

# Module 2-7

## Business Process Analysis (BPA)

Dr. Somnuk Keretho  
Advisory Committee, UNNExT  
Director, iNOVA, Kasetsart University  
[sk@ku-inova.org](mailto:sk@ku-inova.org)



# Three (3) Objectives of the BPA Modules (Day 1 & 2: Module 2-7)

---

The participants will learn:

1. **What is Business Process Analysis (BPA):** A methodology for
  - ▶ Capturing/monitoring “As-Is” (current) processes and documentation requirements related to trade and transport facilitation, and
  - ▶ Proposing “To-Be” (target) improvement, e.g. with process simplification, document harmonization, and automation including Single Window implementation;
2. **How to describe** these processes and documentation with **graphical notations (diagrams)** and associated descriptions based on a standardized/**Unified Modelling Language (UML)**;
3. **How to conduct** a business process analysis and **to propose** recommendations for improvement (managing it as a **Project**).

## **Module 2**

# **Introduction to Business Process Analysis**

Dr. Somnuk Keretho  
Advisory Committee, UNNExT  
Director, iNOVA, Kasetsart University  
[sk@ku-inova.org](mailto:sk@ku-inova.org)



# Agenda

---

---

1. BPA for Monitoring and Proposing Improvement of Trade and Transport Facilitation
2. Introduction into Unified Modeling Language (UML)
3. The Three (3) Phases of a BPA Project
4. Example: A BPA Project for a national logistics development plan

# What is a Business Process?

---

- ❖ *A Business Process is a collection of related and structured activities or tasks that produce a specific service or product.*
- ❖ Example
  - ▶ Applying and Issuing Procedures for a Phyto-Sanitary Certificate (PSC), e.g. for exporting agriculture goods from Bhutan
  - ▶ Import Customs Clearance Procedures at the Border Check Point of Phuentsholing
  - ▶ Procedures and Documentations of Exporting Oranges from Thimpu, Bhutan to Dhaka, Bangladesh

# What is a Business Process Analysis (BPA)?

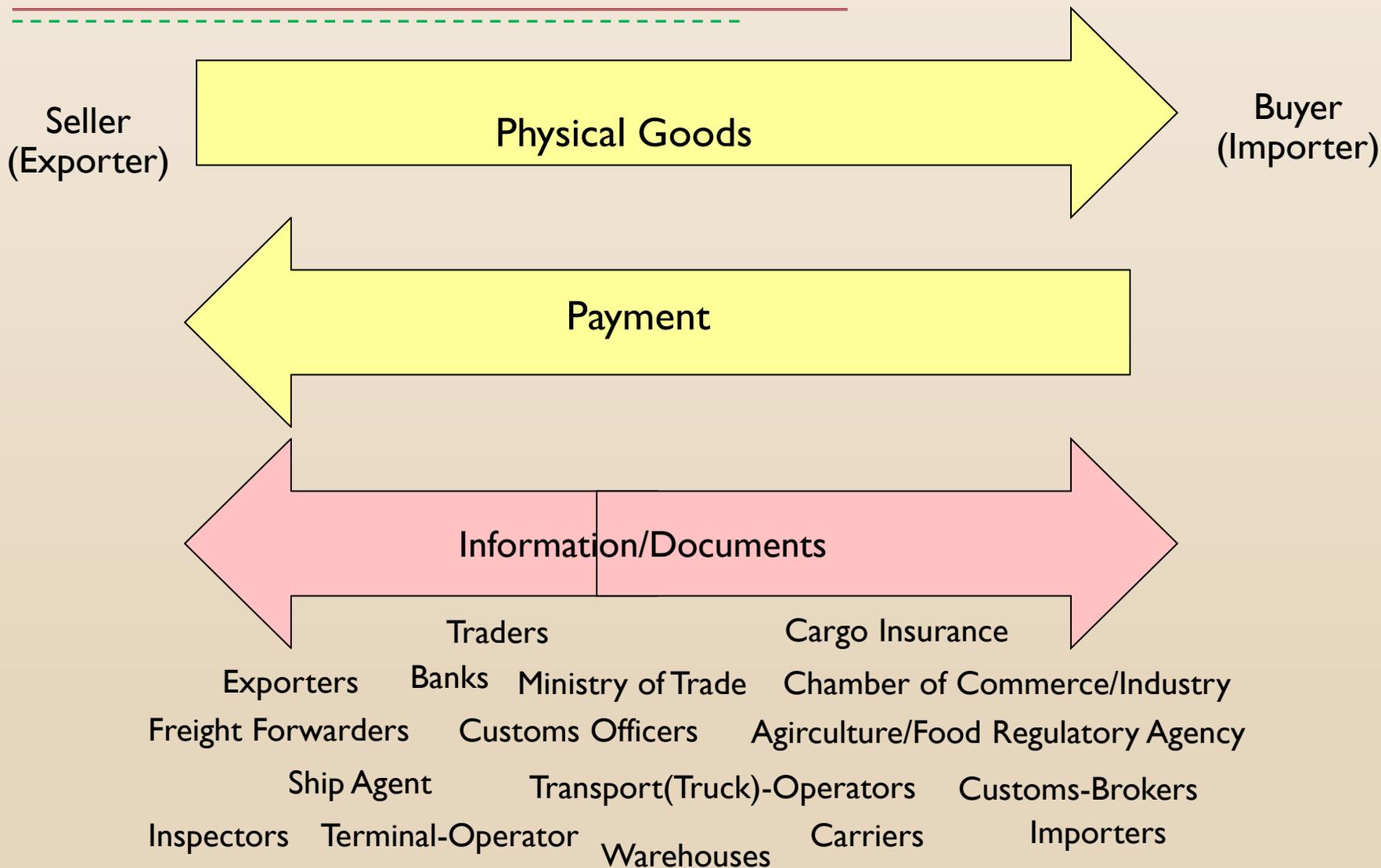
---

*An analysis and modelling of business processes for capturing/monitoring “as-is” (current) conditions and proposing “to-be” (target) improvement.*

❖ For example, it may include.....

- ▶ Documenting **existing practices** in an administration/company
- ▶ Describing a “**Standard Procedure,**” e.g. some common cases
- ▶ Identifying related **quantitative indicators, e.g. number of steps**
- ▶ Collecting information about **time and costs** at different steps
- ▶ Providing **a specification for simplification or automation** of the process (to be implemented in the future)

# Trade & Transport Facilitation – capturing/monitoring/improving at least 3 Kinds of Flow



# Documents related to Exportation of Rice

(from purchase order until the cargo container leaving a sea port)



36 Documents involving 15 parties, and more than 1,140 data elements to be filled in

## Buy/Pay Docs

1. Proforma Invoice (35)
2. Purchase Order (39)
3. Commercial Invoice (51)
4. Application for Letter of Credit (24)
5. Letter of Credit (32)
6. Packing List (25)
7. Cargo Insurance Application Form (20)
8. Cover Note (23)
9. Insurance Policy (24)
10. Booking Request Form – Border Crossing (25)
11. Booking Confirmation – Border Crossing (30)
12. Booking Request Form – Inland Transport (16)
13. Booking Confirmation – Inland Transport (18)
14. Bill of Lading (42)
15. Empty Container Movement Request (TKT 305) (20)
16. Request for Port Entry (TKT 308.2) (27)
17. Equipment Interchange Report (EIR) (24)
18. **Container Loading List (28)**
19. Container List Message (32)
20. Outward Container List (34)

## Transport Docs

21. Master Sea Cargo Manifest(17)

22. House Sea Cargo Manifest (37)

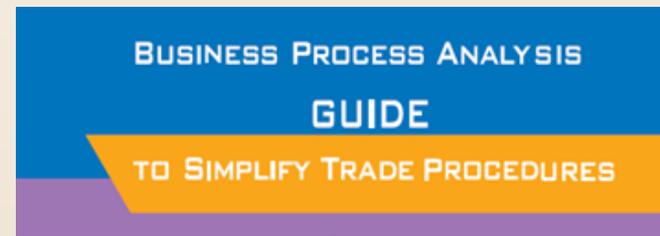
## Regulatory Docs

23. **Export Declaration (114)**
24. **Good Transition Control List (27)**
25. **Application for Permission to Export Rice (KP. 2) (24)**
26. Sales Report (KP 3) (21)
27. **Application for the Collection of the Permit for the Export of Rice (A. 3) (35)**
28. **Permit for the Export of Rice (A. 4) (35)**
29. **Application for Certificate of Standards of Product (MS. 13/1) (44)**
30. **Certificate of Analysis (17)**
31. **Certificate of Product Standards (MS. 24/1) (45)**
32. **Certificate of Fumigation (21)**
33. **Application for Phytosanitary Certificate (PQ. 9) (29)**
34. **Phytosanitary Certificate (33)**
35. **Application for Certificate of Origin (42)**
36. **Certificate of Origin (38)**

\* Number in parenthesis is the no. of data elements

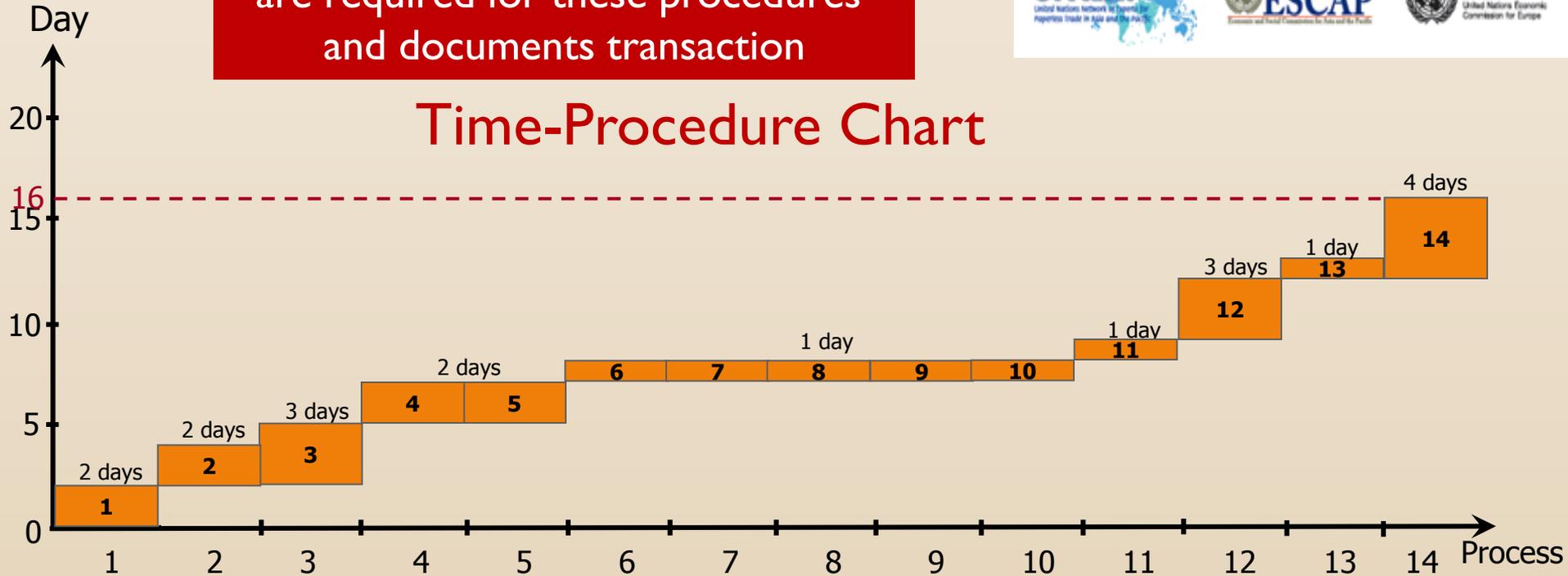
# A Business Process Analysis

- in Exporting Jasmine Rice from Thailand -



**16 days**  
are required for these procedures  
and documents transaction

## Time-Procedure Chart



1. Buy - Conclude sales contract and trade terms
2. Obtain export permit
3. Arrange transport
4. Arrange the inspection and fumigation
5. Obtain cargo insurance
6. Provide customs declaration
7. Collect empty container(s) from yard

8. Stuff container(s)
9. Transfer to port of departure
10. Clear goods through customs
11. Handle container at terminal and stow on vessel
12. Prepare documents required by importer
13. Verify the accuracy/authenticity of exported cargo
14. Pay - Claim payment of goods

The issue is about

# Increasing National Trade Competitiveness

by improving  
Import/Export Procedures and Documents Handlings  
among Government Agencies,  
Business Entities and  
Transport/Logistics Service Providers

(this is called “**Trade/Transport Facilitation**”  
improvement)



# Indicators can help decision makers to understand the importance of import/export procedures related to national trade competitiveness

## World Bank's Trading Across Borders Report 2014 (comparing 188 economies)

Indicators	Bangladesh	Bhutan	India	Nepal	Thailand
Documents to export (number)	6	9	9	11	5
Time to export (days)	25	38	16	42	14
Cost to export (US\$ per container)	1,075	2,230	1,170	2,295	595

Reference - World Bank's Doing Business – Trading Across Border Report 2014 (5 March 2014) [www.doingbusiness.org](http://www.doingbusiness.org)

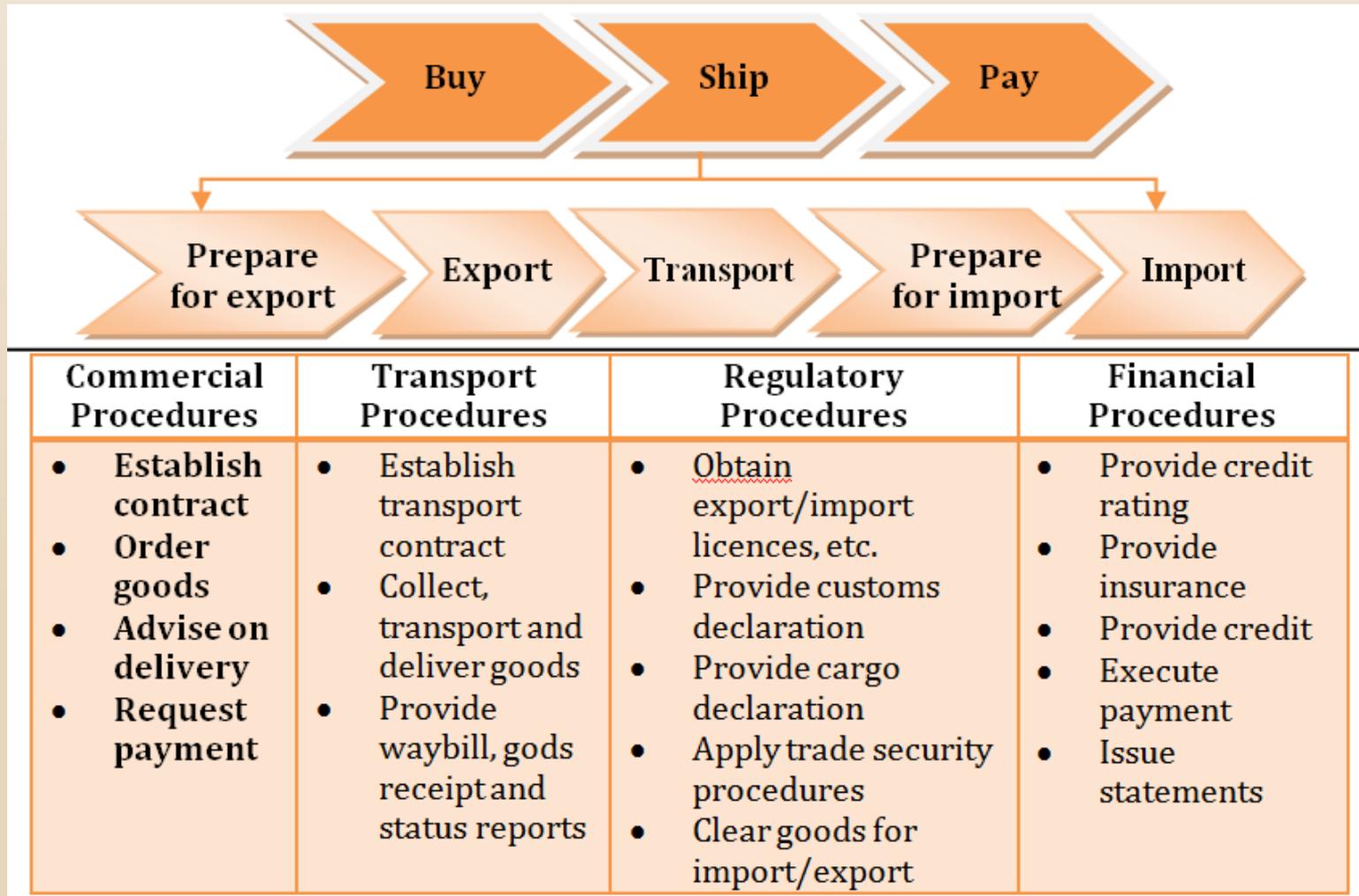
Comparing among 188 countries, the costs and procedures involved in exporting (and importing) a standardized shipment of goods are studied.

Every official procedure involved is recorded – starting from the final contractual agreement between the two parties, and ending with the delivery of the goods.

# What is a Supply Chain?

## Buy-Ship-Pay Model

A *supply chain* is a system of organizations, people, technology, activities, information and resources involved in moving a product or service from seller to buyer.



# Why we should conduct a Business Process Analysis?

---

---

Business Process Analysis is a practical study

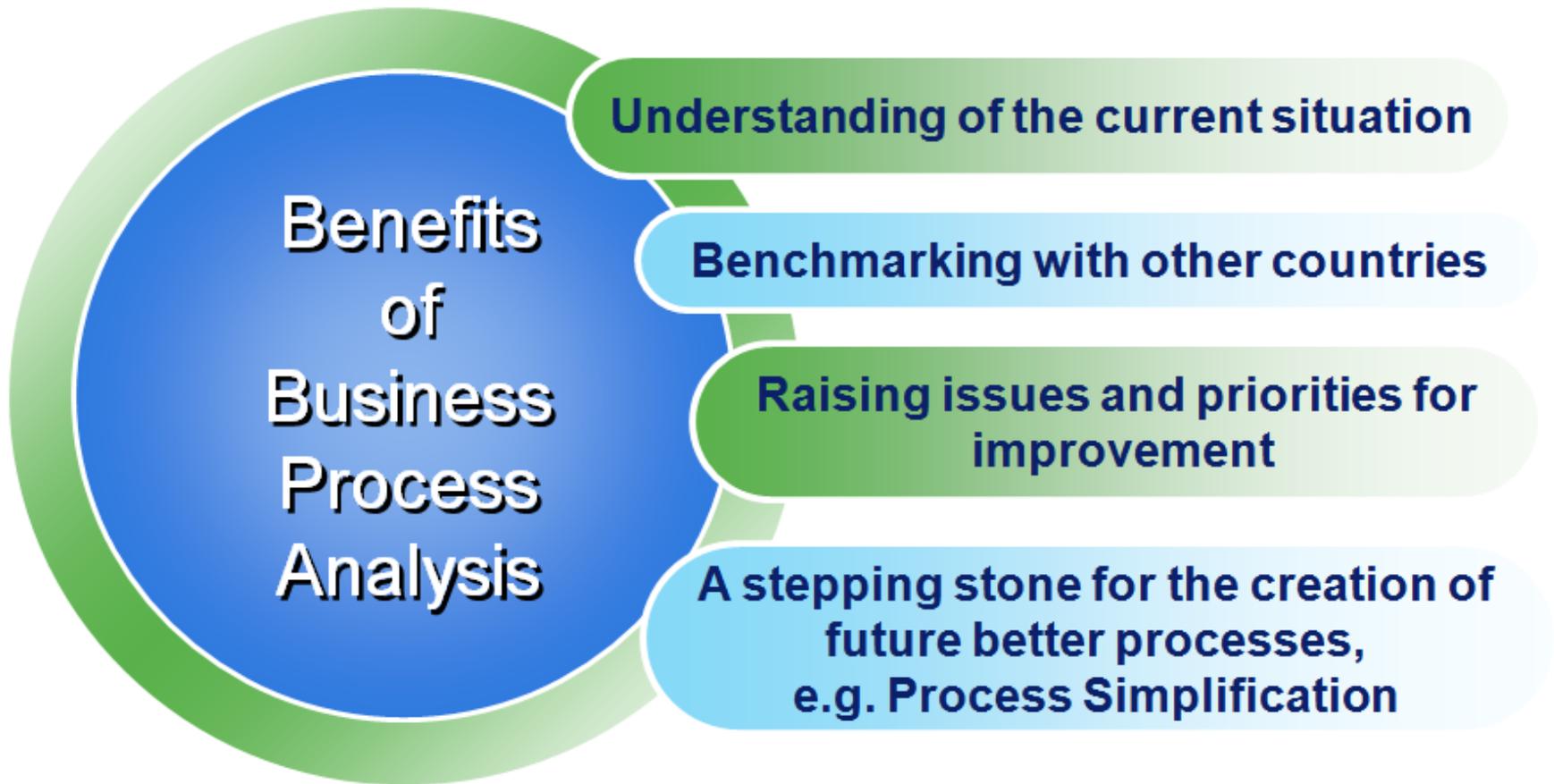
- to understand attributes of business processes, and their relationships



# What are the benefits of Business Process Analysis?

---

---



# Why trading across borders in some countries are more difficult, time consuming and expensive?

---

- ❖ Procedures and documents handling remain **largely paper dependent**.
- ❖ **Missing and incorrect documentation** slows progress through the supply chain
- ❖ Keeping documents & freight in sync is **complex** and **costly**
- ❖ **Multiple parties** capturing the same data is **inefficient** and **error prone**
- ❖ We acknowledge other factors that makes trade in developing countries more difficult, including **infrastructure, corruption, land locked, ...**  
(but these are not the main scope of discussion in this workshop)

# BPA to understand the current trade processes, and then propose improvement.

---

- ❖ BPA is the first technical step in preparing for trade facilitation measures including process simplification and automation.
  
- ❖ It provides
  - ▶ Inventory of processes, documents, data, parties, rules & regulations
  - ▶ Description of the processes
  - ▶ Specifications for harmonizing data and development of electronic documents
  - ▶ Specifications to develop software for the automation of procedures
  - ▶ Business Models for the operation of Single Window environment
  - ▶ A basis for maintenance and improvement

# Economic impacts of the bottlenecks due to trade/transport facilitation processes & documentation

---

- ❖ **Each additional day of delay** (e.g. because of trade/transport procedures) **reduces trade by at least 1%.**

Source: Simeon Djankov, Caroline Freund, and Cong S. Pham. (2007). *Trading on Time*. Washington, D.C.: World Bank.

- ❖ **“Direct and Indirect Cost from import/export-related procedures and required documents is about 1-15% of product cost.”**

Source: OECD. (2003). *Quantitative Assessment of the Benefits of Trade Facilitation*. Paris: OECD Publications

# Agenda

---

---

1. BPA for Monitoring and Proposing Improvement of Trade and Transport Facilitation
2. Introduction into Unified Modeling Language (UML)
3. The Three (3) Phases of a BPA Project
4. Example: A BPA Project for a national logistics development plan

# Business Process Modeling

---

---

## What

- ❖ A technique for documenting a business process and its attributes
  - ▶ Activities that come in a specific order and decision points
  - ▶ Actors who perform those activities
  - ▶ Defined inputs and outputs of each activity
  - ▶ Criteria for entering and exiting the business process
  - ▶ Relationships among actors
  - ▶ Information flow
  - ▶ Associated rules and regulations
  - ▶ Quantitative indicators such as number of steps as well as time and cost required to complete a particular business process

## Why

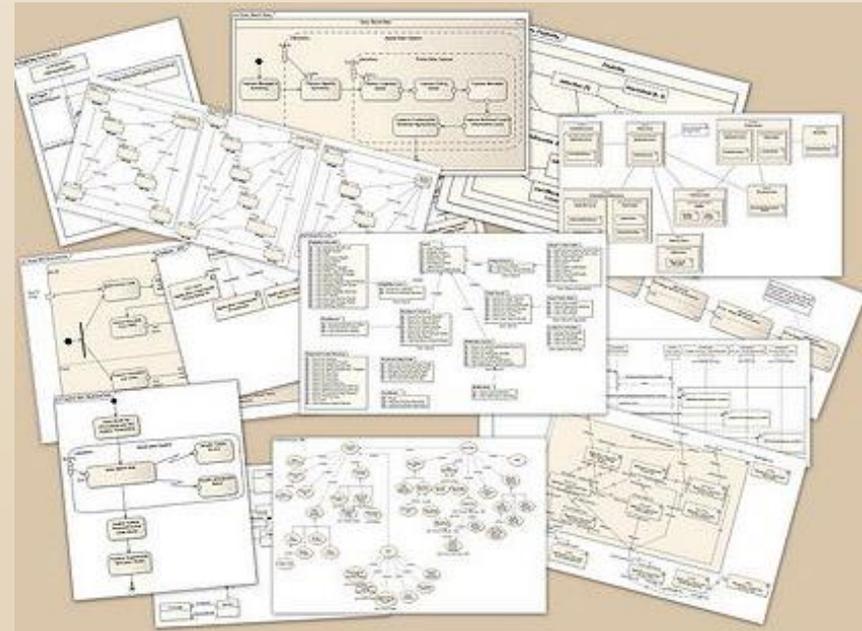
- ❖ To establish a common understanding about a business process that is shared by all relevant parties
- ❖ To communicate better all aspects of a business process

# Unified Modeling Language (UML)

---

❖ A set of standard graphical notations for documenting a business process and business requirements

- Is widely recognized and used among practitioners in business community as well as those in IT and software industry
- Allows business domain experts to communicate procedural and documentary requirements with IT implementation or software development team



[http://en.wikipedia.org/wiki/Unified\\_Modeling\\_Language](http://en.wikipedia.org/wiki/Unified_Modeling_Language)

# UML Diagrams for BPA

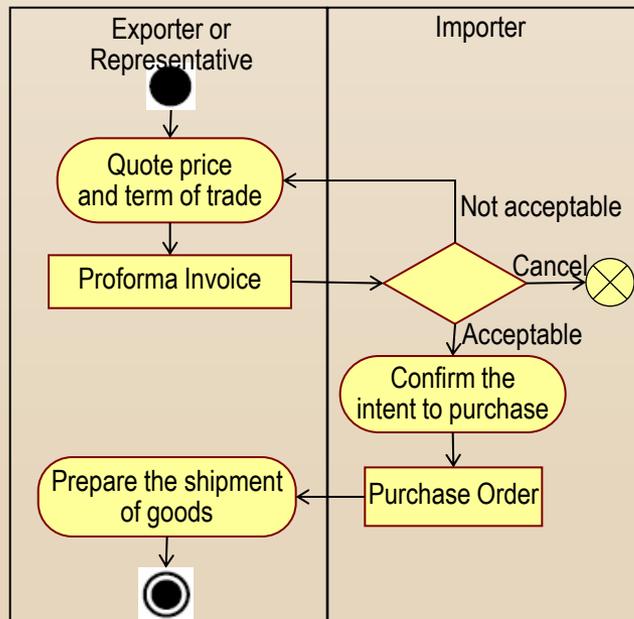


## Use Case Diagram (What)

- ❖ A frame of reference illustrating a high level business process and its associated actors

## Activity Diagram (How)

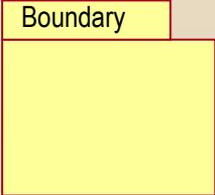
- ❖ A detailed elaboration of a use case diagram
- ❖ A graphical representation of a business process and its attributes
  - ▶ Activities that come in a specific order and decision points
  - ▶ Actors who perform those activities
  - ▶ Defined inputs and outputs of each activity
  - ▶ Criteria for entering and exiting the business process
  - ▶ Relationships among actors
  - ▶ Information flow



# UML Notations for Use Case Diagram

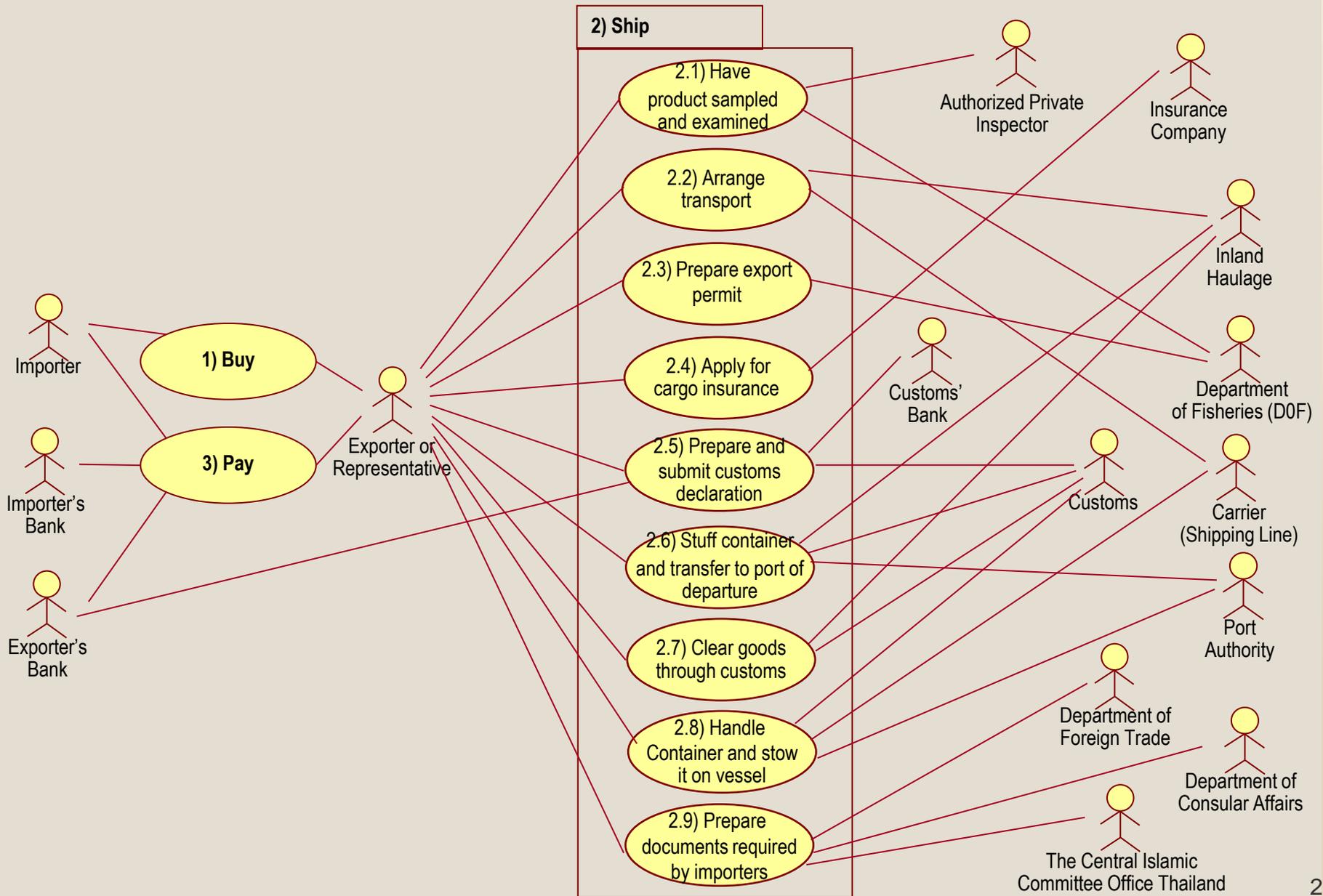
---

---

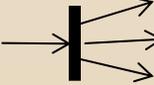
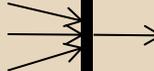
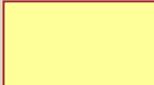
Notation	Description
 <p>Actor/Role</p>	<p>Actor</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Represents a role in a particular business process</li><li><input type="checkbox"/> Is labeled with a role name</li></ul>
 <p>Use case</p>	<p>Use Case</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Represents a business process</li><li><input type="checkbox"/> Is labeled with a descriptive verb phrase</li></ul>
	<p>Relationship Association</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Link actors with business processes that they participate in</li></ul>
 <p>Boundary</p>	<p>Subject Boundary</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Represents a process area</li><li><input type="checkbox"/> Includes the name of a subject boundary on top</li></ul>

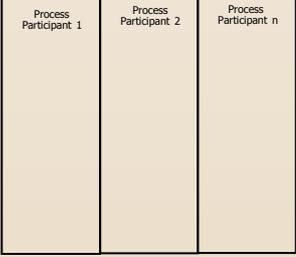
# Exercise – Read the Use Case Diagram

## Thailand's Export of Frozen Shrimp

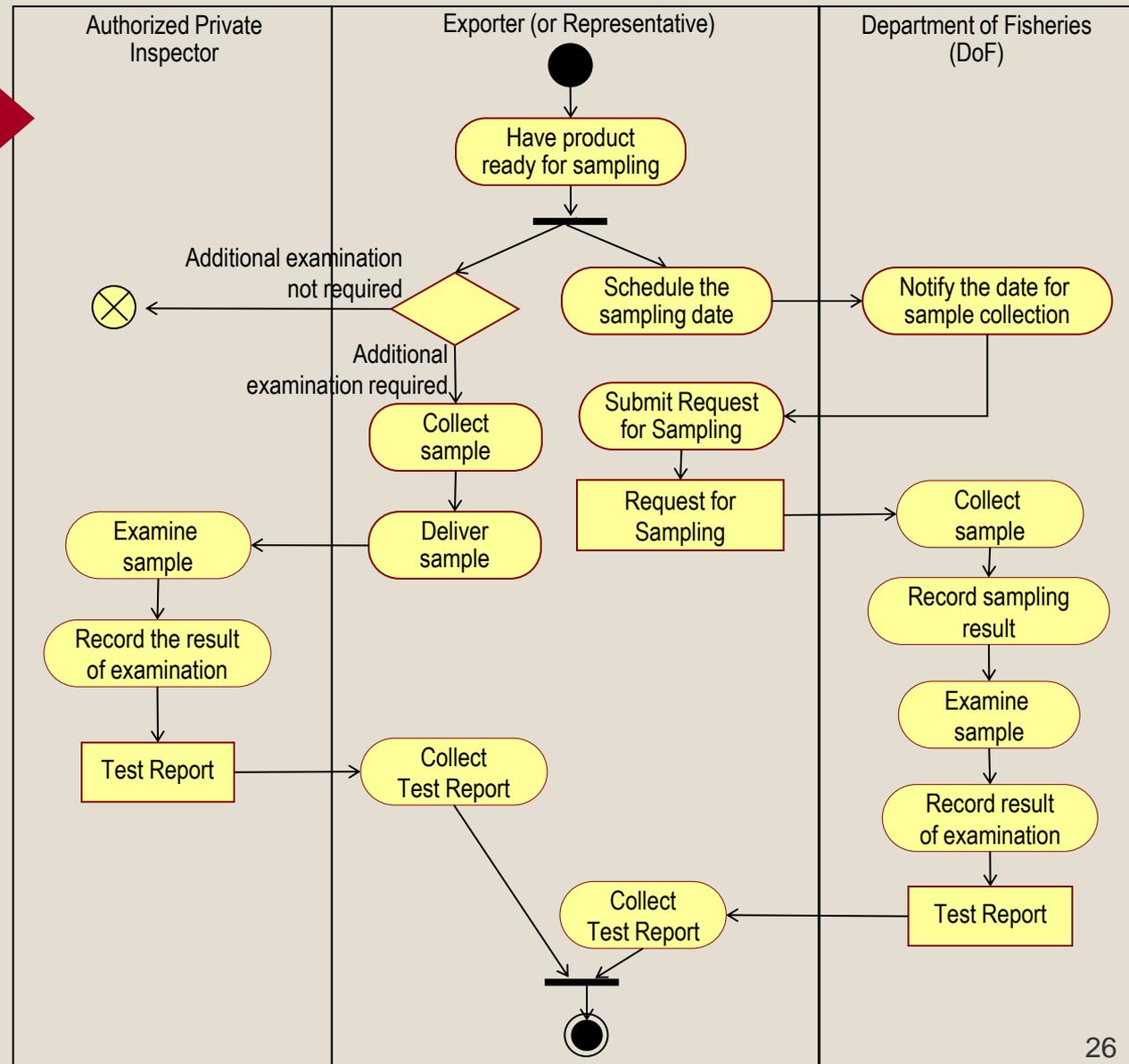
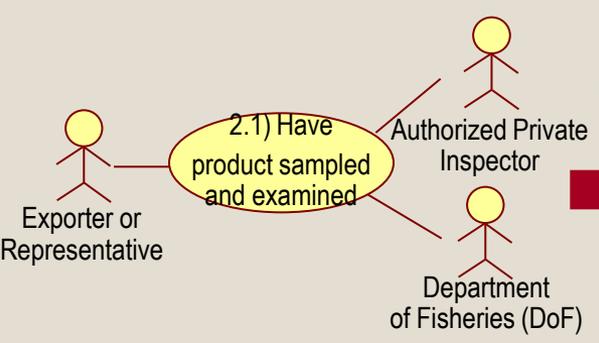


# UML Notations for Activity Diagram

Notation	Description
	<p>Initial State</p> <ul style="list-style-type: none"> <li>□ Represents the beginning of a set of activities</li> </ul>
	<p>Final Activity State</p> <ul style="list-style-type: none"> <li>□ Indicates the completion of the business process</li> </ul>
	<p>Final Flow State</p> <ul style="list-style-type: none"> <li>□ Indicates that further activities cannot be pursued</li> </ul>
	<p>Transition Line</p> <ul style="list-style-type: none"> <li>□ Indicates a sequential flow of actions and information in an activity diagram</li> </ul>
	<p>Fork (Splitting of Control)</p> <ul style="list-style-type: none"> <li>□ Visualizes a set of parallel or concurrent flow of actions</li> </ul>
	<p>Join (Synchronization of Control)</p> <ul style="list-style-type: none"> <li>□ Indicates the end of parallel or concurrent flow of activities</li> </ul>
	<p>Object</p> <ul style="list-style-type: none"> <li>□ Represents a document or information that flows from one activity to another activity (labeled with the name of a document)</li> </ul>

Notation	Description
	<p>Swimlane</p> <ul style="list-style-type: none"> <li>□ Is used to break up individual actions to individuals/ agencies that are responsible for executing their actions</li> <li>□ Is labeled with the name of the responsible individual or agency</li> </ul>
	<p>Activity</p> <ul style="list-style-type: none"> <li>□ Represents a non-decomposable piece of behavior</li> <li>□ Is labeled with a name that 1) begins with a verb and ends with a noun; and 2) is short yet contain enough information for readers to comprehend</li> </ul>
	<p>Decision</p> <ul style="list-style-type: none"> <li>□ Represents the point where a decision has to be made given specific conditions</li> <li>□ Attached with labels addressing the condition on each transition line that comes out of an activities and connects to a decision point or vice versa</li> </ul>

# Exercise – Read the Activity Diagram



# Using UML Modeling Tool for BPA

The screenshot shows the StarUML website in a Windows Internet Explorer browser window. The address bar displays <http://staruml.sourceforge.net/en/>. The page header includes the StarUML logo and the text "The Open Source UML/MDA Platform". Navigation links for "English" and "Korean" are visible. The main content area is titled "Welcome to StarUML!" and features a sidebar with a "Project" menu containing links like "About", "Screenshots", "Case Study", "Roadmap", "Contributing", "Development", "Downloads", "StarUML Download", "Modules", "Templates", "Support", "Forum", "Documentations", "Articles", "Commercial Support", and "Links". The main content area includes a "Featured Modules" section with a list of modules: "addme-cpi-temp", "DISPLAY1", "DISPLAY2", "REPEAT3", "DISPLA", and "REPEAT". A detailed description for "Word Template Designer v1.0" is provided, stating it is useful for defining Microsoft Word templates and interoperates with StarUML and Microsoft Word. The browser's taskbar at the bottom shows the Start button and several open applications, including "StarUML - The Open ..." and "bpa-training-mod1-20...".

**StarUML**  
The Open Source UML/MDA Platform

**UML 2.1 Design Tool**  
.NET, Java, C++, XSD, DDL, PHP, CORBA, Python & more. Free Trial!

**Online UML 2.0 Courses**  
Easily Learn UML 2.0 Thru Online Training Courses. Learn to Use UML

English | Korean

Ads by Google

## Welcome to StarUML!

StarUML - The Open Source UML/MDA Platform

StarUML is an open source project to develop fast, flexible, extensible, featureful, and freely-available UML/MDA platform running on Win32 platform. The goal of the StarUML project is to build a software modeling tool and also platform that is a compelling replacement of commercial UML tools such as Rational Rose, Together and so on. [Learn more...](#)

### Featured Modules

- addme-cpi-temp
- DISPLAY1
- DISPLAY2
- REPEAT3
- DISPLA
- REPEAT

**Word Template Designer v1.0**  
This module is very useful to define Microsoft Word Template for StarUML Generator. It interoperates with both StarUML and Microsoft Word. It requires Microsoft Word XP or 2003. After installation of this module, you can find a new menu item [Tools]->[Word Template Designer] in StarUML.

staruml-wordtemplatedesigner.zip (761KB)

Ads by Google

**Open Source BP4People**  
Design Workflows with BPMN Execute with BPEL 2.0 Server  
[www.intalio.com](http://www.intalio.com)

**UML Diagram Software**  
Easily create UML Diagrams, Lots of UML examples and templates, Free  
[www.edrawsoft.com](http://www.edrawsoft.com)

**Online Class Models**  
Create, share and collaborate on class and data models online.  
[graft.jodoro.com](http://graft.jodoro.com)

# Agenda

---

---

1. BPA for Monitoring and Proposing Improvement of **Trade and Transport Facilitation**
2. Introduction into **Unified Modeling Language (UML)**
3. **The Three (3) Phases of a BPA Project**
4. **Example:** A BPA Project for a national logistics development plan

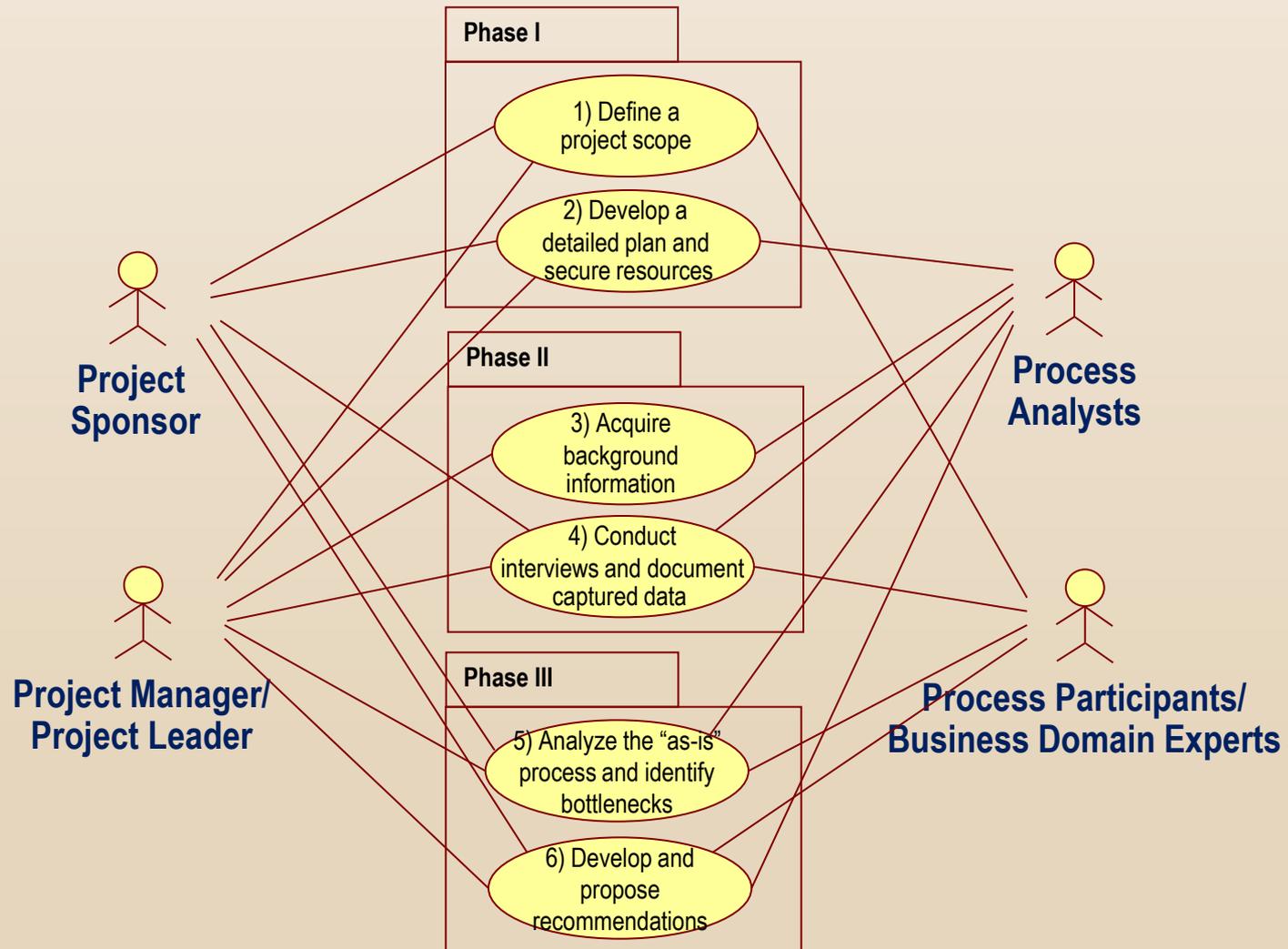
# BPA: Three (3) Phases

---

---

- I. **Scope setting/Planning** – Specify a scope of processes to be analyzed
  - ▶ e.g. import and/or export processes of a specified product, through a certain mode of transportation (trucks, trains, ships or airplanes)
- II. **Data collection and process documentation** – Define and document a sequence of steps in actual practices and their attributes
  - ▶ Who involved (stakeholders/actors)
  - ▶ Procedures and documents required (input to/output from)
  - ▶ Related rules and regulation
- III. **Process analysis** – Locate bottlenecks, examine what causes them, and develop measurable and quantitative process indicators (e.g. the number of steps, time and costs required to fulfill those processes)  
**Recommendation development** – Determine how to eliminate each bottleneck and prioritize improvement actions

# Three(3) Phases of a BPA Project



# Outputs of BPA

	Step	Deliverable
Phase I	<b>Step 1: Define project scope</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Use case diagram illustrating business domain, process areas, process participants, and key business processes</li> </ul>
	<b>Step 2: Develop a detailed plan and secure resources</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Detailed project plan including an estimation of human resources required, schedules, and software supported tools</li> <li><input type="checkbox"/> A list of potential interviewees and their contact information</li> </ul>
Phase II	<b>Step 3: Acquire background information</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> A folder of background information about the business processes under the investigation</li> <li><input type="checkbox"/> A list of guiding questions for the interview</li> </ul>
	<b>Step 4: Conduct interview and document captured data</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> A set of activity diagrams illustrating activities that come in a specific order and decision points, actors who perform those activities, defined inputs and outputs of each activity, criteria for entering and exiting the business process, relationships among actors, and information flow</li> <li><input type="checkbox"/> A set of business process descriptions that describes activity diagram and lists all related rules and regulations</li> <li><input type="checkbox"/> Activity diagram illustrating integrated processes in the business domain</li> <li><input type="checkbox"/> Time-Procedure chart displaying time required to complete each business process</li> </ul>
Phase III	<b>Step 5: Analyze the “as-is” processes and identify bottlenecks</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> A set of observations of the as-is business processes that have the potential for improvement</li> </ul>
	<b>Step 6: Develop and propose recommendations</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Final report with recommendations which may include diagrams of “to-be” business processes</li> </ul>

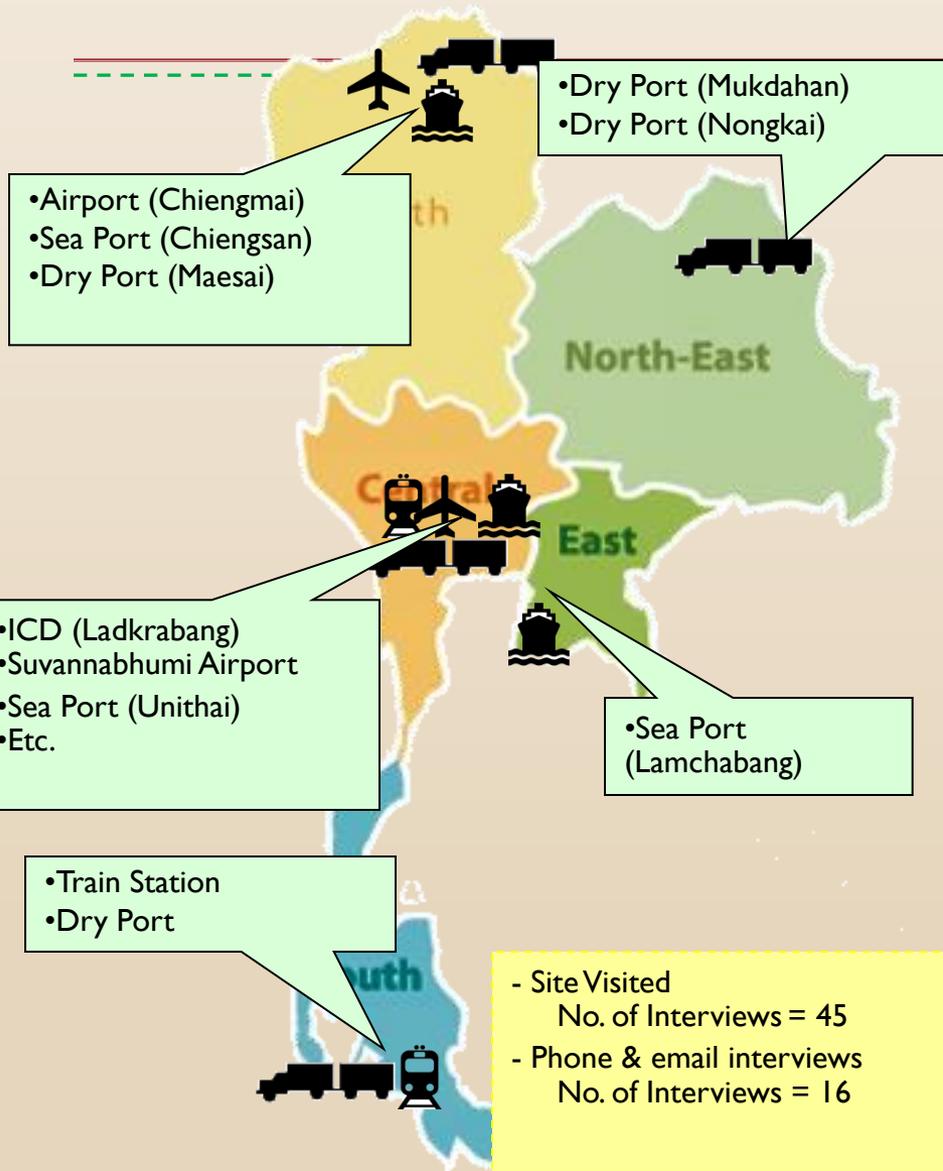
# Agenda

---

---

1. BPA for Monitoring and Proposing Improvement of **Trade and Transport Facilitation**
2. Introduction into **Unified Modeling Language (UML)**
3. **The Three (3) Phases of a BPA Project**
4. **Example: A BPA Project for a national logistics development plan**

# Phase I: Scope Setting



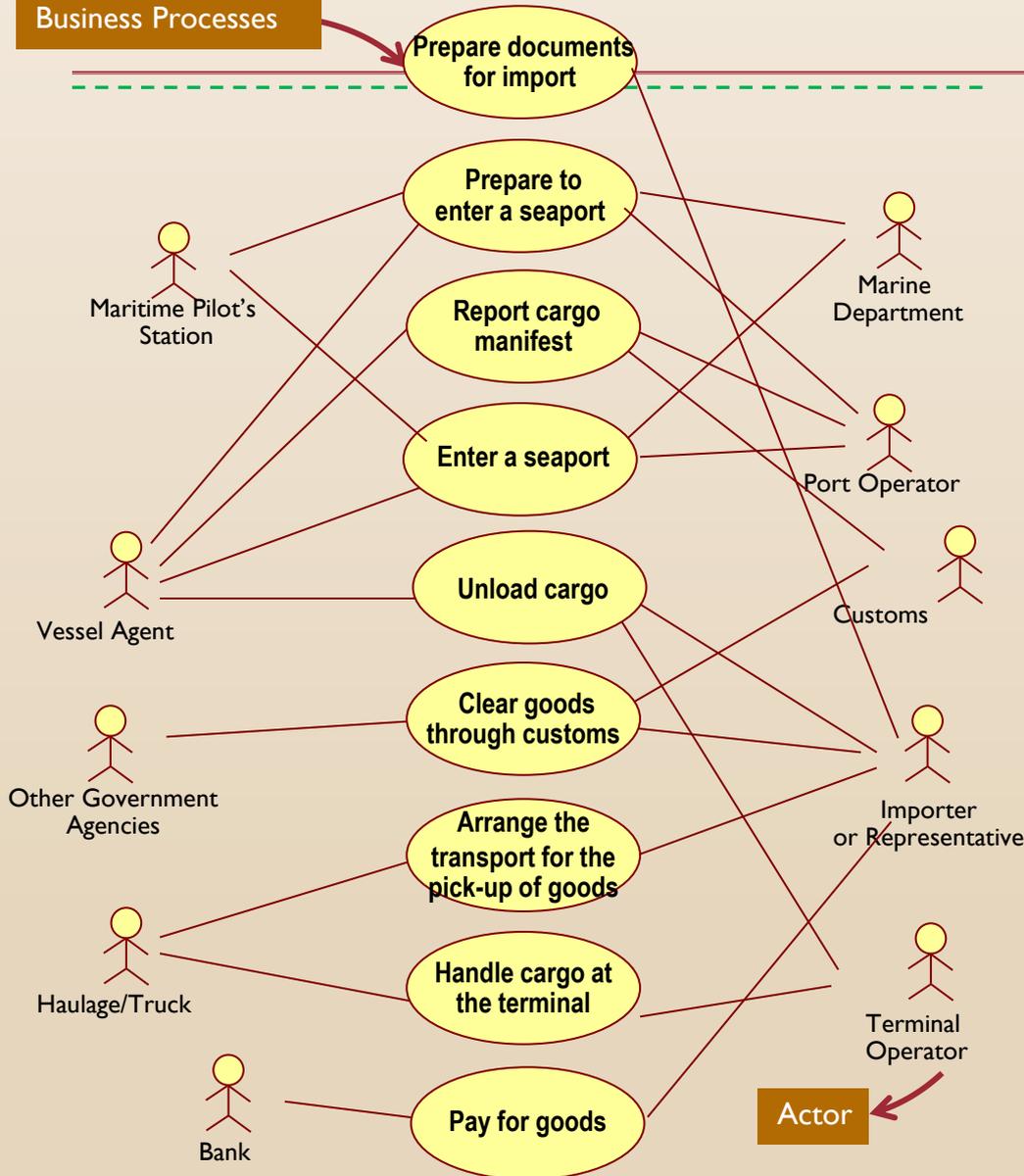
## Example:

- ❖ Regulatory and business requirements related to the operation and management of port before, upon, and after the *import and export of containerized ordinary cargoes* through all modes of transportations (*road, rail, air, and sea*)
  - ▶ Carrier scheduling for port use
  - ▶ Cargo handling
- ❖ Import
  - ▶ **Starting point:** when a carrier enters port
  - ▶ **Ending point:** when cargo is picked up and transferred to an importer
- ❖ Export
  - ▶ **Starting point:** when cargo arrives port
  - ▶ **Ending point:** when cargo is on board and ready to be transferred to the country of importer

# Phase I: Scope Setting

Example: Importation by Sea

Business Processes



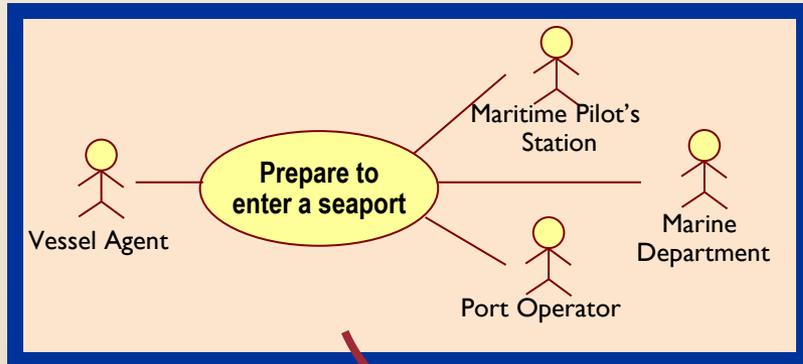
Draw a **use case diagram** to illustrate the business domain with process areas and high-level business processes as well as stakeholders associated with each of them

**Example:** Capturing the Stakeholders involved in importation by sea

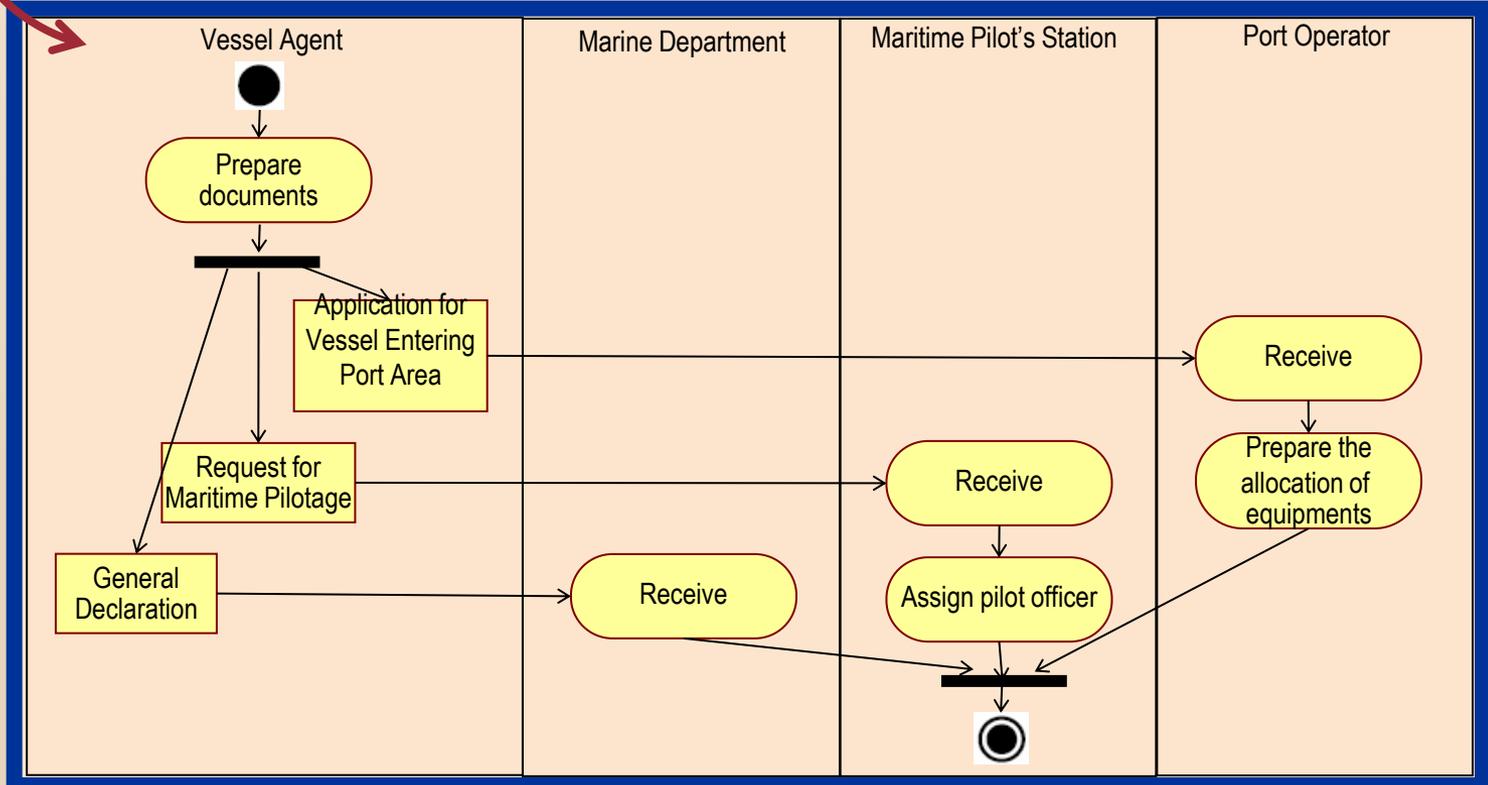
- Vessel Agent
- Maritime Pilot's Station
- Marine Department
- Port Operator
- Customs
- Other Government Agencies
- Importer or Representative
- Terminal Operator
- Haulage/Truck

# Phase II: Data Collection and Process Documentation

## Example: Prepare to Enter a Seaport Process

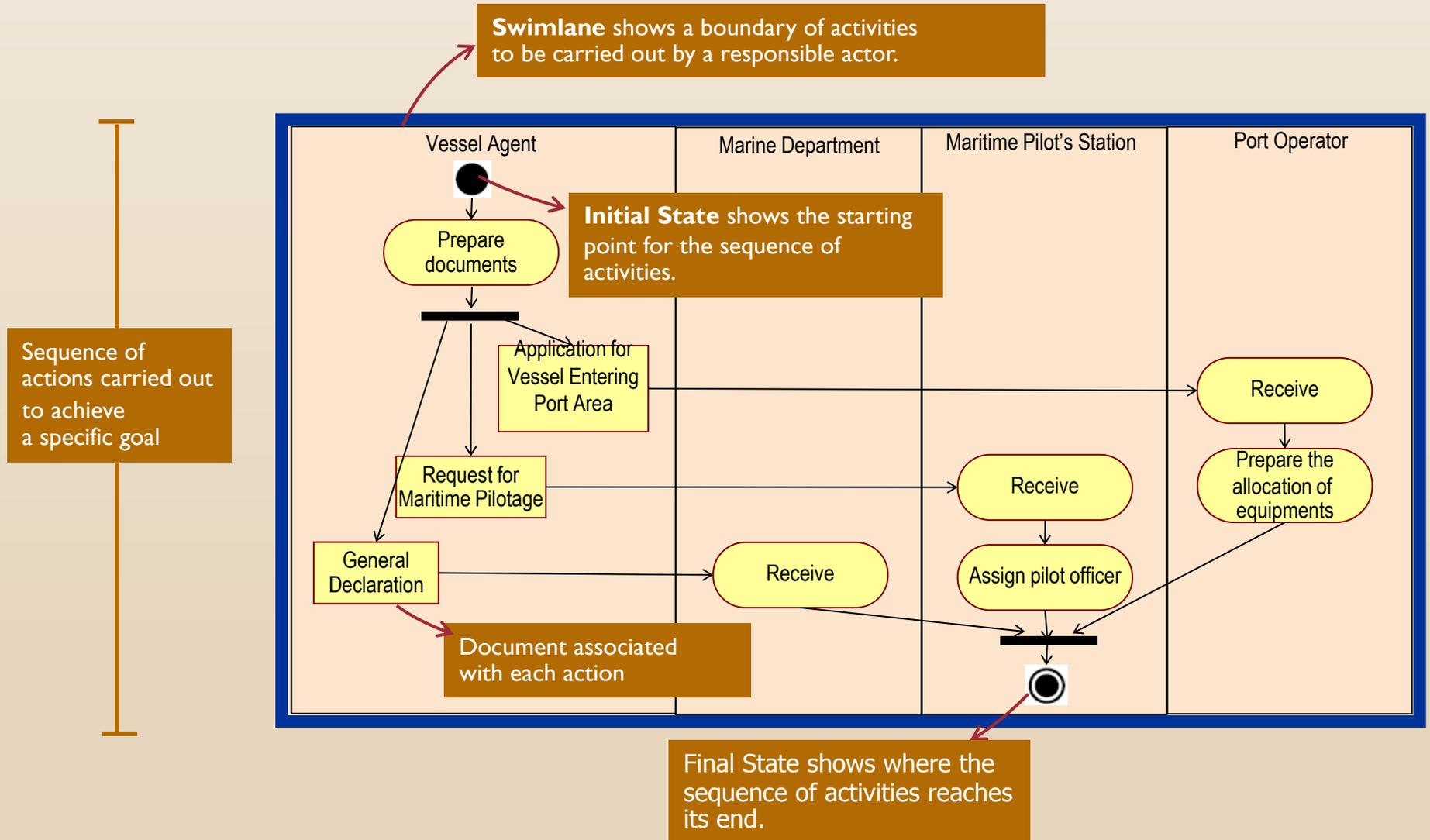


For each process, draw an **activity diagram** that describes activities and associated documentary requirements



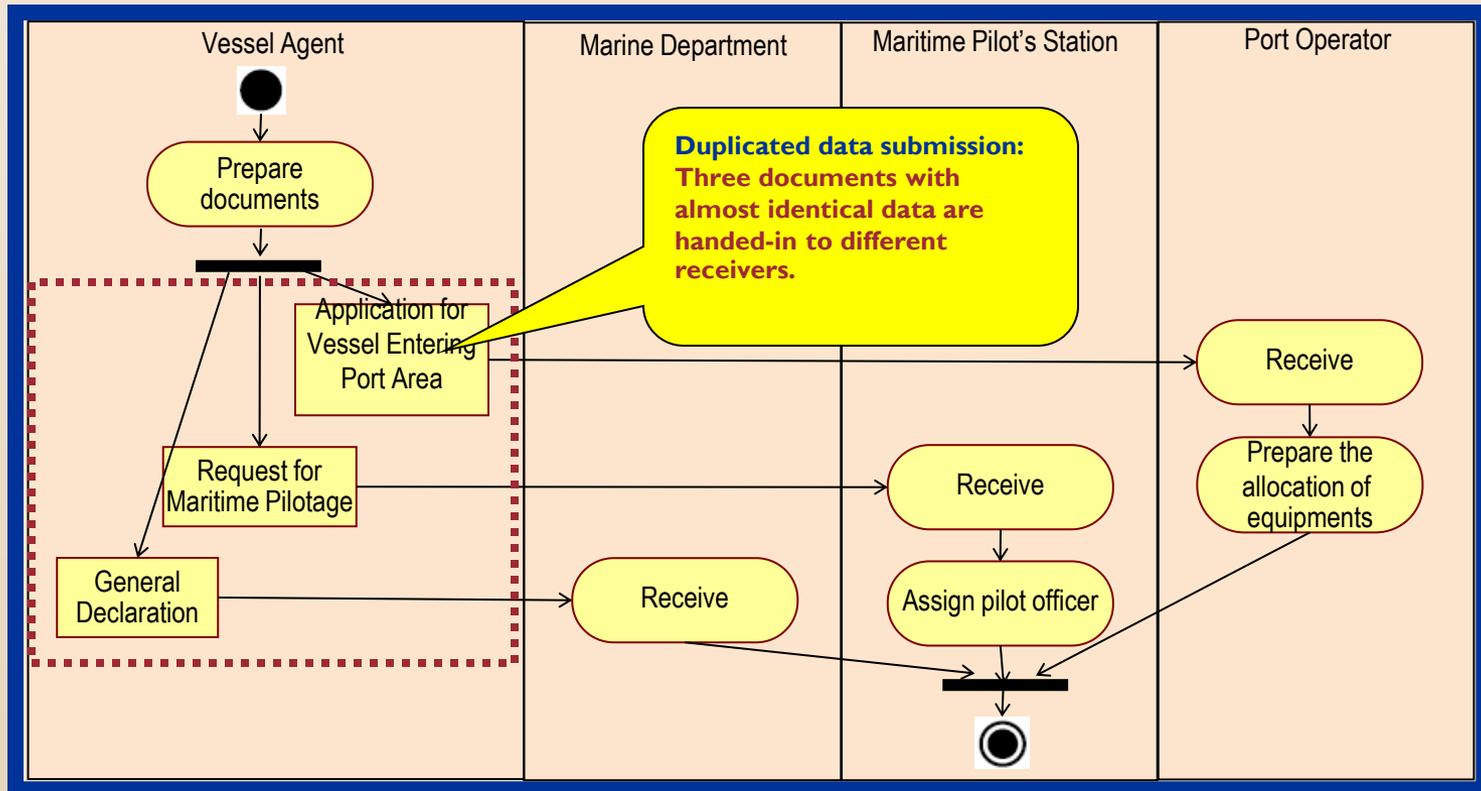
# Phase II: Data Collection and Process Documentation

## Example: Activity Diagram of Prepare to Enter a Seaport Process



# Phase III-1: Process Analysis

## Example: Prepare to Enter a Seaport Process (Existing Process)

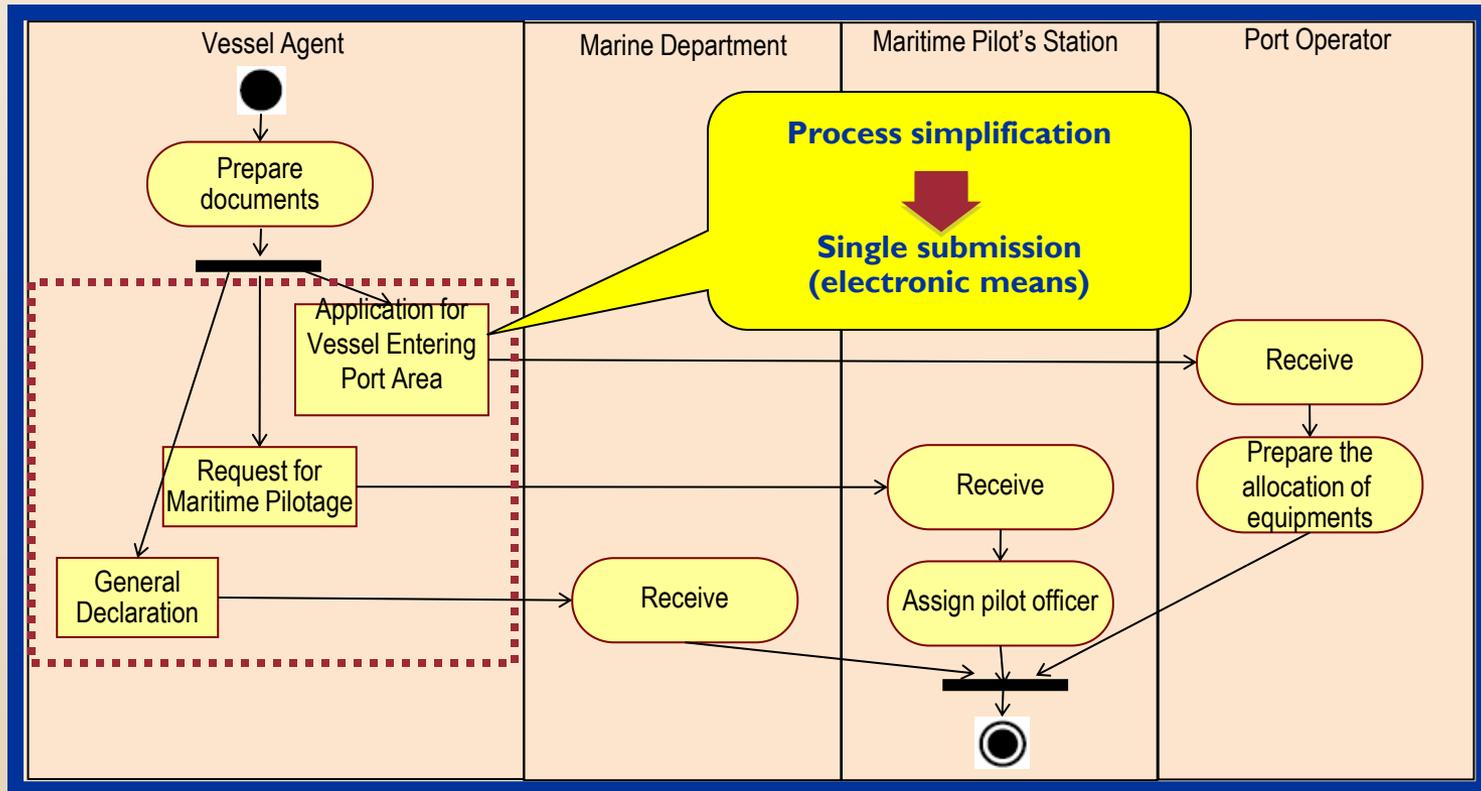


### Problems :

- Duplicated Information
- High Cost and Time for sending and receiving documents
- Data Inconsistency

# Phase III-2: Recommendation Development

## Example: Prepare to Enter a Seaport Process

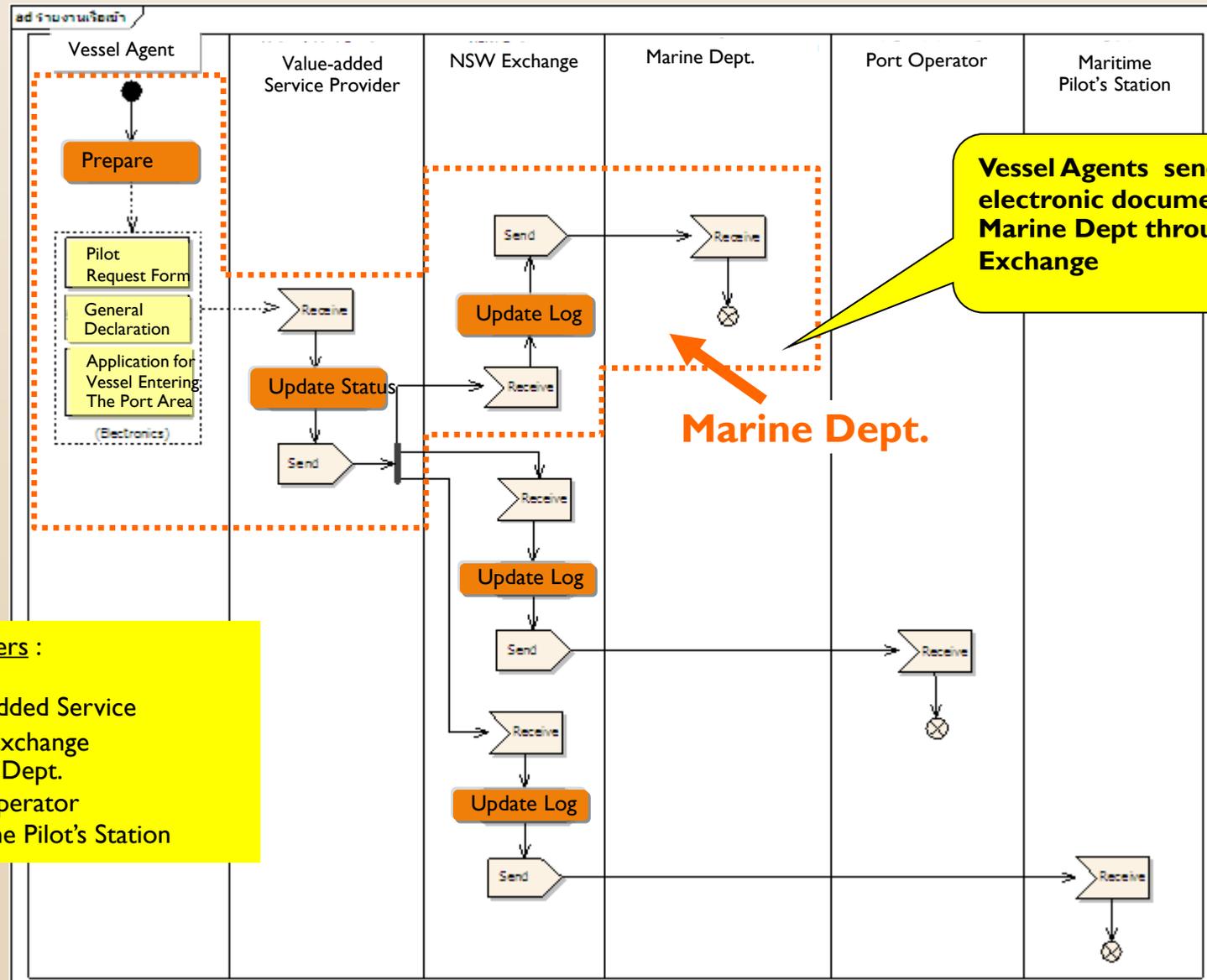


### Proposed Recommendations :

- Remove unnecessary data requirements
- Harmonize and standardize data requirements
- Automate "prepare to enter a seaport" process

# Phase III-2: Recommendation Development

## Example: Prepare to Enter a Seaport Process (Proposed New Process)

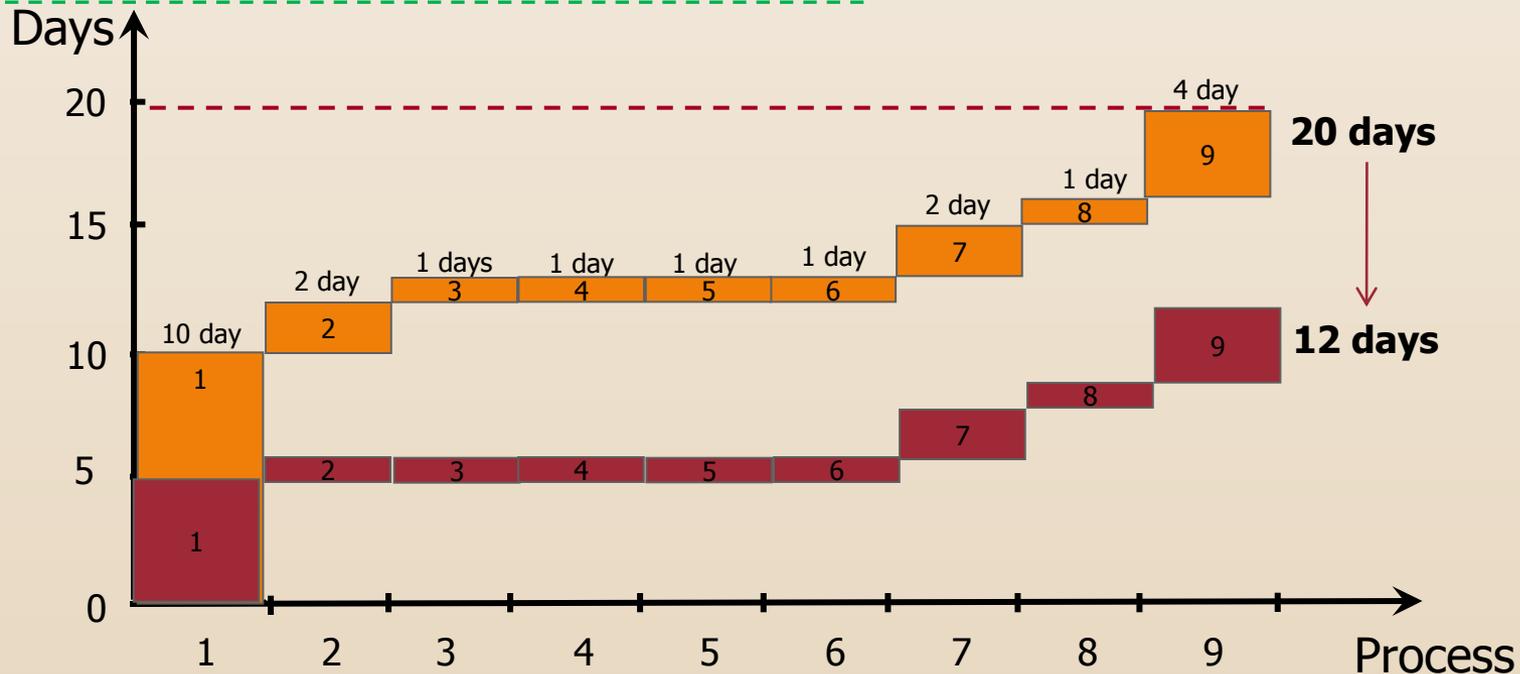


Vessel Agents send electronic documents to Marine Dept through NSW Exchange

Marine Dept.

# Phase III-2: Recommendation Development

## Example: Time – Procedure Chart of Importation by Sea



### 9 Main processes

1. Prepare documents for import
2. Prepare to enter a seaport (Vessel)
3. Enter a seaport (Vessel)
4. Report cargo manifest
5. Unload cargo
6. Clear goods through customs
7. Arrange the transport for the pick-up of goods
8. Handle cargo at the terminal
9. Pay for goods

# Summary of a study: Usage Time for Import

Transport Mode	As-Is Usage Time (day)	To-Be Usage Time (day)	Expected Reduced Time (day)	Expected Reduced Time (%)
Import by Ship	<b>20</b>	<b>12</b>	<b>8</b>	<b>40.00</b>
Import by Airplane	<b>10</b>	<b>8</b>	<b>2</b>	<b>20.00</b>
Import by Truck	<b>10</b>	<b>7</b>	<b>3</b>	<b>30.00</b>
Import by Train	<b>11</b>	<b>9</b>	<b>2</b>	<b>18.18</b>

## Criteria (following UN/CEFACT Recommendation No 18, and other)

- Reduce time for Traveling, Sending and Receiving Documents by humans
- Reduce time for Preparing Documents for next step
- Reduce time for Making Payment
- Reduce time for Searching Information
- Reduce time for Verifying Information

# Lessons learned from Implementing BPA

---

---

- ❖ Get Buy-in from the officials
- ❖ Secure adequate resources
- ❖ Clear Roles and responsibilities of the project stakeholders
- ❖ Choose a Champion
- ❖ Start small, and then evolve
- ❖ Profit from experience
- ❖ Invest in training
- ❖ Performance measurement

# Conclusions

---

---

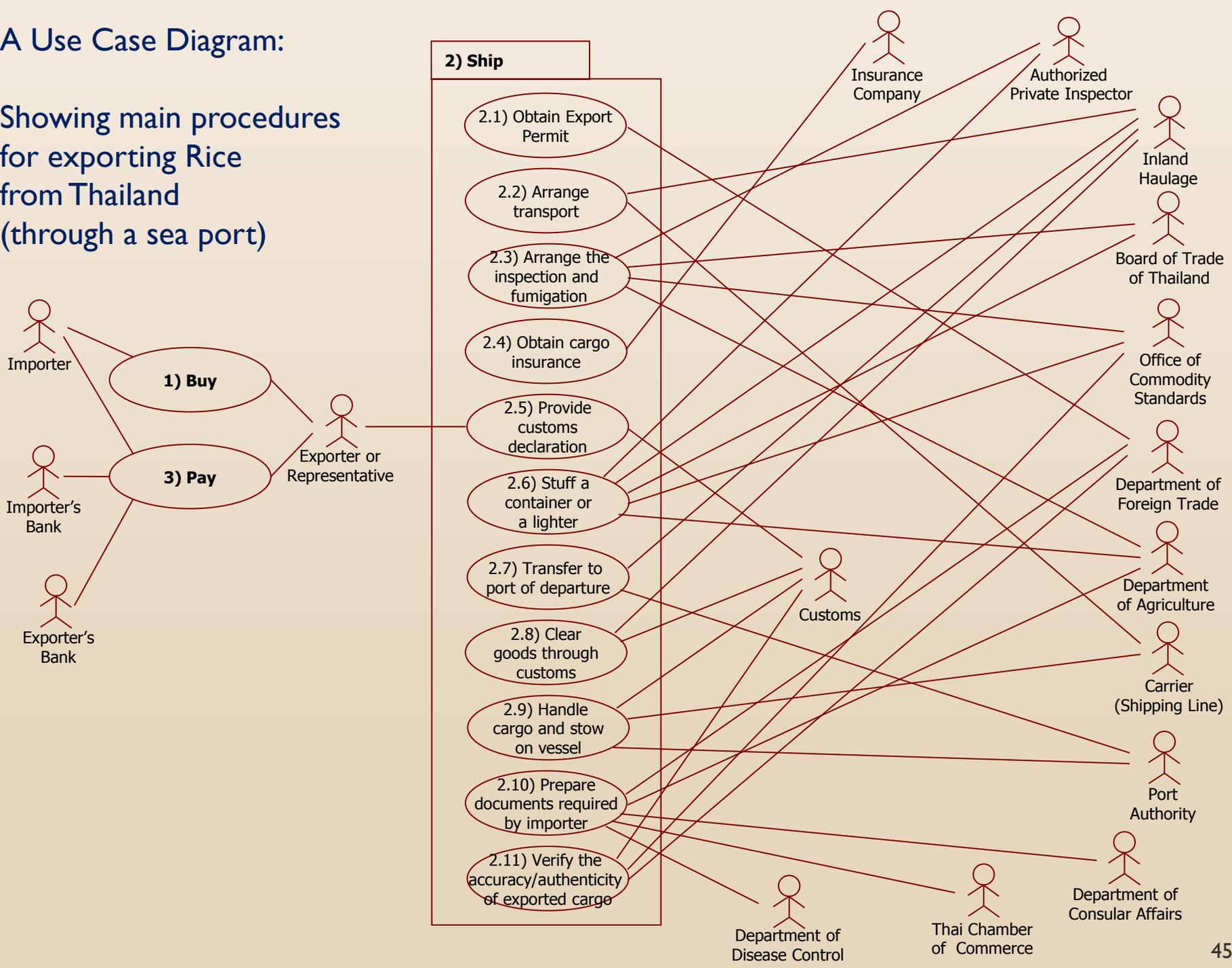
1. **BPA is a very simple but powerful methodology** to capture/monitor the “as-is” conditions, and to propose “to-be” processes and documentation requirements for trade and transport facilitation improvement.
2. **UML Diagrams:** Use Case Diagrams & Activity Diagrams, and also Time-Procedures Chart are introduced.
3. **Three (3) Phases of a BPA Project** is recommended. (1. scoping/planning, 2. capturing/modelling the as-is, and 3. analyzing/proposing recommendations for improvement)
4. **A BPA Project Example** is briefly discussed.

---

**Exercise:** Try to explain the meaning of the following Use Case Diagram and An Activity Diagram

# A Use Case Diagram:

Showing main procedures for exporting Rice from Thailand (through a sea port)



# An Activity Diagram:

Showing detailed procedures and document requirements for obtaining a Rice Export Permit

## Obtain export permit

