

# ER Diagram Entities:

•Shipment

• Container

• Carrier

• Booking

• Route

• Invoice

• Tracking

• Customs

• Document

• Client

# Attributes for entities:

# Attribute for Shipment:

* Shipment\_ID
* Origin
* Destination
* Shipping\_Date
* Arrival\_Date
* Status
* Weight
* Volume
* Client\_ID

Attribute for Container:

* Container\_ID
* Container\_Type
* Container\_Size
* Weight\_Capacity
* Container\_Status
* Arrival\_Date
* Departure\_Date
* Shipment\_ID

Attribute for Carrier:

* Carrier\_ID
* Carrier\_Name
* Contact\_Info
* Address
* Carrier\_Type

Attribute for Booking:

* Booking\_ID
* Shipment\_ID
* Container\_ID
* Carrier\_ID
* Booking\_Date
* Departure\_Date
* Arrival\_Date
* Booking\_Status

Attribute for Route:

* Route\_ID
* Origin
* Destination
* Distance
* Estimated\_Duration

Attribute for Invoice:

* Invoice\_ID
* Shipment\_ID
* Client\_ID
* Amount
* Due\_Date
* Invoice\_Status

Attribute for Tracking:

* Tracking\_ID
* Shipment\_ID
* Location
* Date\_Time
* Tracking\_Status

Attribute for Customs:

* Customs\_ID
* Shipment\_ID
* Declaration\_Date
* Clearance\_Status
* Duty\_Amount

Attribute for Document:

* Document\_ID
* Shipment\_ID
* Document\_Type
* Description
* Document\_Status

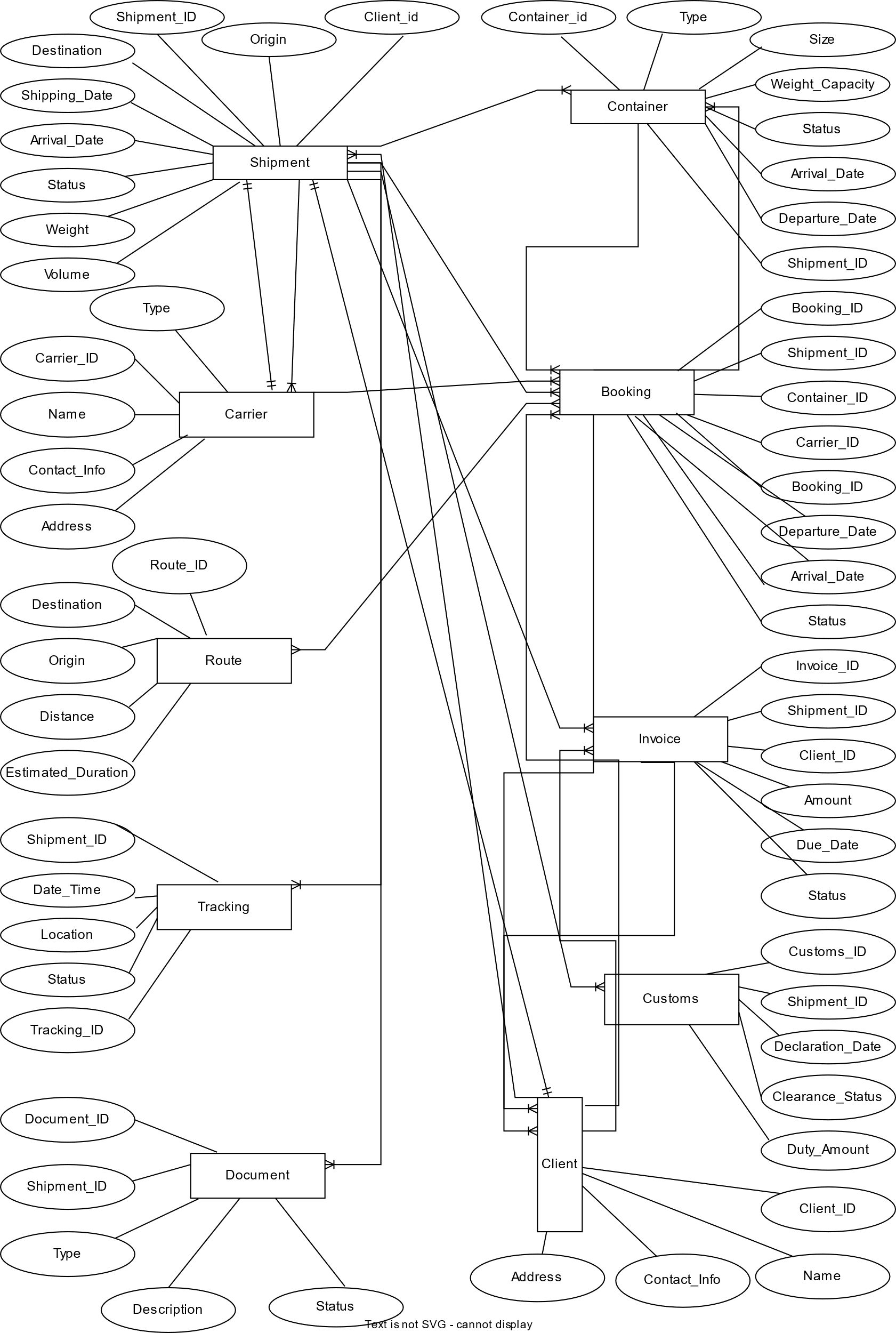
Attribute for Client:

* Client\_ID
* Client\_Name
* Contact\_Info
* Address

### **ER Diagram Relations:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **From** | **To** | **Cardinality** |
| **1** | Shipment | Container | 1…\* |
| **2** | Shipment | Carrier | 1..1 |
| **3** | Shipment | Booking | 1...\* |
| **4** | Shipment | Tracking | 1...\* |
| **5** | Shipment | Custom | 1…\* |
| **6** | Shipment | Document | 1…\* |
| **7** | Shipment | Invoice | 1…\* |
| **8** | Shipment | Client | 1…1 |
| **9** | Container | Shipment | \*…1 |
| **10** | Container | Booking | 1…\* |
| **11** | Carrier | Shipment | \*…1 |
| **12** | Carrier | Booking | 1…\* |
| **13** | Booking | Shipment | \*…1 |
| **14** | Booking | Client | 1…\* |
| **15** | Booking | Container | 1…\* |
| **16** | Route | Booking | \*…\* |
| **17** | Invoice | Shipment | \*…1 |
| **18** | Invoice | Client | 1…\* |
| **19** | Tracking | Shipment | \*…1 |
| **20** | Customs | Shipment | \*…1 |
| **21** | Document | Shipment | \*…1 |
| **22** | Client | Shipment | 1…\* |
| **23** | Client | Booking | 1…\* |
| **24** | Client | Invoice | 1…\* |

**ER diagram:**

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