Business Case Scenario: Data Model for Global-Ship Logistics

# 1. Tables

## a. Vessels Table:

This is where we’ll store the basic information about each vessel in the fleet. Each vessel will be uniquely identified, and we can store details like the vessel's size, type, and owner.

Columns:  
- VesselID (Primary Key): A unique identifier for each vessel.  
- VesselName: The name of the vessel.  
- CallSign: The ship’s unique radio signal.  
- ShipType: Whether it's a cargo ship, tanker, etc.  
- Beam, Length, Draught: These describe the physical dimensions of the vessel.  
- Capacity: How much the vessel can carry.  
- Owner: The company or entity that owns the vessel.

## b. Routes Table:

This table will store details about the routes each vessel takes. For example, where the vessel departs from, where it’s headed, and the estimated times for the trip.

Columns:  
- RouteID (Primary Key): A unique identifier for each route.  
- VesselID (Foreign Key): This links each route to a specific vessel.  
- OriginPort, DestinationPort: The ports involved in each trip.  
- DepartureDateTime, ArrivalDateTime: The actual departure and arrival times.  
- Distance: The distance covered on the route.

## c. DeliveryPerformance Table:

This is a critical table that helps monitor whether vessels are meeting their delivery targets. It will store data about any delays and reasons for them.

Columns:  
- PerformanceID (Primary Key): A unique identifier for each performance record.  
- VesselID (Foreign Key) and RouteID (Foreign Key): Link to the vessel and its route.  
- OnTime: A Boolean field showing whether the vessel was on time (True or False).  
- DelayReason: The reason for any delays (e.g., weather, mechanical issues).  
- DeliveryTime, ExpectedDeliveryTime: These track the actual versus expected delivery time.

## d. PortCongestion Table:

To help monitor and plan around busy ports, we’ll track congestion levels in this table.

Columns:  
- PortID (Primary Key): Unique identifier for each port.  
- PortName: The name of the port.  
- CongestionLevel: This could be Low, Medium, or High.  
- WaitTime: The average time vessels spend waiting at this port.  
- DateTimeLogged: When this data was recorded.

## e. VesselLocation Table:

For tracking where vessels are at any given time (or historically), this table will record the locations of vessels over time.

Columns:  
- LocationID (Primary Key): A unique identifier for each location record.  
- VesselID (Foreign Key): Which vessel is being tracked.  
- Latitude, Longitude: The GPS coordinates.  
- Timestamp: When the vessel was in this location.  
- Speed: The speed at which the vessel was moving.  
- MoveStatus: Whether the vessel is under way, moored, or anchored.

# 2. Relationships

- One-to-Many: A vessel can have many routes (Vessels → Routes).  
- One-to-One: Each route will have exactly one delivery performance record (Routes → DeliveryPerformance).  
- One-to-Many: A vessel will have many location updates (Vessels → VesselLocation).