

Chapter Four Research Analysis

4.1 Analysis Procedures

Since UMM metamodel, UMM transaction pattern and ebXML worksheets are the data analysis tools in the research approach, we specify detailed steps of data analysis as well as the utilization of these three analysis tools.

1. Understanding the Business Domain

In order to understand the structure and dynamics of the business domain, and create categories to help partition the business domain that enables an iteration plan to complete the model, we emphasize the comprehensive understanding of the industry segment, product, services, and business of the case study company at the beginning.

We apply the Business Operations Map (BOM) metamodel of the UMM metamodel in the stage. Business reference model, business areas, and process areas can be identified. Business reference model is a “frame of reference” for the analysis scope. Business areas correspond to the primary business function of the case study company and process areas are like secondary business functions. The categorization of the business reference model, business areas, and process areas should be reviewed by domain experts.

2. Recording Detailed Process Flows for Each Process Area

For each process area, we ask the case study company detailed process flows and record the findings which include actors, information flows, and sequences in the informal flow diagram as well as communication means in the tables. Besides, we ask for copies of business documents used in the processes. After being completed, the informal flow diagram and tables should be reviewed and corrected by the case study company.

3. Identifying Business Process

According to the informal flow diagram corrected, we group process flows into business processes of a process area.

4. Filling out Worksheets of BRM, BA, and PA

After business processes are identified, we apply ebXML worksheets and fill out worksheets of business reference model, business areas, and process areas.

5. Elaborating Business Process and Defining Business Collaboration

We apply the Business Requirements View (BRV) metamodel of UMM

metamodel in this stage. Business Requirements View (BRV) metamodel is a view of a business process model captures the use case scenarios, inputs, outputs, constraints and system boundaries for business transactions, business collaboration protocols and their interrelationships. There are two jobs which are business process elaboration and business collaboration that should be completed.

A business process is a use case that is used to gather requirements about business processes. Actors, goals, preconditions, begin when, ends when, exceptions and postconditions of the business process must be specified in worksheets. We fill out business process worksheets based on the detailed informal flow diagram. If it is hard to fill in the attributes with suitable values, we can consider the case study company information.

Business collaboration consists of a set of roles collaborating through a set of choreographed transactions by exchanging business documents. We divide business process into business collaboration implemented between two roles. In addition, it may make sense to use UML activity diagram to convey some of this information.

5. Identifying Business Transaction and Applying UMM Transaction Pattern

We apply the Business Transaction View (BTV) metamodel of UMM metamodel and UMM transaction pattern in this stage. Individual business transactions that implement the operation of the business collaboration should be identified. Business transaction is the atomic unit of work in a trading arrangement between two business partners. A business transaction is conducted between two parties playing opposite roles in the transaction. The roles are always a requesting role and a responding role. A transaction is made up of several activities and each activity has an authorized role that the signaler must have in order to initiate that activity. The modeling artifacts generated as a result of the worksheet is the business transaction activity diagram.

The UMM has defined several transaction patterns that should be used to define business transactions. By the use of these patterns one can be assured that the transaction is legally binding in accordance with current global and regional legal writings. Figure 6-1 contains a decision tree that can assist a business process and information modeling analyst in determining the appropriate UMM transaction pattern to use within a business transaction between two roles.

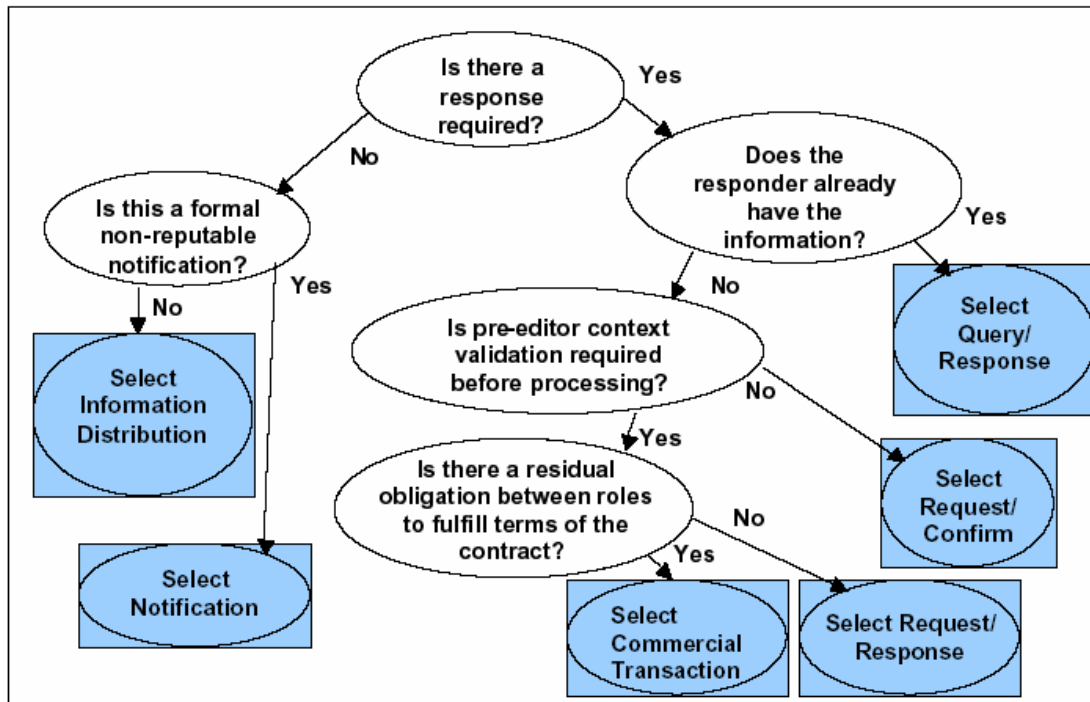


Figure 4. 1 UMM Transaction Pattern Selection Decision Tree

Data source: UN/CEFACT Modeling Methodology, 2001

6. Describing Business Information

This step is to identify the information requirements for the business documents specified in the business transactions. Since an existing business document cannot be found in a business library, we can create the business information context and document content description of the worksheets according to business document copies of the case study company.

7. Drawing a Framework of Research Analysis Result

After each level of the worksheets has been identified and specified, we draw a framework of research analysis result to present the hierarchy of processes. In addition, we iterate up to the upper level to ensure that the scope and information at that level is not changed in the process of data analysis.

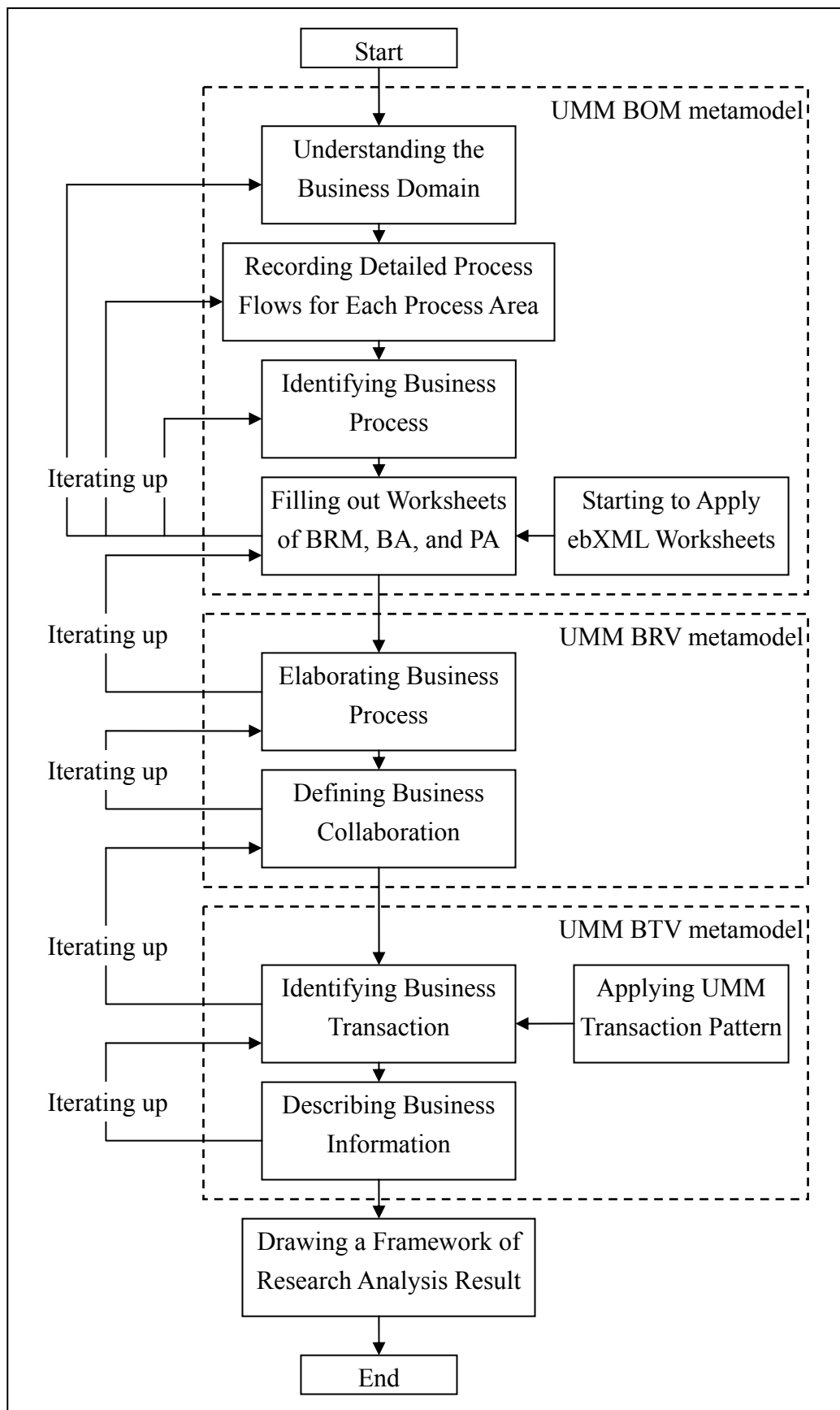


Figure 4. 2 Analysis Procedures

4.2 In-Depth Case Study Company Introduction

The case study company was established in November 1999 as Taiwan's first comprehensive global logistics enterprise. It offers customized services that guarantee the quickest and most efficient way to deliver goods from the starting point to the destination. The case study company focuses on distribution and management of cargo information which contributes to cargo movement. The Kaohsiung Distribution Center of the case study company was established in 2002. The case study company conducts both forwarding and warehousing business now, and provides complete global logistics solution with these comprehensive facilities, the latest information systems, and the well-trained staff. It is a veritable third-party logistics (3PL) firm. The main business of the case study company can be categorized into the following divisions:

1. **Order Management:** Order management takes care of side work associated with purchase ordering. Purchase order entries can be handled through a variety of media, for example, manually, via the Internet, or both, depending on clients' requirements. Pre-shipping and post-shipping advice documents are provided well in advance (www.yeslogistics.com).
2. **Warehousing Management:** Warehousing management covers all the necessities for smooth warehousing workflow including virtual inventory management, value added service and cross-docking (www.yeslogistics.com).
3. **Distribution and Consolidation:** The distribution and consolidation hub is aimed at the specifics of bringing together products that originate from different parts of the world, and then shipping these goods to another destination (www.yeslogistics.com).
4. **Cargo Management:** Cargo management is responsible for finding the most economical route and selecting the most suitable carrier for the assigned goods. The service covers everything from documentation preparation, cargo tally and inspection to performance measurement (www.yeslogistics.com).
5. **One-Stop Documentation:** One-stop paperless documentation is provided for all vendors and their consignees alike on their shipments (www.yeslogistics.com).
6. **Bundled Service:** Bundled service manages the settlement of delivery duties as well as other forms that often take the unsuspecting company by surprise. Yes Logistics is going even further in this area, offering services such as procurement, ecommerce and vendor management (www.yeslogistics.com).

4.3 Operation Processes of Case Study Company

We first collected and detailed the findings in informal flow diagrams in detail in order to gather and organize this findings quickly and comprehensively. Due to space constraint, we describe and discuss on operation processes of full container loads (FCL) export, as shown in Figure 4.1.

In the processes of FCL export, the shipper inquires freight, documentation fee, and related charges by telephoning the forwarder. The forwarder faxes the quotation of price to the shipper. If the shipper agrees to this quotation, he sends a booking request to the forwarder. The forwarder books space and secures Shipping Order (S/O) number from the carrier, and then sends the S/O number back to the shipper.

The shipper sends the customs broker shipping order data to conduct export declaration. The Forwarder notifies the transport company to tow empty containers and instructs the car driver the S/O number. When the car driver arrives at the container yard, the container yard provides the driver the container loading plan, carrier's seal, and equipment interchange receipt (EIR). The container loading plan and carrier's seal must be given to the shipper as well as the EIR must be given to the driver.

After loading, the driver transports the full container to container yard. The container control center checks the containers and issues the exporting cargo storing permission certification. At the same time, the customs broker transmits export declaration to customs house. After examining relevant document and inspecting cargo, customs office sends the release notice to the customs broker, carrier, and container yard.

Simultaneously, after receiving S/O data, the forwarder makes the draft house bill of lading (H B/L) according to the shipping order. When the draft H B/L is finished, it should be checked by the customs broker. The forwarder also provides the carrier with S/O instructions according to the customs broker's S/O data. After the forwarder finishes draft H B/L and draft H B/L is checked by the customs broker, the forwarder provides the carrier with B/L instructions. After the cargos is loaded on board, the carrier issues master bill of lading (M B/L) to the forwarder. The forwarder makes different shipper's H B/Ls according to the M B/L and sends it to the customs broker.

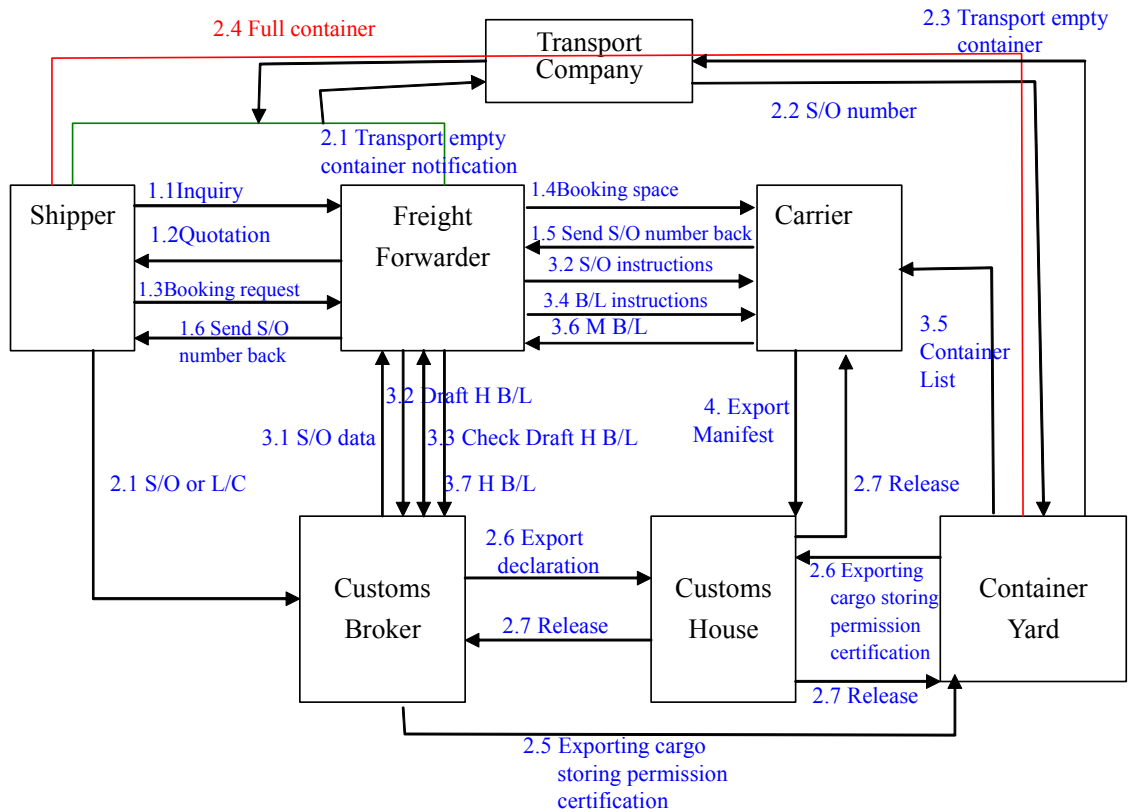


Figure 4. 3 FCL Export Flow Diagram

4.4 Framework of Research Analysis Results

We discover and analyze the public processes of the case study company in use of the ebXML Business Process Analysis Worksheets that are the business process design aids. Based on the Worksheets model, we analyze the processes and proceed from the “Business Reference Model”, “Business Area”, “Process Area”, “Business Process”, “Business Collaboration”, to the “Business Transaction”.

First of all, the business reference model is to define a “frame of reference” for the business processes being identified, and to state the industry segment and domain scope. After referencing the business scope and business processes of the case study company, we define business reference model as “Ocean Freight Forwarder Export and Import Model”.

Under business reference model, we divide the model into two business areas, “Export” and “Import”, based on the primary business function. Next, there are six process areas. The export part includes “FCL (full container loads) Export”, “LCL (less than container loads) Export-self consolidation”, “LCL Export-others consolidation and self B/L (Bill of Lading)”, and “LCL Export-others consolidation

and B/L”; the import part includes “To-Port Import” and “To-Door Import”. The division of FCL and LCL depends on whether shipper’s cargo reaches one container’s allowable maximum (or full) weight or measurement. Moreover, the forwarder may choose to engage in the consolidation of cargo or not. “LCL Export-self consolidation” means that the forwarder engages in the consolidation of shipper’s cargo. “LCL Export-others consolidation and self B/L” means that the forwarder entrusts the consolidation of shipper’s cargo to other forwarder, but still the original forwarder issues B/L. “LCL Export-others consolidation and B/L” means that the consolidation and B/L issuance are entrusted to other forwarder. “To-Port Import” means that the forwarder is responsible for the delivery of shipper’s cargo until the cargo is unloaded at the port of destination. “To-Door Import” means that the forwarder delivers the cargo to the consignee’s premises.

After that, we have to identify and define business processes for each process area. The “FCL Export”, for example, includes “Inquiry/Quote”, “Booking Request”, “Booking Space”, “Warehousing”, “Drafting B/L”, and “Issuing B/L”. After identifying and defining public processes they interact with their trading partners, we have to identify collaborative activities between trading partners according to each business process. We should specify the interaction and cooperation, what role is responsible to these collaboration activities, and its economic output. Taking “Drafting B/L” as an example, we divide it into two collaborations, “Drafting B/L-broker and forwarder” and “Drafting B/L-forwarder and carrier”.

Then, we identify and define the individual transaction in order to instantiate the workflow in terms of business collaboration. A transaction is made up of several activities. For example, the business collaboration, “Drafting B/L-broker and forwarder”, includes “Receiving S/O (Shipping Order)” and “Checking Draft H B/L (House Bill of Lading) forwarder-to-broker”. We should also find the initiating partner, responding partner and related documents of each transaction. Finally, we identify the information requirements for the business documents that have been specified in the business transactions.

Figure 4.2 is the research analysis result at the level of “Business Reference Model”, “Business Area”, “Process Area”, and “Business Process”. Due to the space limitation, we only present the main part of the FCL export process area. Figure 4.3 draws the research analysis result at the level of “Business Process”, “Collaboration”, and “Transaction” of the FCL export process area.

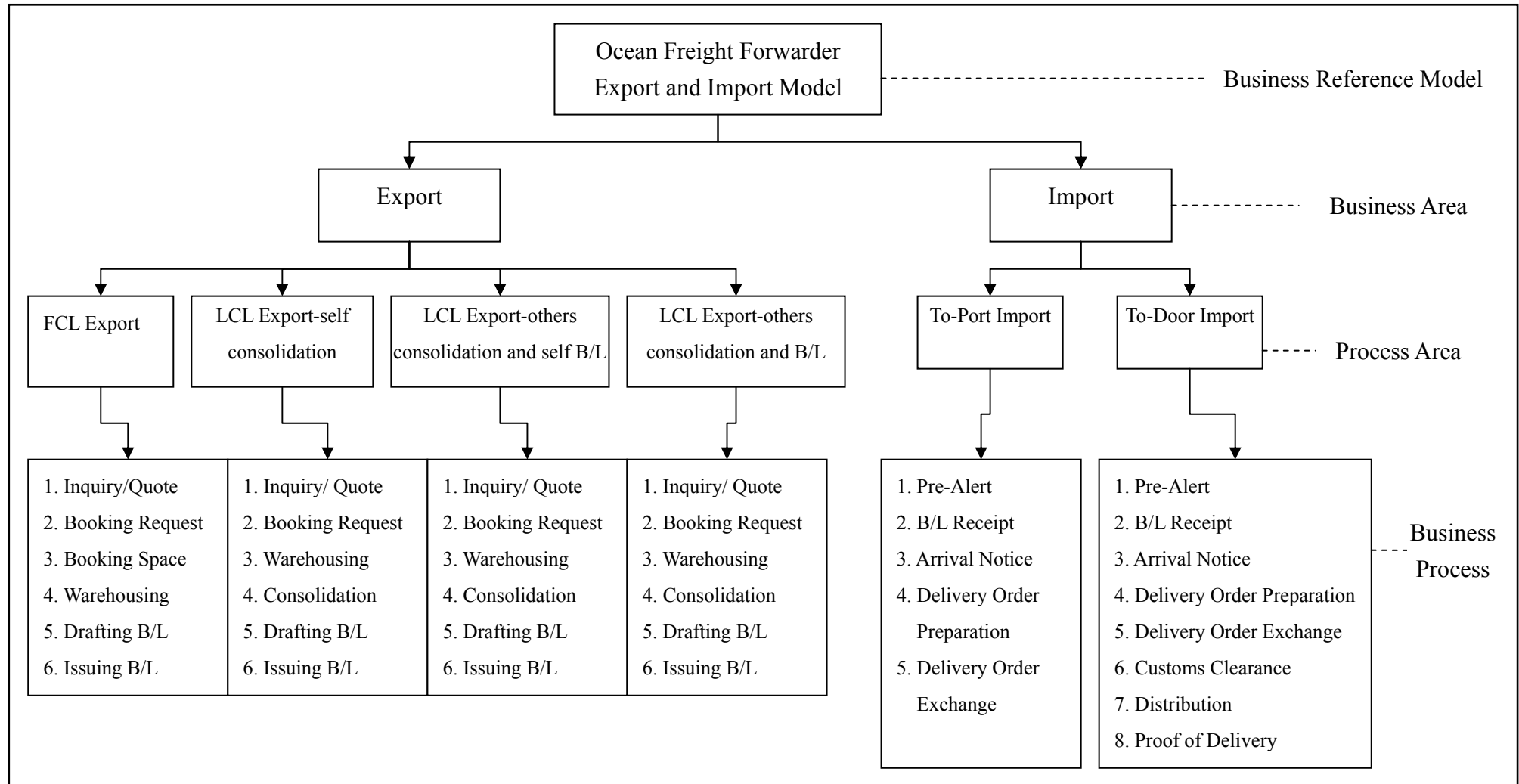


Figure 4. 4 Framework of Research Analysis Result at the Level of Business Reference Model, Business Area, Process Area, and Business Process

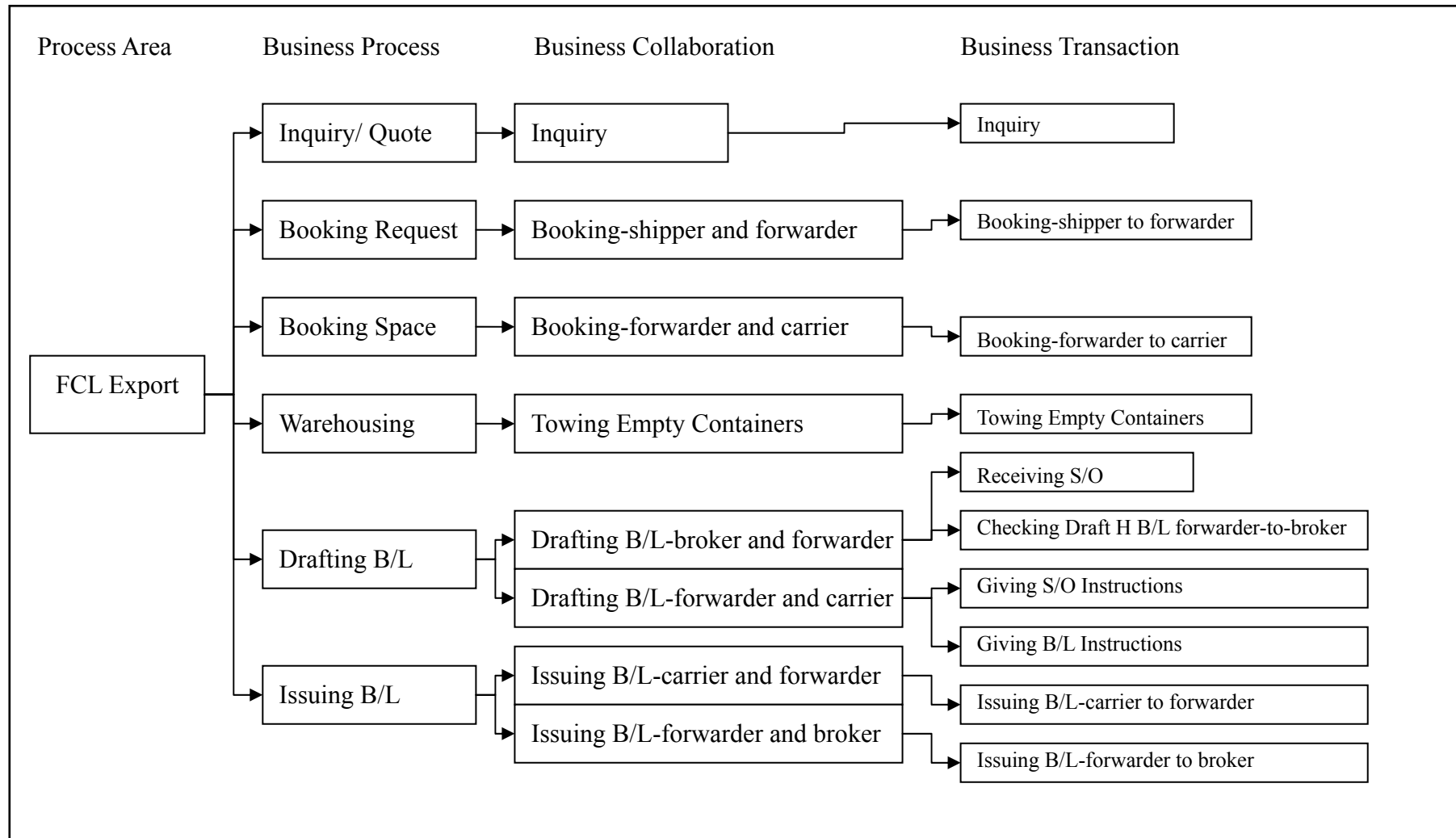


Figure 4. 5 Framework of Research Analysis Result at the Level of Business Process, Collaboration, and Transaction of FCL Export

4.5 Worksheets of Research Analysis Results

4.5.1 Business Reference Model

The business reference model is to define a “frame of reference” for the business processes being identified, and to state the industry segment and domain scope. After referencing the business scope and business processes of the case study company, we define business reference model as “Ocean Freight Forwarder Export and Import Model”.

Table 4. 1 BRM-1.0-Ocean-Freight-Forwarder-Export-and-Import-Model

Form: Describe Business Reference Model	
Form ID	BRM-1.0-Ocean-Freight-Forwarder-Export-and-Import-Model
Business Reference Model Name	Ocean Freight Forwarder Export and Import Model
Industry Segment	Ocean freight forwarder
Domain Scope	Global logistics and distribution services
Business Areas	Export, Import
<i>Optional for ebXML</i>	
Business Justification	None.

4.5.2 Business Area

The business area is to group business processes according to the primary business function. Under business reference model, we divide the model into two business areas, “Export” and “Import”, according to the primary business function.

Table 4. 2 BA-2.0-Export

Form: Describe Business Area	
Form ID	BA-2.0-Expoet
Business Area Name	Export
Description	To ship Shipper’s product outside a country or region.
Scope	To forward exportations.
Boundary of the Business Area	Shipper, Carrier, Customs broker, Container yard, Other forwarder, Transport company.
References	None.

Constraints	It doesn't include multi-country consolidation and transit cargo.
Stakeholders	Shipper, Forwarder, Carrier, Customs broker, Container yard, Other forwarder, Transport company.
Process Areas	FCL Export, LCL Export-self consolidation, LCL Export-others consolidation and self B/L, LCL Export-others consolidation and B/L.
<i>Optional for ebXML</i>	
Objective	None.
Business Opportunity	None.

4.5.3 Process Area

A process area consists of a sequence of processes that are combined to form the “value chain” for a given business area.

Table 4. 3 PA-3.1-FCL-Export

Form: Business Process Area	
Form ID	PA-3.1-FCL-Export
Process Area Name	FCL Export
Objective	Accept Shipper's FCL service booking request. Confirm that the Shipper's cargo will be shipped successfully. Provide the Shipper H B/L (House Bill of Lading).
Scope	To forward FCL exportations.
References	None.
Boundary of the Process Area	Shipper, Forwarder, Carrier, Transport company, Container yard, Customs broker.
Constraints	The Shipper requires FCL service. The Shipper authorizes his Customs broker to conduct declaration, making shipping orders. The Forwarder gives Transportation notification to Transport company.
Stakeholders	Shipper, Forwarder, Carrier, Transport company, Container yard, Customs broker.
Business Processes	Inquiry/Quote, Booking Request, Booking Space, Warehousing, Drafting B/L,

	Issuing B/L.
<i>Optional for ebXML</i>	
Business Opportunity	None.

4.5.4 Business Process

The FCL export includes six business processes, Inquiry/Quote, Booking Request, Booking Space, Warehousing, Drafting B/L, and Issuing B/L.

1. Inquiry/Quote

Table 4. 4 BPUC-5.1.1-Inquiry/Quote

Form: Business Process Use Case	
Form ID	BPUC-5.1.1-Inquiry/Quote
Business Process Name	Inquiry/Quote
Identifier	None.
Actors	Shipper, Forwarder.
Performance Goals	Provides a quotation of prices: the Forwarder makes a quotation of prices according to Shipper's requirements.
Preconditions	None.
Begins When	The Shipper inquires freight, documentation fee, and related charges.
Definition	The Shipper inquires freight, documentation fee, and related charges by telephoning the Forwarder, then the Forwarder will fax the quotation of price to the Shipper.
Ends When	The Shipper receives the quotation of price.
Exceptions	The Forwarder can't quote. Because, for example, the Forwarder doesn't provide the services.
Postconditions	The Shipper acknowledges receipt of Forwarder's quotation.
Traceability	None.

2. Booking Request

Table 4. 5 BPUC-5.1.2-Booking-Request

Form: Business Process Use Case	
Form ID	BPUC-5.1.2-Booking-Request

Business Process Name	Booking Request
Identifier	None.
Actors	Shipper, Forwarder.
Performance Goals	The Forwarder provides valid S/O number: the Forwarder search applicable carriers according to Shipper's requirements.
Preconditions	Valid Shipper Valid Booking
Begins When	The Shipper request for booking space.
Definition	The Shipper telephones the Forwarder, and explains how many containers he needs, the place of receipt, and the place of delivery. The Forwarder will book space and container from Carrier, and then get an S/O number.
Ends When	The Shipper gets an S/O number.
Exceptions	The Forwarder can't book any space, because the Carrier doesn't ship to the place. There are no enough containers. The Shipper doesn't accept the sailing date.
Postconditions	The Shipper accepts the vessel/voyage.
Traceability	None.

3. Booking Space

Table 4. 6 BPUC-5.1.3-Booking-Space

Form: Business Process Use Case	
Form ID	BPUC-5.1.3-Booking-Space
Business Process Name	Booking Space
Identifier	None.
Actors	Forwarder, Carrier
Performance Goals	Getting S/O number: the Forwarder explains Shipper's requirements to the Carrier in order to book space and get S/O number.
Preconditions	Valid Shipper's booking data
Begins When	The Forwarder accepts Shipper's booking request.
Definition	The Forwarder tells the Carrier the number of containers, place of receipt, and place of delivery.
Ends When	The Forwarder gets S/O number.
Exceptions	The Forwarder can't book any space, because the Carrier doesn't ship to the place.

	There are no enough containers. The sailing date doesn't meet Shipper's booking request.
Postconditions	Valid S/O number
Traceability	None.

4. Warehousing

Table 4. 7 BPUC-5.1.4-Warehousing

Form: Business Process Use Case	
Form ID	BPUC-5.1.4-Warehousing
Business Process Name	Warehousing
Identifier	None.
Actors	Shipper, Forwarder, Transport company, Container yard, Customs broker.
Performance Goals	Warehousing: delivers Shipper's cargo to storehouse station.
Preconditions	The Shipper accepts the sailing date.
Begins When	The Forwarder notifies Transport company to tow empty containers.
Definition	<p>The Forwarder notifies Transport company to tow empty containers.</p> <p>The Container yard will give the driver the container loading plan, carrier's seal, and EIR (equipment interchange receipt). The container loading plan and carrier's seal must be given to the shipper; while the EIR must be given to the driver.</p> <p>After loading, the driver transports the full container to Container yard. The container control center will check the containers and issues the exporting cargo storing permission certification.</p>
Ends When	The car driver transports the full container to Container yard. The container control center issues the exporting cargo storing permission certification successfully.
Exceptions	<ol style="list-style-type: none"> 1. Go to the wrong Container yard. 2. The vessel, voyage number, port of discharge, and related data in container loading plan are wrong. 3. The full container is overweight. 4. Special container, that is hard to on board. 5. When Checking the EIR, find the outside of the container is damaged. 6. The carrier's seal number is wrong.
Postconditions	Valid exporting cargo storing permission certification.
Traceability	None.

5. Drafting B/L

Table 4. 8 BPUC-5.1.5-Drafting-B/L

Form: Business Process Use Case	
Form ID	BPUC-5.1.5-Drafting-B/L
Business Process Name	Drafting B/L
Identifier	None.
Actors	Forwarder, Carrier, Customs broker.
Performance Goals	<ol style="list-style-type: none"> 1. Making the correct H B/L: the Forwarder makes the correct draft H B/L according to the shipping order that is provided by the Customs broker, and asks the Customs broker to check the draft H B/L. 2. Making the correct M B/L (Master bill of lading): the Forwarder provides the Carrier with the correct B/L instructions to make correct M B/L.
Preconditions	Valid S/O (Detail S/O data)
Begins When	The Customs broker provides the Forwarder S/O data.
Definition	<ol style="list-style-type: none"> 1. The Customs broker provides the Forwarder S/O data; the Forwarder makes the correct draft H B/L according to the shipping order. When the draft H B/L is finished, it should be checked by the Customs broker. After checked, the Customs broker should send acknowledgement message to the Forwarder. 2. The Forwarder provides carrier S/O instructions according to the Customs broker's S/O data. After the Forwarder finishes draft H B/L and draft H B/L is checked by the Customs broker, the Forwarder will provide the Carrier with B/L instructions.
Ends When	The Forwarder provides the Carrier B/L instruction.
Exceptions	<ol style="list-style-type: none"> 1. The Customs broker checks draft H B/L without concern. 2. The Forwarder delays the draft H B/L.
Postconditions	Valid B/L Instruction.
Traceability	None.

6. Issuing B/L

Table 4. 9 BPUC-5.1.6-Issuing-B/L

Form: Business Process Use Case	
Form ID	BPUC-5.1.6-Issuing-B/L
Business Process Name	Issuing B/L
Identifier	None.
Actors	Forwarder, Carrier, Customs broker.

Performance Goals	Issuance of M B/L: the Carrier issue M B/L. Issuance of H B/Ls: the Forwarder makes correct H B/Ls according to the M B/L and sends it to the Customs broker.
Preconditions	Cargo is loaded on board the vessel.
Begins When	The Carrier issues M B/L to the Forwarder.
Definition	The Forwarder makes different shipper's H B/Ls according to the M B/L and sends it to the Customs broker.
Ends When	The Forwarder issues H B/L to the Customs broker.
Exceptions	None.
Postconditions	The Customs broker received the H B/L.
Traceability	None.

4.5.5 Business Collaboration

Business collaboration specifies input and output triggers, constraints and system boundaries, as well as the use case scenarios. It represents the collaborative activities of two trading partners. In addition to Business Collaboration Table, UML activity diagrams or Business Collaboration Protocol Tables can be used to identify the main activity and participant.

1. Inquiry

Table 4. 10 BC-6.1.1-Inquiry

Form: Business Collaboration	
Form ID	BC-6.1.1-Inquiry
Identifier	None.
Partner Types	Shipper, Forwarder.
Authorized Roles	Shipper.shipping, Forwarder.sales
Legal Steps/Requirements	None.
Economic Consequences	The customer receives the quotation of price.
Initial/Terminal Events	Initial: the Shipper inquires by telephone. Terminal: the Forwarder replies a quotation of price.
Scope	The Forwarder provides a quotation of prices according to the Shipper's requirements.
Boundary	Shipper, Forwarder

Constraints	None.
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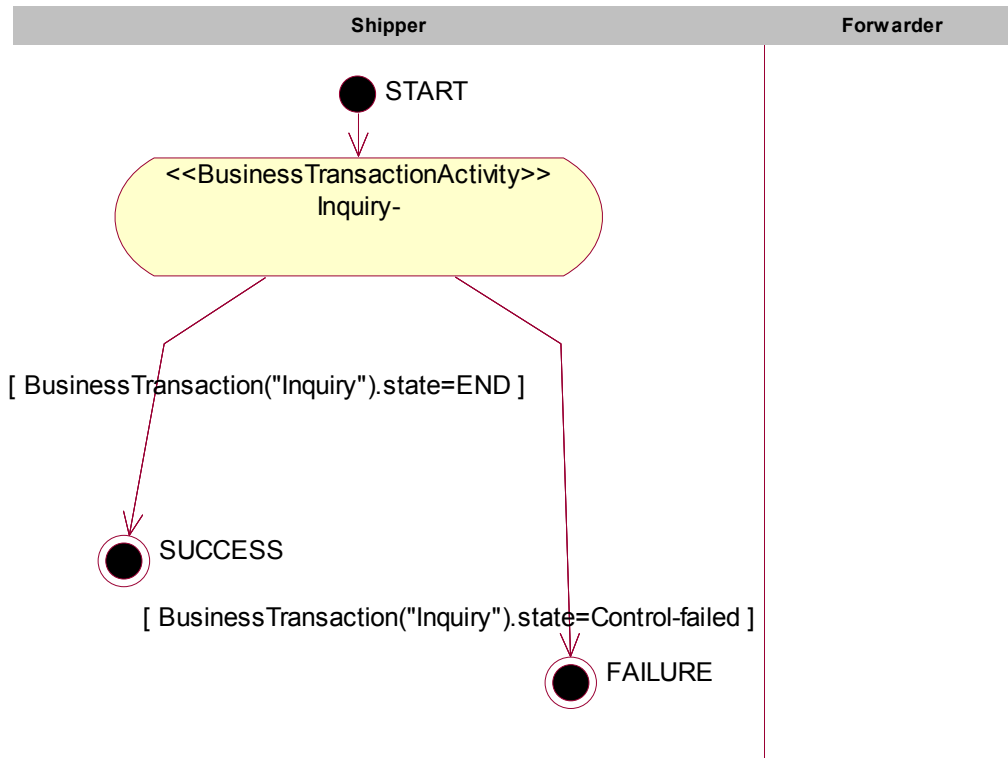


Figure 4. 6 <<BusinessCollaborationProtocol>>Inquiry

Table 4. 11 BCPT-6.1.1-Inquiry

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.1-Inquiry			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Shipper	Inquiry	Forwarder	None.
Inquiry	NOT-APPLICABLE	Success	Forwarder	BusinessTransaction(“ Inquiry”).state=END
Inquiry	NOT-APPLICABLE	fail	Forwarder	BusinessTransaction(“ Inquiry”).state=Control-failed

2. Booking-shipper and forwarder

Table 4. 12 BC-6.1.2- Booking-shipper-and-forwarder

Form: Business Collaboration	
Form ID	BC-6.1.2-Booking-shipper-and-forwarder
Identifier	None.
Partner Types	Shipper, Forwarder
Authorized Roles	Shipper.shipping, Forwarder.operation
Legal Steps/Requirements	The Shipper explains the shipping requirements correctly and clearly. The Forwarder replies correct S/O number. The Shipper accepts the sailing date.
Economic Consequences	S/O number
Initial/Terminal Events	Initial: the Shipper sends the Forwarder booking request by telephone, email, or fax. Terminal: the Forwarder replies the S/O number.
Scope	The Shipper request for booking space. The Forwarder books space and gets an S/O number. Then, the Forwarder sends the S/O number to the Shipper.
Boundary	None.
Constraints	Time to reply to the Shipper’s booking requests is not specified. The Shipper must provide detailed shipping requirements, such as the port of loading, the port of discharge, the place of receipt, and the number of containers.

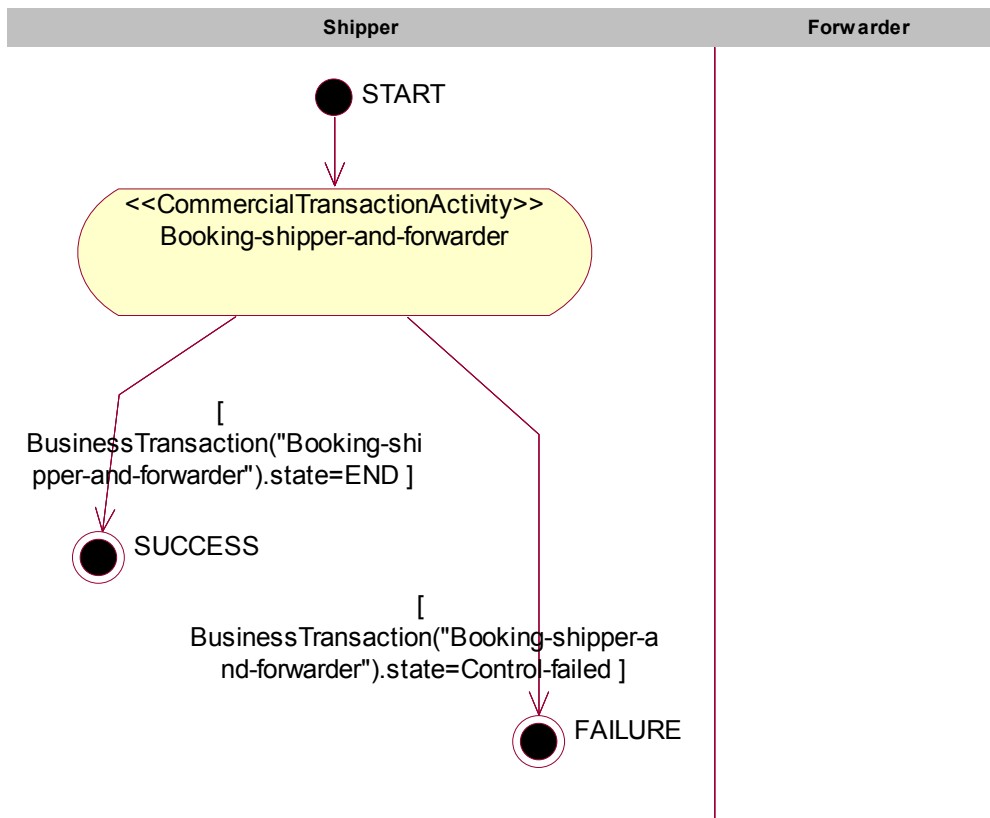


Figure 4. 7 <<BusinessCollaborationProtocol>> Booking-shipper-and-forwarder

Table 4. 13 BCPT-6.1.2- Booking-shipper-and-forwarder

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.2-Booking-shipper-and-forwarder			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Shipper	Booking-shipper-and-forwarder	Forwarder	None.
Booking-shipper-and-forwarder	NOT-APPLICABLE	Success	Shipper	BusinessTransaction(“Booking-shipper-and-forwarder”).state=END
Booking-shipper-and-forwarder	NOT-APPLICABLE	fail	Shipper	BusinessTransaction(“Booking-shipper-and-forwarder”).state=Control-failed

3. Booking-forwarder and carrier

Table 4. 14 BC-6.1.3-Booking-forwarder-and-carrier

Form: Business Collaboration	
Form ID	BC-6.1.3-Booking-forwarder-and-carrier
Identifier	None.
Partner Types	Forwarder, Carrier
Authorized Roles	Forwarder.operation, Carrier.sales
Legal Steps/Requirements	The Forwarder explains shipping requirements correctly and clearly. The Carrier replies correct S/O number to the Forwarder.
Economic Consequences	S/O number
Initial/Terminal Events	Initial: the Forwarder books space by telephone, email, or fax. Terminal: the Carrier replies the Forwarder S/O number.
Scope	The Forwarder books a space and gets S/O number from the Carrier. Then, the Forwarder sends S/O number to the Shipper.
Boundary	None.
Constraints	None.

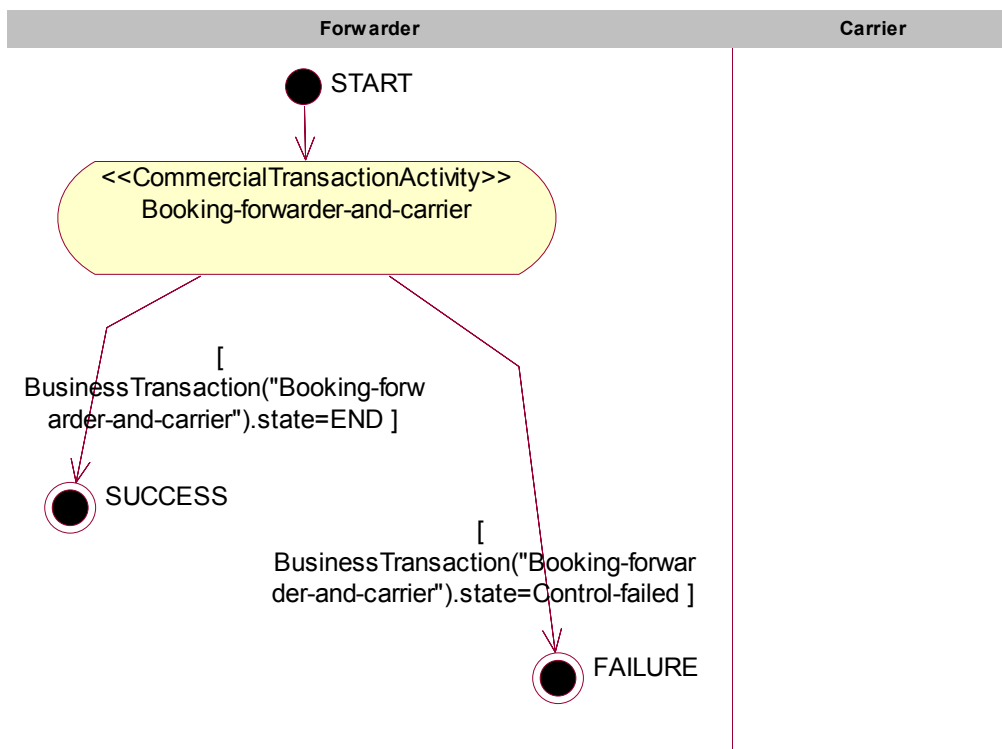


Figure 4. 8 <<BusinessCollaborationProtocol>> Booking-forwarder-and-carrier

Table 4. 15 BCPT-6.1.3-Booking-forwarder-and-carrier

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.3-Booking-forwarder-and-carrier			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Forwarder	Booking-forwarder-and-carrier	Carrier	NONE
Booking-forwarder-and-carrier	NOT-APPLICABLE	Success	Forwarder	BusinessTransaction(“Booking-forwarder-and-carrier”).state=END
Booking-forwarder-and-carrier	NOT-APPLICABLE	fail	Forwarder	BusinessTransaction(“Booking-forwarder-and-carrier”).state=Control-failed

4. Towing Empty Containers

Table 4. 16 BC-6.1.4-Towing-Empty-Containers

Form: Business Collaboration	
Form ID	BC-6.1.4-Towing-Empty-Containers
Identifier	None.
Partner Types	Forwarder, Transport company
Authorized Roles	Forwarder.operation, Transport company.dispatcher
Legal Steps/Requirements	The Forwarder notifies the Transport company of towing empty containers.
Economic Consequences	Empty container is trailed to the Shipper.
Initial/Terminal Events	Initial: the Forwarder notifies the Transport company of towing empty containers. Terminal: empty container is shipped to the Shipper.
Scope	The Forwarder notifies the Transport company of towing empty container at the right container yard, and tells the driver the S/O number. The driver tows empty container at container yard and takes the EIR, the container loading plan, and the carrier’s seal back for the shipper.
Boundary	None.
Constraints	None.

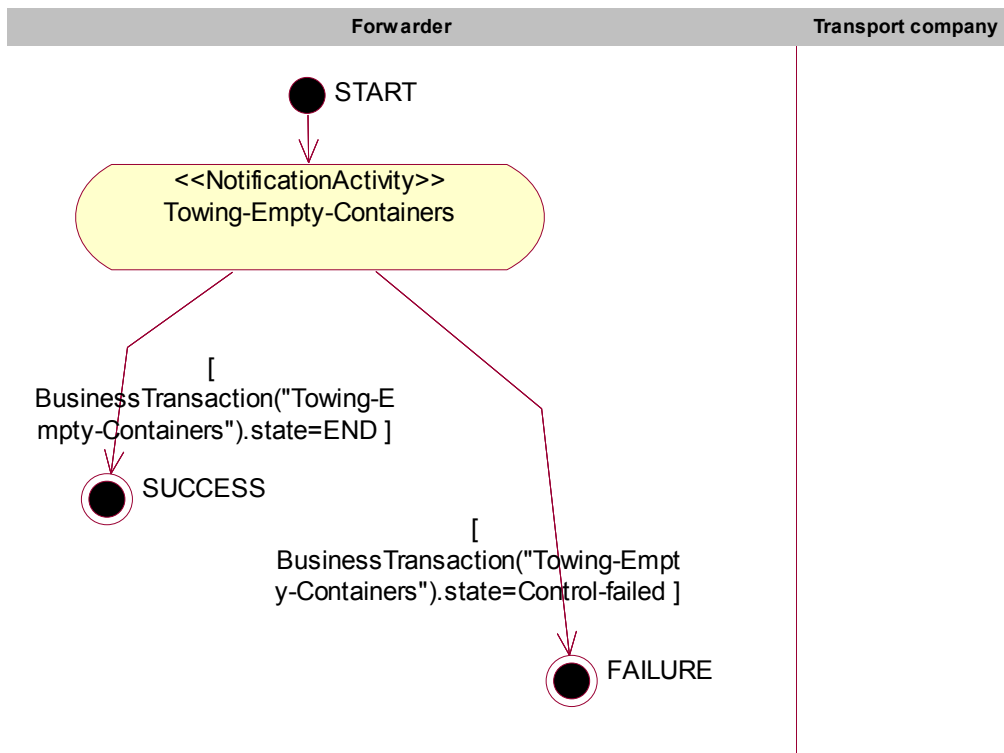


Figure 4. 9 <<BusinessCollaborationProtocol>> Towing-Empty-Containers

Table 4. 17 BCPT-6.1.4-Towing-Empty-Containers

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.4-Towing-Empty-Containers			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Forwarder	Towing-Empty-Containers	Transport company	NONE
Towing-Empty-Containers	NOT-APPLICABLE	Success	NOT- APPLICABLE	BusinessTransaction(“Towing-Empty-Containers”).state=END
Towing-Empty-Containers	NOT-APPLICABLE	fail	NOT- APPLICABLE	BusinessTransaction(“Towing-Empty-Containers”).state=Control-failed

5. Drafting B/L-broker and forwarder

Table 4. 18 BC-6.1.5-Drafting-B/L-broker-and-forwarder

Form: Business Collaboration	
Form ID	BC-6.1.5-Drafting-B/L-broker-and-forwarder
Identifier	None.
Partner Types	Forwarder, Customs broker
Authorized Roles	Forwarder.documentation, Customs broker
Legal Steps/Requirements	The Customs broker must provide the Forwarder with S/O data.
Economic Consequences	Draft H B/L
Initial/Terminal Events	Initial: the Customs broker provides the Forwarder with S/O data. Terminal: the Customs broker checks draft H B/L/.
Scope	The Customs broker provides the Forwarder with S/O data The Forwarder makes the draft H B/L according to the shipping order, and asks the Customs broker to check the draft H B/L. After being checked, Customs broker should send an acknowledgement message to the Forwarder.
Boundary	Forwarder's documentation system
Constraints	The Customs broker must check draft H B/L sent by the Forwarder.

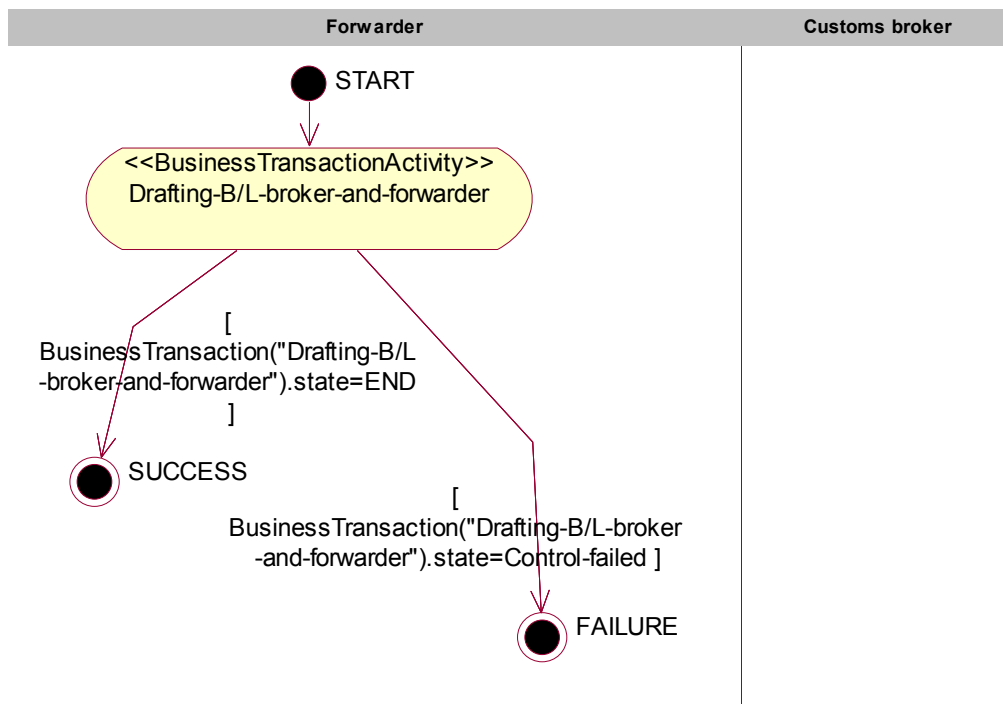


Figure 4. 10 <<BusinessCollaborationProtocol>> Drafting-B/L-broker-and-forwarder

Table 4. 19 BCPT-6.1.5-Drafting-B/L-broker-and-forwarder

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.5-Drafting-B/L-broker-and-forwarder			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Customs broker	Drafting B/L-broker and forwarder	Forwarder	NONE
Drafting B/L-broker and forwarder	NOT-APPLICABLE	Success	NOT-APPLICABLE	BusinessTransaction(“Drafting B/L-broker and forwarder”).state= END
Drafting B/L-broker and forwarder	NOT-APPLICABLE	fail	NOT-APPLICABLE	BusinessTransaction(“Drafting B/L-broker and forwarder”).state= Control-failed

6. Drafting B/L-forwarder and carrier

Table 4. 20 BC-6.1.6-Drafting-B/L-forwarder-and-carrier

Form: Business Collaboration	
Form ID	BC-6.1.6-Drafting-B/L-forwarder-and-carrier
Identifier	None.
Partner Types	Forwarder, Carrier
Authorized Roles	Forwarder.documentation, Carrier.documentation
Legal Steps/Requirements	The Forwarder makes draft H B/L.
Economic Consequences	Draft H B/L
Initial/Terminal Events	Initial: the draft H B/L is finished by the Forwarder. Terminal: the Carrier receives B/L instruction.
Scope	The forwarder will provide carrier S/O instruction according to customs broker’s S/O data. After the Forwarder finishes draft H B/L and draft H B/L is checked by the Customs broker, the Forwarder would provide the Carrier with B/L instruction.
Boundary	Forwarder’s documentation system
Constraints	The Forwarder must provide the Carrier with B/L instruction.

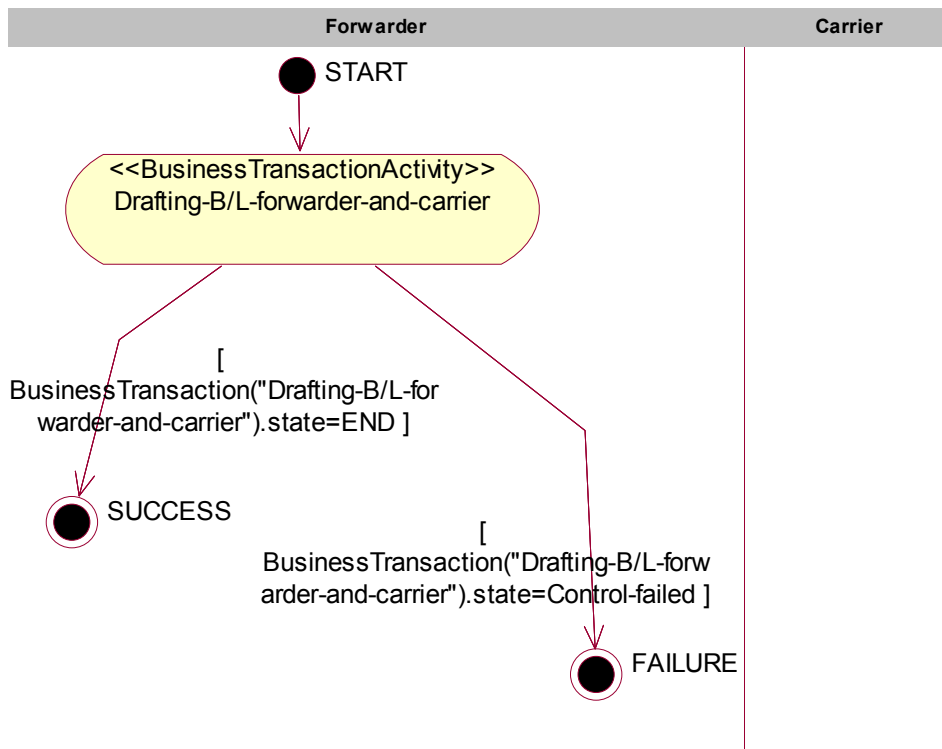


Figure 4. 11 <<BusinessCollaborationProtocol>> Drafting-B/L-forwarder-and-carrier

Table 4. 21 BCPT-6.1.6-Drafting-B/L-forwarder-and-carrier

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.6-Drafting-B/L-forwarder-and-carrier			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Forwarder	Drafting-B/L-forwarder-and-carrier	Carrier	NONE
Drafting-B/L-forwarder-and-carrier	NOT-APPLICABLE	Success	NOT-APPLICABLE	BusinessTransaction(“Drafting-B/L-forwarder-and-carrier”).state=END
Drafting-B/L-forwarder-and-carrier	NOT-APPLICABLE	fail	NOT-APPLICABLE	BusinessTransaction(“Drafting-B/L-forwarder-and-carrier”).state=Control-failed

7. Issuing B/L-carrier and forwarder

Table 4. 22 BC-6.1.7-Issuing-B/L-carrier-and-forwarder

Form: Business Collaboration	
Form ID	BC-6.1.7-Issuing-B/L-carrier-and-forwarder
Identifier	None.
Partner Types	Forwarder, carrier
Authorized Roles	Forwarder.documentation, Carrier.documentation
Legal Steps/Requirements	Cargo is loaded on board the vessel.
Economic Consequences	M B/L
Initial/Terminal Events	Initial: after the cargo is loaded on board the vessel, the Carrier issues M B/L to the Forwarder. Terminal: the Forwarder acknowledges receipt.
Scope	After the cargo is loaded on board the vessel, the Carrier issues M B/L to the Forwarder. When receiving M B/L, the Forwarder acknowledges receipt.
Boundary	None.
Constraints	The Carrier must send M B/L to the Forwarder as soon as the cargo is loaded on board the vessel.

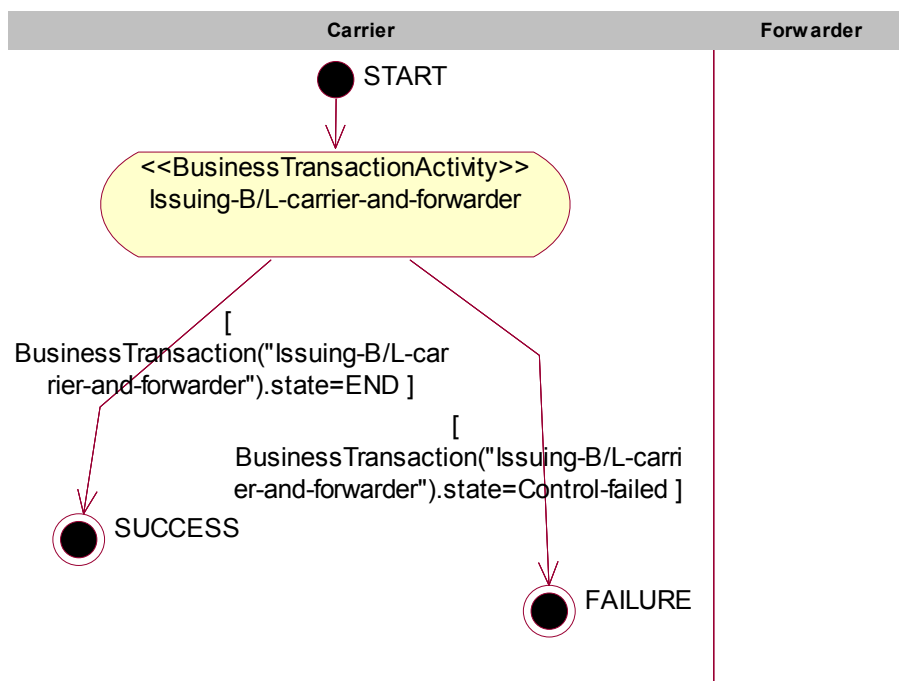


Figure 4. 12 <<BusinessCollaborationProtocol>> Issuing-B/L-carrier-and-forwarder

Table 4. 23 BCPT-6.1.7- Issuing-B/L-carrier-and-forwarder

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.7- Issuing-B/L-carrier-and-forwarder			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Carrier	Issuing-B/L-carrier-and-forwarder	Forwarder	NONE
Issuing-B/L-carrier-and-forwarder	NOT-APPLICABLE	Success	NOT- APPLICABLE	BusinessTransaction(“Issuing-B/L-carrier-and-forwarder”).state=END
Issuing-B/L-carrier-and-forwarder	NOT-APPLICABLE	fail	NOT- APPLICABLE	BusinessTransaction(“Issuing-B/L-carrier-and-forwarder”).state=Control-failed

8. Issuing B/L-forwarder and broker

Table 4. 24 BC-6.1.8-Issuing-B/L-forwarder-and-broker

Form: Business Collaboration	
Form ID	BC-6.1.8-Issuing-B/L-forwarder-and-broker
Identifier	None.
Partner Types	Forwarder, Customs broker
Authorized Roles	Forwarder.documentation, Customs broker
Legal Steps/Requirements	The Forwarder receives M B/L.
Economic Consequences	H B/L
Initial/Terminal Events	Initial: after receiving M B/L, the Forwarder issues H B/L to the Customs broker. Terminal: the Customs broker acknowledges receipt.
Scope	After receiving M B/L, the Forwarder issues H B/L to the Customs broker which acknowledges receipt when receiving H B/L.
Boundary	None.
Constraints	The Carrier must send M B/L to the Forwarder as soon as the cargo is loaded on board the vessel. The Forwarder must send H B/L to the Customs broker as soon as the Forwarder receives M B/L.

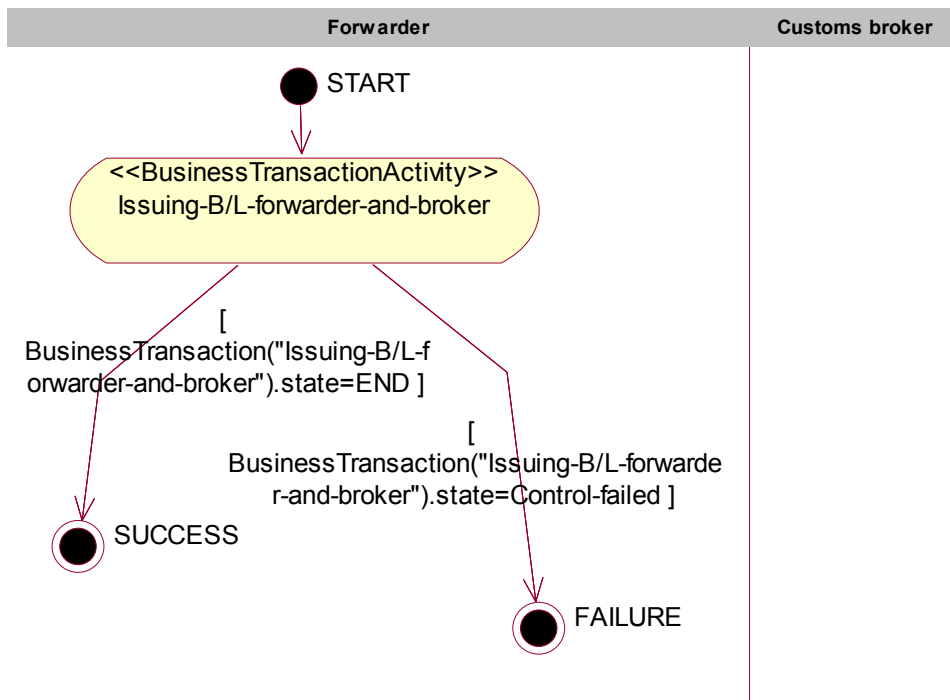


Figure 4. 13 <<BusinessCollaborationProtocol>> Issuing-B/L-forwarder-and-broker

Table 4. 25 BCPT-6.1.8-Issuing-B/L-forwarder-and-broker

Form: Business Collaboration Protocol Table				
Form Id	BCPT-6.1.8-Issuing B/L-forwarder-and-broker			
Identifier	None.			
From Business Activity (Transaction)	Initiating Partner Type	To Business Activity	Responding/ Receiving Partner Type	Transition Condition
START	Forwarder	Issuing-B/L-forwarder-and-broker	Customs broker	NONE
Issuing-B/L-forwarder-and-broker	NOT-APPLICABLE	Success	NOT-APPLICABLE	BusinessTransaction("Issuing-B/L-forwarder-and-broker").state=END
Issuing-B/L-forwarder-and-broker	NOT-APPLICABLE	fail	NOT-APPLICABLE	BusinessTransaction("Issuing-B/L-forwarder-and-broker").state=Control-failed

4.5.6 Business Transaction

A transaction is made up of several activities and each activity has an authorized role. The modeling artifacts generated as a result of the worksheet is the Business Transaction Activity Diagram. A series of activity diagrams illustrating business transactions of FCL export are given as follows.

1. BTTT-7.1.1-Inquiry

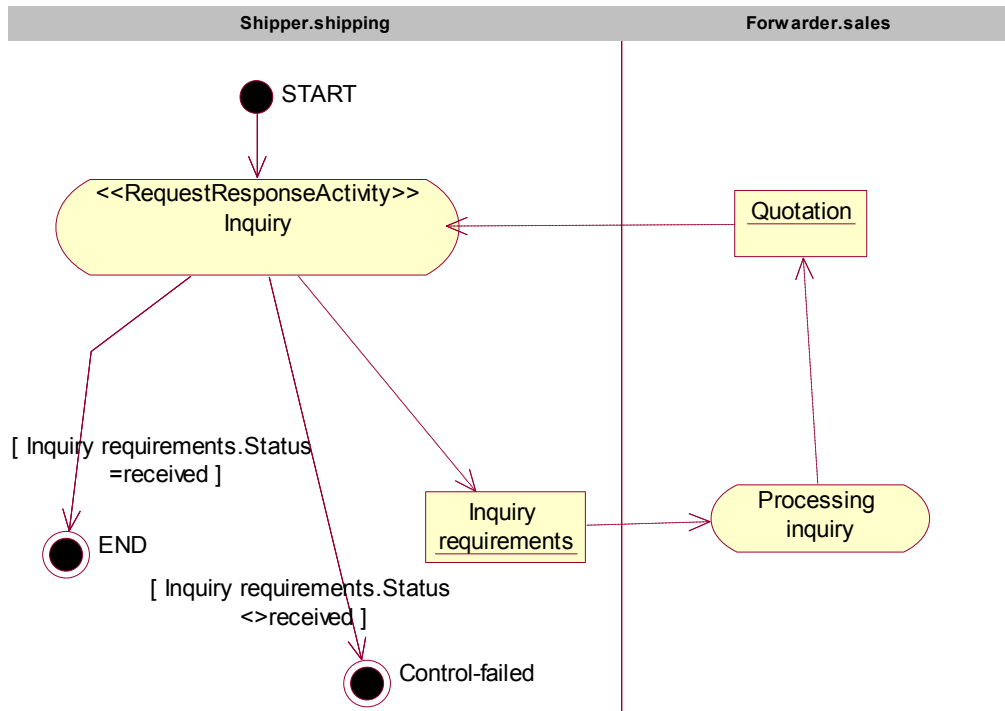


Figure 4. 14 <<BusinessTransaction>>Inquiry

2. BTTT-7.1.2-Booking-shipper to forwarder

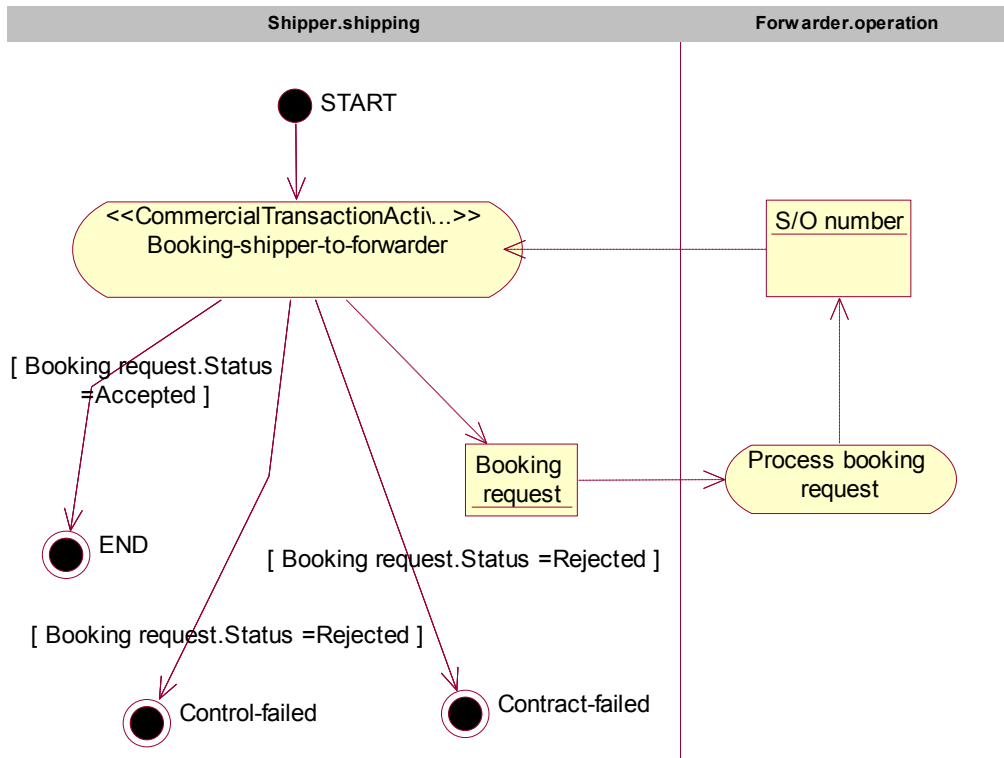


Figure 4. 15 <<BusinessTransaction>> Booking-shipper-to-forwarder

3. BTTT-7.1.3-Booking-forwarder to carrier

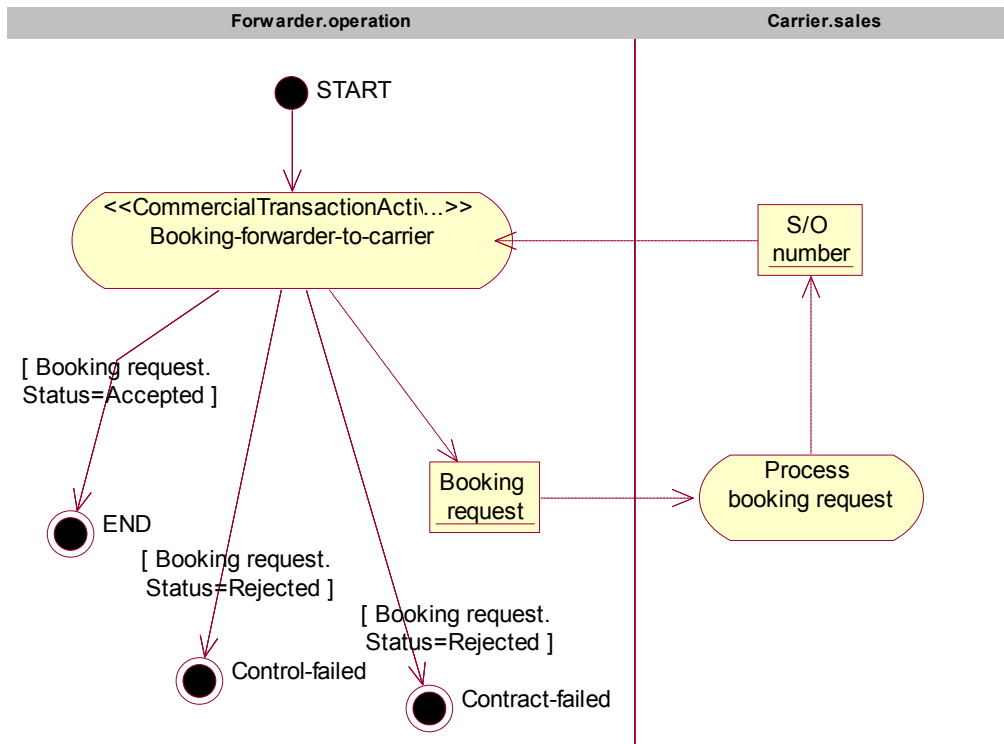


Figure 4. 16 <<BusinessTransaction>> Booking-forwarder-to-carrier

4. BTTT-7.1.4-Towing Empty Containers

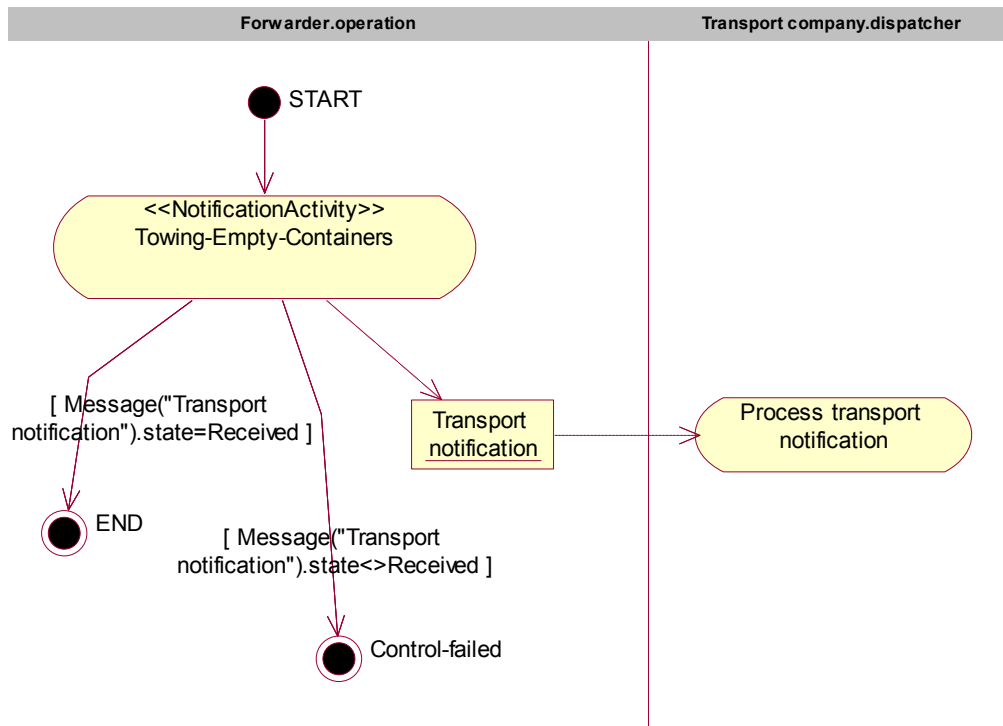


Figure 4. 17 <<BusinessTransaction>> Towing-Empty-Containers

5. BTTT-7.1.5-Receiving S/O

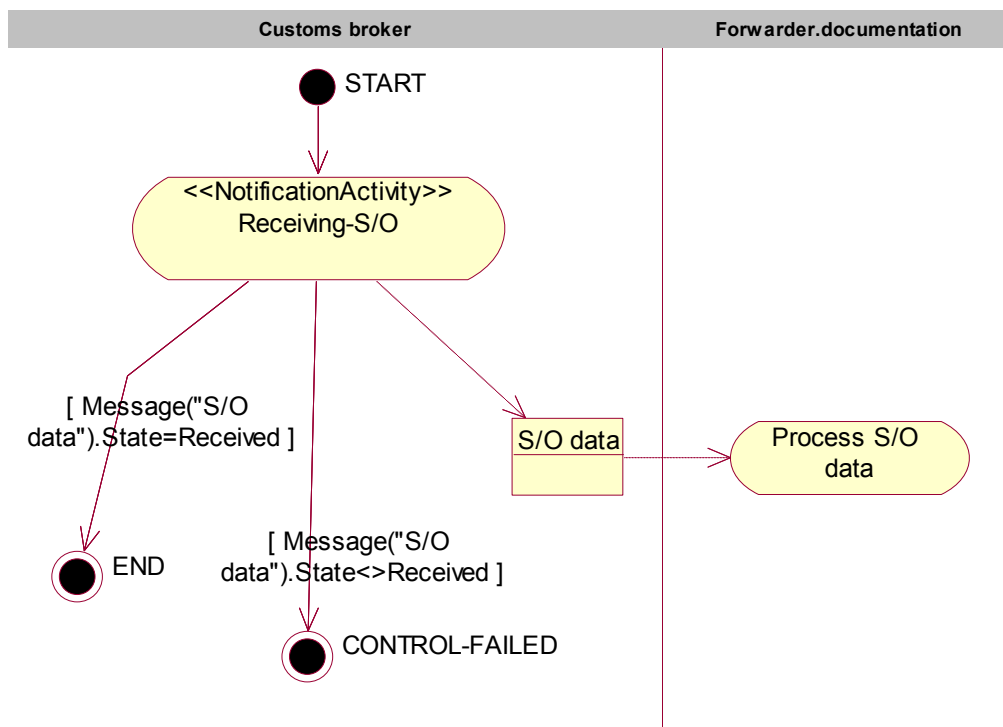


Figure 4. 18 <<BusinessTransaction>> Receiving-S/O

6. BTTT-7.1.6-Checking Draft H B/L forwarder-to-broker

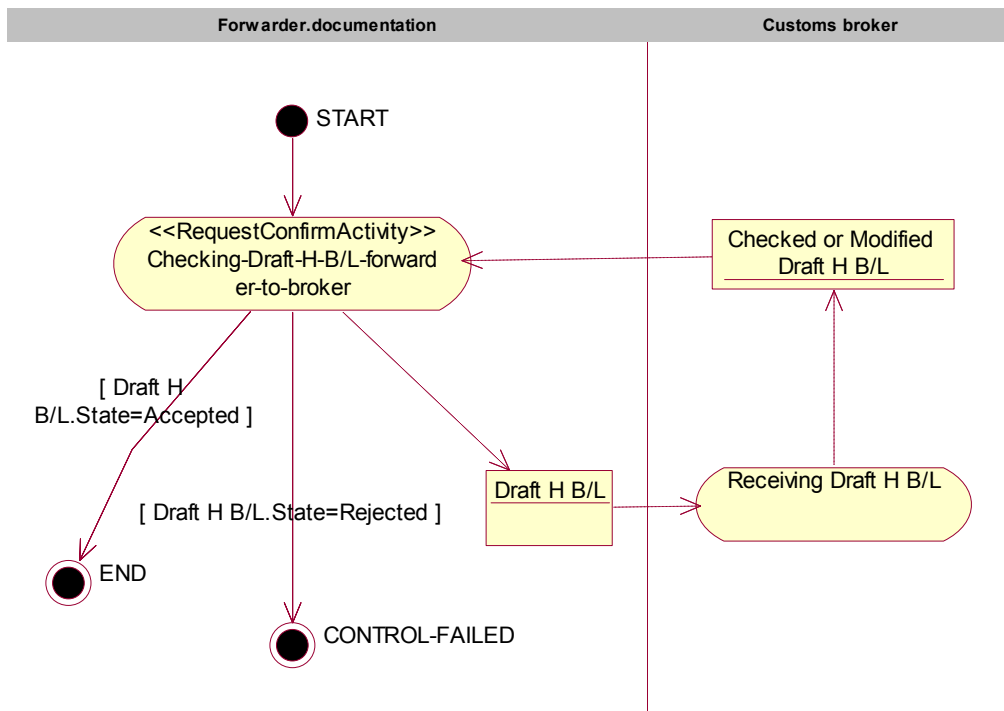


Figure 4. 19 <<BusinessTransaction>> Checking Draft H B/L forwarder-to-broker

7. BTTT-7.1.7-Giving S/O Instructions

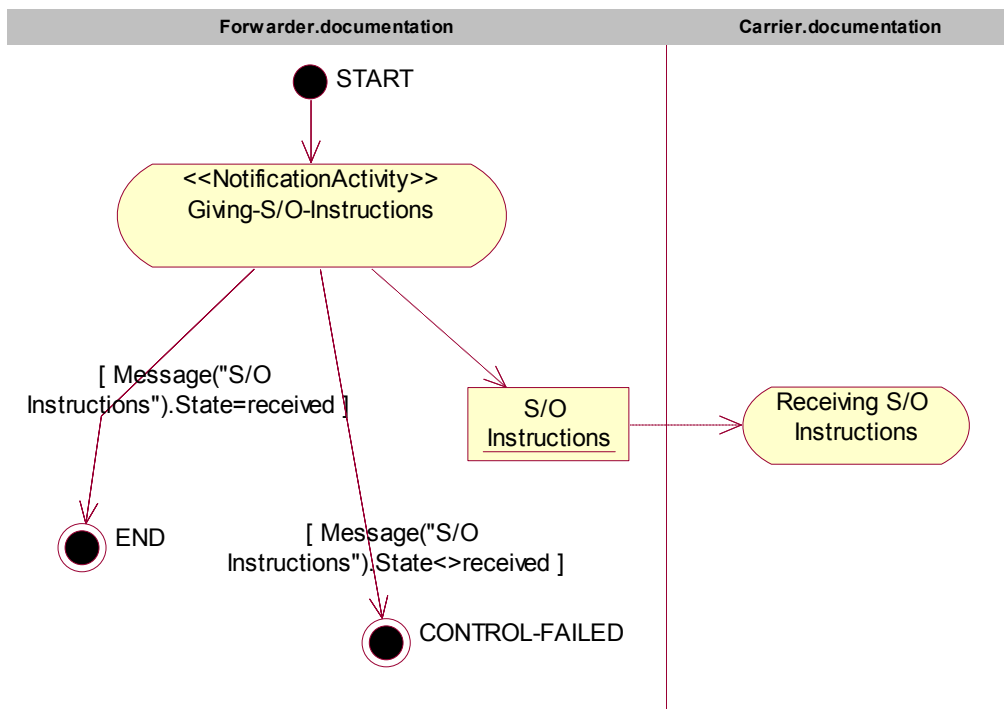


Figure 4. 20 <<BusinessTransaction>> Giving-S/O-Instructions

8. BTTT-7.1.8-Giving B/L Instructions

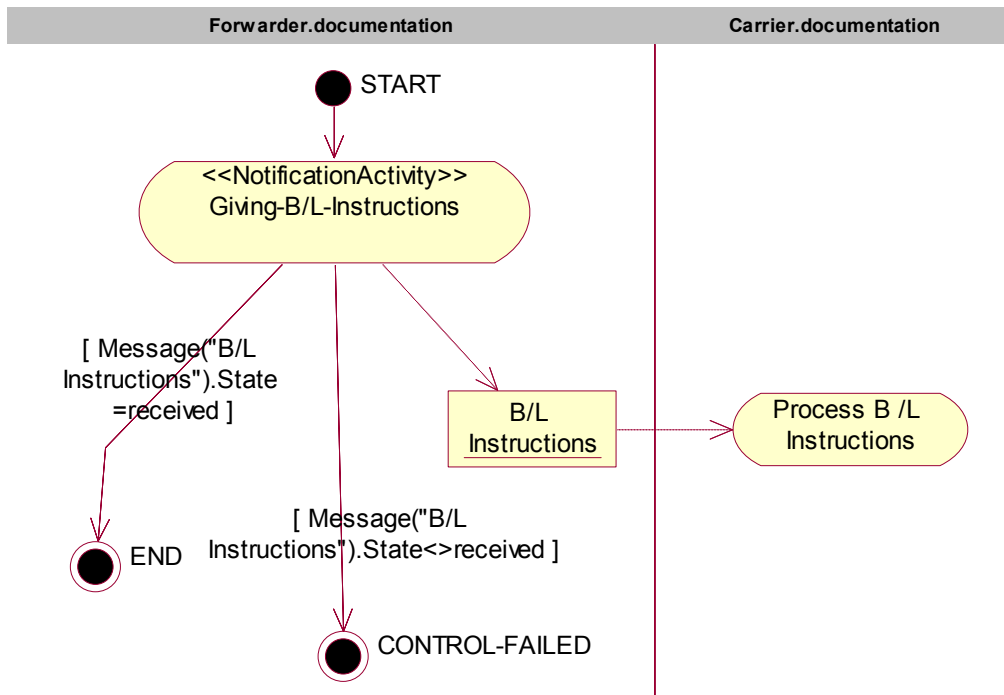


Figure 4. 21 <<BusinessTransaction>> Giving-B/L-Instructions

9. BTTT-7.1.9-Issuing B/L-carrier to forwarder

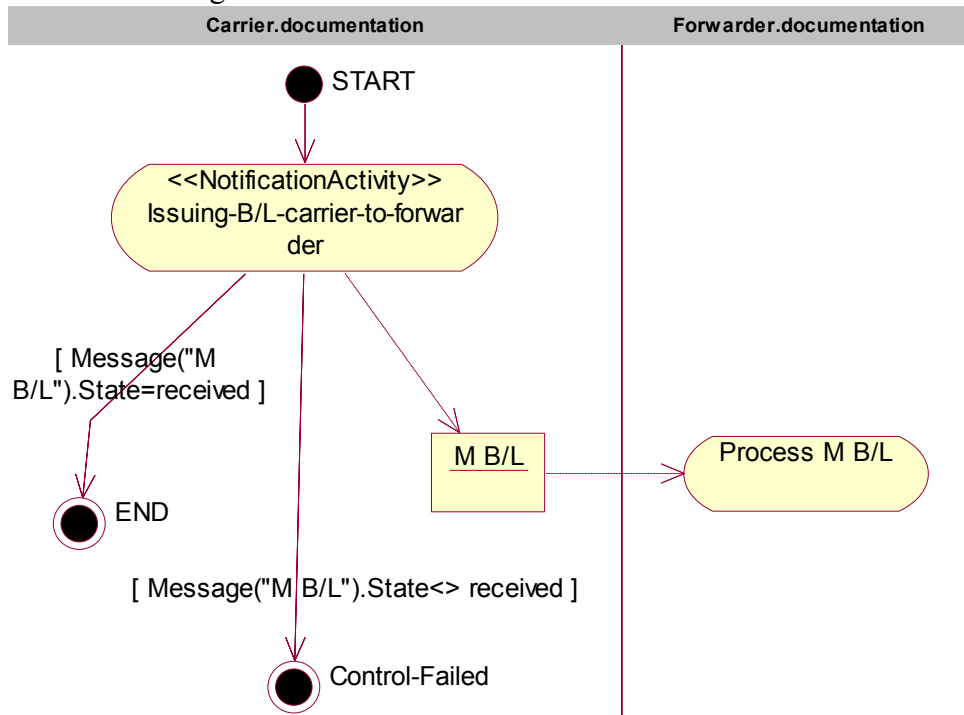


Figure 4. 22 <<BusinessTransaction>> Issuing-B/L-carrier-to-forwarder

10. BTTT-7.1.10-Issuing B/L-forwarder to broker

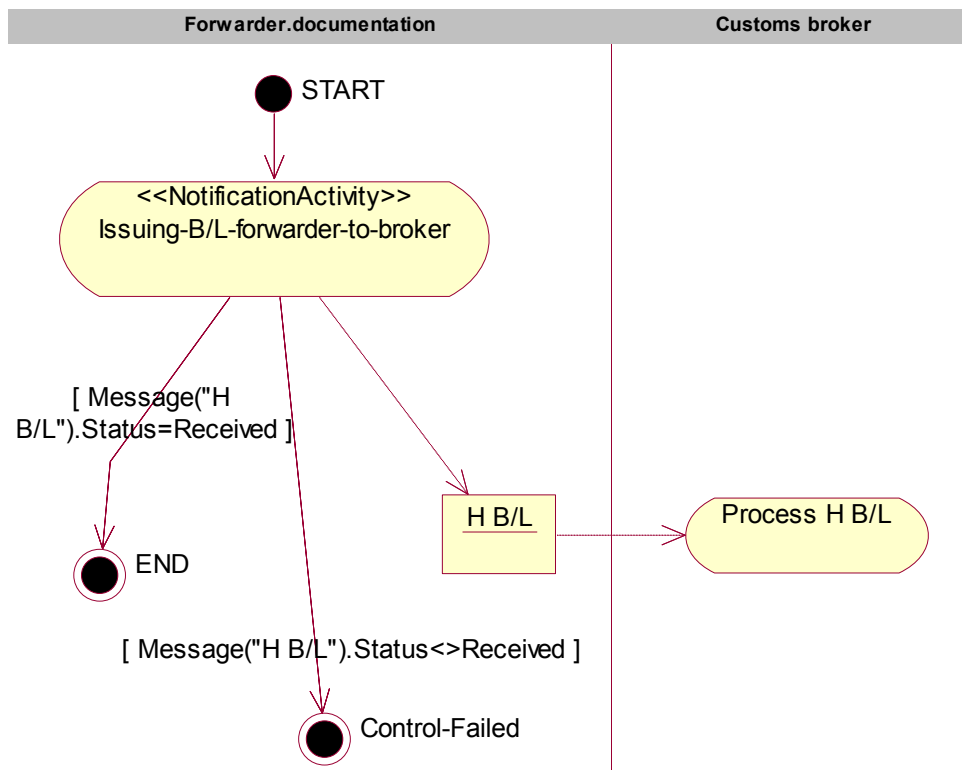


Figure 4. 23 <<BusinessTransaction>> Issuing-B/L-forwarder-to-broker

4.5.7 Business Information

Business Information is to identify and define the information requirements for the business documents described in the business transactions. Since shipping order (S/O) and bill of landing (B/L) are the essential documents used in FCL export transactions, we need to specify them as well as follows.

1. Shipping order (S/O)

Table 4. 26 BIC-8.1-S/O

Form: Business Information Context	
Form Id:	BIC-8.1-S/O
Industry Segment	Ocean freight forwarder
Business Process	BPUC-5.1.5-Drafting-B/L BC-6.1.5-Drafting-B/L-broker-and-forwarder BTTT-7.1.5-Receiving S/O
Product	NOT-APPLICABLE
Physical Geography /Conditions /Region	NOT-APPLICABLE

Geo-Political Legislative/ Regulatory/ Cultural	NOT-APPLICABLE
Application Processing	NOT-APPLICABLE
Business Purpose /Domain	See BPUC-5.1.5-Drafting-B/L
Partner Role	Forwarder.documentation, Customs broker
Service Level (profiles – not preferences	NOT-APPLICABLE
Contracts/Agreements	NOT-APPLICABLE

Table 4. 27 CD-8.1-S/O

Form: Content Description					
Form Id:	CD-8.1-S/O				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
S/O Header	1		N/A	Including the S/O number, shipper, consignee, port of loading, port of discharge, etc.	
S/O Detail	0..1		N/A	Cargo transportation information provided by the shipper.	
S/O Summary	0..1		N/A	Contact information of the shipper and customs broker.	

Table 4. 28 CD-8.1.2-S/O Header

Form: Content Description					
Form Id:	CD-8.1.1-S/O Header				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
S/O no.	1	integer		Shipping order number.	
Vessel	1	String		Ocean vessel.	
Voy No.	1	String		Voyage number.	
Port of Loading	1	String		Port of loading	
Port of Discharge	1	String		Port of discharge	
Place of Receipt	0..1	String		Place of receipt	
Place of Delivery	0..1	String		Place of delivery	
Shipper	1	String		Shipper	

Consignee	1	String		Consignee	
Notify Party	1	String		Notify party	
Also Notify Party	0..*	String		Also notify party	
Service required	1	String		Service type shipper required.	

Table 4. 29 CD-8.1.3-S/O Detail

Form: Content Description					
Form Id:	CD-8.1.2-S/O Detail				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
Marks & Numbers	1	String		Marks and numbers.	
No. of Pkgs or Containers	1	String		Total number of containers or packages.	
Descriptions of Packages & Goods	1	String		Descriptions of packages and goods.	
Gross Weight (Kgs)	1	number		Gross weight	
Measurement (M ³)	1	number		Measurement	

Table 4. 30 CD-8.1.3-S/O Summary

Form: Content Description					
Form Id:	CD-8.1.3-S/O Summary				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
Containers Required	1	Integer		Total number	
Special Containers Required	0..1	String		The special containers the shipper requires.	
B/L Required	0..1	Boolean		Does shipper require original B/L or Non-negotiable copies?	
Tel Number of Shipper	1	Integer		Telephone number of shipper.	
Tel Number of Broker	1	Integer		Telephone number of customs broker.	
Fax. Number of Shipper	1	Integer		Fax number of shipper.	
Fax. Number of Broker	1	Integer		Fax number of customs broker.	
Notice	1	string		Matters the shipper should notice.	

2. Bill of lading (B/L)

Table 4. 31 BIC-8.2-B/L

Form: Business Information Context	
Form Id:	BIC-8.2-B/L
Industry Segment	Ocean freight forwarder
Business Process	BPUC-5.1.5-Drafting-B/L BPUC-5.1.6-Issuing-B/L BC-6.1.5-Drafting-B/L-broker-and-forwarder BC-6.1.6-Drafting-B/L-forwarder-and-carrier BC-6.1.7-Issuing-B/L-carrier-and-forwarder BC-6.1.8-Issuing-B/L-forwarder-and-broker BTTT-7.1.6-Checking Draft H B/L forwarder-to-broker BTTT-7.1.8-Giving B/L Instructions BTTT-7.1.9-Issuing B/L-carrier to forwarder BTTT-7.1.10-Issuing B/L-forwarder to broker
Product	NOT-APPLICABLE
Physical Geography /Conditions /Region	NOT-APPLICABLE
Geo-Political Legislative/ Regulatory/ Cultural	NOT-APPLICABLE
Application Processing	NOT-APPLICABLE
Business Purpose /Domain	See BPUC-5.1.6-Issuing-B/L
Partner Role	Forwarder.documentation, Customs broker, carrier
Service Level (profiles – not preferences.)	NOT-APPLICABLE
Contracts/Agreements	NOT-APPLICABLE

Table 4. 32 CD-8.2-B/L

Form: Content Description					
Form Id:	CD-8.2-B/L				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
B/L Header	1		N/A	Including the S/O number, B/L number, shipper, consignee, port of discharge, etc.	
B/L Detail	0..1		N/A	Cargo transportation information provided by	

				the shipper.	
B/L Summary	0..1		N/A	Freight and charges, laden on board the vessel, number of original B/L, B/L issue date, signature, etc.	

Table 4. 33 CD-8.2.1- B/L Header

Form: Content Description					
Form Id:	CD-8.2.1- B/L Header				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
Document no.	1	Integer		S/O number.	
B/L no.	1	String		B/L number.	
Shipper	1	String		Shipper.	
Consignee	1	String		Consignee.	
Notify Party	1	String		Notify party.	
Pre-carriage by	0..1	String		Mark the first vessel of transshipment cargo.	
Place of Receipt	0..1	String		Place of receipt.	
Vessel/ Voyage/Flag	1	String		Ocean vessel and voyage number.	
Port of Loading	1	String		Port of loading.	
Port of Discharge	1	String		Port of discharge.	
Place of Delivery	0..1	String		Port of delivery.	
Delivery agent	1	String		Overseas agent.	
Onward inland routing	0..1	String		No data.	
Loading pier/Terminal	0..1	String		No data.	
Originals to be released at	0..1	String		No data.	
Type of movement	0..1	String		Service type.	

Table 4. 34 CD-8.2.2-B/L Detail

Form: Content Description					
Form Id:	CD-8.2.2-B/L Detail				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes

CNTR nos W/Seal nos. Marks & Numbers	1	String		Container number and seal number, marks & numbers.	
No. of Pkgs	1	String		Number of packages.	
Description of Packages & Goods	1	String		Description of packages and goods.	
Gross Weight (Kgs)	1	Number		Gross weight.	
Measurement (M ³)	1	Number		Measurement.	

Table 4. 35 CD-8.2.3-B/L Summary

Form: Content Description					
Form Id:	CD-8.2.3-B/L Summary				
Element/Component Name	Occurs	Data Type	Field Width	Semantic Description	Notes
Service contract no	0..1	Integer		Service contract number.	
Rout code	0..1			No data.	
Commodity code	0..1	String		Commodity code.	
On board date	1	Date		Laden on board.	
Number of original B(S)/L	1	Integer		Number of original B/L/	
Freight & charges	1	String		Freight and charges.	
Rated as	1	String		Charges unit (e.g. one container).	
Rate	1	Number		Unit price (e.g. how much does a container cost).	
Prepaid	0..1	String		Freight prepaid (shipper pays freight).	They are alternative.
Collect	0..1	String		Freight collect (consignee pays freight).	
Rate of exchange	1	String		Exchange rate.	
Date of issue	1	Date		B/L issue data.	
Signature	1	String		Signature.	