

Smart and Sustainable Ports: Tools for Implementing Port Community Systems - Appendices

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SMART AND SUSTAINABLE PORTS

TOOLS FOR IMPLEMENTING PORT COMMUNITY SYSTEMS APPENDICES



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Stakeholders in port communities

The specific ministries and institutions involved in a port community, their functions,

and objectives will differ from country to country. They include the following:

Public institutions

- Port Authority
- Maritime Authority
- Digital Affairs Authority
- Customs Authority
- Ministry/Foreign Trade Authority
- Department of Immigration
- Ministry/Department of Health
- Ministry/Department of Agriculture
- Department of National Security

Private stakeholders

- Terminal operators
- Shipping companies
- Ship agents
- Freight forwarders
- Customs brokers
- Road haulers
- Rail operators
- Importers
- Exporters
- Insurance companies
- Banks

Functions and mandates of public port community stakeholders

The public institutions involved in port communities have a mandate to carry out certain functions, as described in the following sections.

- The **Port Authority** will normally be responsible for:
 - providing, supervising, monitoring, and authorizing general port services;
 - organizing the port service area and port uses;
 - planning, designing, constructing, maintaining, and managing the port public domain, port works, services, and maritime signals;
 - managing port infrastructure and financial resources;
 - promoting industrial and commercial activities related to maritime and port traffic; and
 - coordinating the operations of different transportation modes within the port area.
- The **Maritime Authority** is responsible for the general management of maritime navigation and the civil fleet, specifically:
 - overseeing maritime traffic and dispatch control;
 - general management of recreational nautical activities;
 - preventing marine pollution caused by vessels;
 - establishing the minimum composition of civilian vessel crews;
 - organizing and executing technical inspections and controls;
 - setting and applying fees and providing maritime services; and
 - drafting the sectoral regulations regarding vessel clearance.
- The **Digital Affairs Authority** has the mandate to introduce and implement regulations to improve competitiveness, telecommunications, and the information society. Likewise, they may be responsible for government policy on digital transformation initiatives.
- The **Customs Authority** is responsible for ensuring that all imports and exports entering a country comply with national laws and regulations. In the port environment, it handles the following activities:
 - overseeing the control of passengers, their baggage, cargo, and mail;
 - assessing and collecting customs duties, fees, and penalties due on imports;
 - identifying and apprehending individuals or companies engaged in fraudulent practices designed to circumvent customs-related laws;
 - protecting the country's national industry and intellectual property rights;
 - collecting and maintaining statistics on the country's foreign trade;

- The **Foreign Trade Authority** is responsible for introducing and implementing foreign trade policy, including the promotion and defense of trade and industrial policy for internationalization and foreign investment and transactions.
 - The **Department of Immigration** has a mandate to guarantee compliance with the immigration legislation in force in the country regarding the entry, exit, permanent or temporary residence, expulsion, and regulation of foreign citizens.
 - The **Department of Health** introduces and implements policy, legislation, and administrative action to promote and protect the health and well-being of the population. The activities it handles in the port environment include:
 - organizing and planning health resources and health services;
 - regulating and overseeing matters related to food hygiene and safety;
 - preventing disease and promoting health good practices;
 - overseeing epidemiological surveillance;
 - regulating and overseeing pharmaceuticals; and
 - authorizing the import and export of food, drugs, chemicals, and so on, as well as inspections.
 - The **Department of Agriculture** has a mandate to oversee the country's agricultural industry, including forestry or livestock farming. In a port environment, the department of agriculture is responsible for preventing the entry of pests and diseases into the country through passengers; cargo, mail, and postal shipments; and goods.
 - The **Department of National Security** is responsible for protecting the country against threats, including by:
 - maintaining and ensuring the proper functioning of the national security situation center;
 - providing crisis monitoring and management; and
 - coordinating different national security bodies and ensuring they collaborate and cooperate, in accordance with the applicable legal and regulatory provisions.
- Port authorities, customs authorities, and ministries relating to transportation or foreign trade are key stakeholders in building the institutional framework required to promote and coordinate cross-cutting projects in the port environment. For instance, as new private operators have joined the port sector, a large variety of ICT solutions have become available. There is now an increased need for interoperability and coordination between the stakeholders in the port community. Public bodies with close ties to the port sector have generally led communities in the introduction and implementation of cross-cutting solutions such as PCSs and single windows.
- Public authorities should satisfy the following minimum requirements to play a key role within port communities:
- **Be neutral:** to ensure that initiatives are accepted by the port community, leading authorities should be neutral in their approach and dealings and not have any vested interests that benefit only one or a few of the port's stakeholders.



- Be able to **coordinate the different public bodies** participating in a port community.
- Have **sufficient resources** to manage and coordinate port community projects and support the necessary investments for these projects.
- align efforts to develop ICT solutions for the entire port community; and
- initiate and lead training and education programs to increase the port community's awareness of the benefits and proper implementation of ICT solutions.

With specific reference to IT platforms such as PCSs, the authority selected to lead the port community must develop certain competencies. The IDB describes five such skills in “International Case Studies and Good Practices for Implementing Port Community Systems”:¹

- mediate commercial B2B relations with port operators and customers;
- support the necessary investments to develop ICTs;
- actively apply and enforce rules and regulations through cooperation with regulatory agencies;

Given the need for these skills and knowledge of the local context, for the highest degree of neutrality, in most countries, the port authority takes leadership of the port community.

¹Mendes Constante, Jonas. 2019. “International Case Studies and Good Practices for Implementing Port Community Systems.” Technical Note IDB-TN-1641. Washington, DC: Inter-American Development Bank. https://publications.iadb.org/publications/english/document/International_Case_Studies_and_Good_Practices_for_Implementing_Port_Community_Systems.pdf.

Port Community Committee Management Models

According to *International Case Studies and Good Practices for Implementing Port Community Systems*², there are three main management and leadership models:

- **Neutral.** This model is led and managed entirely by a partner that is considered neutral in relation to the coordination of port activities and that has sufficient resources to perform this function. Examples of coordinating bodies that are considered neutral include port authorities or the ministries of transport or foreign trade. The Port Community of Jamaica is an example of a neutral management and leadership model: it is led by the Port Authority of Jamaica, in close collaboration with Jamaica Customs and the private sector (shipping association) which is responsible for raising public awareness and understanding of the port community programs and initiatives.
- **Independent.** In this case, dedicated personnel such as a general manager are contracted exclusively to the port community to manage it. These individuals do not represent any stakeholders within the port community. The Port Community of San Antonio (COLSA) is an example of this approach: it hired a full-time president to handle the day-to-day aspects of the port community.
- **Mixed.** The leadership positions within the organization chart are assigned to different entities over time. This fosters their commitment to the port community and eliminates the belief that the port authority is always in charge of the daily management of activities. The Port Community of Barcelona uses this model: the customs authority or another member of the community acts as president while the daily management is carried out by the port authority. There is a rotating chair, such that the president of the port community changes over time.

² Mendes Constante, J. 2019. *International Case Studies and Good Practices for Implementing Port Community Systems*, IDB Technical Note no. IDB-TN-1641, Washington, DC: IDB; available at <http://dx.doi.org/10.18235/0001665>.

PCS Committees

The purposes and tasks of the committees are described below.

- **Level 1: Interministerial committee**

This committee will focus on strategic coordination and legal, regulatory, and policy issues by:

- championing the digital platform concept;
- facilitating stakeholder cooperation;
- supervising platform development;
- driving policy reform and policy-making;
- reviewing laws and regulations;
- fostering capacity-building;
- improving cybersecurity; and
- driving innovation and promoting the fourth industrial revolution.

The interministerial committee should be made up of some or all of the following officials, or their equivalents, depending on the country:

- Minister of Transportation;
- Head of Maritime Authority;
- Minister of Finance;
- Minister/Head of Department of Digital Affairs.
- Head of Customs Authority;
- Minister of or Foreign Trade authority;
- Minister/Head of Department of Immigration;
- Minister/Head of Department of Health;

- Minister/Head of Department of Agriculture; and
- Minister/Chief of National Security.

Ideally, the interministerial committee should meet quarterly, and a representative from the office of the prime minister or president could act as its president.

- **Steering committee**

The steering committee should be made up of the directors general of public agencies and members of the upper management of private bodies. The main function of this committee is to lead the implementation of the digital maritime trade and logistics roadmap while also being instrumental in guaranteeing the sustainability of the digital platforms and systems. The steering committee will oversee the following activities:

- reviewing PCS project status;
- approving the project budget and any potential modifications;
- following up on milestones and deliverables;
- discussing risk and change management;
- reviewing the legal framework;
- improving cybersecurity;
- following up on action items and issues;
- discussing outstanding problems and proposed actions to be taken; and

- resolving deviations from schedule and taking corrective actions.

All key stakeholders should be equally involved in the committee. The strategic leadership must work to promote collaboration while demonstrating their neutrality in leading the project. Those participating in the steering committee should include the following (or the equivalent stakeholders within the port community):

- Port Authority;
- Maritime Authority;
- Digital Affairs Authority;
- Customs Authority;
- Foreign Trade Ministry/Authority;
- Ministry/Department of Immigration;
- Ministry/Department of Health;
- Ministry/Department of Agriculture;
- Ministry/Department of National Security;
- associations of terminal operators; shipping companies and agents; freight forwarders; customs brokers; truckers; rail operators; importers and exporters; and insurance and/or banking institutions.

The steering committee could meet monthly and the Port Authority, Maritime Authority, Customs Authority, and/or foreign trade representatives would all be appropriate choices for presiding over it.

- **Business process committee**

The business process committee should include representatives of both the public and private sector. Each entity should nominate two individuals who are preferably

business process experts in their respective organizations.

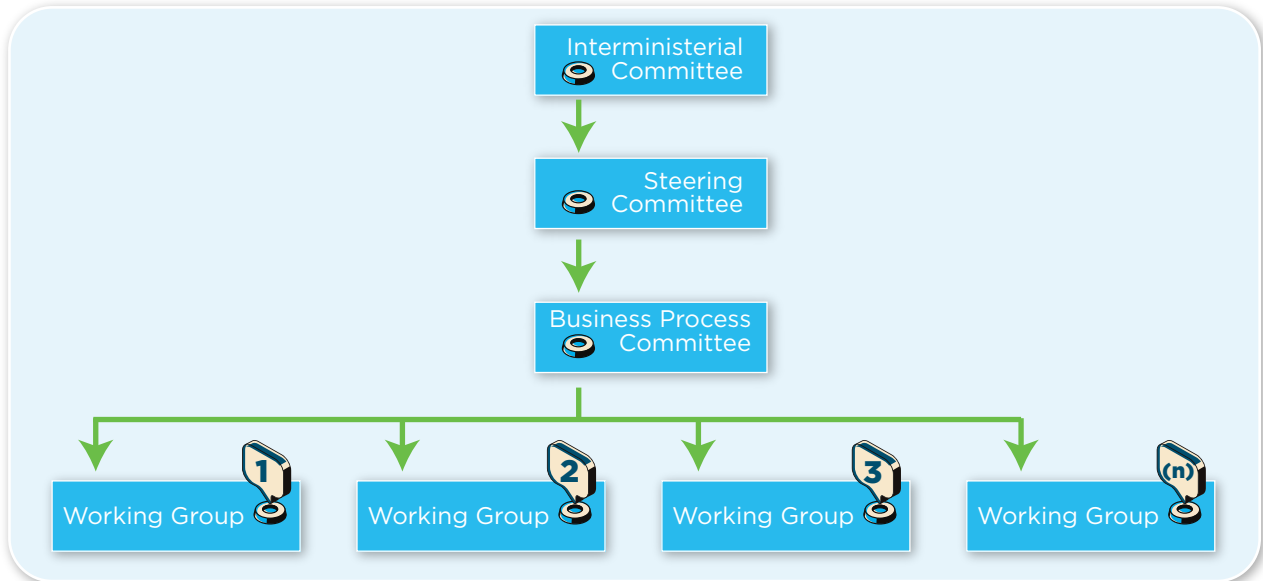
The committee will participate in analyzing, optimizing, automating, re-engineering, and rethinking the business process roadmap. This committee is expected to play a key role in the long-term evolution and sustainability of digital business processes. Its activities would include:

- reviewing the project status report;
- following up on milestones and deliverables;
- reviewing as-is and to-be business processes;
- digitizing all manual processes;
- re-engineering and reinventing all business processes, as needed;
- digitizing all processes within the port community;
- introducing overtime and review new business procedures;
- improving cybersecurity;
- coming up with the use cases for 4.0 technologies;
- promoting best practices;
- supporting in-change management activities related to the implementation or introduction of new and re-engineered processes within the port community; and/or
- implementing standardization.

The government authorities and private stakeholders that should provide the business process experts should be from key entities listed above.

The business process committee could meet quarterly, and a representative from the port authority should preside over it.

Figure A4.1 Decision-Making Hierarchy for PCS Committees



Source: IDOM.

Communications Protocols

The **Simple Object Access Protocol (SOAP)** is a network communications protocol designed by Microsoft in 1998. Today, it is mainly used to exchange structured information in web services by transferring data over HTTP/HTTPS SOAP. This protocol only supports XML data formatting and strictly follows pre-established standards, such as a messaging structure, a set of encoding rules, and conventions for providing process requests and responses.

This protocol contains web-based services that allow SOAP to handle communications and generate responses that are language- and platform-independent. Although most information exchanges between systems are currently carried out using the representational state transfer protocol, the SOAP protocol remains in use because it is highly standardized, allows automation, and in some cases is more secure.

Based on HTTP or HTTPS, representational state transfer (REST) is an interoperability protocol that defines a set of restrictions for creating web services. The main languages used by this protocol are XML and JSON. RESTful web services allow the requesting system to use predefined and unified stateless operations to access and manipulate the textual representation of resources. By using stateless protocols and standard operations, RESTful systems aim to improve performance, reliability, and scalability by reusing manageable and up-

gradable components without affecting the entire system, even when they are running.

The REST protocol is used by browsers and, increasingly, cloud-based services, which users manage, connect to, and interact within a distributed environment via application programming interfaces (APIs). REST APIs are used by sites such as Amazon, Google, LinkedIn, and Twitter.

Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) is an interoperability language that can be sent through any communication protocol. It is supported by the rules of the United Nations and has a long history in the port sector.

EDIFACT includes a set of standards, directories, and guidelines for electronic exchange that are agreed internationally. These standards allow messages to be defined in formats that permit them to be automatically written, read, and processed. Messages can be exchanged in structured formats with hierarchy sections and designed using an electronic exchange like a webservice.

All standards are constantly reviewed and assembled based on agreements included in the international standards maintained by the UN/CEFACT. This results in ongoing research on the possibility of applying more recent editions of the standards. Many shipping companies and container terminals continue to use this language as its structures are widely recognized in the port industry.

Cybersecurity

Relevant systems include:

- ICT-based systems, such as access control, enterprise resource planning systems, terminal operation systems, and more;
- domain awareness systems, such as closed-circuit television, radar, automatic identification system, and other security monitoring programs; and
- operational technology systems, such as industrial control systems, supervisory control and data acquisition-enabled systems, cranes, conveyor systems, utility infrastructures, and others.

Some cybersecurity standards or good practices to be followed to achieve this are:

- ISO/IEC 27001 Information Security Management Standard;³
- Cybersecurity Framework, United States National Institute of Standards and Technology (NIST);⁴
- Good practices and cybersecurity guidelines on ports, ENISA;⁵ and

- Implementation Guide for Cyber Security on Vessels, Digital Container Shipping Association (DCSA).⁶

The DCSA has launched a cybersecurity initiative to facilitate framework creation and provide best practice guidance to shipping companies. The “DCSA Implementation Guide for Cyber Security on Vessels” consists of a series of best practices that seek to provide all shipping companies with a common language and a manageable, task-based approach. It is intended to complement the vessel security standards and their respective requirements by providing additional guidance on the cyber-related aspects of the security measures it contains.

³ <https://www.iso.org/isoiec-27001-information-security.html>.

⁴ <https://www.nist.gov/cyberframework>.

⁵ <https://www.enisa.europa.eu/publications/guidelines-cyber-risk-management-for-ports>.

⁶ <https://dcsa.org/wp-content/uploads/2020/03/DCSA-Implementation-Guideline-for-BIMCO-Compliant-Cyber-Security-on-Vessels-v1.0.pdf>.

Operational and Technological Standards of the Port Industry

UN/CEFACT

The mission of the United Nations Centre for Trade Facilitation and Electronic Commerce (UN/CEFACT) is to improve “the ability of business, trade and administrative organizations [...] to exchange products and relevant services effectively. Its principal focus is on facilitating national and international transactions, through the simplification and harmonization of processes, procedures and information flows, and so contributing to the growth of global commerce.”⁷

UN/CEFACT Standards and Documentary Processes

UN/CEFACT has produced trade facilitation recommendations and a range of electronic business standards which are widely used in PCSs. These include: UN/EDIFACT; Business Requirements Specification; UN/LOCODE; Component Library Center; XML Scheme; UNTDED—ISO7372; ISO/TC 154; and Mapping Requirements Specification.

Digital Container Shipping Association (DCSA)

The new DCSA was created in 2019 and is an independent nonprofit organization run by a coalition of maritime shipping companies. Its goal is to promote a digitally intercon-

nected container shipping industry and set universally applicable technology and business standards. Its members include major shipping companies (Maersk, CMA CGM, Hapag-Lloyd, MSC, ONE, Evergreen, HMM, Yang Ming, and ZIM) and experts who provide guidelines for developing these standards (UNECE, UN/CEFACT, INTTRA, ISO, SMDG, and GT Nexus). Its main objective is to standardize digital formats in the maritime industry and achieve greater digitization of container transportation. Some of the DCSA’s current technological initiatives are listed below.

DCSA Standards and Documentary Processes

- The **DCSA information model** (figure A7.1) is intended to serve as the foundational data language, designed to support a shared understanding of concepts, terms, and rules within the shipping industry.
- Definitions of the **REST communication protocol with Track&Trace API** in the SwaggerHub open-source API development platform.
- The **Load List and Bat Plan Definitions** initiative prepares vessel calls in ports so the estimated amount of container move-

⁷ <https://unece.org/trade/uncefact/introduction>.

ments (loading and unloading) can be forecast.

- The **Operational Vessel Schedule Definitions** specify the minimum data that must be sent when sharing the vessel schedule.
- **IoT technology for GateWay Connectivity Interfaces** includes radio standards for gateways in ships, on land, at event venues, and on handheld devices. These standards provide an initial set of connectivity recommendations that are vendor- and platform-agnostic to reduce the investment risk, raise operational efficiency, and enable innovation.

procedural and legal needs of border regulatory agencies, including customs, export control, import, and transshipment transactions. This data model:

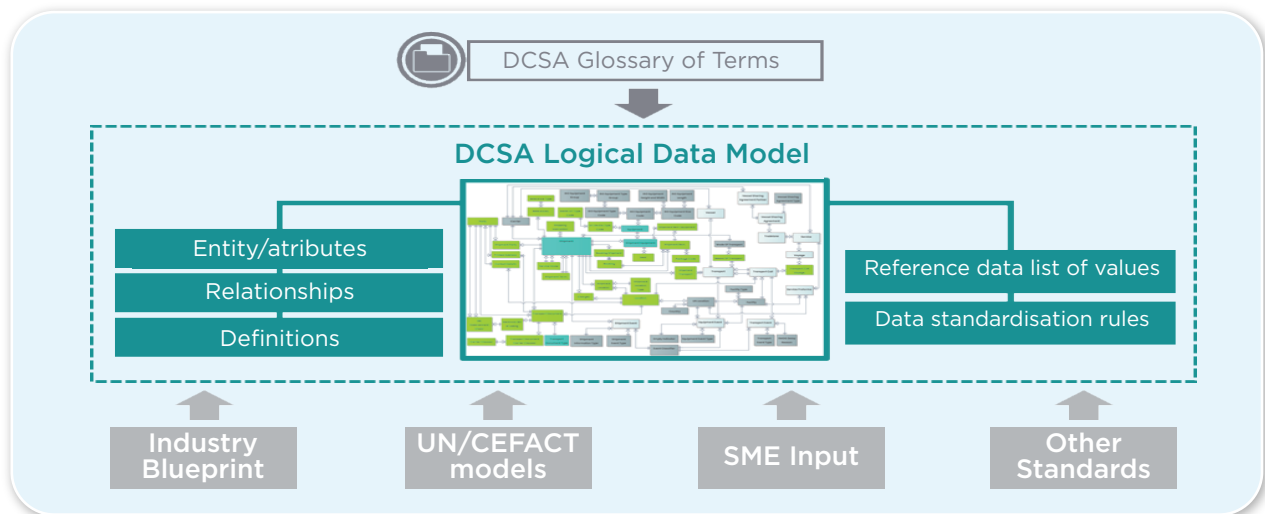
- organizes the information requirements for a modern customs administration;
- is in accordance with the standardized business processes described in the revised Kyoto Convention;
- complies with the international conventions on information related to trade and transportation;
- assists in the application of advanced information requirements, including the SAFE Standards Framework; and
- allows participation in customs-to-customs information exchange programs.

World Customs Organization (WCO)

The WCO data model is an international standard that covers a set of data requirements that are updated periodically to meet the

The model also includes regulatory requirements for customs, statistics, food safety, agriculture, maritime safety, and the environ-

Figure A7.1 DCSA Information Model



Source: IDOM.



ment. In addition, it provides electronic messaging solutions for use in an interoperability environment, identifying possibilities for regulatory and border control agencies to share information and documentation. At an interoperability level, it:

- works with various ICT syntax solutions and messaging technologies;
- provides context for information exchange;
- contains a data set and standard code lists to use;
- contains information exchange structures for information models; and
- contains technical solutions for the information exchange: UN/EDIFACT and XML.

WCO Standards and Documentary Processes

The high-level processes covered by the standard include:

- Shipment journey: booking process; B/L process; and cargo release.
- Equipment journey: empty container pick-up; VGM; haulage transport order; and empty container return.
- Vessel journey: loading lists; stowage plan and shipping instructions; customs manifest; arrival and departure times; long-term schedules; and coastal schedules.

International Maritime Organization (IMO)

The IMO is a United Nations agency that is responsible for shipping safety and security and the prevention of marine and atmospheric pollution by ships. With this goal, it

creates codes to be followed by the stakeholders involved in shipping and handling operations. In 1965, the members of the IMO adopted the Convention on Facilitation of International Maritime Traffic, known as the FAL Convention. The FAL Convention implemented mandatory requirements for the electronic exchange of information on cargo, crew, and passengers. The annexes of this agreement provide recommended practices and a series of standards, formalities, and documentary requirements that must be applied to make PCSs or single windows interoperable.

IMO Standards and Documentary Processes (FAL Forms)

- IMO General Declaration (FAL Form 1);
- Cargo Declaration (FAL Form 2);
- Ship's Stores Declaration (FAL Form 3);
- Crew's Effects Declaration (FAL Form 4);
- Crew List (FAL Form 5);
- Passenger List (FAL Form 6); and
- Dangerous Goods (FAL Form 7).

Five other documents/forms are required for protection, vessel waste, and electronic information on cargo prior to arrival to carry out the Customs risk assessments, as are two additional documents under the Universal Postal Convention and International Health Regulations.⁸

The most relevant mandatory international conventions and other instruments issued or promoted by the IMO are:

- 1974 SOLAS Convention (chapters VI and VII and other relevant parts);

⁸ <https://imo.org>.

- International Convention for the Prevention of Pollution from Ships (MARPOL)—annexes III and V;
- International Maritime Dangerous Goods (IMDG) Code and related supplements;
- International Maritime Solid Bulk Cargoes (IMSBC) Code and related supplements;
- International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code);
- International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium, and High-Level Radioactive Wastes on Board Ships (INF Code);
- International Code for the Safe Carriage of Grain in Bulk; and
- Code of Safe Practice for Cargo Stowage and Securing (CSS Code).

The following are the most significant IMO optional conventions and other instruments:

- Code of Safe Practice for Solid Bulk Cargoes (BC Code);
- Code of Safe Practice for Ships Carrying Timber Deck Cargoes;
- Code of Safe Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code);
- Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas;
- Guidelines for the Preparation of the Cargo Securing Manual;
- Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide);
- Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG);
- reporting procedures, including inspection programs for cargo transport units carrying dangerous goods; reporting of incidents involving harmful substances and/or marine pollutants; reporting of casualties involving dangerous cargoes;
- IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units;
- Recommendations on the Safe Use of Pesticides in Ships; and
- recommendations and guidelines relevant to the carriage of bulk cargoes.

Port Call Optimization

Maritime transportation and ports have formed an international working group to promote port call optimization by improving the quality and availability of event data using existing standards. This will benefit shipping companies, shippers, terminal operators, and ports. This working group includes:

- shipping companies (e.g., CMA CGM);
- shipping agents (e.g., Vopak Agents);
- ports (e.g., Port of Rotterdam);
- terminal operators (e.g., Oldendorff Carriers); and
- standard partners (e.g., GS1).

The working group is a platform for shipping companies, agents, and ports to discuss the optimization of port calls and develop a viable solution for each trade and port, from port to port and end to end.

The development plan covers the following items, which should be considered when designing a PCS:

- agree on the business process of port calls;
- agree on the minimum scope of data;
- agree on minimum requirements for standards;
- agree on data definitions for master data;



- agree on data definitions for event data;
- agree on the data model for master data;
- agree on the data model for event data;
- develop incentives for data owners; and
- develop guidance for data owners.

For the purposes of interoperability, the use of REST API communication protocols that use the same language for data exchange has been proposed. The objective of this standard is that it can be used to better syn-

chronize port operations, working with standardized messages that allow the delivery of timely notifications about planning status.

Figure A7.2 presents a selection of the members.

One unique aspect of this initiative is that shipping companies, shipping agents, and port authorities work together on port call optimization to come up with solutions that are applicable to every operation and port, from port to port and end to end. As

Figure A7.2 Members of the Port Call Optimization Initiative



Source: Port Call Optimization.

mentioned before, the objective is to define universal port-agnostic standards for business processes that are applicable across the world. However, this is a difficult task because the shipping industry is used to adapting itself to the specific circumstances of each port (type of cargo, exports/imports, packaging, etc.). When developing port call optimization projects, the shipping industry normally does this per trade (e.g., only for line or tramp shipping). Projects are often developed for each individual port, as these often compete with each other.

As can be observed in figure A7.3, port call timestamps are important components of the port call optimization process. Certain stakeholders (e.g., the terminal, port authority, and shipping agent/captain) report the sequence of estimated, requested, planned, and actual times when a vessel approaches, arrives at, and leaves the port, along with the times that certain services are executed. Each timestamp is the responsibility of just one entity. At present, this sequence is not used consistently by ports, terminals, and service providers around the world.

The scope of ship-port interface data for deep-sea vessels is restricted to operations between the pilot boarding place and the fender line of the berth, including anchorage areas. Prior to the pilot boarding place, this data is normally the domain of the national hydrographic office, and beyond the fender line of the berth, this data is normally the domain of the terminal.

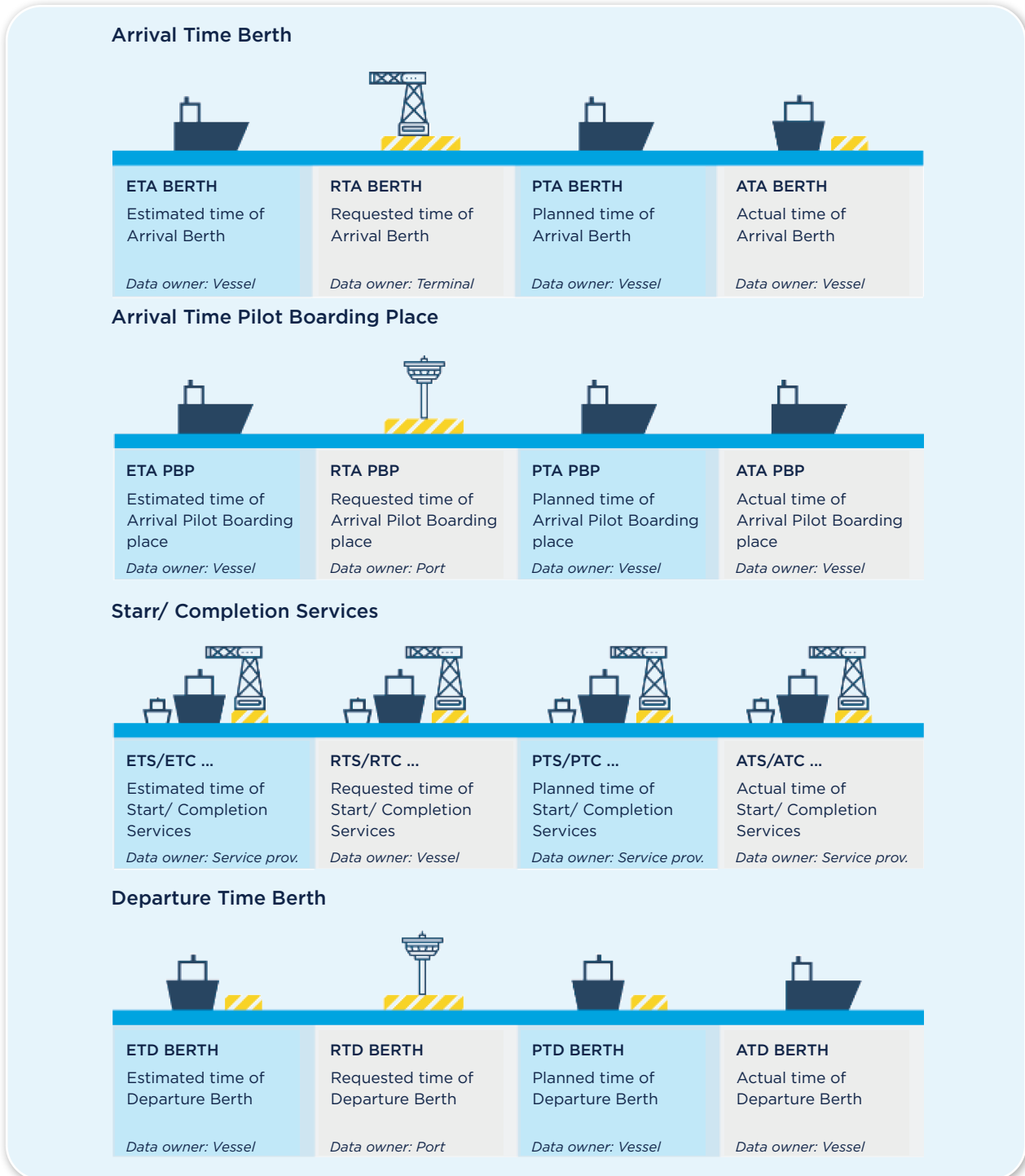
PROTECT Group

The PROTECT Guide develops and maintains EDI messages that are published through UN/EDIFACT:

- **International Forwarding and Transport Dangerous Goods Notification (IFTDGN).** PROTECT defined the standard for messages declaring dangerous goods to public authorities. This message is sent by the party responsible for declaring the dangerous goods (e.g., shipping agent, freight forwarder) to the party acting on behalf of the local authority that checks compliance with legal requirements around the monitoring of dangerous goods (normally the port authority). Each IFTDGN contains information relating to one conveyance/voyage of a means of transport such as a vessel, train, truck, or barge on the dangerous goods being loaded, unloaded, and/or in transit.
- **Berth management messages (BERMAN).** This XML message was also defined by PROTECT and its purpose is to send berth services requests. It is sent by the shipping agent/captain of a vessel to the port authority and is based on and supports implementation by means of an EDI message that is aligned to international and European legislation and the International Ship and Port Facility Security (ISPS) code.
- **Waste disposal messages (WASDIS).** In view of the implementation of the EU Directive on Port Reception Facilities, the PROTECT Group has worked on an electronic message for waste reporting by shipping agents or captains to the appropriate official bodies in the port of call. The message is also suitable for conveying waste information and inspection data from the authority in the vessel's current port of call to the authority in the next.



Figure A7.3 Port Call Time Stamps



Source: Port Call Optimization.

Ship Message Design Group (SMDG)

SMDG is a nonprofit organization and an official Pan-European User Group that is recognized by UN/CEFACT. Its members participate in meetings and are actively involved in developing messages, implementation guides (user manuals), and code lists. Members include: shipping companies/ocean carriers; container terminals; port authorities; and ICT service providers. Within the SMDG, various working groups have been established to cover specific EDI-related topics, including:

- **business process efficiency:**
 - reduce duplication of manual work on the part of sender and receiver when exchanging information such as booking forecast (load recap), schedules, or terminal departure report;
 - increase system automation enabling the follow-up of verified gross mass and handling/stowage requirements; and
 - optimize loading process and capacity management.
- **standard codes** that enable the transmission of data in machine-readable coded form;
- **BAPLIE/MOVINS (ship planning)** for defining messages from a container vessel's stowage plan and move instructions sent from the vessel operator to the port terminal and containing stowage instructions, including the planned stow position for each container;
- **container messages**, which define the functional use and format of all EDI messages relating to container moves;
- **vessel schedules**, which define the message used for a vessel's port call transmissions and voyage submitted by the shipping agent;
- **VERMAS—VGM**, which designs EDI messages that comply with regulations making the shipper responsible for reporting the VGM to the shipping company and the latter to the terminal;
- **DG bookings**, which define the transmission of a dangerous goods booking request sent from the container operator to the shipping agent of the vessel on which it is to be loaded; and
- **web services standardization**, which was implemented to explore the potential of web services for complementing existing EDI messages—some specific web services are already used by individual members of the industry, but there is no international coordination so far.

Containerized Cargo Documentation

The documents/forms required for container cargo can also be used for the import of

other types of cargo, including dry or liquid bulk, general cargo, ro-ro, etc.

Table A8.1 Export, Import, and Transshipment Documents for Cargo

Document name	Cargo type	Cargo flow	Description
Arrival notice	Container, all other cargo	Import	A document sent by the ocean freight forwarder, carrier, or shipping agent to the consignee or notify party indicating the shipment's arrival date at a specific location (normally the destination). The parties that are notified of the arrival are generally listed as the consignees in the bill of lading (importer, freight forwarder, or non-vessel-operating common carrier—NVOCC).
Bill of lading (master B/L, carrier's B/L)	Container, all other cargo	Export, import	Contractual document issued to the shipper that confirms the carrier's receipt of the cargo, acknowledging goods being shipped or received for shipment and specifying the terms of delivery (as one of the pieces of evidence of the contract of carriage). The bill of lading is usually prepared based on shipping instructions, including a description of the cargo, given by the shipper on forms issued by the carrier. It is also the title to the goods and can be a negotiable document.
Booking confirmation	Container	Export	A confirmation of the reservation of space and/or equipment for a vessel/voyage and possibly inland transportation (carrier's haulage) with a specific origin/destination/equipment type and commodity. The confirmation is sent by the carrier to the shipper.
Booking request	Container	Export	A request to reserve space and equipment for a vessel/voyage and possibly inland transportation.
Container acceptance/release order	Container	Export, import	An order presented by the shipping agent to the terminal operator to receive the cargo in its facilities (exports) or release it from these (imports), confirming that all the formalities with B/L release have been complied with. This stage is often confused with gate-out, but cargo release is the authorization necessary before shipments can be allowed to gate-out.

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Table A8.1 Export, Import, and Transshipment Documents for Cargo *(continued)*

Document name	Cargo type	Cargo flow	Description
Container announcement/discharge list (loading/unloading list)	Container, all other cargo	Export, import, transshipment	Document sent by a shipping agent or the carrier to the terminal operator that includes the numbers and types of containers that will be loaded onto/unloaded from a specific vessel/voyage. It also carries information on dangerous goods. Each vessel can have several loading/unloading lists in the case of vessel sharing agreements. For transshipment, the loading/unloading list contains information on containers that will be loaded/unloaded in the in-transit regime.
Customs clearance	Container	Export, import	Document issued by customs to the shipper (for exports) or importer (for imports) indicating that all duties have been paid and the shipper's goods have been cleared for export/import.
Customs export/import declaration	Container, all other cargo	Export, import	The customs export declaration is presented to customs by the customs broker on behalf of the exporter. It is presented within a few days of the goods being transported to the place supervised by customs (the terminal). The customs broker handles all the declaration formalities with customs and submits related documents in advance if the name, specification, and quantity of goods can be determined. The customs import declaration may be presented before or after the cargo is unloaded from the vessel. It is presented by a customs broker in the name of the importer. The advance declaration serves to shorten the clearance time of the imported goods.
Dangerous goods authorization	Container, all other cargo	Export	Authorization given by the port authority, maritime authority, and/or terminal operator to the shipping agent and/or haulage coordinator to enable dangerous goods to enter the port facilities.
Empty container destination instructions	Container	Import	Document that indicates the destination depot that a container shall be returned to.
Empty container release/acceptance order	Container	Export, import	A message sent by the shipping agent or shipping company to the empty container depot containing instructions to release (export) or accept (import) an empty container, specifying its type and number. Booking confirmation can sometimes be used for this purpose.
Equipment interchange receipt (EIR)	Container	Export, import	The EIR is a form that is generated every time a container goes from one interchange point to another. The interchange points could be two container ships, terminals, container yards, or at any intermodal interchange point. The document is issued by the carrier to the shipper to pick up or deliver the containers.


Table A8.1 Export, Import, and Transshipment Documents for Cargo *(continued)*

Document name	Cargo type	Cargo flow	Description
Export/import cargo manifest	Container, all other cargo	Export, import	The cargo manifest is a consolidated list of all the cargo that is on board a cargo vessel (including B/L numbers). The list of all cargo carried on the vessel will appear under the vessel name and identification marks of the vessel. It is presented to the customs authority by the shipping agent before loading/unloading but its contents are only validated and the various consequences applied after loading/unloading operations are complete and the actual cargo has been verified.
Gate-in/gate-out (terminal)	Container	Export, import	A message by which a terminal confirms that the containers specified have been delivered by the road hauler (export) or picked up by them (import). The message is created once the truck passes the gate. This message can also be used to report internal terminal container movements (excluding loading and unloading the vessel) and to report the change in status of container(s) without those containers having been physically moved.
Gate-out/gate-in (empty container depot)	Container	Export, import	A message through which an empty container depot etc. confirms that the specified containers have been picked up/delivered by the road hauler. The message is created once the truck passes the gate. This message can also be used to report internal terminal container movements (excluding loading and unloading the vessel) and to report the change in status of container(s) without those containers having been physically moved.
Inland transportation document	Container, all other cargo	Export, import	Document issued by a haulage coordinator and/or the hauler including data of the means of transportation used, details of the hauler, and the driver and details of the cargo transported. This document accompanies the cargo during the entire inland haulage process. During police controls, it serves as proof that the hauler can legitimately carry the cargo on board a particular vehicle.
In-transit bond declaration (transshipment declaration)	Container	Transshipment	The movement of goods from a point of arrival in the customs territory to a point of departure or another point for customs examination and release, without the completion of customs formalities. Transportation between these two points is provided by a carrier approved and bonded for such purposes.
Invoices and payments for empty depot services (gate-out/gate-in)	Container	Export, import	Payment made by the customs broker or shipping agent to the empty container depot for the release/admission of an empty container.

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Table A8.1 Export, Import, and Transshipment Documents for Cargo *(continued)*

Document name	Cargo type	Cargo flow	Description
Payment for terminal services	Container, all other cargo	Export, import	Payment made by the shipping agent/customs broker/importer to the terminal to accept and handle the container in its facilities until it is loaded onto the vessel/truck.
Loading/Unloading list	All other cargo	Export, import	Document sent by a shipping agent to the terminal operator that includes the amount and type of cargo that will be loaded onto/unloaded from the vessel. It also includes information on any dangerous goods.
Loading/unloading report	Container, all other cargo	Export, import, transshipment	Terminal provides shipping agent or the carrier with a report on the containers or cargo loaded onto/unloaded from the vessel. There is a unit report per container and a complete one for all containers.
Loading/unloading plan	All other cargo	Export, import	The loading/unloading plan for dry bulk contains all necessary information for loading/unloading the cargo, such as: quantity of cargo and the corresponding hold number(s) to be loaded/unloaded, the amount of ballast water, ship's drafts, and trim at the completion of each step in the cargo operation, the estimated time for completion of each step in the cargo operation, the assumed rate(s) of loading equipment, and the assumed ballasting rate(s). ^a
Rail unloading/loading list	Container	Export, imports	Document sent by a haulage coordinator to a railway terminal that includes the numbers and types of containers that will be unloaded from/loaded onto the train.
Rail unloading/loading report	Container	Export	The railway terminal provides the haulage coordinator with a report on the containers unloaded from/loaded onto the train.
Road/rail transportation order	Container, all other cargo	Export, import	Order for specific road or rail transportation work carried out by a third-party road or rail hauler on behalf of the haulage coordinator. In the case of carrier haulage, the haulage order is sent directly by the carrier to their haulage provider.
Shipping instructions	Container, all other cargo	Export	Expansion of the original booking that the shipper shares with the carrier. The shipping instruction includes volume/weight, shipping dates, origin, destination, and other special instructions. The information given by the shipper through the shipping instructions is the information required to create the bill of lading. For bulk cargo, a standard bulk cargo shipping name form can be used. ^b

Source: IDOM.

^a <https://www.iacs.org.uk/download/1984>.

^b <https://www.mlit.go.jp/common/001249851.pdf> (page 21).

Legal Factors: Examples of Local and National Legislation Supporting PCSs

Legislation on Electronic Documents

Peru

- **Digitization of Logistics Processes—Legislative Decree No. 1492⁹**

In Peru, Legislative Decree No. 1492 introduced provisions to promote the revitalization, continuity, and efficiency of operations linked to foreign trade logistics chains and to implement the progressive digitization of foreign trade processes in the public sector. This decree is in accordance with Law 30860—Act to Strengthen the Single Window for Foreign Trade (VUCE) and the related regulatory norms.

The decree also establishes that private-sector foreign trade operators (ship agents, terminal operators, customs brokers) must progressively incorporate data exchange systems or the alternative electronic mechanisms needed to validate documents or absorb information into their processes, such as through the use of digital or digitized documents.

- **Law to Strengthen the Single Window for Foreign Trade—Law No. 30860¹⁰**

This law and its regulations state that the national Single Window for Foreign Trade

(VUCE) is the only channel for the interoperability of foreign trade information and documentation, except for those cases that derive from international agreements or conventions whose provisions state otherwise. Likewise, the law states that the VUCE is an interoperability platform for foreign trade information and provides services to entities that require the information stored in or generated by the platform.

- The United Nations Centre for Trade Facilitation and Electronic Business recognizes that “a solid legal framework is required for successful operations of an International Trade Single Window, which includes a PCS.” To this end, the Port Community System of Callao, Peru, has used Law No. 30860 as its legal framework. This law also establishes that stakeholders in the port community must adjust their process as necessary and comply with the conditions set out in the supreme decree for the exchange of information, notably article 92, which states that “the use of a port community system is mandatory for the

⁹ <https://busquedas.elperuano.pe/download/url/decreto-legislativo-que-aprueba-disposiciones-para-la-reacti-decreto-legislativo-n-1492-1866212-4>.

¹⁰ https://www.vuce.gob.pe/marco_normativo/ley%2030860-%20Ley%20de%20fortalecimiento%20de%20la%20VUCE.PDF.

stakeholders in the maritime port sector. It should be implemented gradually, in accordance with the provisions established by MINCETUR.”**The regulation of private operators’ activities**

The Peruvian state regulates some aspects of the private companies that provide foreign trade, maritime, port, and logistics services, among others. Examples of such legislation includes:

- **Mandatory use of the VUCE**

The Second Complementary Provision of Supreme Decree No. 008-2020-MINCETUR¹¹ stipulated that the VUCE should be progressively introduced over six months, after which it would become mandatory for administrative procedures or information requirements. This guideline also applies to the PCS within current regulations, as it is considered part of the VUCE program.

- **Foreign Trade Logistics Services Information Module (MISLO)**

According to Law No. 28.977—Foreign Trade Facilitation Law,¹² foreign trade operators such as haulers, freight forwarders, terminal operators, shipping companies, and shipping agents must transmit and update information on the foreign trade logistics services and the prices of these.. Failure to do so will result in sanctions by MINCETUR.

- **Customs Facilitation, Security, and Transparency (FAST) Program**¹³

The FAST program is a Peruvian Customs initiative that aims to facilitate, streamline,

automate, and make transparent the entry and exit of goods into and out of Peru and to do the same for the complementary processes of logistics operators. All of these are integrated into the transversal processes of customs risk management and logistics chain security. The four projects that make up the FAST program (operators, entry, exit, and risk management) are key to compliance with the strategic objectives of the Peruvian Customs Authority (SUNAT): improve tax and customs compliance and reduce the costs of compliance and customs obligations. The program also seeks to reduce the time needed for customs clearance by using electronic forms, eliminating in-person formalities, strengthening the information exchange between foreign trade operators, and promoting the use of new technologies.

Spain

- **General Telecommunications Law—Law 9/2014**¹⁴

This legislation regulates electronic communication services and issues relating to telecommunications resources and equipment, uses of the public domain, and common infrastructure in buildings. It also seeks

¹¹ <https://busquedas.elperuano.pe/normaslegales/aprueban-reglamento-de-la-ley-n-30860-ley-de-fortalecimien-decreto-supremo-n-008-2020-mincetur-1874820-2/>.

¹² https://www.vuce.gob.pe/marco_normativo/03%20-%20Ley%2028977%20_LeyFacilitacionComercioExterior.pdf.

¹³ <https://www.sunat.gob.pe/operatividadaduanera/fast/>.

¹⁴ <https://www.boe.es/buscar/act.php?id=BOE-A-2014-4950>.

to promote public and private investment in high-capacity networks, given that technologies such as fiber optics and 5G are key to bringing about the digital transformation of society and the economy.

- **National Interoperability Framework—
Royal Decree 4/2010**¹⁵

This decree regulates the National Interoperability Scheme in the field of electronic governance. For a digitized document to be considered an authentic copy of the original, the requirements established in the Technical Interoperability Standards for E-Document Authentic Copy and Conversion Procedures need to be met.

For example, the decree states that the software used to issue digital invoices must be approved by the Spanish Customs Authority (AEAT) to guarantee that the digitized file is the same as the original. If the invoice is issued by the approved software tool and contains a digital signature, paper-based invoices can be eliminated. It is also important for users to back up all digitized documentation and maintain a well-organized document management system through which documents can easily be accessed. The National Interoperability Scheme considers the recommendations of the European Union, the technological capabilities of different public institutions and the systems they use, the use of open standards, and the standards that are widely used by citizens. As a result, this legal best practice offers the flexibility to use different solutions, software, and systems to digitize documents, such that citizens can make independent decisions on this matter.

Chile

- **Decree 72**¹⁶

This decree covers the interoperability between the single windows for foreign trade of the member countries of the Pacific Alliance through the recognition of electronically signed documents. Under these regulations, member states acknowledge the validity of the electronic signature used in the electronic documents transmitted through the interoperability platform for single windows for foreign trade and the electronically signed documents exchanged between each party's single windows. It also guarantees the confidentiality of the information transmitted through these platforms. It should be noted that Chile and Peru are already working on solutions to interconnect their maritime national single windows (VUCE and VUMAR).

- **Decree 86**¹⁷

Decree 86 covers the issuing and reception of certificates of origin that were issued and signed electronically within the framework for the interoperability of Pacific Alliance single windows for foreign trade and the acceptance of these within member states. The regulations in question make it mandatory for parties involved to do their best to promote the issuing of electronically signed

¹⁵ <https://www.boe.es/buscar/act.php?id=BOE-A-2010-1331>.

¹⁶ <https://www.bcn.cl/leychile/navegar?idNorma=1105498>.

¹⁷ <https://www.bcn.cl/leychile/navegar?idNorma=1130244>.

certificates of origin and the use of the same XML version of electronically signed certificates of origin that the Pacific Alliance uses. It also states that any changes related to the XML version will be communicated to the customs authorities.

To comply with these regional decrees, Chile has developed the following systems:

- **Chilean Maritime Single Window—VUMAR**

The maritime single window in Chile is currently at the design stage, and the Ministry of Transportation and Telecommunications is working on the necessary legal regulations to formalize the initiative.¹⁸ The system focuses on ship agents to be able to carry out vessel reception and departure procedures vis-à-vis public authorities. VUMAR also allows the electronic management of documents recommended by the IMO, such as certificates and FAL forms, which are mandatory for vessel reception through VUMAR. The new system will replace some functions of the current system, the Comprehensive Vessel Service System (SIAN).

- **Integrated Foreign Trade System—SICEX**

Chile is also investing in SICEX through the inclusion of public entities such as the Agriculture and Livestock Service, the National Fisheries and Agriculture Service, and the National Health Service to validate the documentary requirements for goods entering/leaving the country. At present, SICEX is only working for export operations, while the import operations functions are being developed. Presenting documentation through the SICEX platform is currently optional, as stated in Resolution 611 EXEMPT.¹⁹

Jamaica

- **Memorandum of Understanding (MOU) between the Jamaica Customs Department and the Port Authority of Jamaica**

The regulation of the establishment and functioning of a PCS and cooperation between entities like customs and port authorities are essential for the successful implementation of a PCS. In 2013, by virtue of Cabinet Decision No. 8/12 February 27, 2012, an MOU was signed between the Jamaica Customs Department and the Port Authority of Jamaica. The purposes of this document include establishing the first stage in the policy-making process, namely recognizing the PCS as the single entry point for the submission of trade-related information. The MOU also defines the objectives of the PCS to provide a single electronic portal to connect the various systems operated by different organizations within the port community and establish a framework of cooperation between the two major stakeholders. These authorities have taken on responsibility for developing the PCS and the legal power to promote it.

- **Electronic evidence**

The admissibility of electronic evidence is essential for the transition from a paper-based system to a digital one. Agreements between the PCS operator and government

¹⁸ <https://portalportuario.cl/gobierno-presenta-avances-del-proyecto-ventanilla-unica-maritima/>.

¹⁹ <https://www.bcn.cl/leychile/navegar?idNorma=1059310>.

agencies will authorize the exchange of data and information for specific purposes. Further MOUs between relevant government agencies such as customs also allow data- and information-sharing. In Jamaica, the Electronic Transactions Act²⁰ was a step in the right direction toward addressing this issue, as were the amendments to the Evidence Act, which altered the common law rule in relation to hearsay and computer-generated evidence. These pieces of legislation removed the barriers to electronic evidence or discrimination against this. For countries to evolve from a paper-based system, electronic evidence needs to have the same or better evidential weight as paper-based evidence. Another country where this has taken place is Singapore, which updated its Evidence Act to enable electronic signatures and documents to be used as evidence.

Legislation on cybersecurity and data protection

Peru

- **Personal Data Protection Law (LPDP)—Law No. 29.733²¹**

This law regulates the processing of personal information and establishes obligations for all systems or platforms through which users submit their personal information. These obligations can be summarized as follows:

- Personal data processing needs the prior, free, informed, express, and unequivocal consent of the owner of the data.
- Platform owners must declare their databases to the National Data

Protection Authority and update these records, as appropriate.

- Data must not be gathered by fraudulent, unfair, or illegal means.
- Data must not be used for purposes other than those that prompted its collection.
- Technical, organizational, and legal security measures must be implemented for existent databases, as required by the legal framework and taking the security directive as a reference.

Spain

- **Public Sector Legal Regime—Law 40/2015²²**

This law regulates general provisions, principles of action, and the functioning of the public sector. Article 156 mentions the National Security Scheme, which is regulated by Royal Decree 951/2015²³ and pursues the following objectives:

- Create the necessary security conditions for the use of electronic media through measures to guarantee the security of systems, data, communications, and electronic services, allowing the exercise of rights and the fulfillment of duties through these media.
- Promote the continuous management of security issues.

²⁰ <https://laws.moj.gov.jm/library/statute/the-electronic-transactions-act>.

²¹ <https://leyes.congreso.gob.pe/Documentos/Leyes/29733.pdf>.

²² <https://www.boe.es/buscar/act.php?id=BOE-A-2015-10566&b=208&tn=1&p=20191105#a155>.

²³ <https://www.boe.es/buscar/act.php?id=BOE-A-2015-10566&b=208&tn=1&p=20191105#a155>.

- Promote the prevention, detection, and sanctioning of cyberthreats and cyberattacks, to increase resilience to these.
- Promote a standardized approach to security that facilitates cooperation around the provision of digital public services when different bodies are involved in this. This includes providing guidelines on how the public sector should address ICT security and also providing a common language to facilitate interaction, as well as the communication of information security requirements to the industry.
- Serve as a model of good practice, in line with the OECD recommendations “Digital Security Risk Management for Economic and Social Prosperity—OECD Recommendation and Companion Document.”

Under the National Security Scheme, security is conceptualized as a comprehensive undertaking in which there is no place for ad-hoc actions or temporary solutions, given that the weakness of a system is determined by its weakest point, and this point is often the overlapping of measures that are individually appropriate but poorly assembled.

- **Cybersecurity Legal Code**²⁴

The objective of the Cybersecurity Legal Code is to guarantee the secure use of information and communication networks and systems by strengthening the country’s prevention, detection, and response capacities against cyberattacks and promoting and adopting specific measures to contribute to secure, reliable cyberspace. To achieve this, Spain has established certain cybersecurity-

related measures for maritime safety, including the following:

- Strengthen the capacities for preventing, detecting, reacting to, analyzing, recovering from, responding to, and investigating cyberthreats, and for coordinating cybersecurity matters at the technical and strategic levels of the National Security System.
- Reinforce and promote regulatory, organizational, and technical mechanisms to improve protection, security, and resilience in the public sector, strategic sectors (especially in critical infrastructure and essential services), the business sector, and among citizens to guarantee a safe and reliable digital environment, and apply measures, implement services, and establish good practices and continuity plans to achieve these ends.
- Strengthen and improve national public-public and public-private cooperation structures in cybersecurity.
- Promote Spain’s cybersecurity industry to attain the necessary technological capabilities.
- Help strengthen security within the EU and internationally, in defense of national interests, promoting cooperation and compliance with international law.
- Promote national and international maritime security policy, especially within the EU, to protect maritime traffic and critical infrastructure.
- Improve cybersecurity in the maritime field.

²⁴ https://www.boe.es/biblioteca_juridica/codigos/codigo.php?id=173_Codigo_de_Derecho_de_la_Ciberseguridad&modo=2.



All security-related legislation in Spain is included in the Cybersecurity Legal Code. This includes:

- **Royal Decree 381/2015**²⁵

Royal Decree 381/2015 includes provisions to protect the integrity of networks, their security, and electronic communications services to ensure the quality of electronic communications services and guarantee the rights of users. It also seeks to reduce the economic damage suffered by both operators and users.

- **Law on Personal Data Protection and Guarantee of Digital Rights—Law 3/2018**²⁶

The main objective of this legislation is to adapt the Spanish legal system to the EU's General Data Protection Regulation (GDPR)—EU Regulation 2016/679, regarding the protection of physical persons about the processing of their personal data and the free circulation of this.

Law 3/2018 also pursues the following objectives:

- guarantee natural persons' fundamental right to personal data protection;
- guarantee citizens' digital rights in accordance with the mandate established in the Spanish Constitution;
- establish companies' requirements and obligations as to how to proceed with personal information and as regards their consumers' rights;
- protect the intimacy, privacy, and integrity of individuals and regulate their obligations in every data transfer

process to grant the security of data exchanges; and

- establish a legal framework for the protection of personal data online, such as the right to be forgotten or the right to data portability, which allows individuals to obtain and reuse their personal data for their own purposes across different services.

Under this law, personal data includes all data (including text, images, audio, and so on) that can be used to identify a person. The law covers fully and partially automated processing of personal data and nonautomated processing, including content included in a file.

Legislation on PCS governance models²⁷

This section examines the national regulations or restrictions that may influence the selection of a specific governance model and identifies the best practices to be adopted.

The governance model for a PCS is influenced by its sponsors, users, and the services offered, be these public, private, or public-private. Broadly speaking, three governance models are used internationally:

- **Model 1:** PCS operated by a public body, normally port authorities or national gov-

²⁵ <https://www.boe.es/buscar/doc.php?id=BOE-A-2015-5854>.

²⁶ <https://www.boe.es/buscar/doc.php?id=BOE-A-2015-5854>.

²⁷ https://publications.iadb.org/publications/english/document/International_Case_Studies_and_Good_Practices_for_Implementing_Port_Community_Systems.pdf.

ernments, and which may outsource services.

- **Model 2:** PCS operated by an outside company that may be publicly owned or operated through a PPP.
- **Model 3:** PCS operated by a private company.

As a good practice stemming from governance model regulation, countries' legal frameworks should ideally be open to any governance model (public, PPP, or private) for establishing PCS operators.

Peru

Peru's legislation enables a publicly operated PCS (model 1) and PPP-based operations (model 2) but not a fully privately operated model (model 3).

- **Law to Strengthen the Single Window for Foreign Trade (VUCE) and Regulatory Standards—Law No. 30860**

According to this law, the Ministry of Foreign Trade and Tourism (MINCETUR) is responsible for PCSs, which are regulated within the framework of the existing Single Window for Foreign Trade (VUCE). Consequently, MINCETUR owns and is developing the PCS-Callao Project, as the executor of an IDB-financed operation. The law also states that administrative issues linked to the operation, maintenance, support, control, change management, knowledge management, implementation of components, and implementation of improvements or other factors related to the operational management of the platform (i.e., the VUCE and the PCS) may be totally or partially outsourced as per

the forms and regulations allowed under the current legislation.

However, this law also states that coordination with public and private entities or the resolution of conflicts regarding the operation of the (VUCE), which also extends to the PCS, cannot be outsourced. Any outsourcing (total or partial) of areas other than coordination or conflict resolution shall be overseen and supervised by MINCETUR, the PCS-Callao administrator. It also indicates that the port community must cooperate with MINCETUR and the National Port Authority to implement and improve the system. In Peru, under the current legislation, a fully private model (model 3) would not be possible for either the VUCE and/or the PCS. The legislation would have to be changed to enable this, which is possible should the situation require it.

- **State Procurement Law—Law No. 30225, and the regulatory standards for it approved through Supreme Decree No. 344-2008-EF**

This law establishes the type of contract that can be used to outsource the implementation and/or the operation of a PCS, which would apply to a publicly operated system (model 1) that allows outsourcing. When operations are subcontracted under the supervision of the public authority responsible for the PCS, this law establishes who the owner of the platform would be. Service contracts are for a maximum of three years, which may be extended for a further three years, for a total maximum of six years.

The law also stipulates that a public tender process should be used to select the company that will develop the platform for PCS-Callao, operate, and maintain it. As local companies



may not have the resources to implement a project of this sort, one important factor to consider when analyzing the legislation is whether the country's legal framework allows international companies to apply for the public tender and if so, under what conditions.

- **Promotion of Private Investment through Public-Private Associations and Asset Projects—Legislative Decree No. 1362, and the regulations for it approved through Supreme Decree No. 240-2018-EF**

When the PCS operator is an independent external company created through a public-private association (model 2), Legislative Decree No. 1362 applies. This establishes that the concession contract to operate and maintain PCS-Callao can be granted for a maximum of 60 years. MINCETUR will carry out the selection process through the Private Investment Promotion Committee, which must be constituted for this purpose. This is in accordance with clause 8.2 of Legislative Decree No. 1362, which states that “in the case of the national government, the private investment promotion organizations are Proinversión²⁸ or the ministries, through the Private Investment Promotion Committee (...).”

This legislation is a best practice that proposes that the public body that owns the PCS platform should have the legal tools to maintain control over the selection process of the private company to operate it.

Spain

According to its current legislation, Spain can use any of the three governance models.

In practice, Spain has ports that use model 1 and others using model 2, but none yet using model 3. Under model 2, port authorities may create other public companies under their supervision, or they can participate in other PCS operating companies as shareholders, as the Port of Barcelona does through PORTIC.

- **National Ports and Merchant Marine Law—Royal Decree 2/2011²⁹**

The National Ports and Merchant Marine Law regulates port authorities in Spain. According to this legislation, their functions and competencies are to:

- determine and classify the ports within the national territory that fall under the jurisdiction of the General State Administration;
- regulate the planning, construction, organization, management, economic/financial regime, and policing of these ports;
- regulate service provision at these ports, which is important because the PCS might include the management of basic port service requests and authorizations by public authorities, such as the port or maritime authority;
- determine how national ports are organized;
- establish the legal framework for the merchant navy;
- regulate the administration of the merchant navy;

²⁸ Proinversión is a state Agency for the Promotion of the Private Investments.

²⁹ <https://www.boe.es/buscar/act.php?id=BOE-A-2011-16467>.

- establish the regime of infractions and sanctions applicable in the merchant navy and the ports under the state's jurisdiction; and
 - the law allows port authorities to participate in companies and acquire and dispose of shares in these provided that the set of contracted commitments does not exceed 1% of the net noncurrent assets of the port authority and these operations do not imply the acquisition or loss of a majority position.
- when required by the investment recovery period set out in the contract and when these investments cannot be used during the rest of the contractor's productive activity, or their use is uneconomical; and/or
 - in the case of maintenance services contracts, which generally conclude at the same time as the purchase of the good to be maintained, when maintenance can only be provided by the company that supplied the good in question, contracts may last for the useful life of the purchased product. This may also apply to software maintenance.

As part of its regulation of the services provided and used in these ports, this law establishes the conditions for third-party providers or concessionaires. It also defines various mechanisms and conditions for granting these, what can be conceded to third parties, and the duration of these concessions, as Peru does.

- **Law on Public Sector Contracts—Law 9/2017³⁰**

This law introduces the EU directives on the award of concession contracts (2014/23/EU) and public procurement (2014/24/EU) into the Spanish legal system. It regulates all types of contracts made by public institutions, including port authorities and ministries. Our analysis here will focus on service contracts and concession contracts, which may be applicable depending on the PCS business model that is chosen.

Service contracts would be used if the public institution outsources the implementation or operation of the PCS to a third party (model 1). These contracts are typically valid for a maximum of five years, but may be extended under the following circumstances:

This law also eliminates public-private collaboration contracts, the use of which is limited in practice. Experience has shown that concession contracts or mixed private-public ownership companies are better contract options. The latter are described below.

- **Mixed Private-Public Ownership Companies**

When an external company is established to operate the PCS (model 2) but this is not public or has no majority public participation, establishing a mixed private-public ownership company as the PCS operator is a viable solution. These are public commercial enterprises whose shareholders include both public and private entities. Although public capital often accounts for a larger share in these companies than private capital, they are regulated

³⁰ <https://www.boe.es/buscar/act.php?id=BOE-A-2011-16467>.



by private commercial law and usually take the form of a public limited company. The state (or another public institution) becomes a partner within the company and is represented by state officials within the corporate governing bodies. The law states that both the public and private partners must be involved in company administrative activities.

- **Public Sector Legal Regime—Law 40/2015³¹**

This legislation applies should the public authorities opt for the PCS to be operated by a publicly owned outside company (model 2).

- **Public Business Entity**

To create a publicly owned company to operate the PCS (model 2), a public business entity must be created. In accordance with Law 6/1997 on the Organization and Functioning of the General State Administration, such companies must be created by law, establishing the type of company, its purposes, the ministry or institution it operates under, the economic resources it has at its disposal, and matters relating to personnel, contracting, fiscal issues, and any other peculiarities that require specific legislation to be established. These companies are governed by public law and have their own legal standing, their own assets, are managed autonomously, and are financed mainly through market income obtained by providing services or producing goods of public interest. Public business enti-

ties can generate income to finance their activities (in addition to income from assets). In exceptional circumstances and when the law allows, they may be financed using resources from the state budget or other public institutions. Public business entities depend on the General State Administration or other state institutions that are linked to this or dependent on it and which are responsible for their strategic direction, evaluating outcomes, and monitoring their effectiveness.

Local influence on data exchange methodologies

Some port authorities have the legal capacity to influence how port stakeholders exchange data. For example, one method used by port landlords is to take advantage of concession contracts with terminal operators. Through these contracts, clauses can be included to promote the use of digital procedures. Other examples are the incentives given by the port authority to share data through a common system (PCS). The following are examples of such incentives:

- **Port of Barcelona:** terminal operators are obliged by contract to provide the port authority with certain information (gate-in/gate-out, loading/unloading of cargo, etc.) via electronic means.
- **Port of Callao:** concession contracts for the design, construction, financing,

³¹ <https://www.boe.es/buscar/act.php?id=BOE-A-2015-10566>

maintenance, and operation of container terminals (DP World) or multipurpose terminals (APM Terminals) establish that the concessionaire will comply with all the information- and procedure-related requirements established in the contract or to be established by the grantor, the National Port Authority, or the regulator (Supervisory Agency for Investment in Public Transportation Infrastructure, OSITRAN), in accordance with the provisions of the applicable laws.

- **Port of Los Angeles:** The Port Authority of Los Angeles provides financial incentives to terminals if they comply with certain key performance indicators) in their operations, provided they share information through the PCS. This is seen as motivating terminals to improve their operations, which brings benefits to the

port community as a whole, making it profitable for the port authority to allocate financial resources for it.

A PCS operator may also establish trust-based relationships through private contracts with the PCS clients by regulating the clauses of these contracts (PCS terms and conditions). PORTIC Barcelona, for instance, has opted for this model by signing contracts with new PCS users. The clauses of these contracts state that the PCS is not responsible for the veracity of information sent by the stakeholders. In other words, it only provides customers with an information system that streamlines the sending and receiving of messages relating to port logistics processes for foreign trade. This is a good practice to be adopted once the PCS is implemented and the contracts with users are being drawn up.

Advocacy Plan Messaging and indicators

Table A10.1 Examples of Objective and Messages Indicators

Objective	Message	Indicator (message released)
Objective 1 Achieve buy-in to the project by all ministries and government bodies related to ports and foreign trade	Explain that the PCS is a useful tool for foreign trade facilitation that will help other government agencies coordinate inspections with customs, customs brokers, and inspection points in such a way as to eliminate current inefficiencies in coordination and communication between the different parties involved in an inspection, both public and private.	YES
	Communicate that implementing a PCS is necessary for maintaining the competitiveness of the port against other enclaves using such systems.	NO
	Progress indicator	50%
Objective 2 Involve all port community stakeholders in the project from its inception through the PCS committees	Explain that the PCS will facilitate and minimize the cost of integrations between stakeholders.	YES
	Progress indicator	
Objective 3 Convince Customs and/or terminal operators to become PCS ambassadors	Explain that the active participation of customs is a key factor in the implementation of a PCS, since critical information for services comes from customs.	YES
	Express the need for terminal operators to join the PCS as a key stakeholder, communicating how a PCS would benefit their activities.	YES
	Progress indicator	100%
Objective 4 Convince the port community and importers/exporters of how a PCS will benefit them and the country's foreign trade.	Present the potential saving benefits from implementing a PCS, both for the port community and for the country's foreign trade (importers and exporters)	NO
	Progress indicator	

Table A10.1 Examples of Objective and Messages Indicators

(continued)

Objective	Message	Indicator (message released)
Objective 5 Get all professional associations that represent the different port community stakeholders to take an active part in implementing the PCS.	Explain that the most suitable business model has been chosen to sustain the PCS, which is a long-term (open-ended) project that serves the entire port community for a common good, without favoring a single side or stakeholder in the logistics chain.	NO
	Progress indicator	0%
Total progress indicator		57%

Source: IDOM.

Table A10.2 Examples of Impact Indicators

Impact indicators	Objective	Indicator	Minimum to consider successful ^c
Short term	Achieve buy-in to the project by all ministries and government bodies related to ports and foreign trade	Number of public authorities with positive approach out of all the public authorities that participate in the port community.	100%
	Involve all port community stakeholders in the project from its inception through the PCS committees	Number of stakeholders involved at the beginning out of all the stakeholders involved in the advocacy plan.	70%
	Convince Customs and/or terminal operators to become PCS ambassadors	Number of strategic stakeholders with an affirmative approach out of all the strategic stakeholders.	At least customs and one terminal
Medium term	Create a cohesive, stable, and well-organized port community.	Number of stakeholders involved in later stages of the advocacy plan out of all stakeholders involved.	80%
	Convince the port community and importers/exporters of how a PCS will benefit them and the country's foreign trade.	Number of stakeholders that understand the benefits of a PCS out of all the stakeholders involved in the advocacy plan.	80%
Long term	Get all professional associations that represent the different port community stakeholders to take an active part in implementing the PCS.	Number of associations actively participating in the advocacy plan out of the total associations involved.	80%
	The PCS becomes the unique single window for all port logistics activities.	Yes or no.	Yes

Source: IDOM.

^c These values are indicative and may be adapted to each case.

Resource Evaluation

Depending on the characteristics and objectives of the PCS advocacy plan, the list of available and necessary resources and assets includes three main resource categories: financial, human, and infrastructure.

- **Financial resources.** The following aspects should be considered:
 - What funds are available to carry out the advocacy campaign? Options could be funding from a public authority that promotes the PCS implementation initiative, private funding from a sponsor, commercial loans, or similar. In-kind contributions should also be considered as some activities might be implemented by stakeholders who might not request funding. Financial planning should cover the human capital and infrastructure expenses required to develop the communication plan.
- **Human resources.** The following professionals might be needed to form part of the advocacy plan team:
 - A **graphic designer** who will design the messages to be conveyed.
 - A **communications or public relations expert** who will liaise with the stakeholders and distribute the messages defined in the communication plan through the local press, newsletters, meetings, and social media platforms (Twitter, LinkedIn, YouTube, and similar).
 - A **change management expert** who can provide support to the communications expert to define the messages to be transmitted, thereby reducing or eliminating stakeholders' resistance to change. This expert will also monitor progress on the communications strategy and audience responses to analyze the level of buy-in to know if the change management strategy is effective.
- **Infrastructure.** The physical and software resources needed to execute the advocacy plan should include spaces for in-person and virtual presentations, as well as social media platforms to communicate project news.

Benchmarking

ePuertoBilbao

The Port Authority of Bilbao led the ePuertoBilbao project, which is an electronic trade platform that optimizes communications and facilitates the interaction between different companies within Bilbao's port community. It provides the following services:³²

- integrated calls procedure service;
- management of cargo manifests service;
- management of dangerous goods service;
- service for the coordination of container positioning at the border inspection post, integrated customs inspection center, and scanner;
- pre-entry notification management;
- export cargo list service; and
- delivery and acceptance service.

GapBilbao was created in 2000 as a representative and working group to define, establish, and continuously improve the procedures that regulate the port logistics activity chain to further implement these in the PCS platform (ePuertoBilbao) as value-added services. ePuertoBilbao is owned by the Port Authority of Bilbao, which also operates and maintains the PCS and develops new value-added services. Likewise, the Port Authority of Bilbao relies on two technological partners to develop software solutions and provide communication management and security

solutions, respectively. The infrastructure and development of ePuertoBilbao are fully financed by the Port Authority of Bilbao, so ePuertoBilbao does not charge stakeholders any fees for its services.

PORTIC

The PCS of Barcelona is a private company with four shareholders. These shareholders are public and private:

- Port Authority of Barcelona—public (40.7%);
- CaixaBank—private (25.8%);
- Sabadell Bank—private (25.8%); and
- Official Chamber of Commerce, Industry, and Navigation of Barcelona—public (7.7%).

PORTIC offers the port logistics industry the following solutions³³:

- Import services:
 - transport: release order, empty container acceptance order, arrival notice, and transport order;
 - customs: import cargo manifest, customs clearance, ENS ;

³² <https://www.epuertobilbao.com/en/what-does-e-puertobilbao/>.

³³ <http://www.portic.net/ENG/soluciones.shtml>.

- payment: electronic payment and electronic invoice; and
 - unloading ship: schedules, port call request, waste notification, shipment confirmation request, stevedores request, cargo manifests, dangerous goods declaration, shipment confirmation and pro-forma invoice.
- Export services
 - booking: schedules, dangerous goods declaration, booking, port call request, and shipping instructions;
 - transport: container acceptance order, transport order, empty container release order, container acceptance order;
 - customs: customs export declaration, export cargo manifest; and
 - loading ship: stevedores request.

PORTIC uses two fee types:

- **A flat fee** for a commercial pack: functionality and services packages are defined according to the profile of the company within the port community. A company might have one or several packs.
- **A specific fee** for a functionality or service: logistics operators that do not subscribe to a complete fee package pay for particular functionality or service, as do those who already have subscribed to a package but wish to add an extra functionality.

Most of these fees include a registration fee and a fixed annual fee. However, the mobile delivery orders communication service for drivers uses a monthly fee per truck that is charged to the road carrier. Some packages only include an annual fee but do not have a registration fee.

PORTBASE

PORTBASE is a nonprofit organization created in 2009 with public funding as a result of a merger between Infolink of the Port of Rotterdam and the PortNET system of the Port of Amsterdam. Its main function is to simplify and streamline the port logistics chains of Rotterdam and Amsterdam and make them as competitive as possible by creating a “single port window” for the exchange of information. It is currently a private company with 100% public capital divided between the Port of Rotterdam (75%) and the Port of Amsterdam (25%). PORTBASE provides 44 different services to facilitate easy, efficient exchanges of data in the logistics chain. These services are grouped into the following categories:

- **Vessel calls:** services for agents, shipping companies, and cargo handling agents. These include:³⁴
 - crew and passengers notifications;
 - dangerous goods notifications;
 - vessel notifications; and
 - single window notifications.
- **Import cargo:** services for agents, shipping companies, cargo handling agents, importers, and forwarders. These include:
 - cargo declaration import;
 - cargo tracker;
 - pre-arrival cargo declaration; and
 - discharge information.
- **Hinterland transport:** services for road, barge, and rail sectors. These include:

³⁴ <https://www.portbase.com/en/services/>.

- hinterland container notification;
- inland port dues; and
- wagonload information system.
- **Export cargo:** services for forwarders, exporters, agents, shipping companies, and cargo handling agents. These include:
 - export manifest;
 - loading list;
 - cargo declaration export bulk; and
 - cargo declaration export containers.

PORTBASE has two fee structures:

- **Basic:** a registration fee is charged to stakeholders. After that, transaction fees are charged depending on the number of transactions made by the user through the platform.
- **Basic plus:** users pay a fixed monthly fee plus transaction/unit fees, which are lower than the basic fees.

Users who subscribe to a service through integration between systems (user's own system interconnected with the PCS) will also receive a subscription to access the PCS through an internet browser at no additional charge. Once a user has registered with PORTBASE, a monthly fee and/or a transaction/unit fee will be charged based on each notification or transaction made through the PCS. The fees depend on the platform user and the type of subscription.

Dubai Trade

Dubai Trade integrates all stakeholders in Dubai's commercial and logistics operations, including:

- DP World, which has a portfolio of more than 65 maritime terminals on six continents;
- Dubai Customs, the main customs administration in the region and the first government department in Dubai to fully embrace ICT automation; and

The Dubai Trade Portal was launched in 2003, and in 2006, a series of institutional collaboration activities resulted in the creation of Dubai Trade as an independent private entity. This platform effectively links different stakeholders within the logistics value chain, including various government entities that regulate foreign trade. Dubai Trade users include both private and public players, such as Dubai Customs, DP World Trade, and terminals, shipping companies, shipping agents, customs brokers, road haulers, freight forwarders, and free zone operators. Although Dubai Trade was founded as a PPP in which Dubai Customs and Economic Zones World were involved, it is now a fully private entity owned exclusively by DP World. The main services provided are:³⁵

- cargo handling;
- customs clearance;
- online documentation;
- port gates access;
- letters and reports;
- payments;
- registration services;
- employment services;
- government services;
- visa and permits;
- leasing and licensing; and
- vessel operations.

³⁵ <http://www.dubaitrade.ae/en/>.

Dubai Trade's revenues are mainly based on weekly, monthly, or annual fees charged to users. However, the revenue model is more complex, and is a hybrid model in which income comes from a mix of:

- subscription fees;
- variable incomes per TEU or transaction;
- income per value-added services;
- one-off payments for the use of applications; and
- income from breach of service-level agreements (SLAs) by suppliers.

Core Process Mapping

The following processes should be mapped as part of the core process mapping exercise.

- **Macro processes (level 0):**
 - vessel management;
 - containerized cargo outbound (export);
 - containerized cargo inbound (import);
 - containerized cargo transshipment;
 - noncontainerized cargo outbound (export); and
 - noncontainerized cargo inbound (import).
- **Low-level processes (level 1):**
 - vessel management processes:
 - port call request (vessel arrival);
 - port services; and
 - vessel departure.
 - containerized cargo outbound processes:
 - booking and shipping instructions;
 - empty container pick-up;
 - road haulage management;
 - container transport by rail;
 - container entrance to port terminal;
 - inspections;
 - VGM, loading list, and loading report;
 - B/L and cargo manifest; and
 - consolidation.
 - containerized cargo inbound processes:
 - import manifest and arrival notice;
 - unloading list and report;
 - cargo release;
 - inspections;
 - road haulage management;
 - container exit from terminal;
 - deconsolidation;
 - empty container delivery; and
 - container transport by rail.
 - containerized cargo transshipment processes:
 - transshipment.
 - noncontainerized cargo outbound processes:
 - shipping instructions;
 - road haulage management;
 - cargo entrance to port terminal;
 - inspections;
 - loading list and reports; and
 - B/L and cargo manifest.
 - noncontainerized cargo inbound processes:
 - import manifest and arrival notice;
 - unloading list and unloading report;
 - cargo release;
 - inspections;
 - road haulage management; and
 - cargo exit from terminal.

Ideally, each level 1 process should have its own flow diagram in BPMN and an associated table providing the following information:

- process objective;
- scope of the process;
- process description;
- main potential PCS KPIs;
- clients and suppliers of the processes; and
- inputs and outputs of the processes.

Qualitative Benefit Analysis

Strategic-level benefits

Strategic benefits derive when implementing a PCS achieves the strategic objectives established in the strategic plan and strategic lines of port authorities, regions, the country, and so on. Table A14.1 provides examples of the strategic benefits associated

with PCS implementation based on Peru's National Plan for Port Development (2019)³⁶, which are then discussed in the following section.

³⁶ <https://www.iacs.org.uk/download/1984>.

Table A14.1 Strategic Lines and Objectives of the National Plan for the Port Development of Peru

Strategic Line/Strategic Objective

SL1	Promote the strengthening of the National Port System (SPN) legal framework
	<ul style="list-style-type: none"> • SO1 Strengthen the SPN legal framework
SL2	Promote the modernization of infrastructures and connectivity
	<ul style="list-style-type: none"> • SO2 Promote the sustainable development of port infrastructure • SO3 Increase maritime-river connections and port movement
SL3	Promote the competitiveness of port service activities with the integration of innovation and technological development in the SPN
	<ul style="list-style-type: none"> • SO4 Improve the competitiveness and the quality of port services and activities • SO5 Reduce environmental impacts in port activities for a sustainable environment • SO6 Reduce the insecurity of port activities and services and maintain the protection levels of the port terminals of the SPN
SL4	Promote the port logistics community as a source of added value to the intermodal logistics chain through the integration of innovation and technological development
	<ul style="list-style-type: none"> • SO7 Promote the development of new port logistics communities nationwide • SO8 Promote cost reduction in the logistics chain • SO9 Promote intermodal integration in the logistics chain, including cabotage • SO10 Promote the development of world-class ICT systems for the SPN
SL5	Integrate the port-city relationship into the territory sustainably
	<ul style="list-style-type: none"> • SO11 Promote port-city integration

Source: National Port Authority of Peru.

Although the two objectives of strategic line 2, infrastructure modernization (SO2) and connectivity (SO3) will not contribute directly to improving the port's physical infrastructure or increasing its number of vessel voyage lines, they will help increase the competitiveness of the port and its commitment to information transparency. In this way, in the medium and long term, these indirect improvements may strengthen the port, increase port traffic, and therefore make funds available for undertaking infrastructure improvements, while making the port more attractive to shipping companies.

By promoting the competitiveness of port services and activities in the National Port System (strategic line 3), the PCS will contribute to improving the competitiveness and quality of port services and activities (SO4). By standardizing many processes that are currently carried out in different ways depending on the stakeholder and by digitizing documents and forms that are currently processed manually, logistics chains become more efficient, reducing the time that stakeholders spend on this task. This enables terminal operating throughput to be increased while improving port user satisfaction in terms of the provision of services and activities at port terminals, as cargo flow is faster.

Boosting the port community through technological innovation and development integration as value-added for the intermodal logistics chain (strategic line 4) contributes to the following objectives:

- SO7, the development of new port communities at a national level. PCS implementation can encourage adoption in other national ports.

- SO8, through process re-engineering and document digitization applied in the PCS, container logistics chain will be more efficient, reducing processing times and therefore some port costs, bringing benefits for the entire logistics chain.

A PCS is an ICT platform that is widely used in the world's main ports, acting as a single window for port communities. The implementation of a PCS will contribute to increasing the number of ICT systems implemented throughout the National Port System (SO10).

Tactical-level benefits

The tactical-level benefits that a PCS brings port stakeholders include the direct advantages that are achieved through implementing a PCS:

- PCSs bring information transparency and advanced information on the goods that will arrive at the port. They also provide transparency on the cargo status (physical and document status) and connect with port clients' supply chains, which allows planned goods transportation activities to be improved. Finally, PCSs guarantee the traceability of goods along the entire port logistic chain, removing the "black-boxes" that currently function in ports.
- PCSs act as an integrator for processes that are currently unrelated and lead the port community's business processes. During the design stage for value-added PCS services, port logistics processes are treated in a cross-cutting fashion, such that logistics flows are analyzed by goods and/or transport mode (vessel, truck, train,

etc.). This prevents the creation of isolated systems or services that only serve the processes of a specific port community stakeholder. Vessel management services are a good example of this, as they are usually integrated through port call management. Such services usually provide one-stop access to all vessel-related requirements and documentation.

- PCSs provide a knowledge input that is essential for future improvements and to increase competitiveness. Beyond the major benefits of a system (standardization, cost savings, etc.), the PCS brings visibility and improves processes within the port community through collaboration and user feedback, thus providing a self-learning tool. This facilitates the process of identifying gaps in different stakeholder processes, which can be discussed and assessed at port community meetings. Incorporating future improvements will improve the competitiveness of the port community and the port itself.
 - PCSs guarantee the quality of data and ensure it is delivered in real time to the main stakeholders. This is one of the major benefits of a PCS.
 - PCSs provide up-to-date EDI/XML messages without the need for stakeholders to develop their own formats or convert formats. For example, a shipping agent using different message formats for communication with terminals represents a waste of time and money because terminals must convert these messages to make them compatible with their systems.
 - PCSs encourage the standardization of messages and the optimization of port logistic processes. Stakeholders can thus receive information in a unique format,
- while the homogenization of processes reduces and simplifies formalities.
- PCSs reduce the cost of stakeholder B2B integration with their commercial partners. PCSs oversee the integration of some applications that would otherwise be stakeholders' responsibility. For instance, the vehicle booking system is a PCS functionality that integrates terminals, external bonded warehouses, empty container depots, and inland ports with customs brokers or other road haulage coordinators and the road haulage providers themselves, including the drivers. All stakeholders only have to integrate with the PCS, rather than each having to integrate individually with different existing booking systems. It is important to help port community members understand that connecting to the PCS is a one-off investment.
 - PCSs allow KPIs to be established using the available information and data gathering, with the aim of defining and measuring the current situation and observing how these indicators evolve through certain data sets. At this point, a quality certification³⁷ process can be planned for the medium term to improve efficiency and quality. Under this umbrella, commitments between all port community members can be defined to make the port more competitive.
 - PCSs also help to increase port resilience. Resilience can be defined as "the ability of a system, community or society exposed to risks to resist, absorb, adapt and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its structures and essential basic

³⁷ <https://www.mlit.go.jp/common/001249851.pdf>.

functions.”³⁸ A PCS provides a database that can be used to make better decisions when defining contingency plans, establishing potential risks, estimating impacts on the port and its community, and other activities required to make the port and its logistics chains more resilient.

Operational-level benefits

Implementing a PCS brings the following operational benefits:

- PCSs reduce office work and administrative tasks, both back-office and front-office work. Processes will be automatized when a PCS is implemented, which allows employees to focus on providing more value-added and increasing the economic impact of their core activities.
- PCSs provide round-the-clock user support. The platform allows the main stakeholders to delegate and simplify client support functions.
- PCSs reduce the use of paper in document exchange processes.
- PCSs increase the availability of information and access to it. As all stakeholders send information through the PCS, all data is stored in the system. This makes large amounts of both historical and current information available to the port community and renders paper archives obsolete.
- PCSs enable the provision of just-in-time data. This information can thus be obtained immediately, including in massive quantities, using filtering and categorization options, without the need for paper documents to be individually reviewed and inputted.
- PCSs increase information security. Transactions are audited and monitored, which provides an advantage over paper documentation and public authority stamps as it is possible to tell which stakeholder provided information at each stage.
- PCSs reduce the risk of cyberattacks on stakeholders’ systems. The PCS will act as a single window for port community agents, as it is the only system that will connect with stakeholder systems. For example, terminals will not have to provide other users with access to their operating systems.
- PCSs combine data that is available in unconnected systems to create value for some processes and services. For example, customs data can be combined with vessel loading lists to make customs clearance processes easier, faster, and more agile.
- PCSs bring massive error reductions and enable the reuse of information, which helps increase the efficiency of port processes. Even if the data is in an electronic format, manual inputting may lead to errors, and data sets themselves might not be error-free. Likewise, systems that are intended to communicate with each other may be incompatible.
- PCSs are a repository for standard and ad-hoc reporting. Different types of reports can be generated using statistical data without human intervention.
- PCSs allow more accurate risk analysis to be conducted and help risk management systems contain more reliable, real-time information. This enables customs to

³⁸ These values are illustrative and can be adapted to each case.



select cargo that might be inspected and can be used by insurance companies and banks, who define their criteria for approving or turning down a loan application based on risk analysis. These analyses are more precise the more variables and information are available to make decisions.

- PCSs impact employment in the port community by significantly reducing administrative tasks, allowing employees to spend more time on value-added tasks. This means that productivity levels should increase without companies having to hire more employees.

