**NORMALIZATION**

**1NF**

Freight( **freightID, freighTypeID** freighTypeName, freighHeight, freighLength, tareWeight, maxgrossWeight, maxNetWeight, InListID, outListID, arrivalTime, departureTime, areaID, locX, locY, stackLvl)

agent (**agentID, ListID** AgentName, agentEmail, specialisation, documentID, approval, direction)

list (**freightID, listID**, freighTypeID, targetID, origin, freightDirection)

targetInfo (**targetID**, PICName, vehicleID, VehicleTypeID, agentID)

vechicleInfo(**VehicleTypeID** , vehicleName, vehicleMaxFreightCounts, vehicleCap, VehicleDescription )

**Partial Dependencies**

since freighTypeName, freighHeight, freighLength, tareWeight, maxgrossWeight, maxNetWeight only depends on part of the primary key, **freighTypeID** and nothing do with **freightID**

therefore:

**freighTypeID 🡪** freighTypeName, freighHeight, freighLength, tareWeight, maxgrossWeight, maxNetWeight

since documentID, approval, direction only depends on part of the primary key, **ListID** and nothing do with **agentID.**

Therefore:

**listID** 🡪 documentID, approval, direction,agentID

**2NF**

freight (**freightID** InListID, outListID, arrivalTime, departureTime, areaID, locX, locY, stackLvl)

Freighttype(**freighTypeID** , freighTypeName, freighHeight, freighLength, tareWeight, maxgrossWeight, maxNetWeight )

agent (**agentID** AgentName, agentEmail, specialisation)

request (**listID,** documentID, approval, direction,agentID)

list (**freightID, listID**, freighTypeID, targetID, origin, freightDirection)

targetInfo (**targetID**, PICName, vehicleID, VehicleTypeID, agentID)

vechicleInfo(**VehicleTypeID** , vehicleName, vehicleMaxFreightCounts, vehicleCap, VehicleDescription )

**Transitive dependencies**

Since InListID, outListID is depends on **arrivalTime, departureTime and freightID**,

Take note that **arrivalTime, departureTime** are non-prime attributes.

Therefore,

**arrivalTime, departureTime** 🡪 InListID, outListID

**Functional dependencies**

**agentID** → agentName, agentTelNo, agentEmail, specialisation

**targetID** → PICName, freightCount, agentID, vehicleID, vehicleTypeID

**vehicleID** → vehicleTypeID

**vehicleTypeID** → vehicleName, maxFreightCounts, capacity, specDescription

**listID** → agentID, documentID, approval, direction

**listID, freightID** → targetID, freightTypeID, freightDirection, grossWeight, origin

***#According to ISO 668, all freight containers have the same width***

**freightTypeID** → freightTypeName, maxGrossWeight, tareWeight, maxNetWeight, maxVolCap, length, height

***#freight in current port***

**freightID** → arrivalTime, inListID, areaID, locX, locY, level

***#historical freight***

**freightID**, **arrivalTime**, **departureTime** → inListID, outListID, targetID

**3NF**

***#freight in current port***

freight (**freightID**, InListID, arrivalTime, areaID, locX, locY, stackLvl)

***# historical freight***

HistorialFreight (**freightID, arrivalTime, departureTime,** InListID, outListID)

Freighttype (**freighTypeID** , freighTypeName, freighHeight, freighLength, tareWeight, maxgrossWeight, maxNetWeight )

agent (**agentID** AgentName, agentEmail, specialisation)

request (**listID,** documentID, approval, direction,agentID)

list (**freightID, listID**, freighTypeID, targetID, origin, freightDirection)

targetInfo (**targetID**, PICName, vehicleID, VehicleTypeID, agentID)

vechicleInfo(**VehicleTypeID** , vehicleName, vehicleMaxFreightCounts, vehicleCap, VehicleDescription )